AUSTRALIA 677682

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NOTICE OF ENTITLEMENT

We, FELTEN & GUILLEAUME AUSTRIA AG, of A-3943 Schrems-Eugeria 1 Austria, being the applicant in respect of Application No. 72369/94 state the following:-

The Person nominated for the grant of the patent has entitlement from the actual inventors by assignment.

The person nominated for the grant of the patent is the applicant of the application listed in the declaration under Article 8 of the PCT.

The basic application listed In the declaration made under Article 8 of the PCT is the first application made in a Convention country in respect of the invention.

By our Patent Attorneys,
WATERMARK PATENT & TRADEMARK ATTORNEYS

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Stephen K. Plymin

Registered Patent Attorney

11th February, 1997

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OVERVOLTAGE PROTECTION DEVICE

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(56) Prior Art Documents
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DE 3805890

(57) Claim

1. An overvoltage protection device with two or more protective elements designed as varistors accommodated in a housing, whose earth electrodes are electrically interconnected by means of a strip with a contact piece, whereby the other mains electrodes are connected to contacts by means of separators connected in series to the protective elements, wherein all separators are arranged in the pivoting region of the web of an essentially U-shaped bail designed as a rocker and swivel-mounted in the housing, and in that a displaceably mounted actuating bolt bears on the web and an indicating device is arranged on the bail also.

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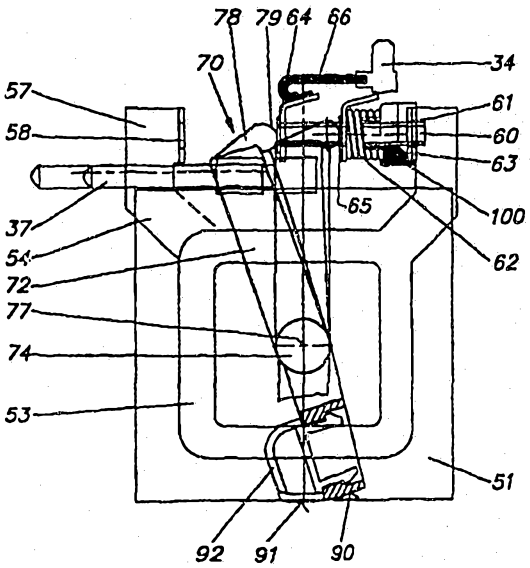
(54) Title: OVERVOLTAGE PROTECTION DEVICE

(54) Bezeichnung: ÜBERSPANNUNGSSCHUTZVORRICHTUNG

(57) Abstract

An overvoltage protection device (2) has a plurality of varistors (51) fitted in a housing, whose earth electrodes are electrically interconnected via a strip (58). The mains electrodes (53) of the varistors are connected to contacts (34) via separators (60, 61). The separators consist of a push-rod in the form of a tubular rivet (60) connected to the electrodes (53) via a soft-soldered point (61). The push-rod (60) can move in a guide (100) of insulating material. One end of each push-rod (60) act together with a rocker (70) shared by all the separators which can pivot in the overvoltage protection device. On triggering, i.e. when one of the varistors (51) is overloaded, the soft-soldered connection (61) opens and the push-rod (60) concerned, actuated by a release spring (62), pivots the rocker (70) so that further switching operations are triggered. The rocker (70) also bears an indicating device (90, 91) visible through a window in the housing of the overvoltage protecting device (2), making it possible to see from outside that one of the separators (60, 61) has been triggered. As a single rocker (70) is allocated to all the separators, the design of the overvoltage protecting device is simple.



(57) Zusammenfassung

Eine Überspannungsschutzvorrichtung (2) besitzt mehrere in einem Gehäuse untergebrachte Varistoren (51), deren erdleitungsseitige Elektroden über eine Leiste (58) elektrisch leitend miteinander verbunden sind. Die netzseitigen Elektroden (53) der Varistoren sind über Abtrennvorrichtungen (60, 61) mit Kontaktstücken (34) verbunden. Die Abtrennvorrichtungen bestehen aus einem als Rohrniet (60) ausgebildeten Stössel, der mit den Elektroden (53) über eine Weichlotstelle (61) verbunden ist. Der Stössel (60) ist in einer Führung (100) aus Isolierwerkstoff verschiebbar aufgenommen. Jeder der Stössel (60) wirkt mit einem seiner Enden mit einer allen Abtrennvorrichtungen gemeinsamen Wippe (70) zusammen, die in der Überspannungsschutzvorrichtung verschwenkbar ist. Im Auslösefall, d.h. bei Überlastung eines der Varistoren (51), öffnet sich die Weichlotverbindung (61) und der betroffene Stössel (60) verschwenkt, angetrieben durch eine Auslösefeder (62) die Wippe (70), die ihrerseits einen Betätigungsstift (37) verschiebt, so daß weitere Schaltvorgänge ausgelöst werden. Die Wippe (70) trägt weiters eine Anzeigevorrichtung (90, 91), die durch ein Fenster im Gehäuse der Überspannungsschutzvorrichtung (2) sichtbar ist, so daß von außen erkennbar ist, daß eine der Abtrennvorrichtungen (60, 61) ausgelöst hat. Dadurch, daß allen Abtrennvorrichtungen eine einzige Wippe (70) zugeordnet ist, ergibt sich eine einfache Konstruktion der Überspannungsschutzvorrichtung.

OVERVOLTAGE PROTECTION DEVICE

The present invention relates to an overvoltage protection device with two or more protective elements designed as varistors accommodated in a housing, whose earth electrodes are electrically interconnected by means of a strip with a contact piece, whereby the other mains electrodes are connected to contacts by means of separators connected in series to the protective elements.

The object of the invention is to improve known devices of the type initially mentioned and to simplify them in structure, without disadvantageously impairing the protective properties.

