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(54) **A PLUG**

(57) A plug, comprises a body (1) having a first lateral surface (15) and a second lateral surface (11) which are opposite to each other; a plurality of pins (3) arranged on the first lateral surface (15); wherein a pull portion (2) is arranged on the second lateral surface (11) of the body (1); the pull portion (2) is unitarily connected to the body (1), and the pull portion (2) can be turned over in the

direction away from the first and second lateral surfaces (15,11) under the action of an external force. Compared with the prior art, the connecting portion and the body are formed integrally, so that later assembly procedure is saved, the manpower cost is reduced, and the production efficiency is high.

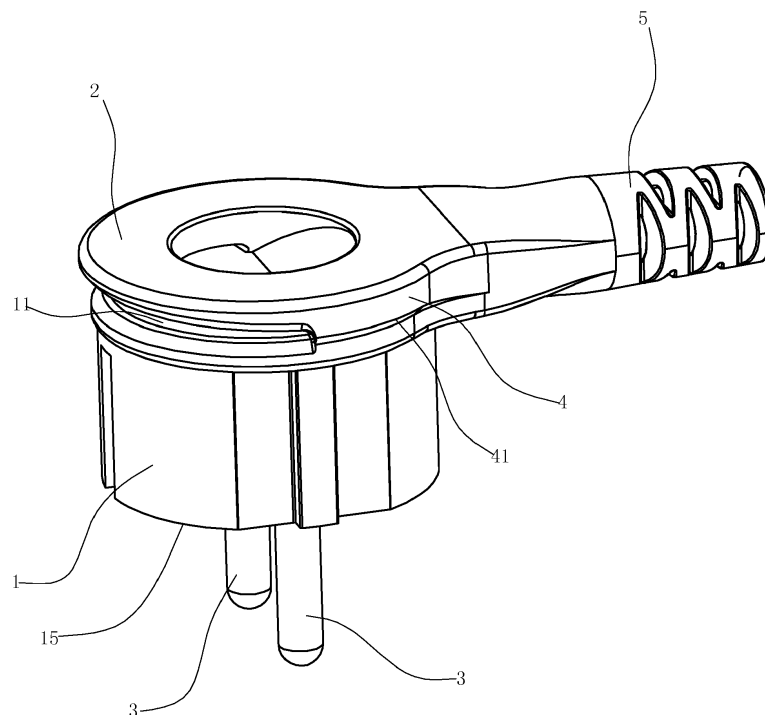


FIG. 1

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Description

Field of the Invention

[0001] The present invention relates to the field of electrical connection, and specifically, to a structure of a plug.

Description of the Prior Art

[0002] More and more electrical appliances enter people's lives with the development of society, and various plugs are put in sockets on walls. Most of the sockets protrude from the walls, some furniture thus cannot be placed against the walls, and certain gaps have to be reserved, leading to waste of indoor space; meanwhile, the protruding plugs have large grasping space, so that children easily pull out the plugs to get into danger. In order to solve the above problems, the European plug and socket is designed in a manner that the socket has a sunken hole, the plug can be nearly completely embedded into the hole, and only a small part of the plug protrudes from the surface of the socket, so that the spatial waste and the safety problem can be well solved. However, a new problem is aroused, that is, only a small part of the plug protrudes from the surface of the socket, so that the grasping space is greatly reduced and the plug is difficult to pull out of the socket.

[0003] A Chinese patent CN205264988U (Patent No.: ZL 201520827514.4) discloses a power plug, which is provided with a pull ring at one side of a plug shell opposite to a connection terminal, so that when a user pulls away the plug from a socket, a force application point is provided for the user and the user can conveniently pull the plug out. In this case, the user can conveniently pull the plug out indeed, but the pull ring protrudes from the surface of the shell, thus causing the problem of large space occupation.

