(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 282 116 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **13.05.92** (51) Int. Cl.5: **H01R 11/11**

(21) Application number: **88200329.6**

(22) Date of filing: **23.02.88**

(54) **Plastic branch terminal and coupling screw.**

(30) Priority: **26.02.87 NL 8700482**
23.06.87 NL 8701466

(43) Date of publication of application:
14.09.88 Bulletin 88/37

(45) Publication of the grant of the patent:
13.05.92 Bulletin 92/20

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

(56) References cited:
EP-A- 0 023 259
EP-A- 0 067 917
EP-A- 0 142 901
DE-A- 2 438 003
DE-C- 61 078
US-A- 3 816 817

(73) Proprietor: **Lovink-Terborg B.V.**
Lovinkweg, 3
NL-7061 DT Terborg(NL)

(72) Inventor: **Van den Hout, Jan Simon**
Eksterhof 3
NL-7051 WP Varsseveld(NL)
Inventor: **Kaptein, Bartholomeus Johannes**
Ph.P. Cappettilaan 20
NL-7071 CS Ulft(NL)

(74) Representative: **Schumann, Bernard Herman Johan et al**
OCTROOIBUREAU ARNOLD & SIEDSMA
Sweelinckplein 1
NL-2517 GK The Hague(NL)

EP 0 282 116 B1

Description

The invention relates to a branch terminal for connecting at least one electrical branch conductor to a continuous electrical main conductor, which branch terminal comprises an electrically conducting contact block which can be clamped in a position by clamping means on said main conductor, with which block an electrically conducting coupling screw rotatable from outside co-operates by means of a threaded hole, whereby said clamping means support said main conductor on its side facing away from said coupling screw, and said contact block displays for each branch conductor a hole for receiving thereof and a screw rotatable from outside for fixing in place of that branch conductor in that hole, in which

said clamping means consist of two separated U-shaped clamping parts which can be placed over said main conductor from two sides and are coupled to each other while enclosing said contact block,

the clamping parts can be connected to each other by a snap coupling, comprising a plurality of snap edges following on from one another in the coupling direction of the clamping parts, such that the interval over which said clamping parts are coupled to each other can be selected.

Such a branch terminal is known from e.g. EP-A-0 067 917.

The branch terminal according to the invention is characterized in that the coupling screw can be placed in contact with said main conductor by rotation and that at least one of the legs of the clamping parts comprise a U-shaped structure with two legs of which the surfaces facing each other are provided with snap edges extending in transverse direction relative to the coupling direction and following on from one another in the coupling direction of clamping parts and which can co-operate for snapping with snap edges present on the leg of the other clamping part.

Relative to the mentioned prior art specification the invention is residing in the generally U-shaped structure of at least one of the legs of one of the clamping parts. Such construction ensures a highly reliable snapping even under the high tensile forces exerted on the related legs when tightening the clamping screw. The inner legs 21, 22 according to fig. 3 of EP-A-0 067 917 are not blocked for inward displacement which might occur when tightening screw 17. Such construction might lead to the loosing of the snap connection between the co-operating teeth of the ends of the legs. This disadvantage is not present in the construction according to the invention.

The clamping parts can consist of a mechanically strong plastic, such as polyamide.

The plastic is preferably reinforced, for instance with glass fibres.

Various types of coupling may be considered suitable. Use can be made of a strong and quick drying adhesive or an ultrasonic weld treatment. The drawback here is that additional materials and equipment are needed at the workplace, which is often out in the open, and in varying weather conditions. Preference is therefore given to an embodiment in which the clamping parts can be connected to each other by a snap coupling. In this latter case a variant can be advantageously employed which displays the feature that the snap coupling comprises a number of snap edges following on from one another in the coupling direction of the clamping parts, such that the interval over which the clamping parts are coupled to each other can be selected. In this case the coupling interval can be chosen on the basis of the relevant cable diameter, which enables universal application of the branch terminal.

In order to enable, particularly in the case of the use of an insulated main conductor, reliable supporting of the main conductor against the pressure force of the coupling screw the variant is preferably used in which the clamping part supporting the main conductor displays a number of sharp projections, such as pyramids, cones, cross ribs or longitudinal ribs, the tops of which are positioned such that they can all be placed in contact with the main conductor by tightening of the coupling screw. In another embodiment the branch terminal displays the feature that the coupling screw has a head which can be set in co-operation with the main conductor, this head having a cutter face and a stop collar. This embodiment has the advantage that a well controllable contact can be ensured between the coupling screw and the main conductor, without there being any danger of excessive damage to the main conductor or of its elastic limit being exceeded.