This task is solved by all separators being arranged in the pivoting region of the web of an essentially U-shaped bail designed as a rocker and swivel-mounted in the housing, and by a displaceably mounted actuating bolt bearing on the web and by an indicating device being arranged on the bail also.

Preferred and advantageous embodiments of the overvoltage protection device according to the present invention are the object of the sub-claims.

As a common rocker is allocated to all the separators, in turn allocated to protective elements installed in the overvoltage protection device, the construction is simplified. All the same it is ensured that when only one of the separators is opened (released) the actuating bolt is displaced and the provided release indicating device reaches the position which indicates that an exchange of the overvoltage protection device is necessary.

Further details and features of the invention will emerge from the following description of an embodiment of the invention, namely an insert designed as block conductor (overvoltage protection device) which is inserted exchangeably into an instrument base.

Figure 1 shows the block conductor inserted into the instrument base, from the front,

Figure 2 shows the combination of block conductor and instrument base of Figure 1 from the side,

Figure 3 shows the instrument base from the front,

Figure 4 shows the instrument base form the side,

Figure 5 shows the instrument base with the housing cover removed,

AUSTRALIAN PATENT OFFICE

Figure 6 shows the instrument base without cover in partial section,

Figure 7 shows the insert, viewed from below,

Figure 8 shows the insert, viewed from behind,

Figure 9 shows the insert, viewed from below, with partially removed housing wall,

Figure 10 shows the insert, viewed from behind, with the housing cover removed,

Figure 11 shows the insert without housing cover, after a separator has opened,

Figure 12 shows the overvoltage protection device without housing,

Figure 13 shows the rocker of the overvoltage protection device, and

Figure 14 shows the rocker in side elevation.

In the following description the terms 'above', 'below', front', 'behind' refer to the orientation of instrument base 1 shown in Figures 1 and 2 and of the insert 2 engaged therein, in which an overvoltage protection device, for example, is accommodated.

Instrument base 1 is designed essentially in a U-shape in cross-section, as in Figure 2, whereby a device comprising a hooked projection 3 and a spring-loaded snap slide 4 is provided at its rear (therefore 'behind'), by means of which instrument base 1, as is known, can be snap-locked onto a support rail mounted in a switch cabinet.

In upper leg 5 of instrument base 1 illustrated in the ready position in Figures 1 and 2 terminals 6 for three external leads and a terminal 6' for the neutral lead are arranged, the development of which is evident from Figures 5 and 6.

In lower leg 7 of instrument base 1 illustrated in the ready position a terminal 8 for the earth lead as well as two auxiliary contacts 9 and 10 for an integrated auxiliary switch (closer) are arranged.

A contact angle 11 departs from each contact terminal 6, 6' and 8, to which a spring contact 12 is connected. Contacts 12 project from legs 5 and 7 into the web of instrument base 1. The free ends of contacts 12 are pressed forwards by contact springs 13, therefore into the space between both legs 5 and 7 of instrument base 1.

A leaf spring 17 is connected to auxiliary terminal 9, which can be bent by an actuating bolt 37 bearing on auxiliary terminal 10 in a manner yet to be described in detail, such that auxiliary terminals 9 and 10 are interconnected electrically conductively.

Contacts 12 are accessible by way of apertures 18 in forward pointing middle part 19 of housing cover 20 sealing instrument base 1 internally, as in Figures 3 and 4.

AUSTRALIAN PATENT OFFICE 13

Formed in upper and lower wall parts 21, 22 of housing cover 20 of instrument base 1 are gripping recesses 23 and 24 which at their deepest point run into a boss 25 which are designed undercut to the web of instrument base 1, as in Figure 2.

Provided in the wall part covering lower leg 7 of instrument base 1 of housing cover 20 in its upwards pointing wall part with the instrument base in the ready position is a slot 27 open to its inside, through which contact spring 17 is accessible.

Insert 2 has a housing composed of a cover 30 and a trough 31. Projecting through the rear floor of housing cover 30 in the ready position are a contact 33 and four contacts 34 which through apertures 18 in wall part 19 of housing cover 20 of instrument base 1 lie on contacts 12 of three contact terminals 6 for the external leads and contact terminal 6' for the neutral lead, whenever insert 2 is snap-locked with instrument base 1, as shown in Figures 1 and 2.

Provided on a wall of trough 31 of insert 2 is a projecting fin 35 which engages in slot 27 at insert 2 inserted into instrument base 1, such that insert 2 can be mounted solidly on instrument base 1.

Projecting through an aperture 36 in the vicinity of the upper edge of trough 31 of the housing of insert 2 is actuating bolt 37 which cooperates with contact spring 17 in instrument base 1 in a manner yet to be described.

Another two apertures 38 sealed by synthetic cups for test contacts and a viewing window 39 for a release display 90, 91 is provided on the front side, that is, on the forwards pointing floor of trough 31 of the housing of insert 2.

Provided on cover 30 of the housing of insert 2 are two snap-lock arms 40 which engage in corresponding recesses in the side walls of trough 31 of the housing of insert 2 Each snap-lock arm 40 bears an actuating projection 41 and two likewise outwards pointing detents 42 which lock into place behind detents 25 of instrument base 1 on insert 2 snap-locked with instrument base 1. In order to remove insert 2 from the instrument base, it suffices to press from both sides on actuating projections 41 such that projections 42 are released from detents 25 and insert 2 can be removed forwards from instrument base 1, that is, to the right in Figure 2. As a consequence actuating projections 41 are easily accessible because of gripping recesses 23, 24. It should be pointed out here that gripping recesses 23, 24 are covered by a screen in the installed position, that is. in a combination mounted in a switch cabinet of instrument base 1 and insert 2, that is, are not accessible without difficulty. Unauthorised handling is thereby at least impeded.

