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(54) **Industrial plug or socket with three or more poles with facilitated opening and safety eyelet**

(57) The invention is a new plug and socket, with facilitated use, provided with a support (S) and (O) of the contacts (Sc) and (Oc), with housings or grooves corresponding to the various possible positions of the contacts, with a closed eyelet (Co) arranged in a position

opposite the tooth or lug (Cr), designed to permit improved grip for the extraction of the plug-socket and with a device for releasing the shell (G) from the body (C) with an elastic tooth (Gx) present on the outer surface of the edge joining the shell (G) to the body (C).

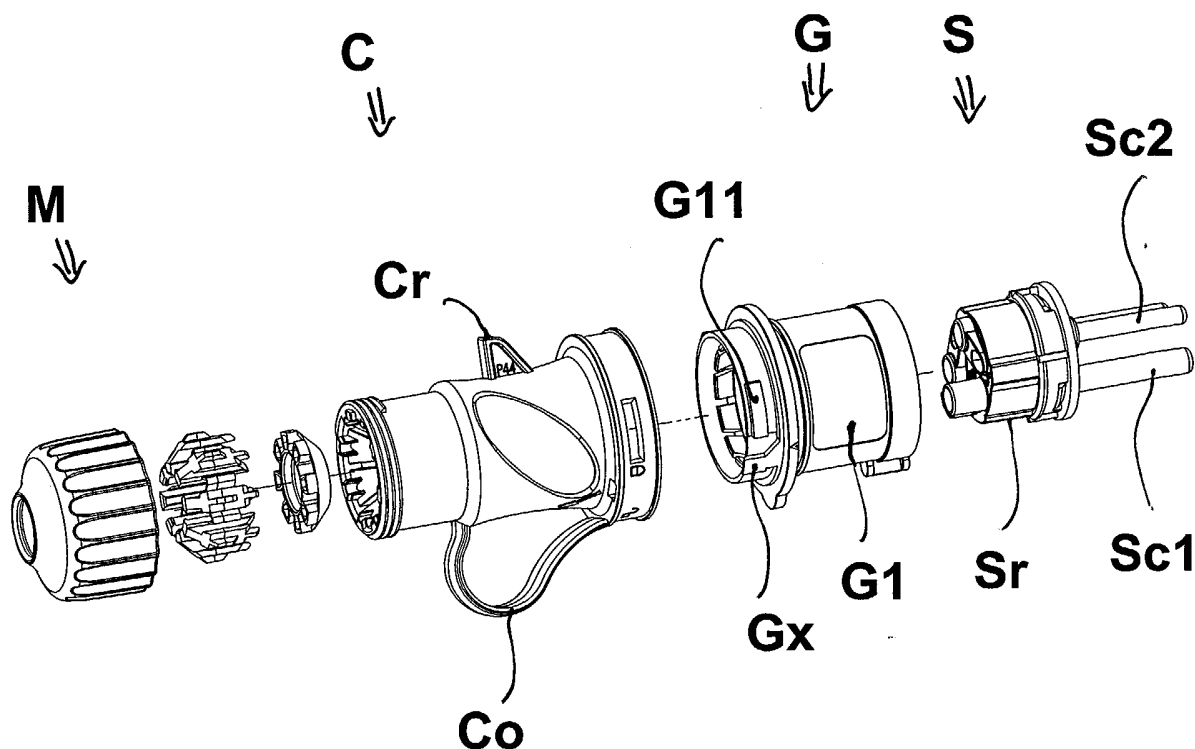


Fig. 1

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Description

[0001] This patent concerns trailing plugs and sockets and in particular the so-called industrial trailing plugs and sockets.

[0002] So-called industrial plugs and sockets are known, i.e. with cylindrical body with three or more contacts, female holes or male cylindrical terminals, arranged in a generally polygonal configuration and in different positions according to the sector of use.

[0003] Said plugs and sockets are provided with safety devices, covers to protect the female contacts, and groove or external longitudinal lug which acts as a key for correct coupling between the male and female elements.

