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(54) **A high-current protection device**

Starkstromschutzvorrichtung

Dispositif de protection à courant fort

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- **PATENT ABSTRACTS OF JAPAN vol. 096, no. 002, 29 February 1996 & JP 07 254346 A (SUMITOMO WIRING SYST LTD), 3 October 1995,**

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Description

[0001] The present invention relates to a multiple high-current protection device, having a protective casing and a conductive input portion electrically connected to a plurality of conductive output portions by respective fuse means with predetermined nominal currents (In).

[0002] In the present patent, the term "high current" is intended to indicate a current intensity greater than or equal to 20A.

[0003] More particularly, the invention relates to a high-current protection device for use in the automotive industry and this field will be referred to in non-limiting manner in the following description.

[0004] As is known, in the automotive field, safety and ease of maintenance constitute two important requirements to be given appropriate consideration. Moreover, from an electrical point of view, in order to achieve ever greater safety, it has now become customary for all of the supply lines of the vehicle, with the possible sole exception of the line supplying the starter motor, to be protected by fuses. Alongside the customary use of low- and medium-power fuses arranged for protecting the auxiliary electrical services of the vehicle, the use of power fuses, or so-called maxi-fuses having nominal currents (In) greater than or equal to 20A has thus been introduced. The power fuses most generally used are those having a nominal current (In) within the range of 40-130A, although it may sometimes be necessary to use power fuses having a nominal current (In) of 200A.

[0005] It should be stressed that, whereas low- and medium-power fuses may have to be replaced quite frequently, power fuses do not need to be replaced during the life of the vehicle unless certain events such as, for example, a road accident take place. In this event, electrical short-circuits may in fact easily occur, causing excessive currents to circulate in the portion of the fuse with a small conductive cross-section, leading to heating and hence fusion of this portion.

[0006] German utility model DE-295 20 691-U discloses a multiple high-current device with a protective casing and a conductive input portion electrically connected to conductive output portions by respective fuse means with predetermined nominal currents. The input portion, the output portion and the fuse means form a single shaped conductive plate formed in a single piece from a conductive metal sheet. Each fuse means comprises a central portion having the function of a fuse element and having a cross-section calibrated upon the nominal current provided for.

[0007] For effective intervention by the fuse, it is essential for the portion of the fuse having a small conductive cross-section to be covered by an insulating casing. This is both to prevent dangerous dispersal of molten metal and to ensure suitable thermal insulation. The thermal insulation in fact enables the melting point of the material to be reached even though the resistance of the fuse is low.

[0008] On the other hand, maintenance requirements and particularly the need for quick assembly require the fuses to be grouped in fuse-holder boxes preferably for location in the vicinity of the battery in an area which is easily accessible and is protected from spray and infiltration of water.

[0009] With regard to protection against high currents in particular, motor-vehicle manufacturers need to have multiple protection devices ready for fitting in suitable housings so as to connect an input to several outputs with the interposition of a fuse element of predetermined nominal current.

[0010] The multiple protection devices which are currently used are constituted by multiple fuse-holders each comprising a body of plastics material inside which several power fuses connect a single conductive input portion to a plurality of conductive output portions. Power fuses generally have drilled terminals so that they can be connected to the conductive input or output portions with the use of screw clamping members.

[0011] These devices have the disadvantage of being constituted by a large number of parts and hence requiring a large number of assembly operations which naturally have an adverse effect both on their assembly time, that is, on productivity, and on manufacturing costs. In this connection, it must be borne in mind that, since the sale price of these protection devices has to be limited for reasons of competitiveness, and also in view of the large production volumes required, there is a great need also to limit production costs somewhat.

[0012] Moreover, it is necessary to take into consideration the need to reduce to a minimum the number of connections required since, over the years, these may be the cause of malfunctions due to oxidation of the contacts. Since the supply voltage is relatively low (12V or, in some applications, 24V), physical interruptions causing local voltage drops should also be limited to the smallest possible number.

[0013] Furthermore, it should be taken into consideration that, after the aforementioned protection devices have been assembled, it is necessary to check whether a power fuse with the required nominal current has been located in each conductor portion. The nominal current values of each fuse of the same protection device are generally different and the sequence in which the various fuses are arranged in the device depends on the car manufacturer's technical specification.

[0014] The problem upon which the present invention is based is that of devising a multiple high-current protection device which has structural and functional characteristics such that it can be produced quickly and inexpensively, and that it satisfies the aforementioned requirements and prevents the problems of protection devices of the prior art.

[0015] This problem is solved by a protection device according to claim 1.

[0016] Further characteristics and the advantages of the multiple high-current protection device according to

the invention will become clear from the following description of two preferred embodiments thereof, given by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is a partially-sectioned, exploded, perspective view of a multiple high-current protection device according to the invention,
Figure 2 is a schematic plan view of some details of the device of Figure 1,
Figure 3 is a section taken on the line III-III of Figure 2,
Figure 4 is a partially-sectioned, exploded, perspective view of a variant of the device of Figure 1, and
Figure 5 is a schematic plan view of some details of the device of Figure 4.

[0017] With reference to Figures 1 to 3, a multiple high-current protection device according to the present invention is generally indicated 1.

[0018] The device 1 comprises a protective casing 2 of plastics material and a suitably shaped conductive metal plate 5.

[0019] The protective casing 2 is formed by a substantially rectangular support base 3 of predetermined thickness H and by a cover 4 associated therewith. A respective rim 6 extends along each of the two sides (the short sides) of the support base 3, the two rims 6 being parallel and opposed. The support base 3 is intended to constitute a rigid support surface for the conductive plate 5.