AUSTRALIAN PATENT OFFICE

In order to connect cover 30 of the housing on insert 2 to trough 31 there are four tongues 45 formed on cover 30, which bear inwards pointing catch projections (not illustrated here) on their free ends. Tongues 45 are taken up in grooves 46 in the outside of both longitudinal walls of trough 31, whereby their catch projections engage in holes 47 at cover 30 placed on trough 31. Holes 47 are provided at the rear ends of grooves 46.

With reference to Figures 9 to 14 the inner structure of insert 2 designed as overvoltage protection device is described hereinbelow.

In the illustrated embodiment four protective elements in the form of metallic oxide varistors are accommodated in a receiving space separated on one side by a wall 50 in trough 3. Each protective element 51 is inserted into its own receiving space, whereby the receiving spaces are separated from one another by partitions 52.

Electrically conductive electrodes 53, 54 are connected to protective elements 51 on both sides. The arrangements of protective element 51 and both electrodes 53, 54 are secured in their receiving spaces by a (polyurethane) sealing compound 55. In order to achieve a uniform and common casting with level balance of sealing compound 55, partitions 52 are designed sufficiently long for them to end under upper edge 56 of trough 31.

Electrodes 54 are connected electrically conductively to a common conductor rail, which runs into contact 33, as in Figure 9, by means of terminal lugs 57. In the process electrodes 54 develop the 'earth side' of protective elements 51.

Placed between contacts 34 and electrodes 53 positioned on the 'mains side' of protective elements 51 are separators which respond during overload of protective element 51.

The separators are described hereinbelow with reference to Figure 12.

Each separator comprises a push-rod in the form of a hollow rivet 60 which is soldered by means of soft soldering 61 with a lug of electrodes 53. Secured to an angled part 63 of electrode 53 is an insulating piece 100, whereby a sleeve-shaped part of insulating piece 100 acts as guide for hollow rivet 60 and slidably receives in itself hollow rivet 60. A compression spring is stuck over insulating piece 10 as release spring, which is inserted between the widened end of insulating piece 100 attached to angled part 63 of electrode 53 and a contact plate 64 with prestress. Thus the end of reset spring 62 is electrically insulated from part 63 of the lug of electrode 53. Contact plate 64 rests on a flange 65 provided at the end of hollow rivet 60, with its side averted from compression spring 62. A flexible conducting cable 66 is connected electrically conductively to contact plate 64 and leads to respective contact 34.

AUSTRALIAN PATENT OFFICE

A rocker 70 is swivel-mounted in insert 2 and is illustrated in Figures 13 and 14. Rocker 70 is designed as a substantially U-shaped bail and has trunnions 73, 74 on both its legs 71, 72. Trunnions 73, 74 are swivel-mounted about an axle 77' in bearing recesses 75, 76 on the narrow walls of trough 31.

Four stops 78 are provided on web 77 of rocker 70 and are assigned to the end displaying flange 65 of hollow rivet 60 with their hemispherical cambered front sides 79.

Aforementioned actuating bolt 37 is mounted displaceably in trough 31. Actuating bolt 37 has a thickened end 80 which engages in a recess 81 on the end bearing longer leg 72 of web 77 of rocker 70. A reset spring, which holds actuating bolt 37 against web 77 of rocker 77, is inserted between thickened end 80 and a partition 82 in trough 31.

It is evident that actuating bolt 37 is displaced from the housing of insert 2 during pivoting of rocker 70 out of the essentially horizontal position of its legs 71, 72 (vertical in Figure 12) in the ready position illustrated in Figure 12 into the oblique position also illustrated in Figure 12 and presses contact springs 17 through slot 17 against auxiliary contact terminal 10, such that auxiliary contact terminals 9 and 10 are connected electrically conductively.

If a soldering point 61, which connects hollow rivet 60 to angled part 63 of the lug of electrode 53, is brought to a certain temperature, this soldering point 61 opens and hollow rivet 60 is moved by compression spring (release spring) 62, moved away from angled part 63 of electrode 53 and guided in insulating piece 100 with this movement. This insulating piece 100 guarantees insulation between angled part 63 of electrode 53 and release spring 62 after release, that is, a separation procedure. With this separation procedure (of varistor 51 from the mains supply), an air gap of 5 mm for instance arises between angled part 63 of electrode 53 and hollow rivet 60, guaranteeing the necessary withstand strength.

With the abovedescribed separation procedure, thus the opening of a soldering point 61 of any of the separators, assigned to the four varistors 51, rocker 70 is pivoted into the oblique position illustrated in Figure 12, as already mentioned. With this pivot movement of rocker 70 into its release position actuating bolt 37 is pushed out through the opening out of the housing of insert 2, as already mentioned.

The free end of longer leg 72 of rocker 70 acts as indicating device for all pole gaps of the overvoltage protection device. Through display window 39, in the forwards pointing floor of trough 31 in the ready position (Figures 1 and 2) either the green-coloured end surface 90 of leg 72 or the red-coloured end surface 91 of an indicator 92 is visible which is snap-locked with

AUSTRALIAN PATENT OFFICE

the free end of longer leg 74 of rocker 70, as is apparent from Figure 14 or 12. With the abovedescribed separation procedure the display visible in display window 39 changes from green (end surface 90) to red (end surface 91) and shows that it is necessary for insert 2 be exchanged.

For the required testing of a fault current circuit breaker two test contacts 95 are provided which are connected to an external conductor (upper test contact 95 in Figure 10) or to the earth (lower test contact 95 in Figure 10). As explained, test contacts 95 are accessible through openings sealed with synthetic cups 38, which are also provided in the floor of trough 31.