A preferred embodiment of the branch terminal according to the invention displays the feature that the contact block is enclosed in one of the clamping parts, the coupling screw is rotatable via a through-hole present in that clamping part and that the wall part containing that hole is resilient such that after tightening of the coupling screw that wall part exerts an elastic force on the contact block, thus ensuring a permanent contact with a substantially constant contact force between the coupling screw and the main conductor.

The invention further relates to a method for manufacturing a coupling screw with a cutter face. This method according to the invention displays the feature that a screw is provided and a hole is drilled through the active leading end face thereof, at least a part of the edge of which hole can serve

as cutting edge. The method is preferably applied such that the drill is directed such that its central axis makes an angle with the central axis of the screw. In a particular embodiment the method may have the feature that the drill is directed such that its central axis lies in the same plane as the central axis of the screw. In a variant the method has the particular feature that a through-hole is drilled which extends between the leading end face of the screw and its outer envelope surface. When an angle is allowed between the central axis of the screw and that of the drill, and thereby the bore hole made with it, a hole is obtained with a non-round edge, for example, in the case of a flat leading end face of the screw, a hole the edge of which takes the form of an ellipse, the long side of which extends more or less radially, depending on the fact of whether both central axes lie in the same plane.

Finally, the invention also relates to a coupling screw obtained with the above described methods.

The invention will now be elucidated with reference to the drawing of two random embodiments. In the drawing:

Fig. 1 shows a perspective view of a first embodiment, whereby the various parts are shown for the sake of clarity at some distance from one another;

fig. 2 shows the branch terminal as in fig. 1 in position of use during fitting;

fig. 3 is the section along the line III-III in fig. 2;

fig. 4 shows a cross section corresponding to fig. 3 of a second embodiment in its final operative position;

fig. 5 is a partly broken away side view of a coupling screw in which a cutting side is arranged using a drill; and

fig. 6 is a view of the leading end face of the coupling screw shown in fig. 5.

Fig. 1 shows a branch terminal 1 in a first embodiment of the invention. It comprises two U-shaped clamping parts 2 and 3 respectively, which are both manufactured of polyamide reinforced with glass fibre, which is obtainable on the market. The use of such insulating material has the advantage that branch terminal 1 is completely insulated to the outside and can therefore if required be arranged on a main conductor carrying current.

Clamping parts 2 and 3 can be coupled with each other in the direction indicated with the arrows 4. For this purpose the legs of the U-shaped upper clamping part 2 each comprise once again a U-shaped structure with two legs 5, 6 of which the surfaces facing each other are provided with snap edges 7 running in transverse direction relative to the coupling direction 4 and following on from one another in the coupling direction 4 of clamping parts 2, 3 and which can co-operate for snapping with snap edges 9 present on the legs 8 of the lower clamping part 3. The form of the respective snap edges is chosen such that the legs 8 of lower clamping part 3 can be inserted with some force into the space enclosed by the legs 5, 6 of the upper clamping part 2. The reverse movement is not possible because of the barb-like form of the snap edges.

The upper clamping part 2 has a form such that it can enclose a brass contact block 10. This is shown more clearly in the figures to be discussed later.

Upper clamping part 2 displays a through-hole 11 for passage of a coupling screw for coupling of the contact block 10 to a main conductor, and two through-holes 12, 13 for passage of two screws for fixing in position on the contact block of branch conductors.

Lower clamping part 3 has on its inner face, the portion intended for support of the main conductor, five sharply tapering longitudinal ribs 14, the tops of which are placed such that after arranging of the branch terminal and tightening of the coupling screw to be described hereinafter they are placed in contact with the main conductor.

Fig. 2 shows the branch terminal 1 in the situation where the two clamping parts 2 and 3, after having being placed from both sides over a main conductor 15 with insulating sheath 16, are connected to each other by means of the snap edges 7, 9. Contact block 10 is provided with a threaded hole 17 which can be positioned coaxially with the through-hole 11 in the upper clamping part 2. A screw to be fitted in threaded hole 17 can thus be tightened from outside. Threaded hole 17 is a through-hole, as is shown in fig. 3, so that coupling screw 18 can be tightened from outside. As a result of this tightening the insulating sheath 16 is pierced by the relevant head of screw 18 so that screw 18 comes into contact with main conductor 15, so that a conducting contact results between this main conductor 15 and contact block 10. Two through-holes 19, 20 extend in the direction of main conductor 15 and serve to receive the respective branch conductors 21, 22. These can be fixed in place by means of screws 23, 24 that can be tightened from outside. For this purpose the through-holes 12, 13 are in register with the threaded holes 25, 26 in the brass contact block 10 intended for the screws 23, 24.

