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(54) Electrical connection box for photovoltaic or solar plates

(57) Electrical connection box for photovoltaic or solar panels, whose function is to serve as a connection between the panels of a plant and between the latter and the external receivers. The box is designed to lodge within it a printed circuit, with the copper microns necessary in each case and with the following configurations: tinned zones for receiving soldering with panel output billets, these billets pass through a slot located on the bottom of the basis of the box. Lodgings for soldering the panel protection diodes, these diodes will depend on the type of panel, potency, tension, etc.

Terminals for screwing the output conductors. Leak proofing presses for the output of the electrical conductors with the basis of the box. The serigraphy of the positive and negative signs of each terminal will be carried out in order to avoid error when the components are installed in the box.

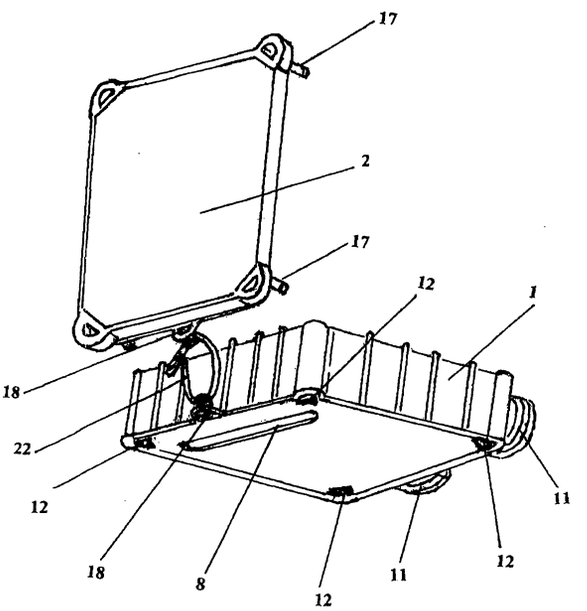

FIG.9

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Description

Object of the invention

[0001] The object of the present invention patent, as expressed in the title of this disclosure, is related to an electrical connection box for photovotaic or solar plates, the function of which is to join photovoltaic or solar panels and external plants. The box is designed to contain the printed circuit plate, with the turret terminal, in its configuration the box has holes bored laterally on one of its sides, through which pass the wiring soldered to the printed circuit plate, the turret terminals functioning as outputs for the conductors for other panels or to the receiving plant.

Background of the invention

[0002] In the market there are different electrical boxes designed to hold terminal strips and circuits for carrying out the connection of the input and output wires. These boxes are made of different materials according to their functions, as well as corresponding lids that are screwed onto to the basis of the box.
In order to eliminate all of these problems that exist in currently available boxes, an innovative new electrical connection box for photovoltaic or solar panels has been designed, to hold the printed circuit, the interface unit, the lengthwise slot on the surface of the basis side for wire output, the limiting walls of the printed circuit, the dice or support bases for the turret terminals, the housing for the input of the bolts or braces for the lid, which facilitates avoiding the use of screws, a flange, the function of which is to prevent the lid from falling when taken of the base box and near the base box, for later use, and closure of the lid on the base box.

Description of the invention

[0003] The electrical connection box for photovoltaic or solar panels is designed to join photovoltaic or solar panels and external plants, being situated within the basis box of a printed circuit, with the terminals (turret terminals) soldered to the printed circuit of the photovoltaic or solar panel, as well as the output turret terminals for other panels or receiver plant.
[0004] The location of the printed circuit and its positioning allows jumping cables of rectifier diodes to be soldered, in order to protect the photovoltaic or solar panel. Due to the design of the printed circuit, the jumping cables that are soldered vary depending on the type of plant and the power generated, as well as the output voltage of the panels.
[0005] The printed circuit if attached to the base box by a screw positioned between the two output terminals. The printed circuit remains flat and parallel to the surface of the basis of the box due to the stoppers positioned on the bottom of the base box.
The base box allows the output electrical conducts to be made through the presses built into the base box, these being made up of the adjusting nuts and the rubber BICONOS, as well as the stopper between nut and cone these elements (electrical wire, rubber BICONO, nut and stopper between nut and cone) facilitate the leaktightness of the electrical connection box.
[0006] The basis box for electrical connections is closed with the lid that has four bolts, braces or gaffs, in order to lodge it in the entry nooks provided on the base box, eliminating closure screws and allowing rapid opening and closing maneuvers. The lid has a rubber joint located along the perimeter of the box, facilitating sealing the box upon closing it. The position that the box has once installed on the panel facilitates the output of water through the existing draining channels, thus avoiding water collecting on the lid.

Detailed description of the drawings

[0007] In order to provide an improved understanding of the object of the present invention, a preferred practical embodiment of the electrical connection box for photovoltaic or solar panels based on the attached figures.

Figure 1 shows a raised plan view of the electrical connection base box, where the positioning of all of the elements that it is composed of are shown.

Figure 2 shows a view of the closure lid of the electrical connection box, a plan and raised front view of said closure lid, with the positioning of the bolts or braces, as well as the feeder ear where the flange that holds the lid of the base box.

Figure 3 shows a perspective view of the nut, as well as a raised and a section of the adjusting nut.

Figure 4 shows a plan and a raised view of the cone of the nut, as well as a lenghtways section where its configuration is shown.