[0020] The width of the conductive plate 5 is substantially equal to the distance between the rims 6 of the support base 3 so that these rims 6 constitute side walls for restraining the conductive plate 5, as can be seen from Figure 1.

[0021] The conductive plate 5 is shaped so as to have a substantially trapezoidal conductive input portion 7 at the top and a plurality of conductive output portions 8 at the bottom. The conductive portions 8 are arranged side by side, separated by spaces of predetermined width D, and are therefore electrically independent of one another. In the embodiment described, there are four of these conductive portions 8 and they are substantially rectangular.

[0022] Each output portion 8 is connected to the input portion 7 by means of a respective central portion 9 having a cross-section of reduced width. Each central portion 9 constitutes a fuse element of the device 1, that is, the part which, as a result of the circulation of currents of predetermined intensity, is heated until it melts, breaking the electrical continuity between the input portion 7 and the respective output portion 8. The width of each central portion 9 is calibrated in dependence on the nominal current (In) to be attributed to the fuse element.

[0023] In order to develop a suitable length for the fuse elements whilst maintaining a limited size, the central portions 9 may be S-shaped.

[0024] The conductive plate 5 can advantageously be formed by blanking from a sheet of metal suitable for forming power fuses such as, for example, tinned zinc. By way of example, the thickness of the conductive plate 5 is 1.8 mm.

[0025] The conductive plate 5 is positioned on the support base 3 so as to be restrained laterally by the rims 6, as explained above, and most of the input portion 7 projects from the upper end 11 of the support base 3. The output portions 8, as well as the central portions 9, on the other hand, are housed entirely within the shape of the support base 3.

[0026] The cover 4 extends from one rim 6 of the support base 3 to the other so as to cover the central portions 9 of the conductive plate 5 completely and to cover part of both the input portion 7 and the output portions 8.

[0027] In the region of the central portions 9 of the conductive plate 5, the support base 3 comprises a channel 19 formed within the thickness H and extending from one rim 6 to the other. This channel 19 prevents the central portions 9 from coming into contact with the support base 3. Similarly, the cover 4 is formed so as to be raised relative to the central portions 9. This advantageously creates an air chamber around the fuse elements, that is, the central portions 9 of the device 1.

[0028] The cover 4 is push-fitted on the support base 3. It is fixed by a plurality of pins 13, that is eight pins in the embodiment shown, which project from the support base 3 to be fitted by a predetermined force in a corresponding plurality of holes 14 in the cover 4. Since the conductive plate 5 is interposed between the support base 3 and the cover 4, the conductive plate 5 has, in the region of each pin, a through-hole through which the pin can extend.

[0029] It should be stressed that, as well as fastening the cover 4, the pins 13 also locate the conductive plate 5 precisely in relation to the support base 3 and also fix the conductive plate 5 to the support base 3. The arrangement of the pins 13 is preferably such that there is at least one pin 13 in the region of each output portion 8 and at least one pair of pins 13 in the region of the input portion 7.

[0030] The cover 4 comprises a generally cylindrical opening or window 16 in the region of each central portion 9. The openings 16 are closed by respective disc-shaped screens 18 of transparent plastics material such as, for example, polystyrol, polystyrene or methacrylate, each having a pair of diametrally-opposed resilient tabs 17.

[0031] The disc-shaped screens 18 are push-fitted in the openings 16, engagement teeth of the tabs 17 snap-engaging with the walls of the openings 16.

[0032] The disc-shaped screens 18 advantageously enable the heat-fusible elements, that is, the central portions 9 housed in the device 1 to be seen.

[0033] The support base 3 comprises three ribs 10 of predetermined width D extending parallel to the rims 6 from the lower end 12 of the support base as far as the cover 4. The ribs 10 are positioned in the spaces be-

tween the conductive output portions 8 and perform the dual task of preventing lateral movements of these portions and preventing any electrical contact between them or between the electrical terminals connected to them, as will become clearer from the following description.

[0034] Each output portion 8 comprises means for connection to a respective electrical terminal 15.

[0035] In the embodiment described, these means comprise a circular opening 20 through which the screw 21 to which the electrical terminal 15 is clamped can extend. Preferably, the head of the screw 21 is fitted in a seat in the support base 3 which prevents it from rotating, or is incorporated in the plastics of the base.

[0036] Each opening 20 advantageously houses a metal washer 22, for example, of tellurium copper, beryllium copper, tinned steel or another conductive material having a high modulus of elasticity, advantageously greater than 10,000 kg/mm^2, and a high yield point, advantageously greater than 20 kg/mm^2.

[0037] The washers 22 are fixed in the corresponding openings 20 by pressing, that is, by pressure exerted on the opposite flat faces of the washers by means of a suitable punch or roller. The pressure causes radial expansion of the washers which are firmly anchored in the output portions 8 of the conductive plate 5, taking up any play.

[0038] The washers 22 prevent weakening or breakage of the conductive output portions 8, even as a result of tight clamping of the screw.

[0039] The input portion 7 projecting from the upper end 11 of the support base 3 also comprises means for connection to an electrical terminal. As already described, these means comprise a circular opening 23 through which a screw for clamping the electrical terminal can extend. A washer 24 structurally and functionally equivalent to the washers 22 is fitted in the circular opening 23.