[0004] A Chinese patent CN202352917U (Patent No.: ZL 201120450026.8) discloses an easily-pulled plug, wherein a plug body is provided with a groove and a column hole, a pull ring is fixed in the column hole and can rotate around the column hole, the pull ring is usually collected in the groove, and when the plug needs to be pulled out, the pull ring is rotated and turned up to provide a force application point for a user, so that the user can conveniently pull the plug out. Another Chinese patent CN201699243U (Patent No.: 201020232733.5) discloses a power plug convenient to take out, wherein a plug body is provided with a pull ring, two sides of one end of the plug body are sunken to form two corresponding vacant structures, and the two lateral sides of the pull ring are matched with the vacant structures, located in the vacant structures and movably connected to the plug body via a positioning pin. The pull ring usually covers the plug body, the pull ring and the plug body form a plane, and when the plug needs to be pulled out, the pull ring is rotated around the positioning pin and turned up as a force application point to pull the plug out.

[0005] The solutions in the above two patents exactly can fulfill the purposes of saving space and conveniently pulling the plug out. However, the pull ring and the plug body therein need to be additionally assembled as two separate components, which brings relatively high cost pressure to enterprises under the condition that the domestic human cost is increasingly high nowadays; besides, because the space of the plug is limited, the rotating shaft of the pull ring or the supporting portion of the rotating shaft may not be too large, and the pull ring is easily broken in the presence of a large pulling force when the plug is pulled. There is another plug on the market, the plug body is provided with a lever, and the plug can be easily pulled out by pulling the lever. Such plug has the problems that firstly, the lever attached to the surface of a socket is inconvenient to pull, and secondly, the lever having relatively large area easily obstructs other jacks in the socket.

Summary of the Invention

[0006] A technical problem to be solved by the present invention is to provide a plug having an integrated structure of a body and a pull portion based on the current situation of the prior art, thereby fulfilling the purposes of reducing the cost, improving the production efficiency and facilitating plugging and unplugging of the plug.

[0007] To solve the above technical problem, the plug comprises a body having a first lateral surface and a second lateral surface which are opposite to each other; a plurality of pins arranged on the first lateral surface; wherein a pull portion is arranged on the second lateral surface of the body; the pull portion is unitarily connected to the body, and the pull portion can be turned over in the direction away from the first and second lateral surfaces under the action of an external force.

[0008] The first lateral surface is the surface from which the pins of the plug extend. The second lateral surface is the surface facing the user when the plug is located in a socket, typically within a wall. The pull portion functions as an interface with which a user can engaged. It can be connected to the body of the plug at one or more points. The pull portion can connect via one region, wherein the pull portion connects to the second lateral surface on the body of the plug. The pull portion can connect via two regions, wherein the pull portion connects to the second lateral surface on the body of the plug at two points. The pull portion can be configured to rotate about the points at which it connects to the body.

[0009] Preferably, the pull portion can be turned over to be perpendicular to the second lateral surface. The pull portion can be turnable, and turning over the pull portion can function position the pull portion such that it extends substantially perpendicularly from the body.

[0010] The pull portion can be configured to move from a first position, in which it extends substantially parallel to the second lateral surface and a second position in which the pull portion such that it extends substantially

perpendicularly from the body.

[0011] Preferably, the pull portion has a first part which is unitarily connected to the body, and a second part which is not connected to the body, the area of the first part is not more than 1/2 of the total area of the pull portion. In this way, the pull portion is more convenient to turn over while the connecting strength is guaranteed. In other words, a gripable portion of the pull portion can be turned away from the second lateral surface enabling it to be pulled.

[0012] Preferably, a space is formed between the second part of the pull portion and the body. Thus, a hand can hold and turn over the pull portion more conveniently. In other words, the space, or recess, can be provided between the part of the pull portion that is turnable to facilitate the ingress of a user's fingertip to displace the pull portion.

[0013] Preferably, the second part of the pull portion is in circular arc transition with the body. Thus, stress concentration caused when the pull portion is turned over can be avoided, so that the service life of the pull portion is prolonged.