It will be apparent that in this way a firm fixing of main cable 15, 16 can be obtained while a good electrically conducting contact is ensured between main conductor 15 on the one hand and the branch conductors 21, 22 on the other via coupling screw 18 and contact block 10.

It is noted that in the embodiment under consideration a sector-shaped main conductor is applied which may for instance form part of a multicore cable.

As already remarked, the figures 2 and 3 show the situation where a conducting contact does in fact already exist between main conductor 15 and contact block 10. Fig. 4 shows however the manner in which a substantially constant contact force is ensured. In fig. 4 the corresponding elements are designated with the same reference numerals as in the previous figures. A difference will be found in the coupling screw 27 which deviates from the coupling screw 18 according to the first embodiment discussed above in so far that screw 27 displays a cutter head 28 of relatively small diameter, while a stop collar 29 connects thereto. In this way a hole can be cut into main conductor 15, after which stop collar 29 then serves as a permanent pressure surface and can in addition form an indication of when to stop tightening of coupling screw 27. When coupling screw 27 is further tightened no further cutting by cutter head 28 into the material of main conductor 15 will take place, but the screw will react to an increasing extent against contact block 10 which as a result will show a tendency to start moving upward. As a result of this upward directed movement a related pressure force is exerted on the upper wall pat 30 of the upper clamping part 2 that is convex in the direction of contact block 10. As is shown clearly when fig. 4 and fig. 3 are compared, this upper wall part 30 springs a little upward to the position shown in fig. 4. Achieved in this way as a consequence of the stiff character of upper clamping part 2, caused on the one hand by its shape and on the other by the stated choice of material, is that an elastic bias occurs which expresses itself in a tensile force in the legs 5, 6, 8. This tensile force translates itself into a clamping force with which the main conductor is held in position in branch terminal 1. With continued tightening of coupling screw 27 the upper wall part 30 is pressed completely flat against the upper surface of contact block 10, following which, if contact screw 27 is further tightened, a great tensile force can result in the legs 5, 6, 8. A virtually constant and always sufficiently great contact force between coupling screw 27 and main conductor 15 is ensured as a result of this construction, even after a very long period of time and also after casting of the entire coupling in an insulating mass.

As fig. 4 shows, the free upper face of coupling screw 27 is situated in the final position a little way beneath the outer surface of upper wall part 30. If desired the through-hole 11 may in that case be closed by means of a stopper (not drawn).

The branch terminal can also be fitted voltage-free by first coupling the branch conductors 21, 22 with contact block 10 by tightening of the screws 23, 24 and by only then connecting coupling screw 18 or 27 to main conductor 15.

Fig. 5 shows a coupling screw 31 of which the leading end face, i.e. the active surface to be placed in contact with main conductor 15, displays a cutting ege. This cutting edge is a part of a through-hole 33 arranged by means of a symbolically designated drill 32. The central axis of hole 33 and the central axis of screw 31 lie in the same plane and form an angle with each other. The through-hole 33 extends between the leading end face 34 of screw 31 and the outer envelope surface thereof.

Fig. 6 shows the leading end face with the hole 33. An arrow 35 shows the rotation direction of screw 31 during the fixing in position against main conductor 15. During this rotation the rearmost portion (designated with 36) of the edge of the hole 33 acts as cutting edge.

A very reliable contact between main conductor 15 and screw 31 is hereby ensured, while this screw 31 nevertheless displays a very simple construction.

Claims

1. Branch terminal (1) for connecting at least one electrical branch conductor (21,22) to a continuous electrical main conductor (15), which branch terminal (1) comprises an electrically conducting contact block (10) which can be clamped in position by clamping means (2,3) on said main conductor (15), with which block (10) an electrically conducting coupling screw (18;27;31) rotatable from outside co-operates by means of a threaded hole (17), whereby said clamping means (2,3) support said main conductor (15) on its side facing away from said coupling screw (18;27;31), and said contact block (10) displays for each branch conductor a hole (19,20) for receiving thereof and a screw (23,24) rotatable from outside for fixing in place of that branch conductor (21,22) in that hole (19,20), in which

said clamping means (2,3) consist of two separate, U-shaped clamping parts (2,3) which can be placed over said main conductor (15) from two sides and are coupled to each other while enclosing said contact block (10),

the clamping parts (2,3) can be connected to each other by a snap coupling, comprising a plurality of snap edges (7,9) following on from one another in the coupling direction (4) of the clamping parts (2,3), such that the interval over which said clamping parts (2,3) are coupled to

each other can be selected,

characterized in that the coupling screw (18;27;31) can be placed in contact with said main conductor (15) by rotation, and that

at least one of the legs of the clamping part (2) comprise a U-shaped structure with two legs (5,6) of which the surfaces facing each other are provided with snap edges (7) extending in transverse direction relative to the coupling direction (4) of the clamping parts (2,3) and following on from one another in this direction (4) and which can co-operate for snapping with snap edges (9) present on the leg (8) of the other clamping part (3).