Figure 5 shows a view of the joint of the lid, its configuration where the slot for attaching it to the perimetral profile of the connection box.

Figure 6 shows a plan and raised view of the terminal screw, as well as a section to show its configuration.

Figure 7 shows a view of the turret terminal, where its configuration is shown.

Figure 9 shows a perspective view of the box and of the lid with the joining flange, which facilitates keeping the lid and the box joined together once separated.

Preferred embodiment of the invention

[0008] The electrical connection box for photovoltaic or solar panels, whose function is to join the photovoltaic or solar panels and external plants. The base box, due to its design, allows housing within it the specific printed circuit plate. The configuration of the box includes output holes for the electrical connections, towards other panels or the receiving plant. In figure 1 the box (1), electrical connection basis, with the lengthways slot (8) for entrance to the panel connectors, the wire output holes (11), which are drawn out as cylinders or moths, these holes having at their outer area reinforcements (10) for wire output, being located inside the cylinders or mouths the nut cones (5), as shown in fig. 4. The threading that the cylinders or mouths have at their exterior areas, the nut is threaded (4), see fig. 3. Between the cone of the nut (5) and the nut (4) the stopper (23) is situated, as shown in fig. 8. Within the base box and inside it are located the walls (9), which support the printed circuit in order to isolate it from the surface of the basis of the box. On the surface of the base box are situated the terminal support dice (13) or blocks, located between them the base cylinder (14) with nerves, which holds the printed circuit fixing screw, on the side where the electrical wire output holes are situated, and within the inside of the base box the walls (15) are positioned, limiting the printed circuit, in order for it to be completely fixed and avoid its movement within the base box. The base box (1) has perforations (12) at each of the angular ends of the base box, in order to allow the entry of the bolts (18) or braces positioned on the lid (2), this lid has around its inner perimeter a joint (3), with the guide positioning (20) as shown in fig. 5, which once closed obtains a leak-proof seal.

[0009] The design of the box allows the printed circuit to be attached by a screw, located between the two output terminals, as well as the printed circuit remaining flat and parallel to the surface of the base box by way of the stoppers positioned on the bottom of the base box as shown in fig. 1.

[0010] In the base box, the electrical output conducts are made by the presses built into it, configured by the adjusting nuts (4), the rubber BICONOS (5) and the stopper (23). These elements (electrical wires, BICONOS, nuts and stoppers) together allow the sealing and isolation of the elements located within the base box.

[0011] The base box (1) of electrical connections in its entirety is closed by the lid (2). This lid (2) includes bolts (17), braces or gaffs, which are lodged in the gaps (12) that are positioned in the base box, this allows screws to be eliminated, as well as quick maneuvers of opening and closing the box. The lid (2), includes a rubber joint (3) along its entire perimeter, which, once positioned on the base box and closed obtains its leak proof sealing. Once installed on the panel there exist drainage channels in the box in order to conduce water and thus avoid water collecting on the lid.

[0012] The different elements that make up the box of electrical connections are made of the following materials. The basis, lid, nut and stopper of polycarbonate. The press BICONOS and the lid joint, of elastomer. The connection terminal and screw, of copper, the terminals being later tinned, and the screw, nickelled. The attaching screw of the printed circuit, of zinc steel. The flange that joins the lid and the base box is polyamide.

[0013] In fig. 9 are shown the box (1), the lid (2), joined by the flange (22) which is lodged in the support bases (18), positioned in the box and lid.

[0014] Having sufficiently described the nature of the present invention, as well as the way of putting it into practice, it is to be noted that the previous dispositions may be modified in their details, as long as their main principles are not altered, being the essence of the invention described, being reserved for the applicant the right to obtain the corresponding certificates of addition, for improvements and optimization which in future may be advised for practice, claiming exclusivity over the following particularities upon which the concession of the privilege of the invention patent applied for, according to the claims listed below.

Claims

1. Electrical connection box for photovoltaic or solar panels, whose function is to join photovoltaic or solar panels to external plants, allowing the specific positioning of the printed circuit and the components that compose the basic electrical assembly lodged within this type of box.

2. Electrical connection box for photovoltaic or solar panels according to claim 1, **characterized in that** the connection box is composed of the base box and the lid, with its specific functional positioning structures for coupling the specific printed circuit and its component located within the box.

3. Electrical connection box for photovoltaic or solar panels according to claims 1 and 2, **characterized in that** the base box, on the inner surface of the base side, has a lengthwise slot for the entrance of the wires to the connectors of the panes. On its base surface it is provided with support dice or blocks for the connection terminals, among the support dice is located a base cylinder for positioning the printed circuit fixing screw. On its interior base and on three of its sides the box includes vertical walls, serving as supports for the printed circuit, on the inner face of the box where the wire output holes are located the higher walls are positioned, limiting the printed circuit. At its perimetral angular ends the base box includes gaps for lodging the bolts or braces of the lid. The base box on its base surface and along its

outer perimeter edges includes an ear on the opposite face of the output holes for passing the flange through.

4. Electrical connection box for photovoltaic or solar panels according to claims 1 to 3, **characterized in that** the box is closed with the lid. The lid has four bolts or braces lodged in the appropriate gaps in the base box, this lid has a ridge with a reference point for locating the joint of the lid along its inner perimeter. On one of its sides and along its outer perimeter an ear is positioned for passing the flange through.