[0004] The electrical contacts of said plugs and sockets have a different diameter, i.e. the phase and neutral have the same diameter, but the earth has a larger diameter. The contacts are arranged in a polygon configuration, in which the earth constitutes the vertex.

[0005] Said plugs and sockets differ according to the sector of use - containers, refrigerators, commonly used trailing plugs-sockets, marine-naval installations - due to the position of the contacts with respect to the lug or groove which acts as a coupling key between plug and socket.

[0006] Currently, for each sector of use, plugs and sockets with the contacts permanently arranged in the appropriate angular position with respect to the coupling key have to be produced.

[0007] The drawback with this system is that different moulds have to be made to produce some parts of said plugs and sockets.

[0008] When separating the plug and socket with sweaty or slippery hands, it is easy to lose grip and the hand may slip; this results in failure to separate the plug from the socket and even injury.

[0009] To overcome all the above-mentioned drawbacks, a new so-called industrial plug and socket with three or more poles has been designed and produced, having facilitated opening, safety and support eyelet, and shaped so that it can be rotated to any angle during assembly.

[0010] The aim of the new plug and socket is to ensure the angular positioning of the contacts with respect to the coupling key according to the sector of use, i.e. according to the socket or plug to be coupled.

[0011] A further aim of the new plug and socket is to permit said positioning of the contacts subsequently to moulding of the plug and socket element and before it is placed on the market.

[0012] A further aim of the new plug and socket is to allow all the positionable parts to be produced with one single set of moulds for all the possible positions.

[0013] A further aim of the new plug and socket is to ensure high levels of safety against short circuits, accidental contacts and similar.

[0014] These and further aims, direct and comple-

mentary, are achieved by the new plug and socket having the contact support positionable in one of the pre-set positions specific for the sector of use, opening by elastic release with simultaneous sliding out, and safety and support eyelet.

[0015] The support of the contacts is provided on the perimeter with some radial lugs. The shell that retains the support of the contacts on the body of the unit is provided internally with housings or recesses, preferably indicated by 12, corresponding to the various possible positions of the contacts and the support. A closed eyelet, preferably positioned opposite the tooth or lug, guarantees a safe grip. The release device comprises an elastic part which is released by means of a screw-driver or similar tool passing through a hole on the edge of the unit.

[0016] The characteristics of the new so-called industrial plug and socket will be better illustrated by the following description with reference to the drawing attached as a non-restrictive example.

[0017] Figure 1 shows the separate parts of the new plug comprising a body (C) provided with safety clamp (M) to prevent the wires from sliding out, a support (S) of the contacts (Sc) and a fixing shell (G).

[0018] The example described in figure 1 corresponds to a plug but the following considerations apply equally to the corresponding socket, shown in figure 2.

[0019] The body (C) of the plug has a generically cylindrical shape with a tooth or lug (Cr) on one side, comprises at one end a safety ring nut (M) to prevent the wires from sliding out and at the other end a housing for the fixing ring nut (G) and in turn for the support (S) of the contacts (Sc1) (Sc2).

[0020] On the front inner edge of the body (C), the seat of said shell (G) of the support (S), arched housings are provided (Cs) for the connection and fixing of the shell (G).

[0021] Inside said front edge of the body (C) of the plug there is also a radial housing or recess (Cx) for a locking and release device (Gx) of the shell (G), as can be seen in figure 3a.

[0022] On the rear part of said front edge of the body (C) of the plug there is a window or aperture (Ca) communicating with said radial housing or recess (Cx) for said locking device (Gx), as can be seen in figure 3.

[0023] The support (S) of the contacts (Sc) consists of a generically cylindrical element, designed to be housed in the body (C) of the plug, on which parallel metal pins are fixed and/or applied which constitute the contacts (Sc) of the plug.

[0024] Said contact pins (Sc) are arranged on a the support according to a polygonal configuration, which is the typical arrangement of the contacts of industrial plugs and sockets, and are provided with appropriate clamps for fixing the electric wires. In particular, one of said metal pins (Sc1) has a larger diameter and constitutes the earth contact.