2. Branch terminal as claimed in claim 1, characterized in that the clamping parts (2,3) consist of a mechanically strong plastic.

3. Branch terminal as claimed in claim 2, characterized in that the plastic is reinforced.

4. Branch terminal as claimed in any of the preceding claims, characterized in that the clamping part (3) supporting the main conductor (15) displays a number of sharp projections (14), the tops of which are positioned such that they can all be placed in contact with said main conductor (15) by tightening of the coupling screw (18;27;31).

5. Branch terminal as claimed in any of the preceding claims, characterized in that the coupling screw (27) has a head (28) which can be set in co-operation with the main conductor (15), this head having a cutter face and a stop collar (29).

6. Branch terminal as claimed in any of the preceding claims, characterized in that the contact block (10) is enclosed in one of the clamping parts (2), the coupling screw (18;27;31) is rotatable via a through-hole (11) present in that clamping part (2) and that the wall part containing that hole is resilient such that after tightening of said coupling screw that wall part exerts an elastic force on said contact block (10), as a result of which a permanent contact with a substantially constant contact force between said coupling screw (18;27;31) and the main conductor (15) is ensured.

7. Method for manufacturing a coupling screw (31) for use with a branch terminal (1) as claimed in anyone of the preceeding claims, characterized in that

a screw (31) is provided and a hole (33) is drilled through the active leading end face (34) thereof, such that the central axis of said drilled hole (33) lies in the same plane as the central axis of the screw (31) and makes an angle therewith; the hole (33) thereby obtaining a non-round edge, at least a part of said edge serving as a cutting edge (36), said nonround edge having a substantial radial component.

8. Method as claimed in claim 7, characterized in that the through-hole (33) extends between the leading end face (34) of the screw (31) and its outer envelope surface.

9. Coupling screw obtained with a method as claimed in any of the claims 7 and 8

Revendications

1. Borne de dérivation (1), pour relier au moins un conducteur de dérivation électrique (21,22) à un conducteur principal électrique continu (15), la borne de dérivation (11) comprenant un bloc de contact (10) conducteur de l'électricité, pouvant être serré en position, à l'aide de moyens de serrage (2,3), sur le conducteur principal (15), bloc (10) avec lequel une vis de couplage (18,27,31) conductrice de l'électricité, susceptible d'être vissée de l'extérieur, coopère au moyen d'un trou taraudé (17), de manière que ledit moyen de serrage (2,3) supporte ledit conducteur principal (15) sur sa face opposée à ladite vis de couplage (18,27,31), et ledit bloc de contact (10) offrant à chaque conducteur de dérivation un trou (19,20) pour le recevoir et une vis (23,24), susceptible d'être tournée de l'extérieur, pour fixer en place ce conducteur de dérivation (21,22) dans ce trou (14,20), dans laquelle

ledit moyen de serrage (2,3) consiste en deux parties de serrage en forme de U (2,3) séparées, pouvant être placées sur ledit conducteur principal (15), depuis deux faces et couplés l'un à l'autre tout en enfermant ledit bloc de contact (10),

les parties de serrage (2,3) peuvent être reliées l'une à l'autre par un accouplement à déclic, comprenant une pluralité de bords d'encliquetage (7,9) qui se suivent dans la direction de l'accouplement (4) des parties de serrage (2,3), de façon que l'espacement suivant lequel lesdites parties de serrage (2,3) sont couplées entre elles puisse être sélectionné,

caractérisée en ce que la vis de couplage (18;27;31) peut être placée en contact avec ledit conducteur principal (15), par rotation, et en ce que

au moins une des pattes de la partie de

serrage (2) présente une structure en U avec deux pattes (5;6) dont les surfaces tournées l'une vers l'autre sont pourvues de bords à déclic (7) qui s'étendent dans une direction transversale par rapport à la direction de couplage (4) des parties de serrage (2,3) et en se suivant les unes les autres dans cette direction (4) et pouvant coopérer pour s'encliqueter avec les bords à déclic (9) présents sur la patte (8) de l'autre partie de serrage (3).

2. Borne de dérivation selon la revendication 1, caractérisée en ce que les parties de serrage (2,3) sont composées en matière synthétique mécaniquement résistante.