[0014] Preferably, the whole pull portion is ring-shaped. Thus, a better force application point can be formed when the plug is pulled. A ring-shaped pull portion can be provided for a balanced force to be applied to the second lateral surface. In other words the whole pull portion can be ring-shaped. And, part of the ring can be connected to the body and the remaining part of the ring detached from the body and movable to be pullable. This can function to evenly distributed force applied to the points at which the pull portion is connected to the body. Other non-ring-shaped pull portions can be provided. In any shaped pull portion the pull portion can be provided with a circular aperture or recess, said recess functioning to provide grip that enables even forces to be applied to the pull portion at the point that it connects to the body. The circular aperture or recess can be configured to receive a finger. The circular aperture or recess can have a region having a ramp, chamfered edge or other such surface providing a transition between the surface beneath the pull portion, adjacent the body, and the second lateral surface. Said ramp or edge can facilitate a user's finger operating the pull portion.

[0015] Preferably, the pull portion is made of a flexible material. Thus, the pull portion is turned over more easily, and is usually recovered to the original shape to save the space.

[0016] Preferably, the pull portion is connected to the body in a rubber coating manner. The pull portion can be connected to the body via a rubber coating. The production is more convenient and the efficiency is higher in such manner.

[0017] The pull portion can be formed from the same material as the body of the plug. Alternatively, the pull portion can be connected to the body via an interface comprising a resilient material.

[0018] Preferably, a space is formed between the pull

portion with no external force and the second lateral surface of the body, and the pull portion can be turned to tilt relative to the second lateral surface under the action of an external force.

5 **[0019]** Preferably, the pull portion with no external force is parallel to the second lateral surface of the body, or an acute angle is formed between the pull portion with no external force with the second lateral surface of the body.

10 **[0020]** Optionally, the pull portion has a first part which is unitarily connected to the body, and a second part which is not connected to the body, the area of the second part is not more than 1/2 of the total area of the pull portion.

15 **[0021]** Preferably, the pull portion is unitarily connected to the body through a connecting portion, so that the pull portion is connected to the body more reliably.

[0022] Preferably, in order to further pull the plug out of a socket, at least part of the side wall of the connecting portion protrudes outside the side wall of the body, forming at least one protruding step at the side wall of the connecting portion for a finger to hold the plug. The plug is pulled out more easily under the coordination of the pull portion and the protruding step.

25 **[0023]** Preferably, the protruding step is in chamfered or smooth transition connection with the side wall of the body, so that the structure is more convenient to hold and the connecting strength between the protruding step and the body is better.

30 **[0024]** Preferably, the plug further comprises a bushing, which is connected to the connecting portion; and the connecting portion has two protruding steps symmetrically arranged centering on the bushing.

35 **[0025]** Preferably, in order to increase the pulling force of the pull portion, the area of the connecting portion is not more than 1/2 of the area of the second lateral surface of the body.

[0026] Preferably, the pull portion is arc-shaped or ring-shaped.

40 **[0027]** Preferably, the side surface of the connecting portion is in chamfered or smooth transition connection with the upper surface of the body, which can effectively avoid stress concentration produced when the pull portion is stressed and prolong the service life of the pull portion.

45 **[0028]** Compared with the prior art, the plug provided by the present invention has the advantages that, the plug is convenient to pull out by designing the pull portion; the pull portion is correspondingly arranged on the second lateral surface of the body, so that the size of the plug is not additionally increased, the plug is attractive in appearance and material-saving, and the material cost is reduced; particularly, the plug is more convenient and easier to pull; meanwhile, the connecting portion and the body are formed integrally, so that later assembly procedure is saved, the manpower cost is reduced, and the production efficiency is high.

Brief Description of the Drawings

[0029]

Fig. 1 and Fig. 2 are respectively perspective views at different angles of a plug according to an embodiment of the present invention;

Fig. 3 and Fig. 4 are respectively vertical section views in different directions of the plug according to the embodiment of the present invention.