The invention can be summarised as follows:

An overvoltage protection device 1 has a plurality of varistors 51 fitted in a housing, whose earth electrodes are electrically interconnected by means of a strip 58. Mains electrodes 53 of the varistors are connected to contacts 34 by way of separators 60, 61. The separators consist of a push-rod in the form of a tubular rivet 60 connected to electrodes 53 by way of a soft-soldered point 61. Push-rod 60 can move in a guide 100 of insulating material. One end of each push-rod 60 acts together with a rocker 70 shared by all the separators which can pivot in the overvoltage protection device. On triggering, that is, when one of varistors 51 is overloaded, soft-soldered connection 61 opens and push-rod 60 concerned, actuated by a release spring 62 pivots rocker 70 so that further switching operations are triggered. Rocker 70 also bears an indicating device 90, 91 visible through a window in the housing of overvoltage protecting device 2, making it possible to see from outside that one of separators 60, 61 has been triggered. As a single rocker 70 is allocated to all the separators, the design of the overvoltage protecting device is simple.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An overvoltage protection device with two or more protective elements designed as varistors accommodated in a housing, whose earth electrodes are electrically interconnected by means of a strip with a contact piece, whereby the other mains electrodes are connected to contacts by means of separators connected in series to the protective elements, wherein all separators are arranged in the pivoting region of the web of an essentially U-shaped bail designed as a rocker and swivel-mounted in the housing, and in that a displaceably mounted actuating bolt bears on the web and an indicating device is arranged on the bail also.

2. Device as claimed in Claim 1, wherein the protective elements are inserted in upwardly open chambers provided in the housing of the overvoltage protection device and are cast therein with a sealing compound.

3. Device as claimed in Claim 2, wherein the protective elements are cast with a polyurethane sealing compound.

4. Device as claimed in any one of Claims 1 to 3, wherein the essentially U-shaped bail is swivel-mounted in the housing by means of trunnions formed on its legs.

5. Device as claimed in any one of Claims 1 to 4, wherein stops are formed on the web of the U-shaped bail and in that each stop is facing one of the separators.

6. Device as claimed in any one of Claims 1 to 5, wherein an end of the actuating bolt accommodated in the housing interior is taken up in a recess in the web of the bail.

AUSTRALIAN 13 PATENT OFFICE

7. Device as claimed in Claim 6, wherein the end of the actuating bolt disposed inside the housing of the protection device is enlarged and in that provided between a wall of the housing and the head is a compression spring which is stuck over the actuating bolt, such that the latter is pressed against the web of the rocker.

8. Device as claimed in any one of Claims 1 to 7, wherein the separator comprises a push-rod made of electrically conductive material, which is accommodated to move in a guide made of insulting material and which is attached by one end with the assistance of solder to the electrode.

9. Device as claimed in Claim 8, wherein the push-rod is connected by means of a contact plate and a flexible conductor cable to the contact piece.

10. Device as claimed in Claim 9, wherein the contact plate bears on a flange which is formed on the push-rod.

11. Device as claimed in any one of Claims 8 to 10, wherein the guide for the push-rod is attached to a lug projecting from the electrode, in particular an angled end of the same.

12. Device as claimed in either one of Claims 8 or 9, wherein a compression spring is stuck over the guide guiding the push-rod, which bears on a contact plate resting on a flange of the push-rod and on a flange of the guide, by means of which the latter is connected to the electrode.

13. Device as claimed in any one of Claims 1 to 12, wherein projections are formed on the web of the rocker, and extend towards the push-rods.

14. Device as claimed in Claim 13, wherein each end of the projections extending towards the push-rods is designed as semi-circular.

AUSTRALIAN PATENT OFFICE

15. Device as claimed in any one of Claims 1 to 14, wherein a leg of the rocker is extended beyond its pivot axis and is designed as release indicator, and in that a display window is provided opposite the end of the leg in the housing of the overvoltage protection device.

16. Device as claimed in any one of Claims 6 to 15, wherein the push-rod is designed as a hollow rivet.

DATED this 11th day of February, 1997.

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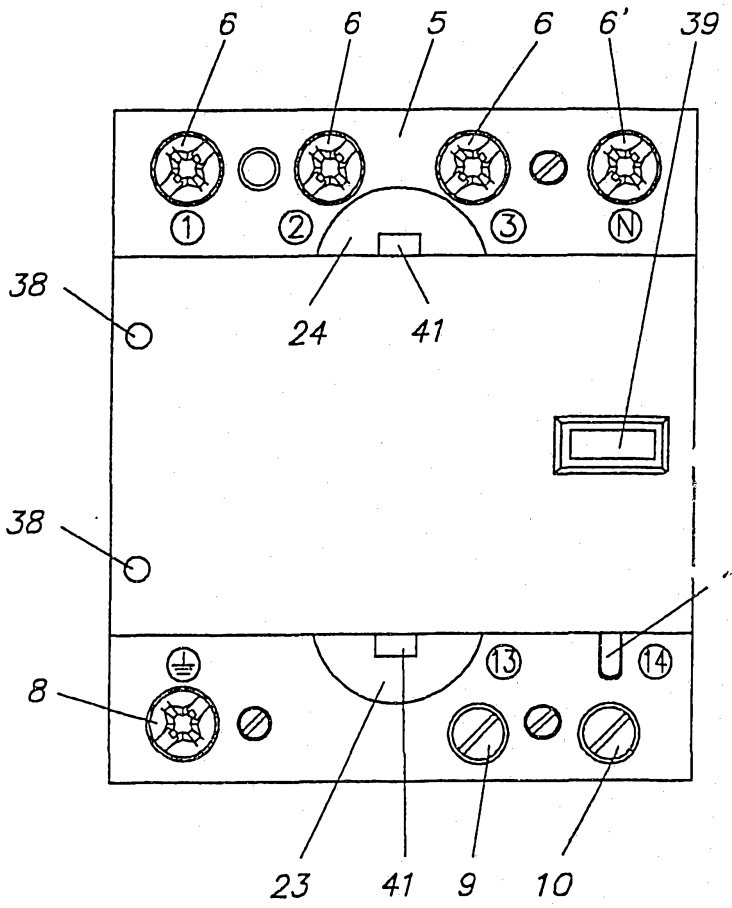
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Fig. 1