5. Electrical connection box for photovoltaic or solar panels according to claim 3, **characterized in that** holes are bored on one lateral side of the base box where cylinders or mouths are located on its exterior, threaded at their ends. Lodged within the inside of these cylinders or mouths are nut cones and, on them, the stoppers for leak-proofing the assembly at the wire output point.

6. Electrical connection box for photovoltaic or solar panels according to claims 3 and 4, **characterized in that** the base box and the lid that make up the connection box, through ears positioned on the box and lid facilitate the joining flange sliding and closing in order to keep the box and lid together once opened.

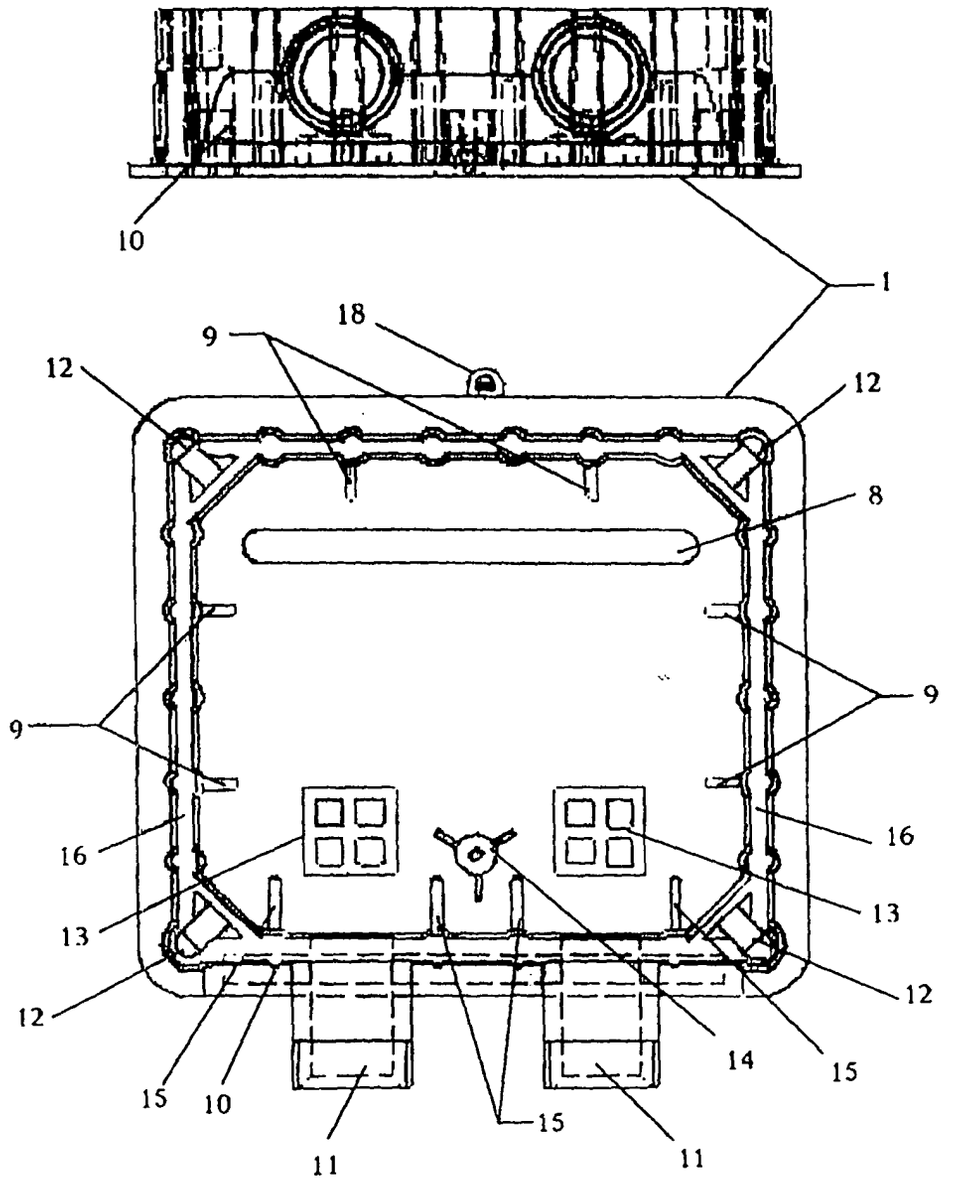

FIG.1