3. Borne de dérivation selon la revendication 2, caractérisée en ce que la matière synthétique est renforcée.

4. Borne de dérivation selon l'une quelconque des revendications précédentes, caractérisée en ce que la partie de serrage (3) qui supporte le conducteur principal (15) offre un certain nombre de saillies vives (14), dont les pointes sont positionnées de telle façon qu'elles puissent toutes être placées en contact avec ledit conducteur principal (15), par serrage de la vis de couplage (18;27;31).

5. Borne de dérivation selon l'une quelconque des revendications précédentes, caractérisée en ce que la vis de couplage (27) présente une tête (28) qui peut être placée en coopération avec le conducteur principal (15), cette tête présentant une face tranchante et une collerette de butée (29).

6. Borne de dérivation selon l'une quelconque des revendications précédentes, caractérisée en ce que le bloc de contact (10) est enfermé dans l'une des parties de serrage (2), la vis de couplage (18;27;31) étant susceptible d'être tournée en passant par un trou traversant (11) présent dans cette partie de serrage (2) et en ce que la partie de paroi contenant ce trou est d'une élasticité telle qu'après le serrage de ladite vis de couplage, cette partie de paroi exerce une force élastique sur ledit bloc de contact (10), à la suite de laquelle est assuré un contact permanent avec une force de contact constante notable entre ladite vis de couplage (18;27;31) et le conducteur principal (15).

7. Procédé de fabrication d'une vis de couplage (31) pour utilisation avec une borne de dérivation (1) selon l'une quelconque des revendications précédentes, caractérisé en ce qu'une vis (31) est prévue et en ce qu'un trou (33) est percé dans sa face d'extrémité avant (34) active, de telle façon que l'axe central dudit trou (33) percé se situe dans le même plan que l'axe central de la vis (31) et fasse un angle avec ce dernier; le trou (33) étant de cette manière doté d'un bord non rond, au moins une partie dudit bord servant de bord tranchant (36), ledit bord non rond ayant une composante radiale notable.

8. Procédé selon la revendications 7, caractérisé en ce que le trou traversant (33) s'étend entre la face d'extrémité avant (34) de la vis (31) et sa surface d'enveloppe.

9. Vis d'accouplement réalisée selon le procédé revendiqué dans l'une quelconque des revendications 7 et 8.

Patentansprüche

1. Abzweigklemme (1) zum Anschluß zumindestens eines elektischen Zweigleiters (21,22) an einen durchgehenden elektrischen Hauptleiter (15), wobei die Abzweigklemme (1) einen elektrisch leitenden Kontaktblock (10) aufweist, der an seinem Platz an dem Hauptleiter (15) mit Hilfe von Klemmeinrichtungen (2,3) festgeklemmt werden kann und mit dem eine elektrisch leitende, von der Außenseite aus drehbare Kupplungsschraube (18;27;31) mit Hilfe einer Gewindebohrung (17) zusammenwirkt, wobei die Klemmeinrichtungen (2,3) den Hauptleiter (15) auf seiner von der Kupplungsschraube (18;27;31) fort gerichteten Seite haltern und der Kontaktblock (10) für jeden Zweigleiter eine Bohrung (19,20) zu dessen Aufnahme und eine Schraube (23,24) aufweist, die von der Außenseite drehbar ist, um diesen Zweigleiter (21,22) in der Bohrung (19,20) festzulegen, und wobei

die Klemmeinrichtungen (2,3) aus zwei getrennten U-förmigen Klemmteilen (2,3) bestehen, die von zwei Seiten aus über den Hauptleiter (15) aufsetzbar sind und die miteinander gekuppelt werden, wobei sie den Kontaktblock (10) umschließen,

die Klemmteile (2,3) miteinander über eine Rastkupplung verbindbar sind, die eine Mehrzahl von Rastkanten (7,9) umfaßt, die aufeinanderfolgend in der Kupplungsrichtung (4) der Kleeteile (2,3) derart angeordnet sind, daß die Strecke, über die die Klemmteile (2,3) miteinander gekuppelt sind, auswählbar ist,
dadurch **gekennzeichnet,** daß die Kupplungsschraube (18;27;31) durch Drehung mit dem

Hauptleiter (15) in Kontakt bringbar ist, und daß zumindestens einer der Schenkel des Klemmteils (2) eine U-förmige Gestalt mit zwei Schenkein (5,6) aufweist, deren aufeinander gerichtete Oberflächen mit Rastkanten (7) versehen sind, die sich in Querrichtung bezüglich der Kupplungsrichtung (4) der Klemmteile (2,3) erstrecken und aufeinanderfolgend in dieser Kupplungsrichtung (4) angeordnet sind, und die für eine Einrastung mit Rastkanten (9) zusammenwirken können, die auf dem Schenkel (8) des anderen Klemmteils (3) vorgesehen sind.