Detailed Description of the Preferred Embodiment

[0030] To enable a further understanding of the present invention content of the invention herein, refer to the detailed description of the invention and the accompanying drawings below:

[0031] As shown in Figs. 1-4, the plug comprises a body 1, a pull portion 2, a plurality of pins 3, a connecting portion 4 and a bushing 5.

[0032] The body 1 is made of an insulating rubber material, having a first lateral surface 15 and a second lateral surface 11 which are opposite to each other; a plurality of pins 3 arranged on the first lateral surface 15; the pull portion 2 is arranged on the second lateral surface 2 of the body 1; and the pull portion 2 is unitarily connected to the body 1 through the connecting portion 4.

[0033] The pull portion 2 is made of silica gel, is in an arc shape adapting to the body 1, and a space is formed between the pull portion 2 with no external force and the second lateral surface 11 of the body 1. In this embodiment, the pull portion 2 with no external force is parallel to the second lateral surface 11, and can be turned over in the direction away from the first and second lateral surfaces 15, 11 to tilt relative to or be perpendicular to the second lateral surface 2 under the action of an external force.

[0034] The pull portion 2 with no external force is parallel to the second lateral surface 11 of the body 1 according to needs, and an acute angle is formed between the pull portion 2 with no external force with the second lateral surface 11 of the body 1.

[0035] The connecting portion 4 is connected to the second lateral surface 11 of the body 1 and used for connecting the pull portion 2 and the body 1; and the area of the connecting portion 4 is not more than 1/2 of the area of the second lateral surface 11 of the body 1.

[0036] At least part of the side wall of the connecting portion 4 protrudes outside the side wall of the body 1, forming at least one protruding step 41 at the side wall of the connecting portion 4 for a finger to hold the plug. In this embodiment, the connecting portion 4 has two protruding steps 41 symmetrically arranged centering on the bushing 5 of the plug; in this embodiment, each protruding step 41 is in chamfered transition connection with the side wall of the body 1; and the side surface of the connecting portion 4 is in circular arc transition connection with the upper surface of the body 1.

[0037] The bushing 5 is connected to the side wall of the connecting portion 4.

[0038] When the plug needs to be pulled out, the pull portion 2 is turned out first to be perpendicular to or tilt relative to the second lateral surface 11, then the two protruding steps 41 are pinched, the pull portion 2 and the plug body 1 are pulled out together, and the plug can be easily pulled out.

[0039] After the plug is pulled out or when the plug is plugged into a socket, i.e., when the pull portion 2 is unstressed, the pull portion 2 is recovered to the state of being parallel to the second lateral surface 11 under the action of self elasticity.

[0040] The body 1, the pull portion 2, the connecting portion 4 and the bushing 5 of the plug in this embodiment are connected into a whole in a rubber coating manner.

Claims

1. A plug, comprising:

a body (1) having a first lateral surface (15) and a second lateral surface (11) which are opposite to each other; and
a plurality of pins (3) arranged on the first lateral surface (15),
wherein a pull portion (2) is arranged on the second lateral surface (2) of the body (1);
the pull portion (2) is unitarily connected to the body (1), and the pull portion (2) can be turned over in the direction away from the first and second lateral surfaces (15, 11) under the action of an external force.

2. The plug according to claim 1, wherein the pull portion (2) can be turned over to be perpendicular to the second lateral surface (2).

3. The plug according to claim 2, wherein the pull portion (2) has a first part which is unitarily connected to the body (1), and a second part which is not connected to the body (1), the area of the first part is not more than 1/2 of the total area of the pull portion (2).

4. The plug according to claim 3, wherein a space is formed between the second part of the pull portion (2) and the body (1).