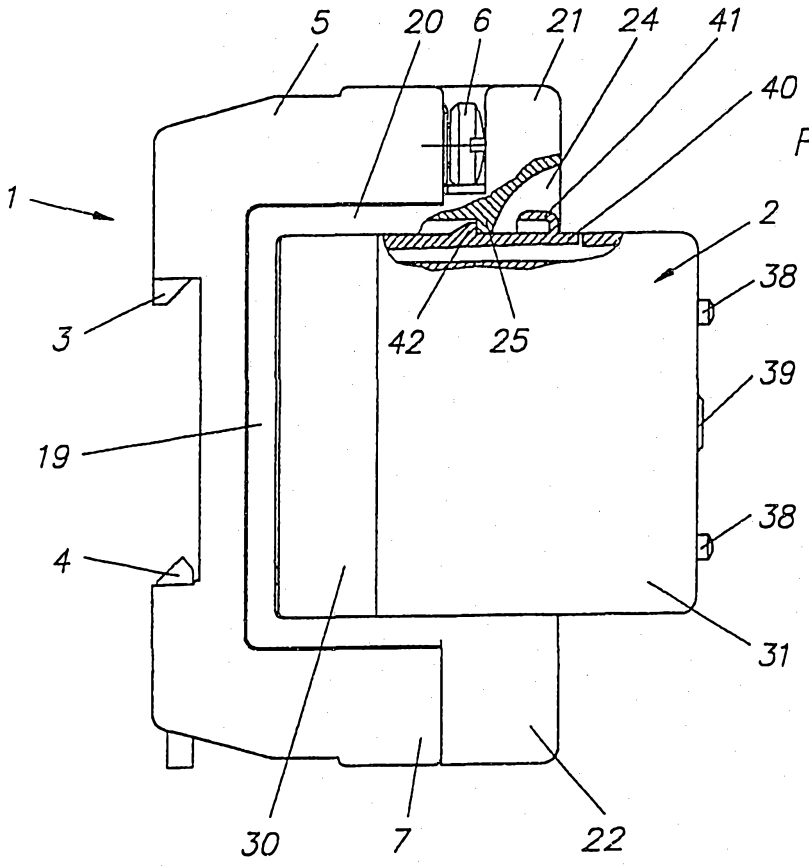
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Fig. 2