[0025] The support (S) of the contacts (Sc) is provid-

ed, on its cylindrical lateral surface, with one or more longitudinal lugs (Sr), parallel to the axis of the support (S).

[0026] In the case of a socket, the support (S) consists of a cylindrical element (O) having three cylindrical cavities (Oc), as shown in figure 2, corresponding to the contacts (Sc) of the plug.

[0027] The shell (G) consists of a cylindrical element (G1) having at one end a housing for the support (S) provided with the related contacts (Sc). In particular, said housing of the shell (G) is provided, along its circumference, with a series of recesses or grooves designed to receive the longitudinal lugs (Sr) of the support (S). The number, preferably 12, and positions of said recesses are such as to permit application of the support (S) in the different positions depending on the various sectors of use of the plug.

[0028] The shell (G) is also provided, on the outer surface of the same end of the housing for the support (S), with arched lugs (G11) with circular sector, designed to permit coupling and fixing with corresponding housings (Cs) on the body (C) of the socket.

[0029] On the same outer surface, said shell (G) is provided with a flexible tooth (Gx), or equivalent flexible mechanical element, which can be bent on a plane parallel to the axis of the shell (G), designed to permit locking and release of the shell (G) on/from the body (C), as can be seen in figure 3c.

[0030] In particular, said flexible tooth (Gx) is arranged on the surface of the shell (G) so that, when the shell (G) is closed on the body (C) of the socket, said flexible tooth (Gx) fits into the housing (Cx) of the body (C) of the socket and is visible and accessible through the window or aperture (Ca) on the body (C) of the socket.

[0031] When the shell (G) is applied and fixed on the body (C) said tooth (Gx) prevents the rotation of said shell (G) with respect to the body (C). The insertion of a screwdriver or other similar tool through the window (Ca) on the body (C) makes it possible to bend said tooth (Gx) radially towards the centre of the body (C) and of the shell (G), so that said tooth comes out of its housing (Cx) and permits the rotation of said shell (G) with respect to said body (C).

[0032] On the body (C) of the socket, in a position diametrically opposite the tooth or lug (Cr), an eyelet or ring-shaped grip (Co) is provided to make it easier to hold the socket when joining it to or, more advantageously, separating it from the plug, or when hooking or hanging the plug-socket.

[0033] To slide out the coupling between the body (C) and the shell (G) it is sufficient to insert a screwdriver or other similar tool into the window (Ca) of the body (C) of the socket, in order to bend the flexible tooth (Gx) and permit the rotation and travel of the shell (G) with respect to the body (C) of the socket.

[0034] To fix the electric wires to the socket, it is sufficient to release the shell (G) from the body (C) of the

socket by means of a screwdriver or other tool and turn the screwdriver.

[0035] Therefore, with reference to the preceding description and the attached drawing, the following claims are expressed.

Claims

1. Socket and plug element, with facilitated use, **characterised in that** it comprises:

- a support (S) or (O) for the contacts (Sc) or (Oc), provided on its perimeter with one or more radial lugs (Sr) designed to be inserted in one or more corresponding housings or grooves on a shell (G), and wherein the position of said housings or grooves corresponds to the various possible positions of the contacts;
- a closed eyelet (Co) arranged in a position opposite the tooth or lug (Cr), designed to permit improved grip for the extraction of the plug-socket from a corresponding socket-plug, and designed to permit the hooking or hanging of the plug-socket;
- a device for releasing the shell (G) from the body (C) of the plug-socket, comprising an elastic tooth (Gx) present on the outer surface of the edge joining the shell (G) to the body (C), comprising a housing (Cx) present on the inside of the edge of the body (C) joining with the shell (G) and a window or aperture (Ca) present on the rear part of the front edge of the body (C), and wherein said elastic tooth (Gx) of the shell (G) is flexible in a radial direction with respect to the shell (G), and wherein said housing (Cx) of the body (C) is radial and is designed in such a way as to receive and house said tooth (Gx) of the shell (G), thus preventing rotation between the shell (G) and the body (C), and wherein said window or aperture (Ca) communicates with said housing (Cx) of the body (C) and is designed to permit the introduction of a screwdriver, or similar tool, in order to make it possible to bend said tooth (Gx) of the shell (G), disengaging it from the housing (Cx) of the body (C) and permitting rotation between the shell (G) and the body (C).