2. Abzweigklemme nach Anspruch 1, dadurch **gekennzeichnet,** daß die Klemmteile (2,3) aus einem mechanisch festen Kunststoff bestehen.

3. Abzweigklemme nach Anspruch 2, dadurch **gekennzeichnet,** daß das Kunststoffmaterial verstärkt ist.

4. Abzweigklemme nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet,** daß der den Hauptleiter (15) halternde Klemmteil (3) eine Anzahl von scharfen Vorsprüngen (14) aufweist, deren Oberkanten derart angeordnet sind, daß sie alle durch Festziehen der Kupplungsschraube (8;27;31) in Berührung mit dem Hauptleiter (15) gebracht werden können.

5. Abzweigklemme nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet,** daß die Kupplungsschraube einen Kopf (28) aufweist, der in zusammenwirkende Beziehung mit dem Hauptleiter (15) bringbar ist, wobei dieser Kopf eine Schneidfläche und einen Anschlagbund (29) aufweist.

6. Abzweigklemme nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet,** daß der Kontaktblock (10) in einem der Klemmteile (2) eingeschlossen ist, daß die Kupplungsschraube (18;27;31) über eine durchgehende Bohrung (11) in dem Klemmteil (2) drehbar ist, und daß der diese Bohrung enthaltende Wandteil elastisch ist, so daß dieser Wandteil nach dem Festziehen der Kupplungsschraube eine elastische Kraft auf den Kontaktblock (10) ausübt, wobei als Ergebnis ein dauernder Kontakt mit einer im wesentlichen konstanten Kontaktkraft zwischen der Kupplungsschraube (18;27;31) und dem Hauptleiter (15) sichergestellt ist.

7. Verfahren zur Herstellung einer Kupplungsschraube (31) zur Verwendung mit einer Abzweigklemme (1) nach einem der vorhergehenden Ansprüche, dadurch **gekennzeichnet,** daß eine Schraube (31) vorgesehen wird und eine Bohrung (33) durch die aktive vordere Endfläche (34) der Schraube derart gebohrt wird, daß die Mittelachse der Bohrung (33) in der gleichen Ebene wie die Mittelachse der Schraube (31) liegt und mit dieser einen Winkel bildet, wobei die auf diese Weise erzielte Bohrung eine unrunde Kante aufweist, von der zumindestens ein Teil als Schneidkante (36) wirkt, wobei die unrunde Kante eine im wesentlichen radiale Komponente aufweist.

8. Verfahren nach Anspruch 7, dadurch **gekennzeichnet,** daß die durchgehende Bohrung (33) sich zwischen der vorderen Endfläche (34) der Schraube (31) und ihrer äußeren Mantelfläche erstreckt.