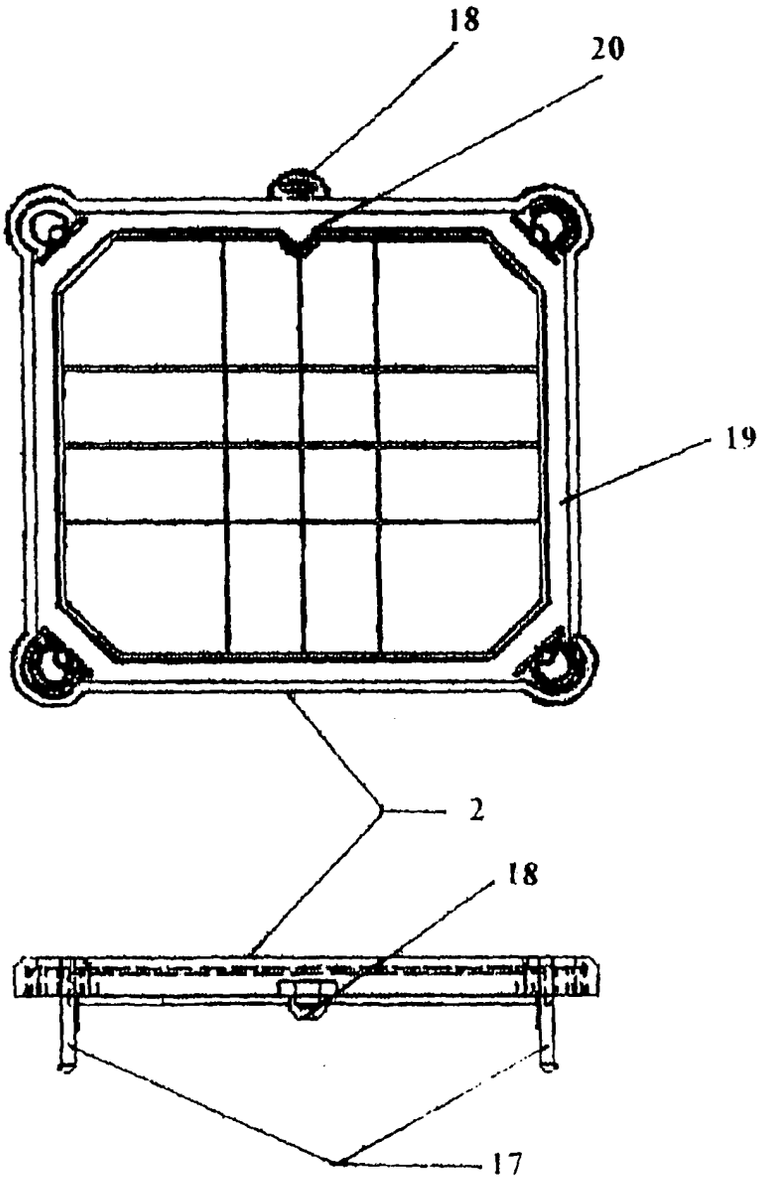

FIG.2

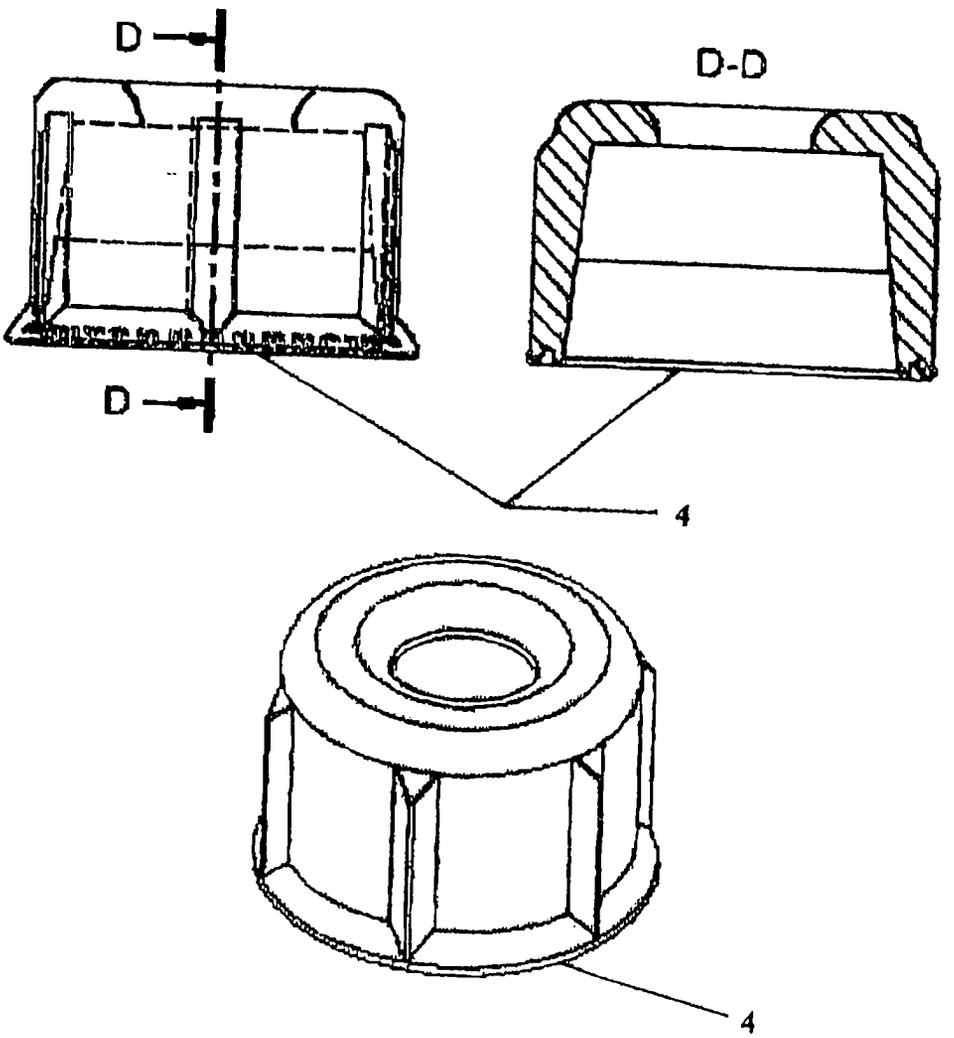

FIG.3

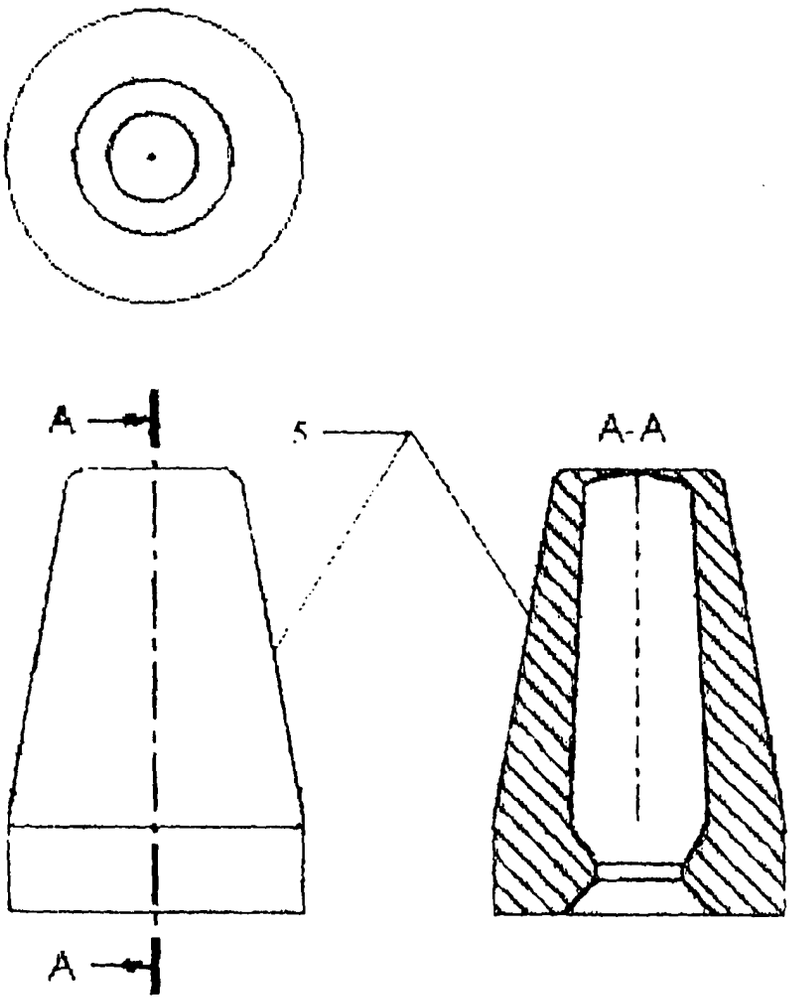

FIG.4

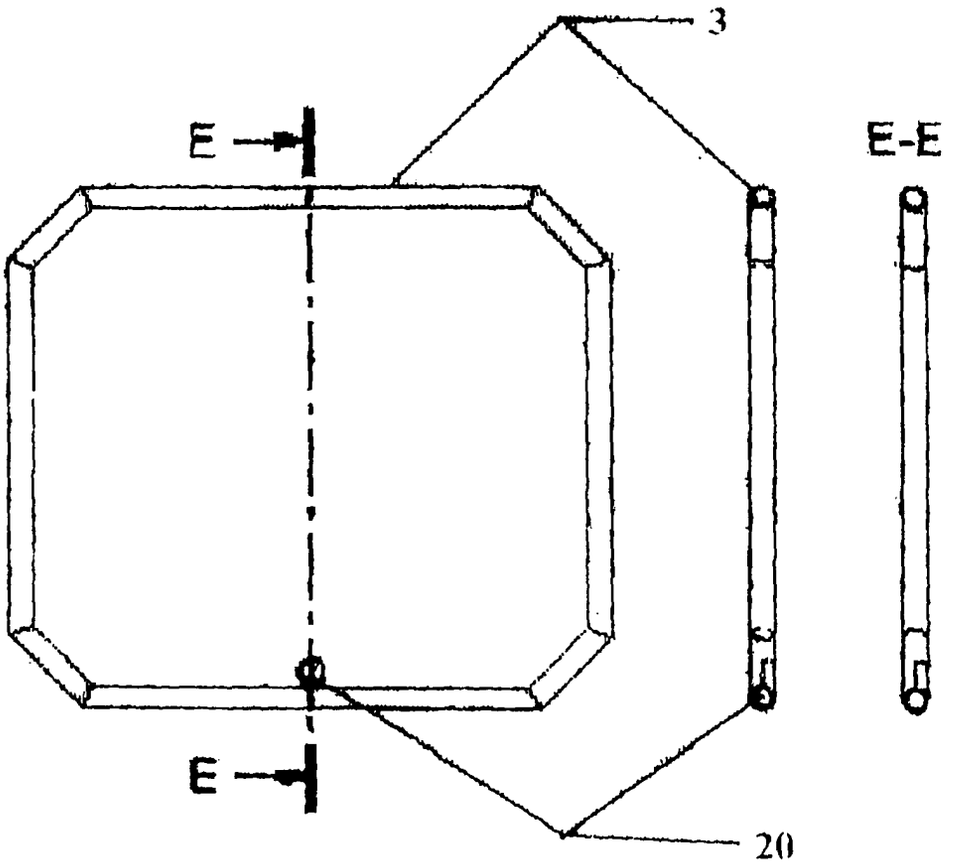

FIG.5