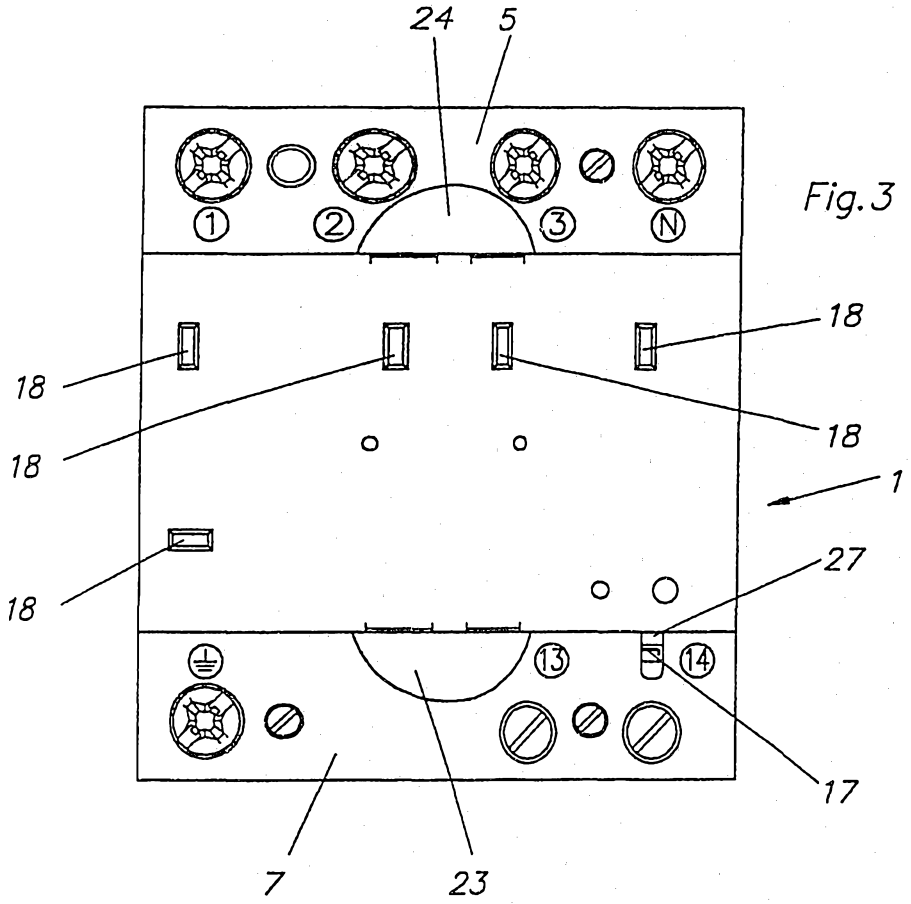


Fig.3

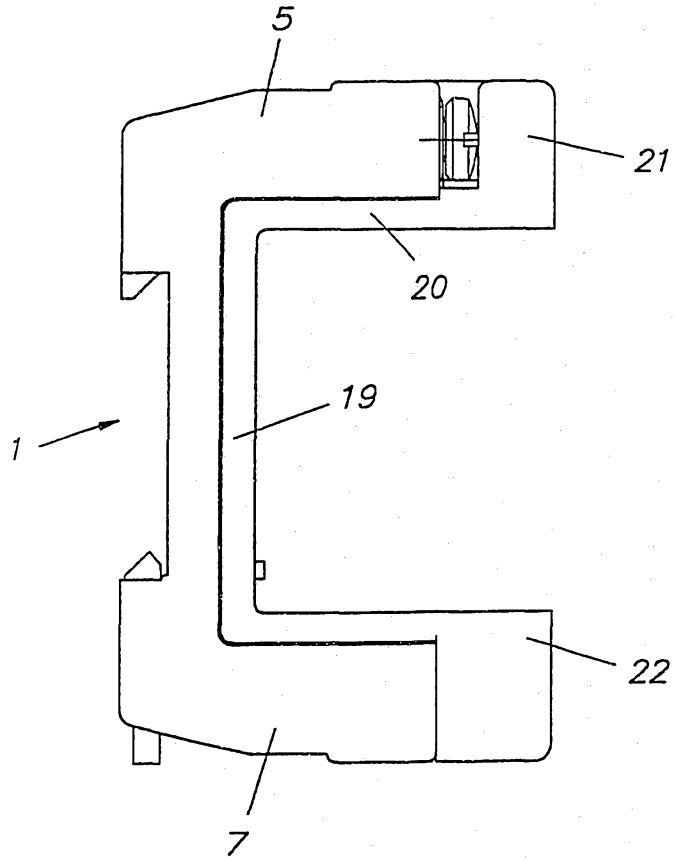


Fig.4

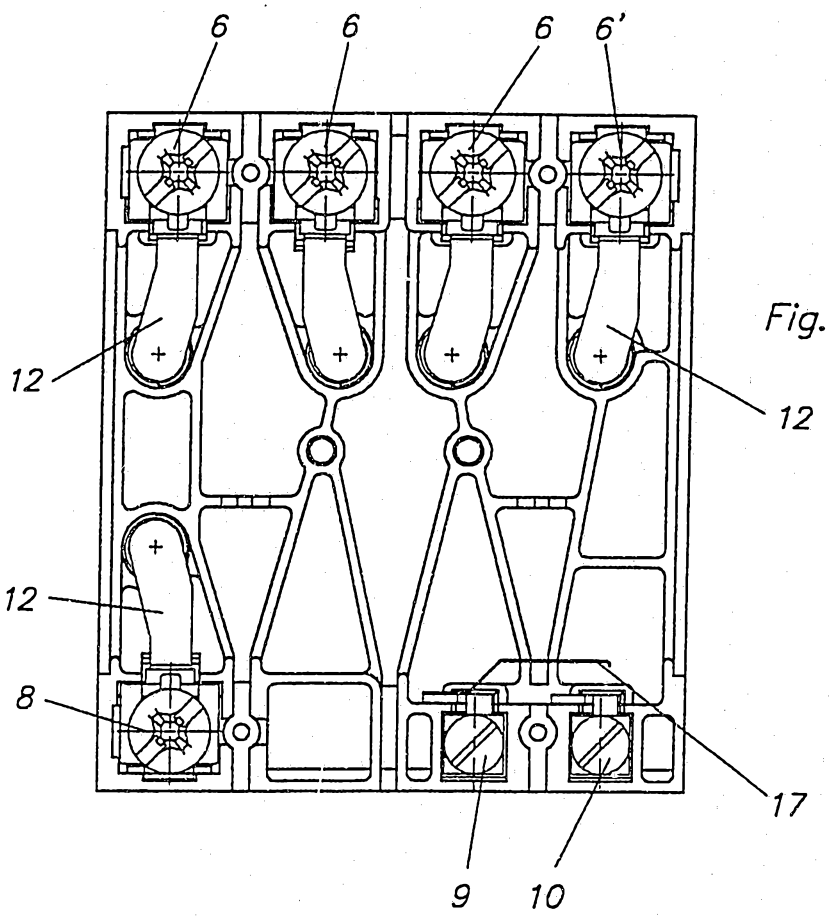


Fig.5

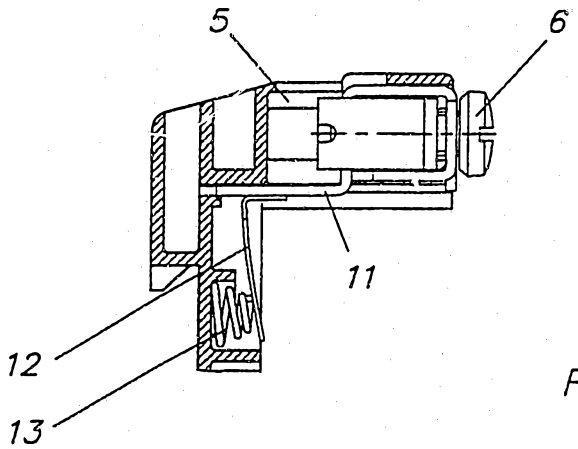
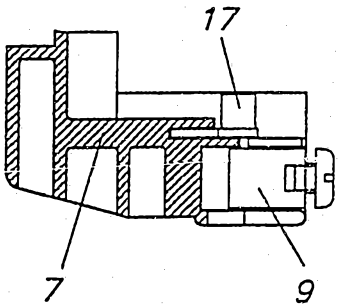