5. The plug according to claim 4, wherein the second part of the pull portion (2) is in circular arc transition with the body (1).
wherein

6. The plug according to any one of claims 1-5, wherein the pull portion (2) is made of a flexible material.

7. The plug according to claim 1, wherein a space is

formed between the pull portion (2) with no external force and the second lateral surface (11) of the body (1), and the pull portion (2) can be turned to tilt relative to the second lateral surface (11) under the action of an external force.

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8. The plug according to claim 7, wherein the pull portion (2) with no external force is parallel to the second lateral surface (11) of the body (1), or an acute angle is formed between the pull portion (2) with no external force with the second lateral surface (11) of the body (1). 10
9. The plug according to claim 7 or claim 8, wherein the pull portion (2) has a first part which is unitarily connected to the body (1), and a second part which is not connected to the body (1), the area of the second part is not more than 1/2 of the total area of the pull portion (2). 15
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10. The plug according to claim 1, **characterized in that**, the pull portion (2) is unitarily connected to the body (1) through a connecting portion (4). 25
11. The plug according to claim 10, wherein at least part of the side wall of the connecting portion (4) protrudes outside the side wall of the body (1), forming at least one protruding step (41) at the side wall of the connecting portion (4) for a finger to hold the plug. 30
12. The plug according to anyone of claim 11, wherein the protruding step (41) is in chamfered or smooth transition connection with the side wall of the body (1). 35
13. The plug according to claim 12, wherein the plug further comprises a bushing (5), which is connected to the connecting portion (4); and the connecting portion (4) has two protruding steps (41) symmetrically arranged centering on the bushing (5). 40
14. The plug according to claim 13, wherein the area of the connecting portion (4) is not more than 1/2 of the area of the second lateral surface (11) of the body (1). 45
15. The plug according to claim 149, wherein the side surface of the connecting portion (4) is in chamfered or smooth transition connection with the upper surface of the body (1). 50

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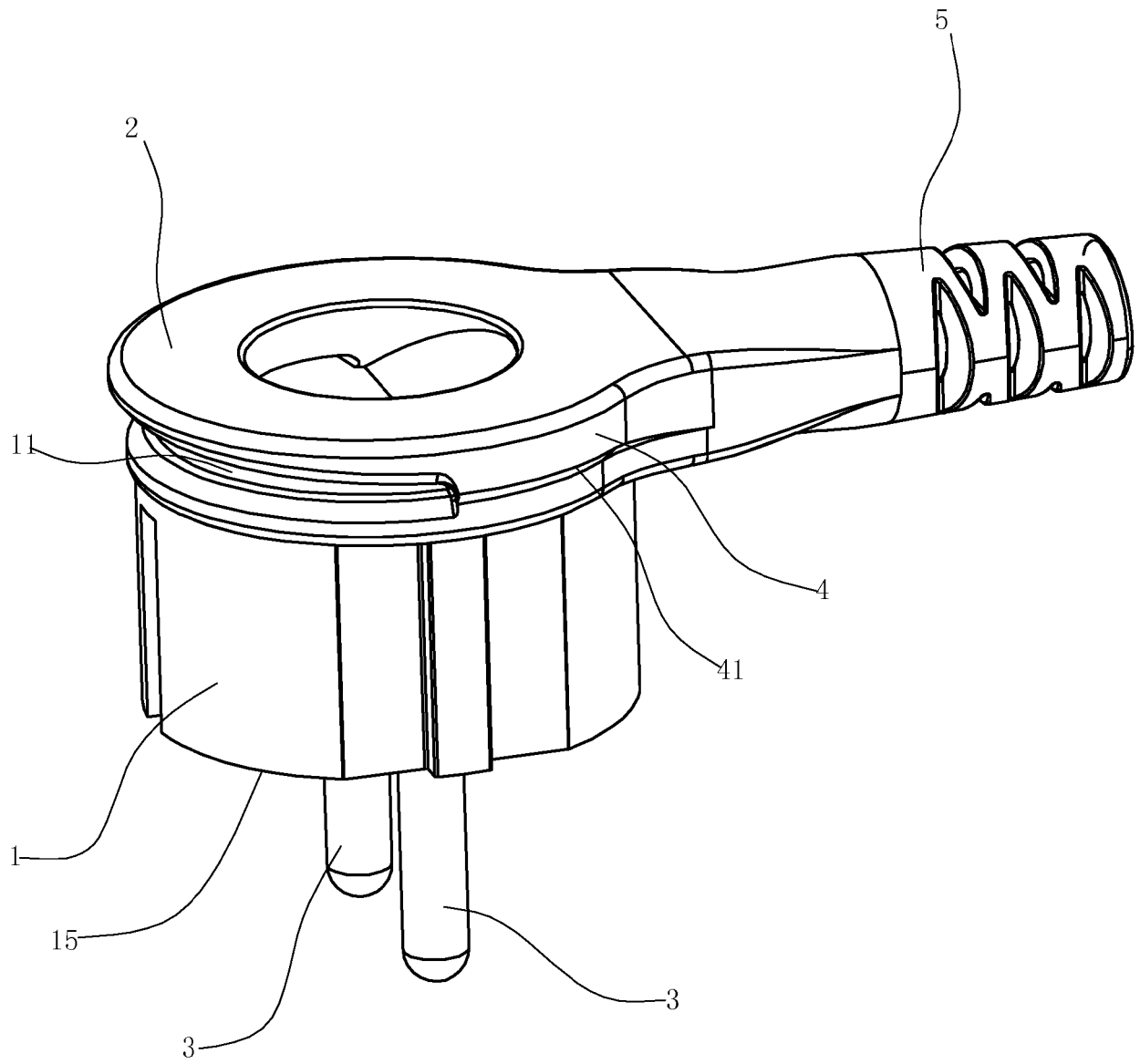