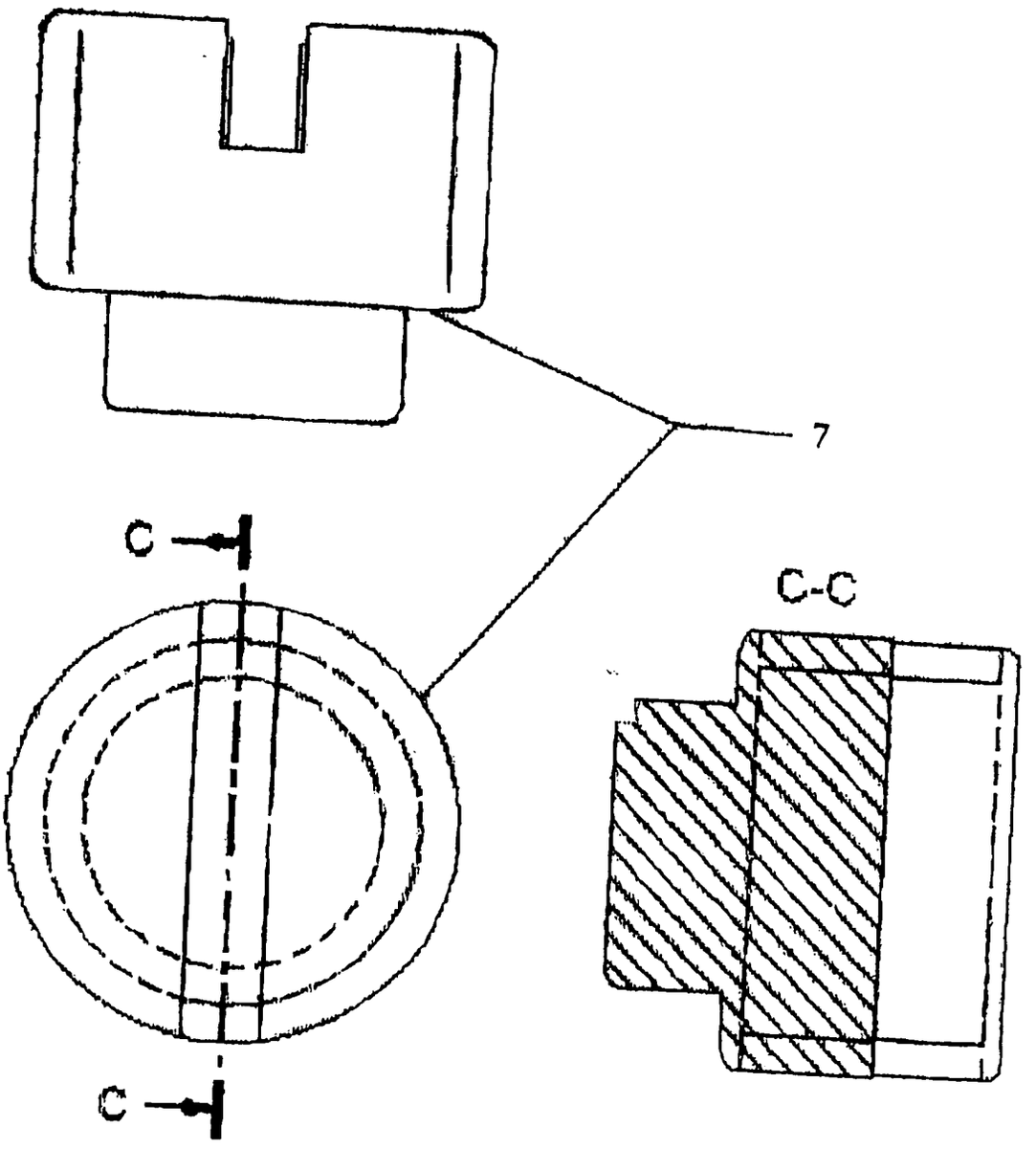

FIG.6

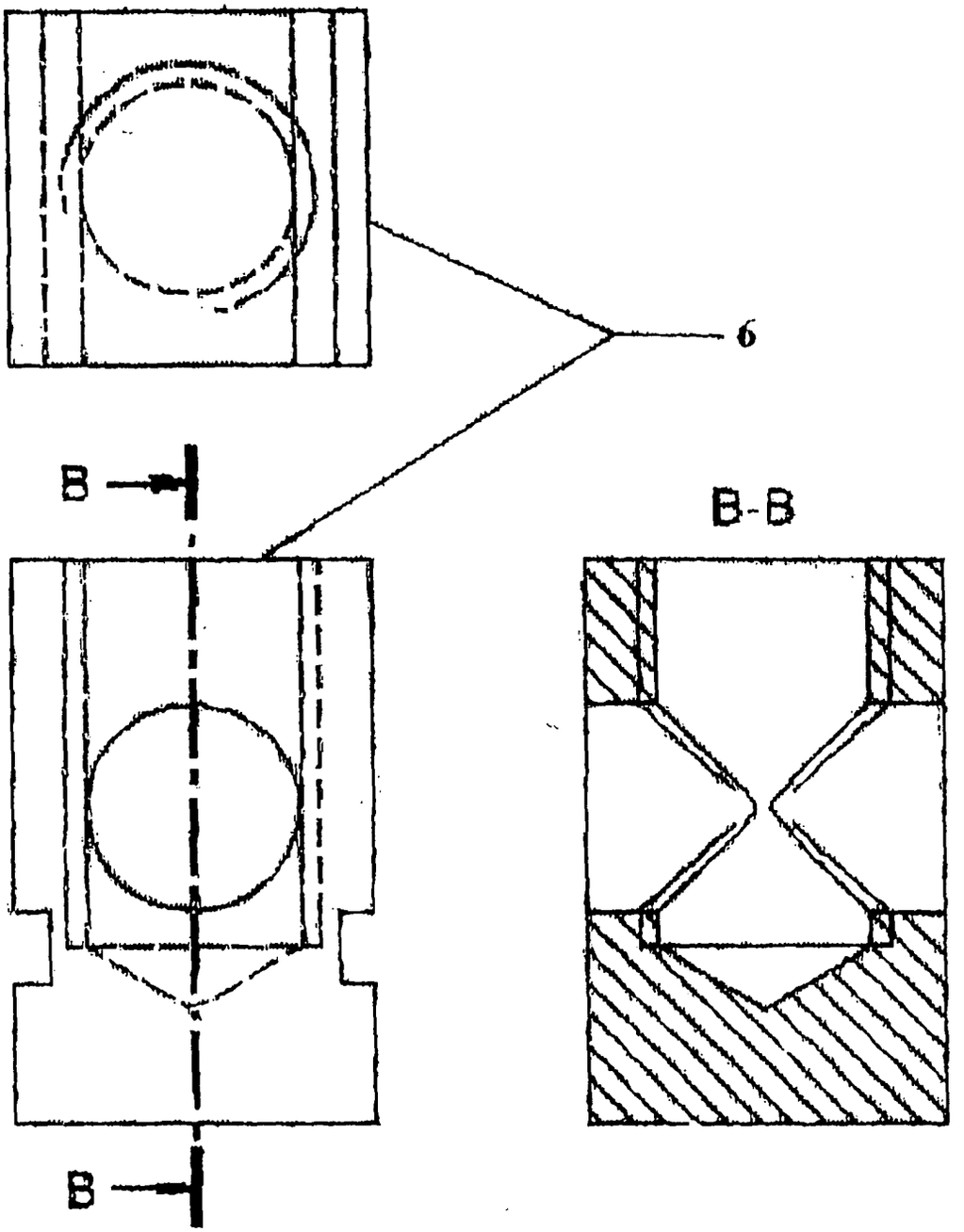

FIG.7

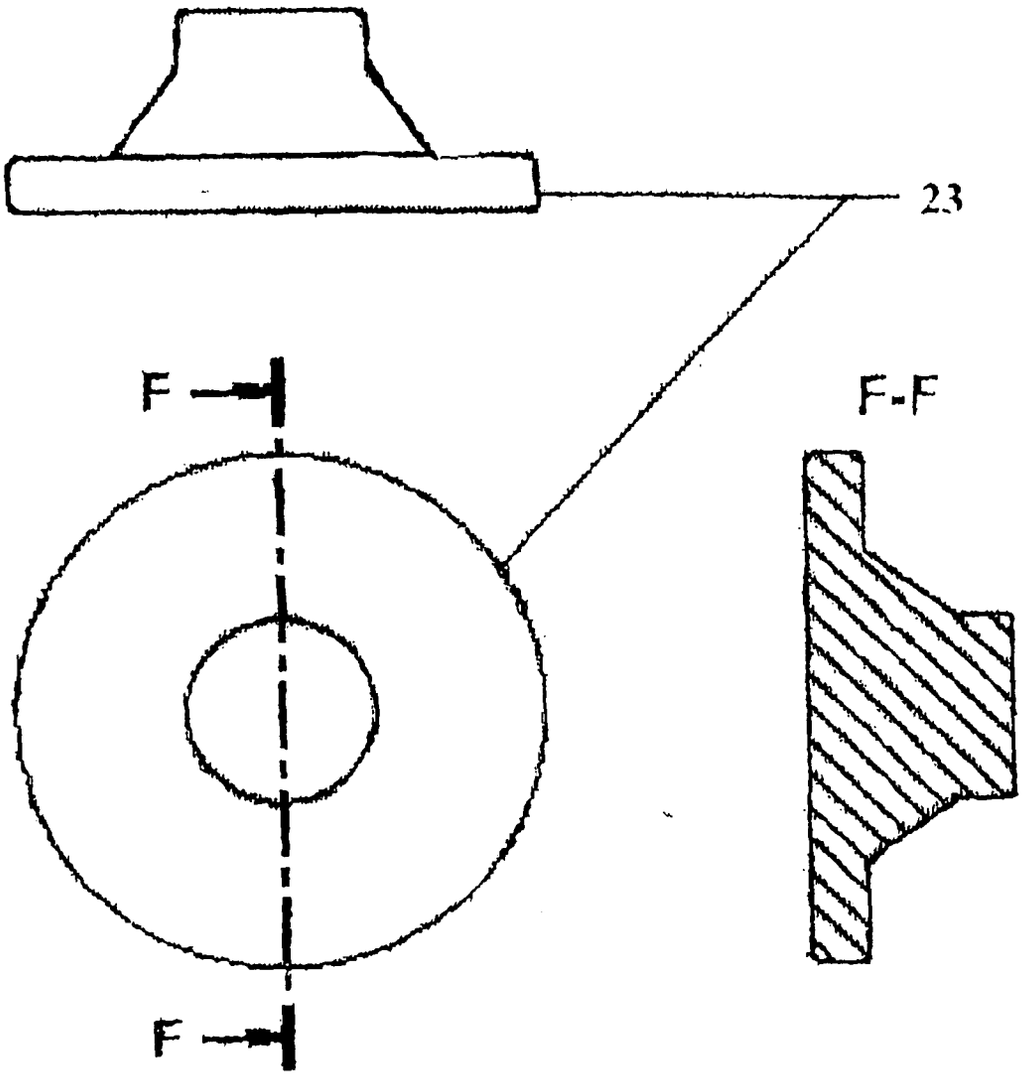

FIG.8

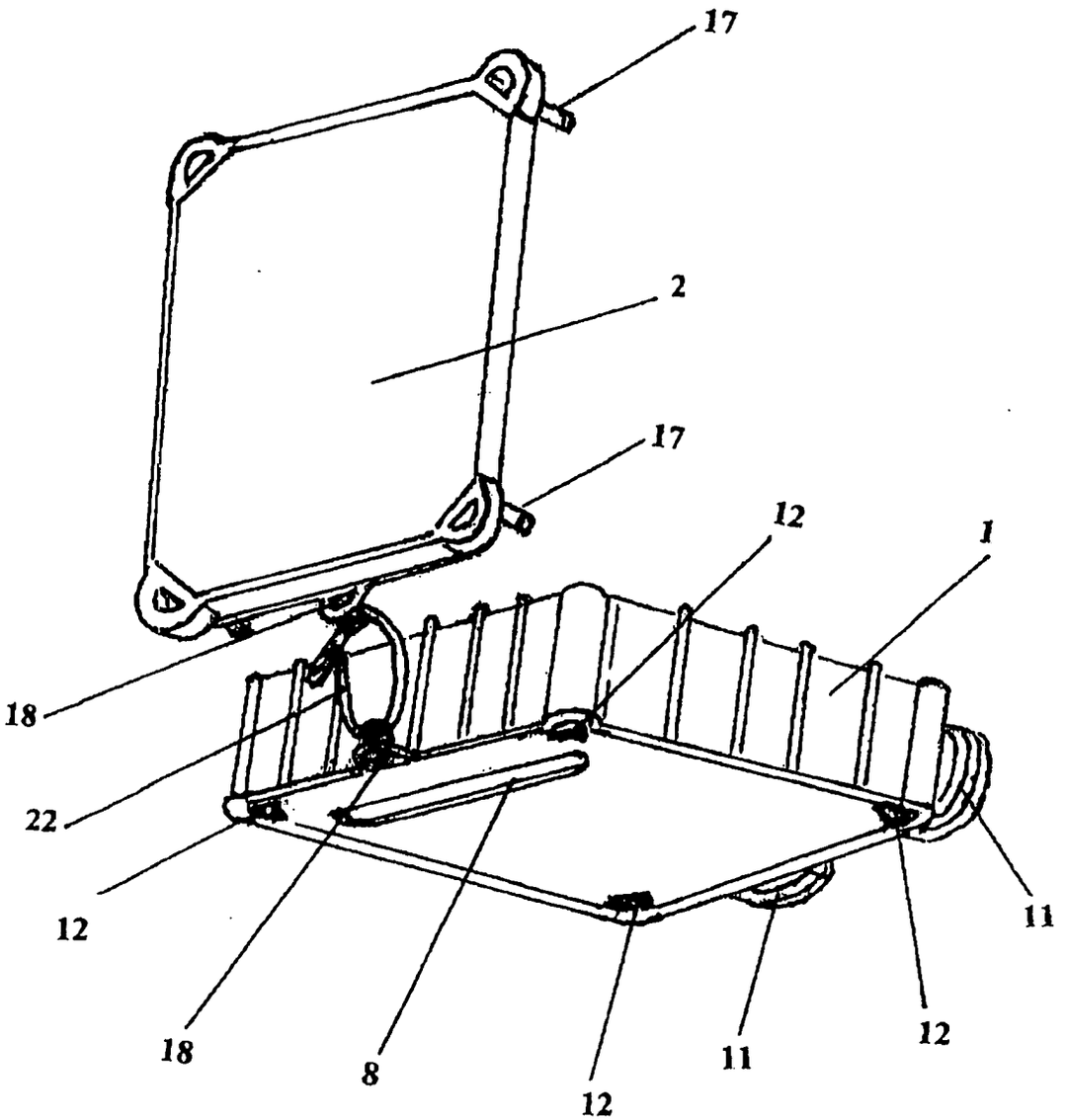

FIG.9