Fig.6



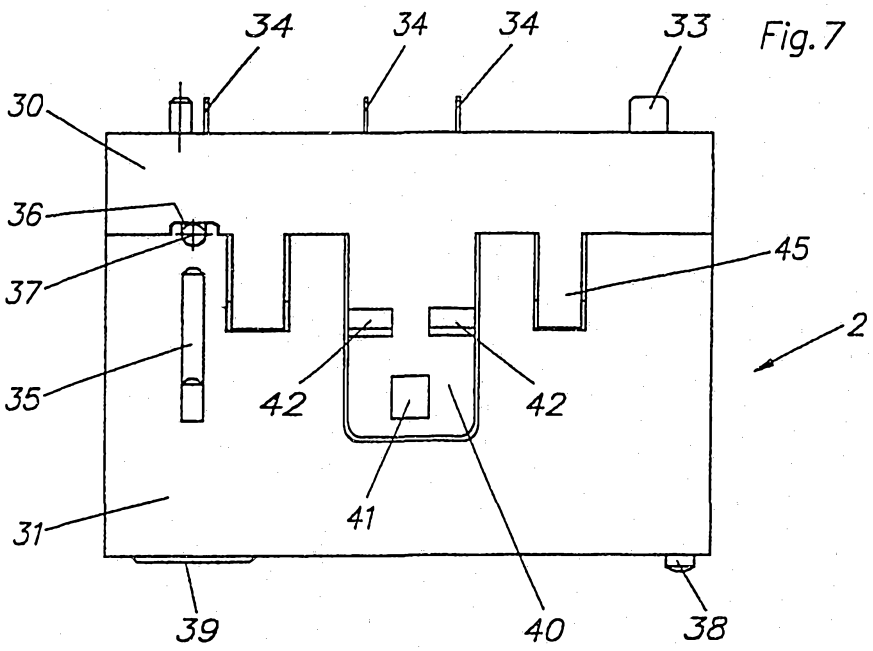

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Fig. 7

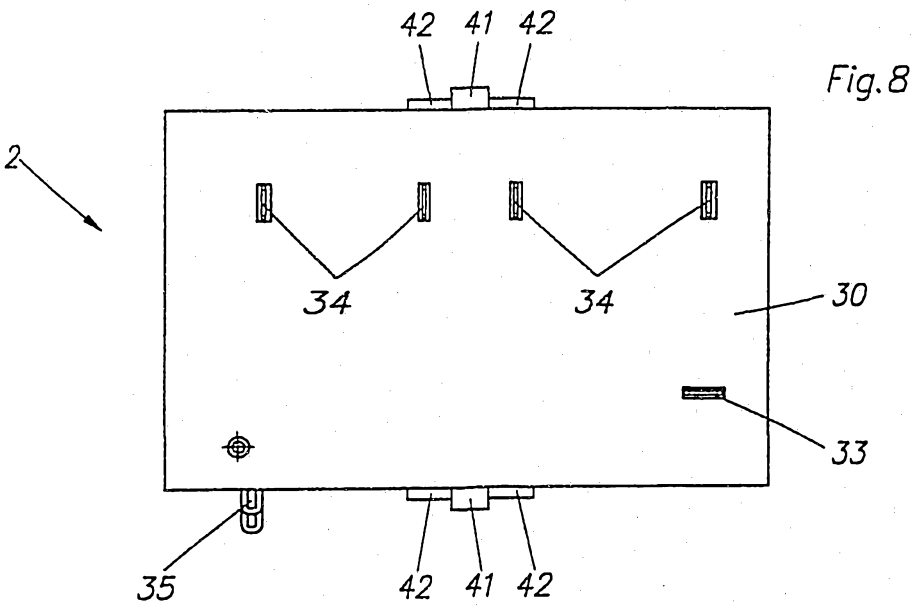
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Fig. 8