[0040] It is clear from the foregoing that the multiple high-current protection device according to the invention is formed by a small number of parts so that its assembly is easy and quick and can easily be automated. In fact, in order to assemble the device 1, it suffices to insert the screws 21 in the seats in the support base 3, to position the conductive plate 5 on the support base 3 in a manner such that the openings 20 coincide with the screws 21 and the holes coincide with the pins 13, and to fit the cover 4 with pressure.

[0041] It is useful here to point out that the assembly of multiple high-current protection devices of the prior art requires the positioning firstly of the conductive input portion, then of all of the conductive output portions and, finally, of the power fuses which, in particular, have to be clamped to the aforesaid input and output portions individually.

[0042] Once the assembly of the device 1 is complete, it is ready to be housed in a corresponding seat (not shown in the drawings) in a motor-car or the like and to be connected to the electrical terminals.

[0043] In this context, it should be borne in mind that, normally, when multiple high-current protection devices of the prior art are to be housed in corresponding seats, there is the problem of checking whether the nominal current values of the fuses associated with each conductive output portion correspond to those provided for in the technical specification. In other words, there is the problem of checking whether the nominal current value associated with each conductive output portion corresponds to that actually required in the specific application.

[0044] To prevent this problem, the device 1 comprises a part which is shaped for engagement with a corresponding complementary part of the seat, the shapes of the part and of said complementary part being different for different nominal current values of the fuse means associated with each conductive output portion 8 of the device 1. The housing of the device 1 in the seat is dependent upon the achievement of engagement between the aforementioned part and complementary part. This engagement therefore constitutes a mechanical consent for the insertion in the seat of the correct device 1, that is, a device having the nominal current value required by the technical specification for that particular application in each conductive output portion 8.

[0045] In the embodiment described, the aforementioned part is a recess 28 formed in the outline of the conductive input portion 7 for engagement by a corresponding complementary projecting portion of the seat. The fitting of the device 1 in the seat is dependent on the achievement of coupling between the recess 28 and the projection of the seat which, as stated, ensures the correct combination between the seat and the device 1.

[0046] If it were attempted to fit in a seat a device 1 having even only one nominal current value associated with one conductive output portion which did not correspond to that provided for by that seat, the projection of the seat would not find a corresponding complementary recess 28 in the plate 5 and insertion would be prevented.

[0047] The recess 28 is advantageously formed directly during the blanking of the conductive plate 5. Its shape as well as its positioning are unequivocally correlated with the sequence of nominal current values of the fuse means associated with the individual conductive output portions 8, that is, with the widths of the central portions 9. In other words, there is a differently shaped and positioned recess corresponding to each different sequence of widths of the central portions 9 associated with the output portions 8. Since the recess is formed directly during the blanking of the conductive plate 5, any error in the unequivocal association between its shape and positioning and the sequence of widths of the central portions can be excluded.

[0048] As an alternative to the embodiment described above, the conductive output portions 8 may comprise means for connection to respective electrical terminals

of a different type.

[0049] Thus, for example, Figures 4 and 5 show a multiple high-current protection device 100 which differs from that of Figure 1 in that the means for connecting the conductive output portions 8 to an electrical terminal 27 comprise a quick-fit electrical connector 25 of known type. This connector is intended to be coupled with a complementary electrical connector 26 carried by the electrical terminal 27. In the embodiment shown, the conductive output portions 8 are shaped so as to form at their ends male connectors 25 for coupling with respective female electrical connectors 26 carried by the electrical terminal 27.

[0050] In the region of each electrical connector 25, the device 100 comprises a tubular protector 29 made of plastics material, associated with the support base 3. Each tubular protector 29 is open at its ends and an electrical connector 25 extends inside it. Similarly, the electrical connector 26 is fixed inside a tubular protector 31 to be fitted in the protector 29 when the electrical connectors 25 and 26 are coupled with one another. The protector 29 has engagement means 30 of known type for snap-engaging the protector 31, preventing accidental separation of the protectors 29 and 31 and hence of the electrical connectors 25 and 26.

[0051] The structural solution offered by the device 100 is suitable for use for nominal currents (In) up to 80A, whereas the solution offered by the device 1 with clamping screws (Figure 1) can also be used with nominal currents of much greater intensity. Clearly, in order to satisfy particular requirements, it is possible to use a device 1 having some output portions 8 with quick-fit connectors and the remainder with clamping screws or equivalent means.

[0052] As can be appreciated from the description, the multiple high-current protection device according to the present invention has structural and functional characteristics such as to satisfy the requirements mentioned above and at the same time to solve the problems of devices of the prior art. In particular, the device according to the invention is constituted by a small number of parts so that its assembly is easy, quick and easily automated.

[0053] Another advantage of the multiple high-current protection device according to the invention lies in its low production cost in comparison with devices of the prior art. In fact, the cost of producing the conductive plate is much less than that of a plurality of power fuses.

[0054] Another advantage of the multiple high-current protection device according to the invention is that it is more compact than devices of the prior art. In fact the solution of using a single conductive plate instead of several power fuses, particularly each having its own protective casing, reduces the size of the device.

[0055] A further advantage of the multiple high-current protection device according to the invention is that its conductive plate has no joints so that voltage drops and malfunctions due to oxidation of the contacts at the joints are prevented and long-term good operation of the device is ensured.

[0056] A further advantage of the multiple high-current protection device according to the invention is that it is not necessary to check the conformity of the nominal current values associated with each conductive output portion before fitting it in a seat. In fact, in the event of an error, the device is physically prevented from being fitted in the seat.