FIG. 1

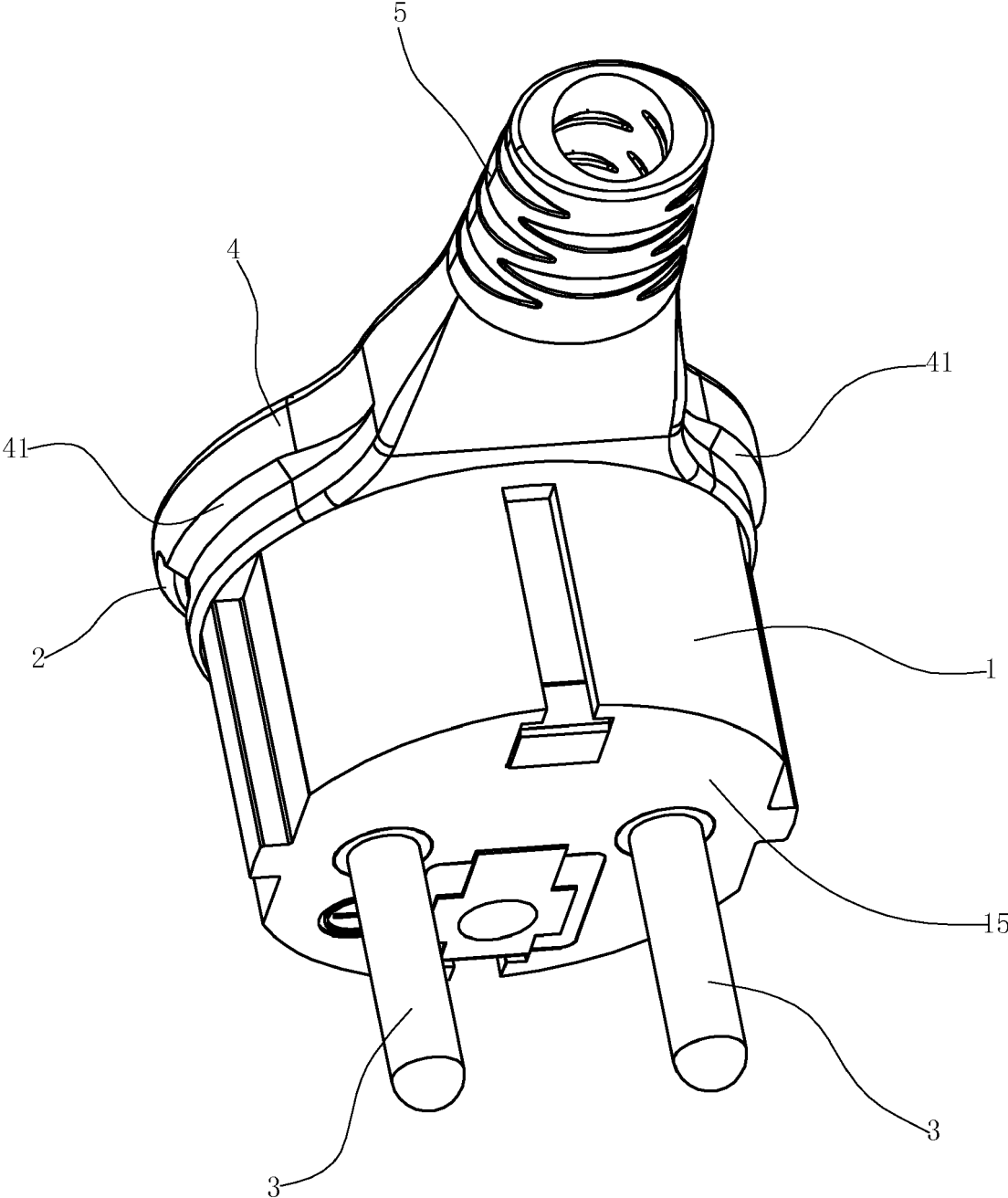


FIG. 2

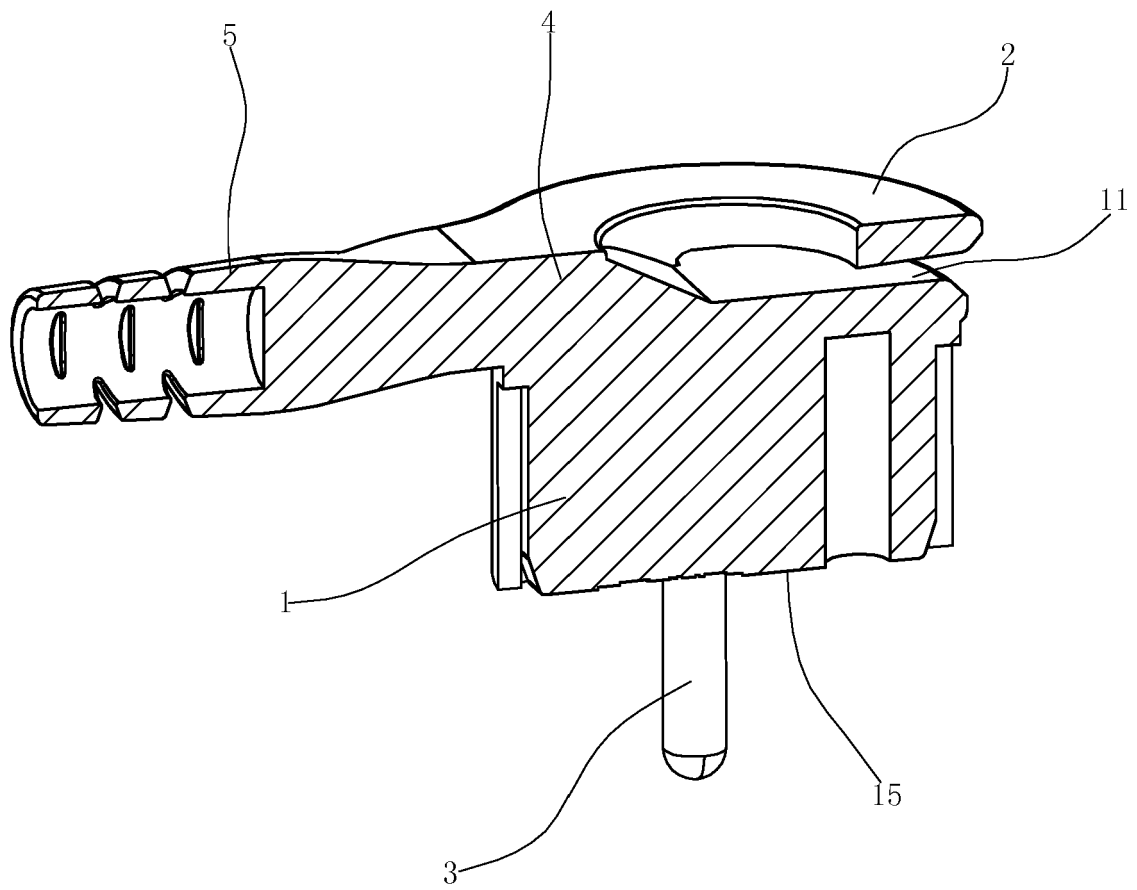


FIG. 3

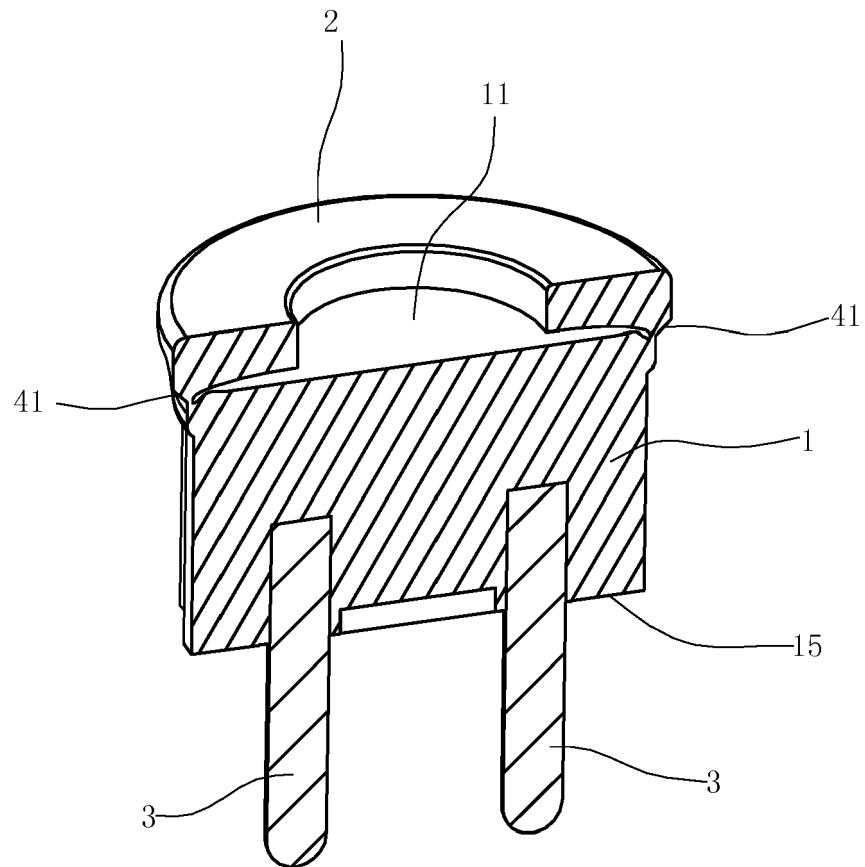


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 17 16 2394

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			TECHNICAL FIELDS SEARCHED (IPC)
			H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 July 2017	Examiner Pugliese, Sandro
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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26-07-2017

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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