9. Kupplungsschraube, die nach einem Verfahren nach einem der Ansprüche 7 und 8 hergestellt ist.

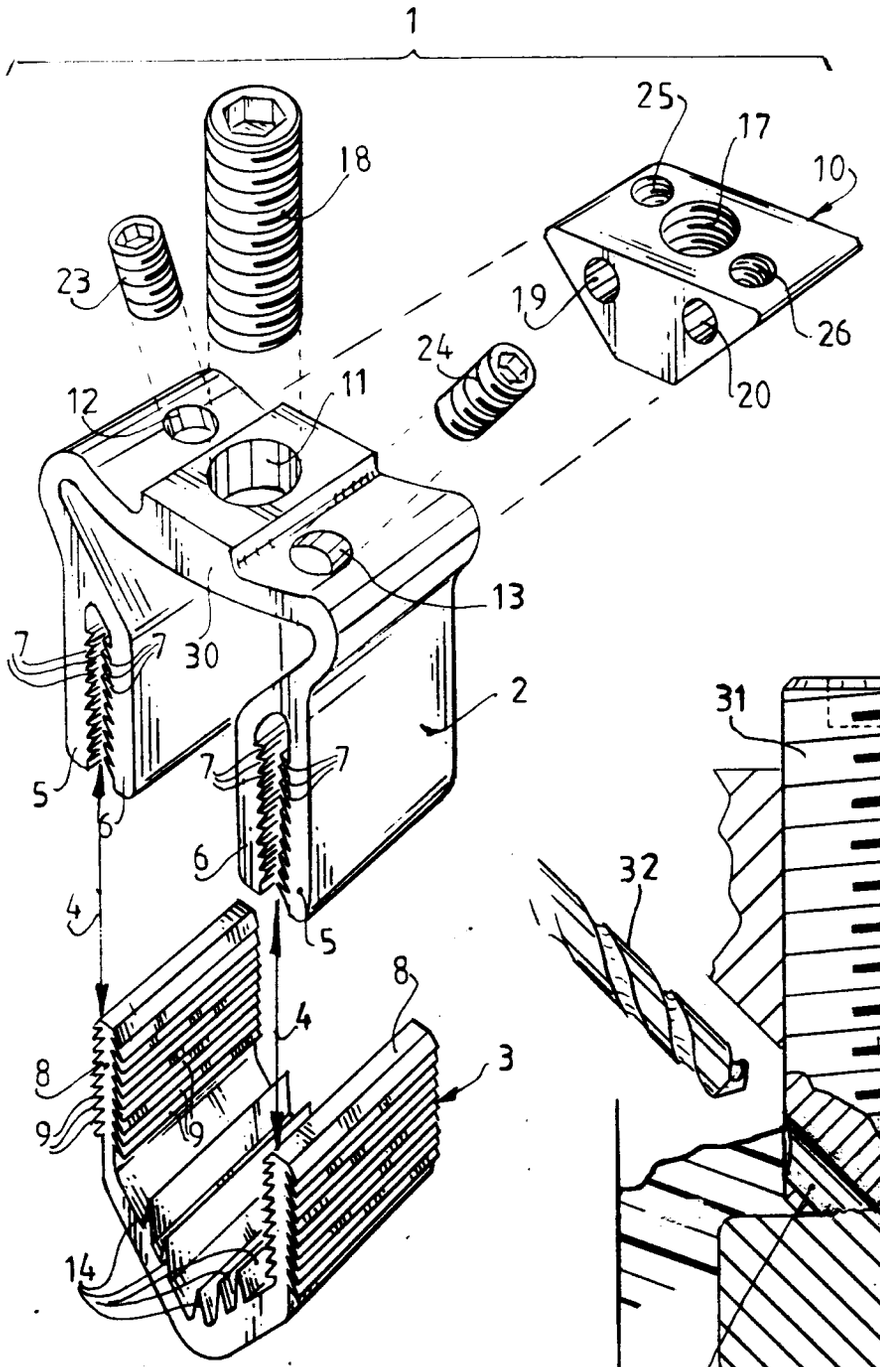

FIG.1

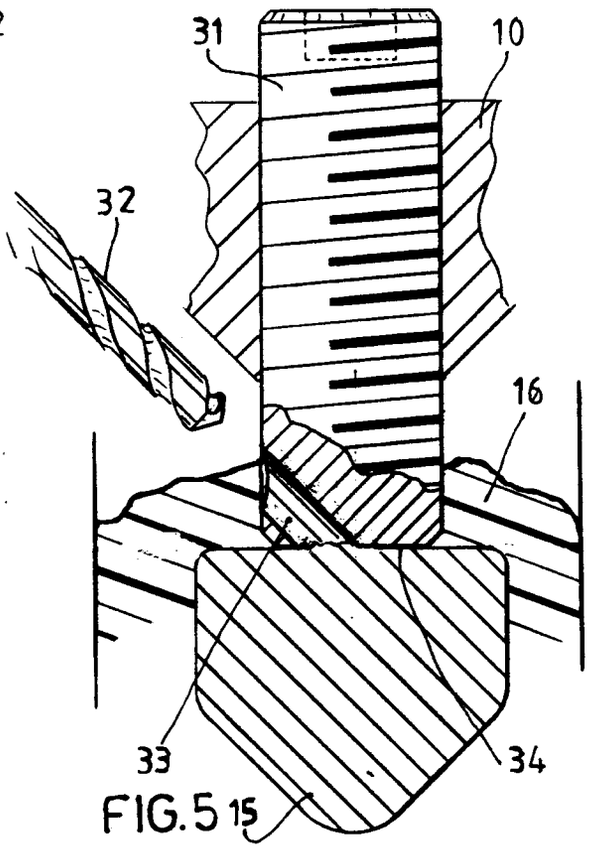

FIG.5