[0057] Naturally, in order to satisfy contingent and specific requirements, an expert in the art may apply to the above-described multiple high-current protection device many modifications and variations all of which, however, are included in the scope of protection of the invention as defined by the following claims.

[0058] Thus, for example, the means for the connection of the conductive portions to the electrical terminals may be replaced by other functionally equivalent elements.

[0059] The number of conductive output portions may be greater than that considered in the examples.

Claims

1. A multiple high-current protection device having a protective casing (2) and a conductive input portion (7) electrically connected to a plurality of conductive output portions (8) by respective fuse means (9) with predetermined nominal currents, the conductive input portion (7), the conductive output portions (8), and the fuse means (9) forming a single shaped conductive plate (5) formed in a single piece from a conductive metal sheet, each fuse means comprising a central portion (9) having the function of a fuse element and having a small cross-section calibrated in dependence on the nominal current provided for, **characterized in that** said protection device comprises a part (28) which is shaped for engagement with a complementary part of a seat, the shape and positioning of the part (28) and of the complementary part being different for different sequences of nominal current values of the fuse means (9) associated with each conductive output portion (8) of the device (1), the engagement between the part (28) and said Complementary part constituting a mechanical consent for the insertion in the seat of the device (1) provided for, that is, the device which has the required nominal current value associated with each conductive output portion (8), wherein
   the part (28) is a recess formed in the outline of the conductive input portion (7) for engagement with the complementary projecting part of the seat.

2. A device according to Claim 1, in which the conductive input portion (7) comprises means (23, 24) for connection to an electrical terminal.

3. A device according to Claim 1, in which each conductive output portion (8) comprises means (20, 21, 22; 25) for connection to a respective electrical terminal (15; 27).

4. A device according to Claim 3 or Claim 4, in which the connection means comprise an opening (20, 23) in which a screw member (21) for clamping the electrical terminal (15) is fitted.

5. A device according to Claim 4, in which an inserted washer (22, 24) of tellurium copper, beryllium copper, tinned steel, or another conductive material having a yield point and modulus of elasticity greater than those of zinc is housed in the opening (20, 23).

6. A device according to Claim 3, in which the connection means comprise a quick-fit electrical connector (25) for coupling with a complementary electrical connector (26) of the electrical terminal (27).

7. A device according to Claim 1, in which the protective casing (2) comprises a support base (3) and a cover (4) coupled with one another with the interposition of the shaped conductive plate (5), the cover (4) cooperating with the support base (3) to cover the fuse means (9) of the shaped conductive plate (5).

8. A device according to Claim 1, in which the support base (3) comprises a plurality of pins (13) engaged in a corresponding plurality of holes (14) in the cover (4), a corresponding plurality of holes, through which the pins (13) can extend, being formed in the shaped conductive plate (5).

9. A device according to Claim 7, in which an opening (16) closed by a screen (18) of transparent plastics material is formed in the cover (4) in the region of at least one of the fuse means (9).

10. A device according to Claim 9, in which the screen (18) has resilient tabs (17) having engagement teeth for snap engagement in the opening (16).

11. A device according to Claim 1 in which the central portion (9) is S-shaped.

Patentansprüche

1. Vielfach-Starkstromschutzvorrichtung mit einem Schutzgehäuse (2) und einem leitfähigen Eingangsabschnitt (7), der durch Sicherungseinrichtungen (9) mit vorgegebenen Nennströmen mit mehreren leitfähigen Ausgangsabschnitten (8) elektrisch verbunden ist, wobei der leitfähige Eingangsabschnitt (7), die leitfähigen Ausgangsabschnitte (8) und die Sicherungseinrichtungen (9) sich auf einer leitfähigen Platte (5) befinden, die in einem Stück aus einem leitfähigen Metallblech gebildet ist, und jede der Sicherungseinrichtungen einen zentralen Abschnitt (9) umfasst, der die Funktion eines Sicherungselements hat und einen auf den vorgesehenen Nennstrom abgestimmten kleinen Querschnitt aufweist,

dadurch gekennzeichnet,

dass diese Schutzvorrichtung einen Abschnitt (28) umfasst, der so geformt ist, dass er sich mit einem komplementären Abschnitt eines Sitzes in Eingriff bringen lässt, wobei die Form und Position dieses Abschnitts (28) sowie des komplementären Abschnitts für unterschiedliche Reihen von Nennstromwerten der mit den leitfähigen Ausgangsabschnitten (8) der Vorrichtung (1) verbundenen Sicherungseinrichtungen (9) verschieden sind und der Eingriff zwischen diesem Abschnitt (28) und dem komplementären Abschnitt eine mechanische Bestätigung dafür darstellt, dass im Sitz die vorgesehene Vorrichtung (1), d. h. die Vorrichtung, die für jeden der leitfähigen Ausgangsabschnitte (8) den erforderlichen Nennstromwert aufweist, eingesetzt ist, und wobei es sich bei dem Abschnitt (28) um eine am Rand des leitfähigen Eingangsabschnitts (7) gebildete Aussparung handelt, die sich mit dem komplementären vorstehenden Abschnitt des Sitzes in Eingriff bringen lässt.

2. Vorrichtung nach Anspruch 1, bei der der leitfähige Eingangsabschnitt (7) Mittel (23, 24) umfasst, mit denen er sich mit einem elektrischen Anschluss verbinden lässt.