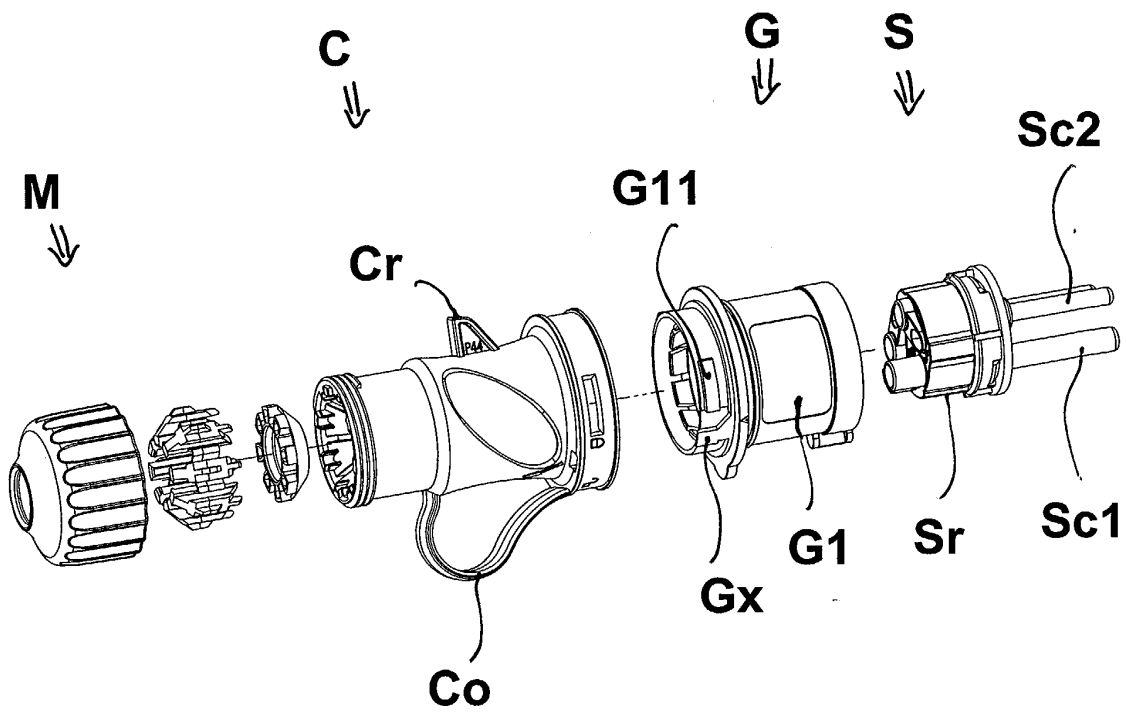


Fig. 1

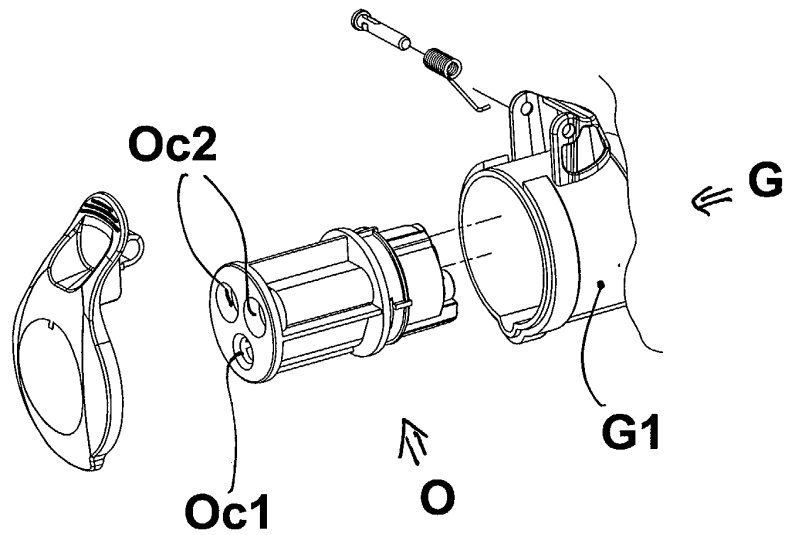


Fig. 2

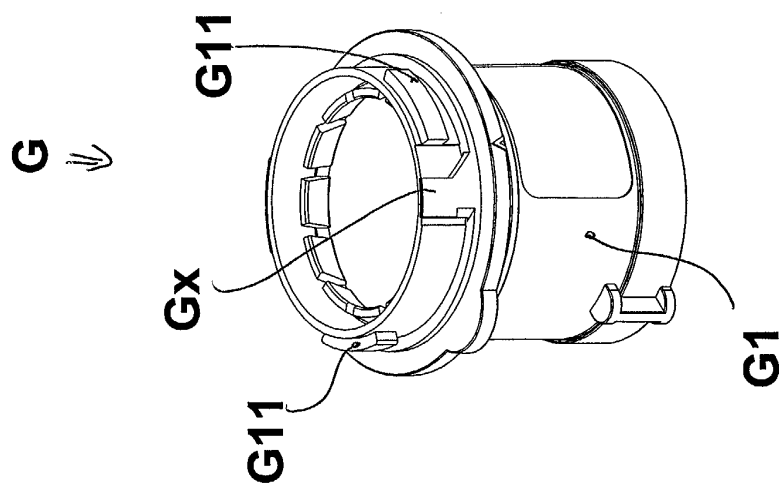