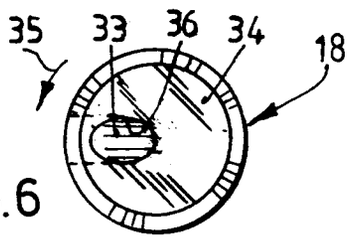

FIG.6

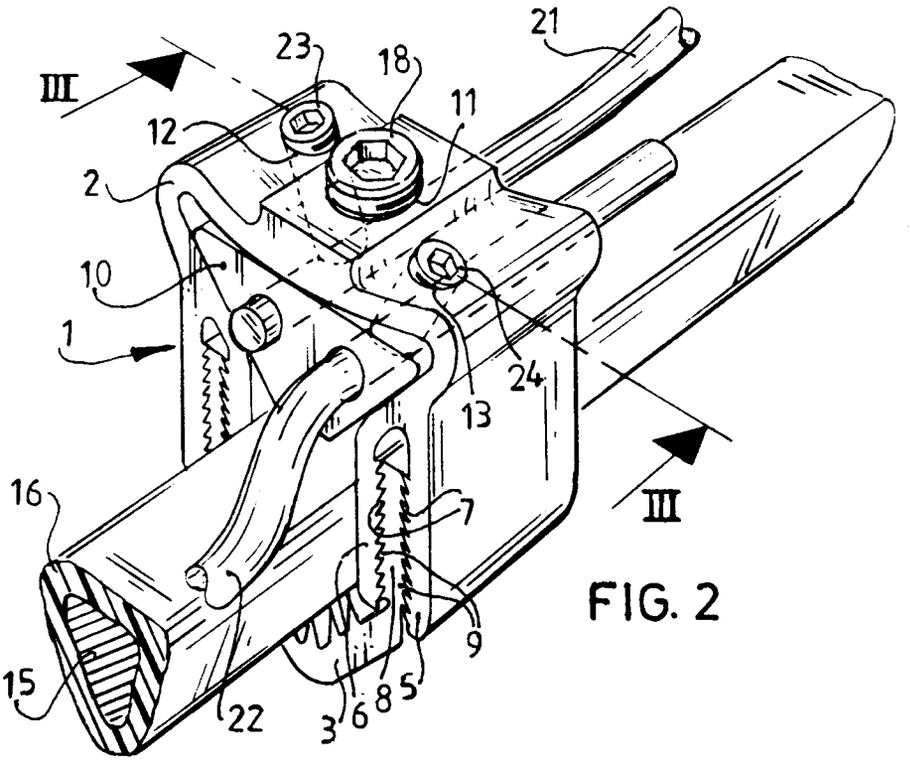

FIG. 2

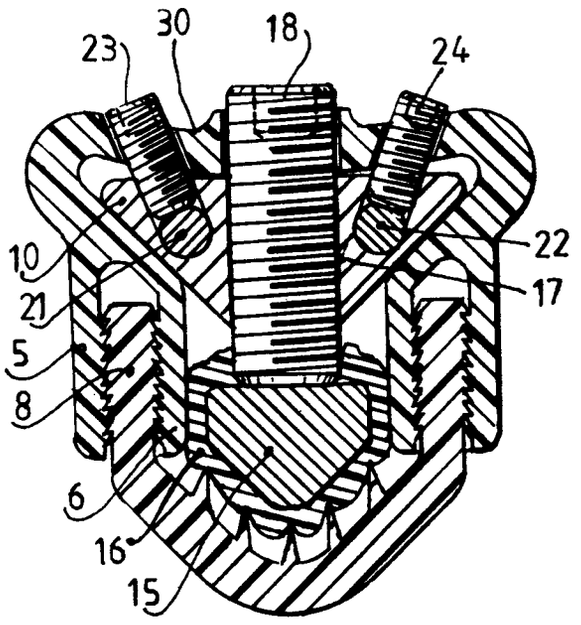

FIG. 3

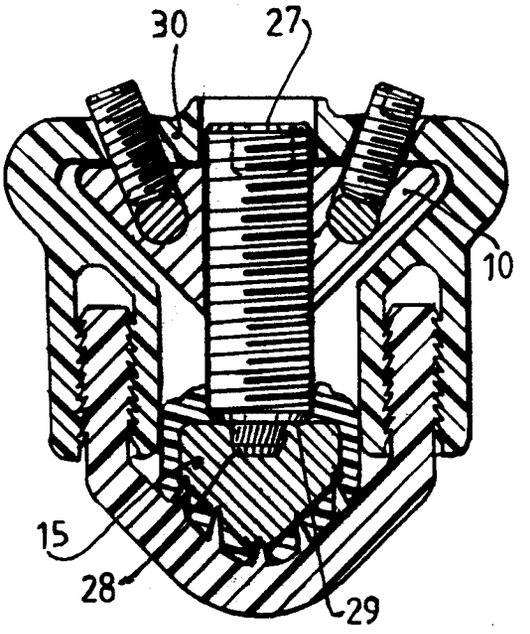

FIG. 4