3. Vorrichtung nach Anspruch 1, bei der jeder der leitfähigen Ausgangsabschnitte (8) Mittel (20, 21, 22; 25) umfasst, mit denen er sich mit einem elektrischen Anschluss (15; 27) verbinden lässt.

4. Vorrichtung nach Anspruch 3 oder 4, bei der die Verbindungsmittel eine Öffnung (20, 23) umfassen, in der ein Schraubenelement (21) zur Befestigung des elektrischen Anschlusses (15) sitzt.

5. Vorrichtung nach Anspruch 4, bei der in der Öffnung (20, 23) eine Beilagscheibe (22, 24) aus Tellurkupfer, Berylliumkupfer, verzinntem Stahl oder einem anderen leitfähigen Material, dessen Streckgrenze und Elastizitätsmodul größer sind als diejenigen von Zink, eingesetzt ist.

6. Vorrichtung nach Anspruch 3, bei der die Verbindungsmittel einen Steckverbinder (25) umfassen, der sich mit einem komplementären Steckverbinder (26) des elektrischen Anschlusses (27) verbinden lässt.

7. Vorrichtung nach Anspruch 1, bei der das Schutzgehäuse (2) eine Halterung (3) und eine Abdeckung (4) umfasst, die miteinander verbunden sind, wobei dazwischen die geformte leitfähige Platte (5) angeordnet ist und die Abdeckung (4) zusammen mit der Halterung (3) die Sicherungseinrichtungen (9) der geformten leitfähigen Platte (5) abdeckt.

8. Vorrichtung nach Anspruch 1, bei der die Halterung (3) mehrere Stifte (13) umfasst, die in entsprechende Löcher (14) der Abdeckung (4) eingreifen, wobei in der geformten leitfähigen Platte (5) eine entsprechende Anzahl an Löchern gebildet ist, durch die die Stifte (13) hindurchragen können.

9. Vorrichtung nach Anspruch 7, bei der in der Abdekkung (4) im Bereich mindestens einer der Sicherungseinrichtungen (9) eine Öffnung (16), die durch eine Sichtabdeckung (18) aus transparentem Kunststoff geschlossen ist, gebildet ist.

10. Vorrichtung nach Anspruch 9, bei der die Sichtabdeckung (18) elastische Zungen (17) mit Eingriffszähnen aufweist, die in der Öffnung (16) einschnappen.

11. Vorrichtung nach Anspruch 1, bei der der zentrale Abschnitt (9) S-förmig ist.

Revendications

1. Dispositif de protection multiple à courant fort, comportant un boîtier protecteur (2) et une partie d'entrée (7) conductrice, reliée électriquement à une pluralité de parties de sortie (8) conductrices par des moyens fusibles (9) respectifs, ayant des courants nominaux prédéterminés, la partie d'entrée (7) conductrice, les parties de sortie (8) conductrices et les moyens fusibles (9) formant une plaque conductrice conformée (5) unique, formée d'une seule pièce à partir d'une tôle de métal conducteur, chaque moyen fusible comprenant une partie centrale (9), ayant la fonction d'un élément fusible et ayant une petite section transversale, étalonnée selon le courant nominal pour lequel il est prévu, **caractérisé en ce que** le dispositif protecteur comprend une partie (28) conformée pour venir en prise avec une partie complémentaire d'un siège, la forme et le positionnement de la partie (28) et de la partie complémentaire étant différents pour des séquences différentes de valeur de courant nominal des moyens fusibles (9) associés à chaque partie de sortie (8) conductrice du dispositif (1), la mise en prise entre la partie (28) et ladite partie complémentaire formant une autorisation mécanique pour l'insertion dans le siège du dispositif (1) prévu à cette fin, c'est-à-dire le dispositif qui a la valeur de courant nominal requise, associé à chaque partie de sortie (8) conductrice, dans lequel la partie (28) est une cavité formée dans le profil de la partie d'entrée (7) conductrice, afin de venir en prise avec la partie complémentaire, en saillie du siège.

2. Dispositif selon la revendication 1, dans lequel la partie d'entrée (7) conductrice comprend des moyens (23, 24), pour assurer la connexion à une borne électrique.

3. Dispositif selon la revendication 1, dans lequel chaque partie de sortie (8) conductrice comprend des moyens (20,21,22; 25) pour assurer la connexion à une borne électrique (15; 27) respective.

4. Dispositif selon la revendication 3 ou 4, dans lequel les moyens de connexion comprennent une ouverture (20,23) dans laquelle est monté un organe fileté (27) devant assurer le serrage de la borne électrique (15).

5. Dispositif selon la revendication 4, dans lequel une rondelle (22,24) insérée, en cuivre-tellurium, cuivre-beryllium, acier étamé ou un autre matériau conducteur ayant une limite élastique et un module d'élasticité supérieurs à ceux du zinc, est logée dans l'ouverture (20,23).

6. Dispositif selon la revendication 3, dans lequel les moyens de connexion comprennent un raccord électrique (25) à montage rapide, pour assurer l'accouplement à un connecteur électrique (26) complémentaire de la borne électrique (27).

7. Dispositif selon la revendication 1, dans lequel le boîtier protecteur (2) comprend une base support (3) et un couvercle (4), couplés l'un à l'autr avec interposition de la plaque conductrice (5) conformée, le couvercle (4) coopérant avec la base support (3) pour couvrir les moyens fusibles (9) de la plaque conductrice (5) conformée.