Fig. 3c

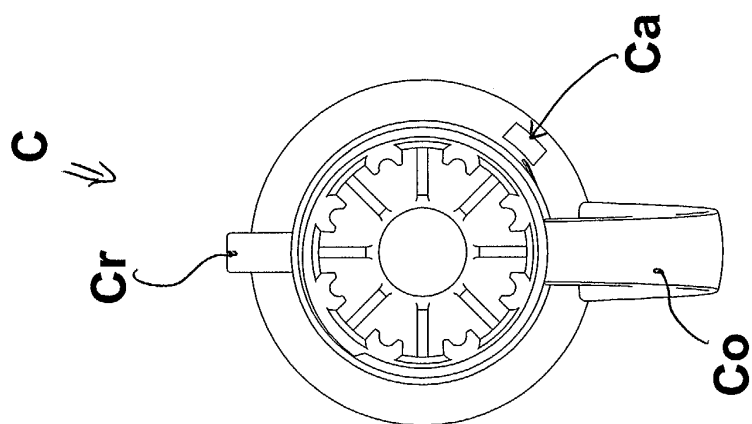


Fig. 3b

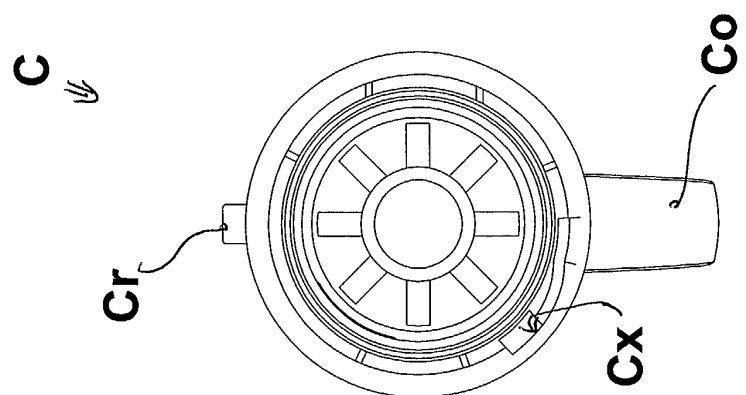


Fig. 3a