8. Dispositif selon la revendication 1, dans lequel la base support (3) comprend une pluralité de broches (13) mises en prise dans une pluralité correspondante de trous (14) ménagés dans le couvercle (4), une pluralité correspondante de trous, par lesquels les broches (13) peuvent s'étendre, étant formés dans la plaque conductrice (5) conformée.

9. Dispositif selon la revendication 7, dans lequel une ouverture (16), fermée par un écran (18) réalisé en matière plastique transparente, est formée dans le couvercle (4), dans la zone d'au moins l'un des moyens fusibles (9).

10. Dispositif selon la revendication 9, dans lequel

l'écran (18) présente des pattes (17) élastiques, ayant des dents de mise en prise devant permettre une mise en prise avec encliquetage dans l'ouverture (16).

11. Dispositif selon la revendication 1, dans lequel la partie centrale (9) est en forme de S.

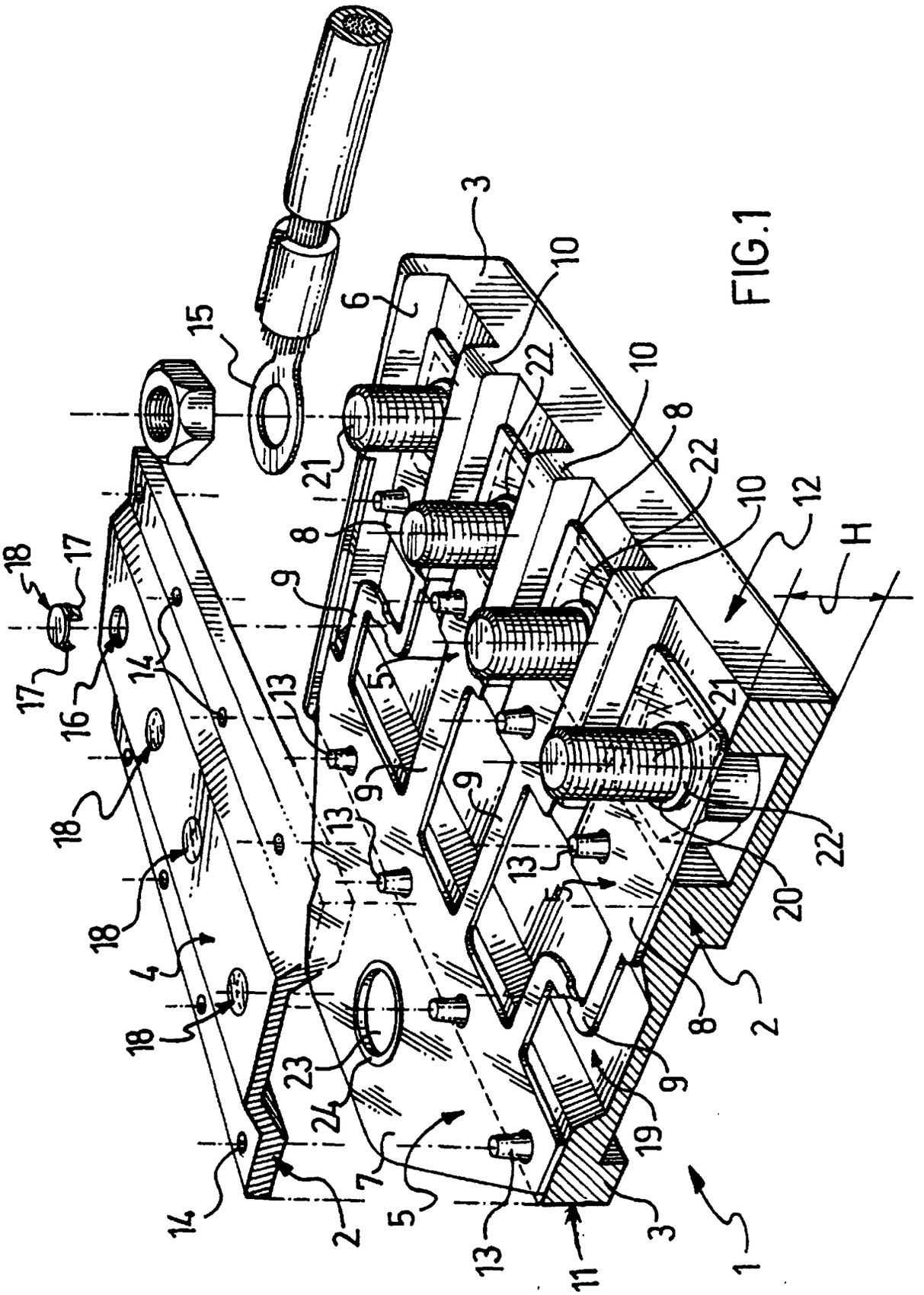


FIG.1

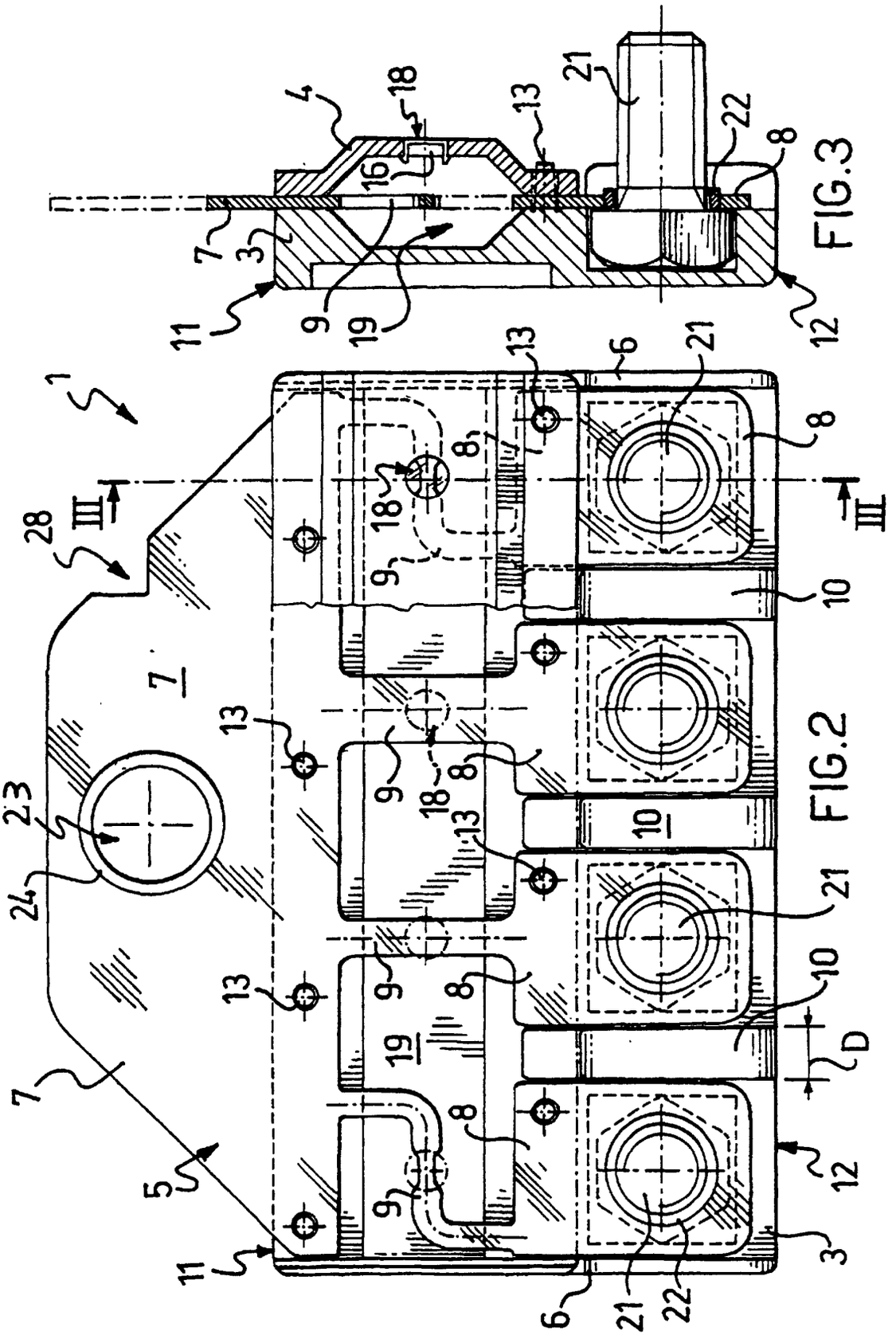


FIG.2

FIG.3

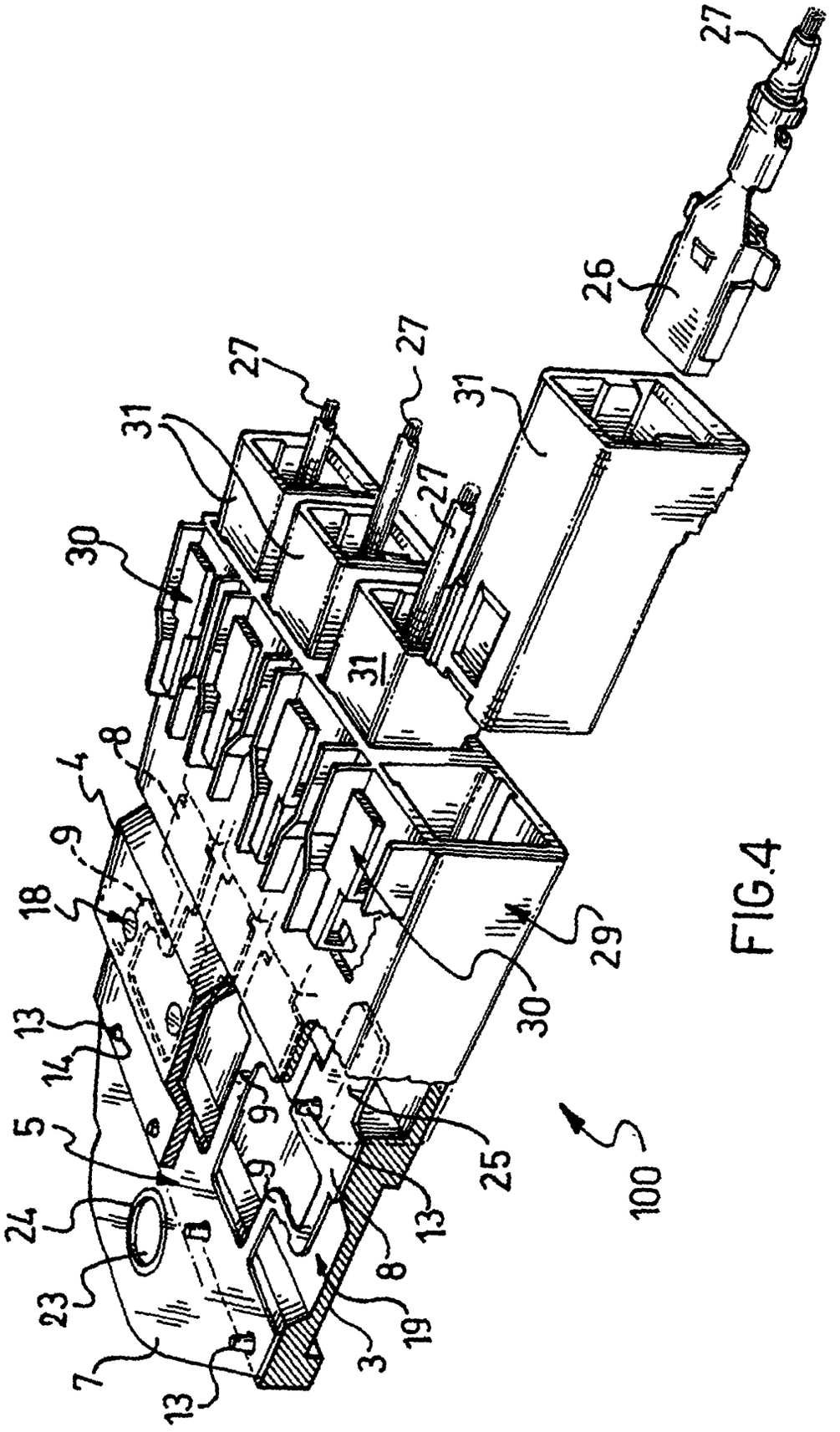

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FIG.4

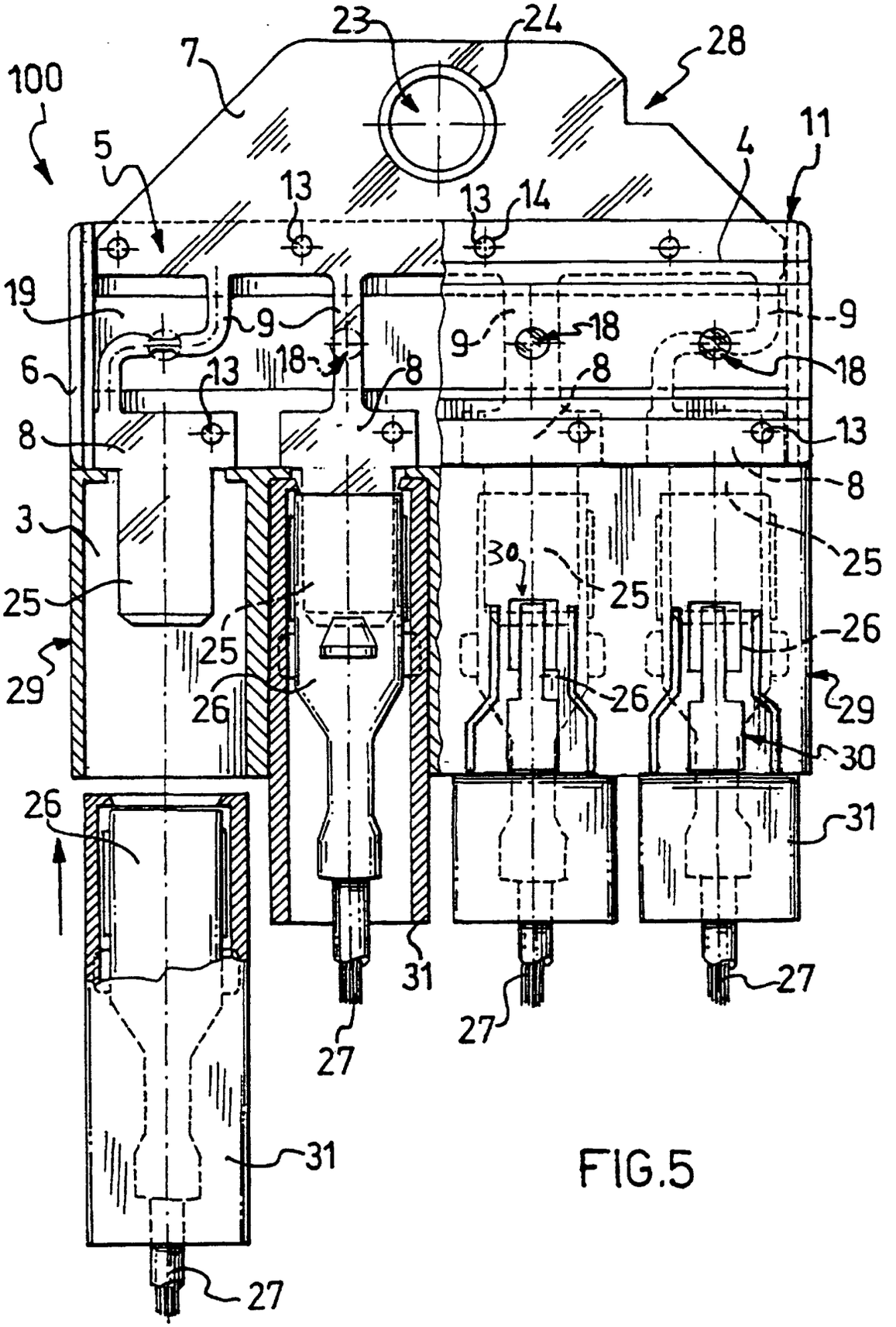


FIG.5