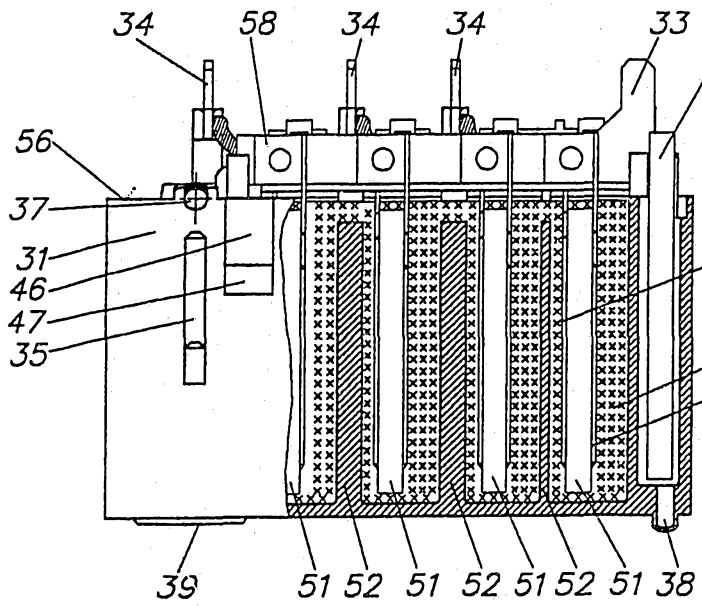

Fig.9

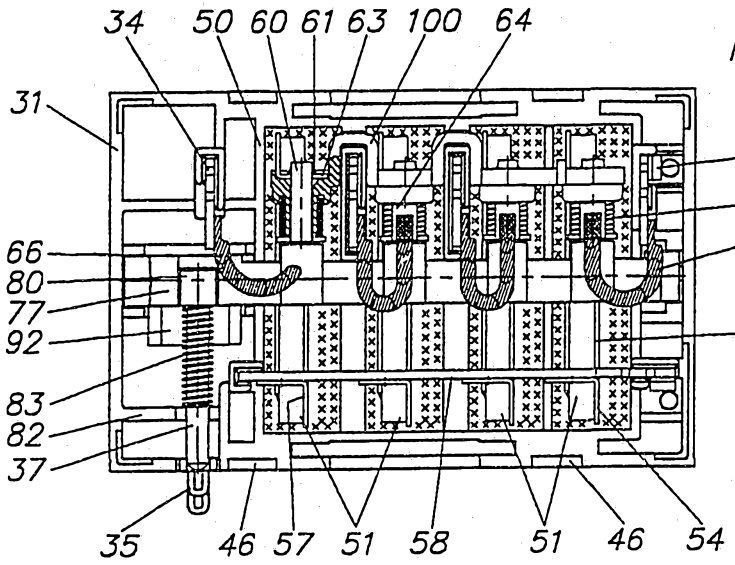

Fig.10

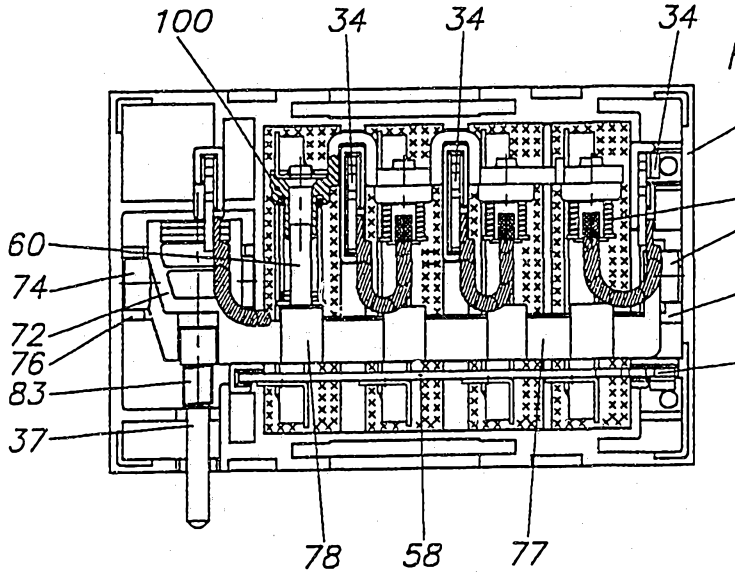

Fig.11

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Fig.12

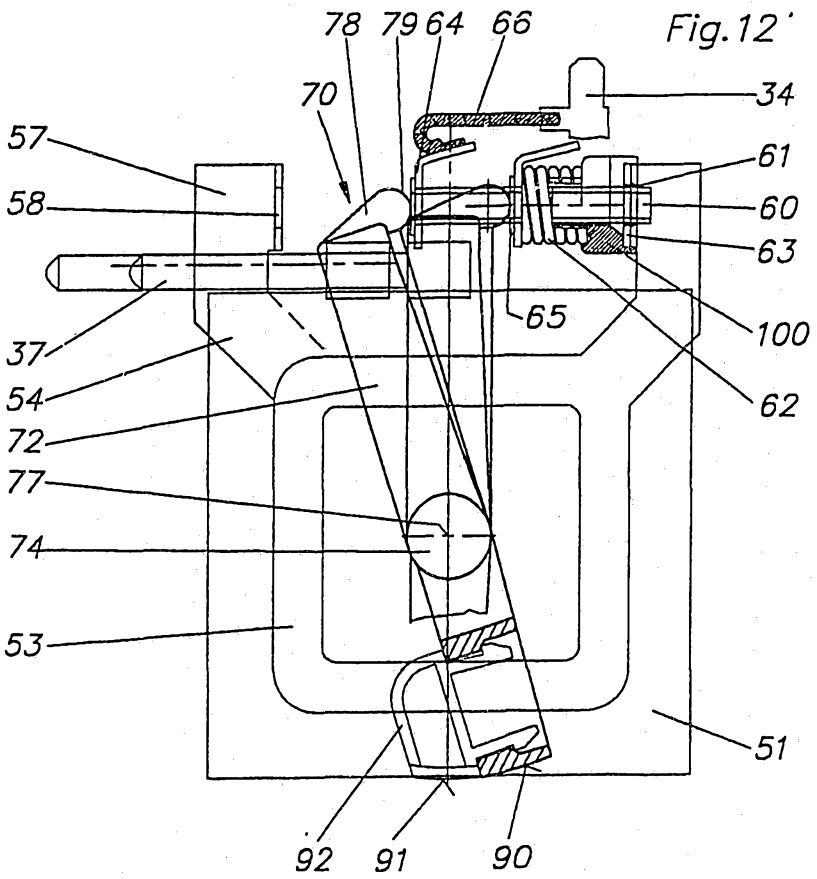
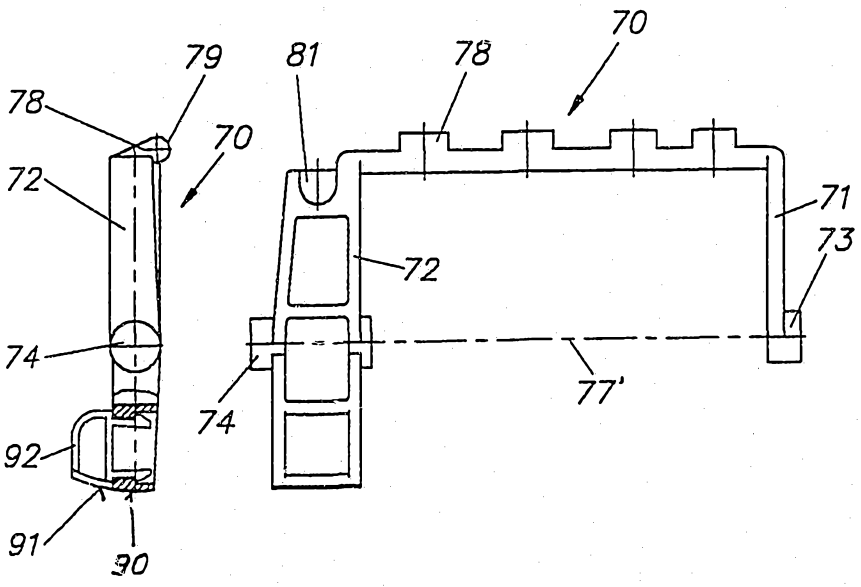


Fig.13



INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/AT 94/00094

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01H83/10 H01C7/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01H H01C H02H H01T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE,U,93 05 796 (DEHN + SÖHNE) 17 June 1993 see claims; figure 1	1,15
A	EP,A,0 436 881 (HERMANN KLEINHUIS GMBH) 1900 see abstract; figure 2	1
A	DE,U,90 10 246 (EDSAS BV) 31 October 1990 see page 8, paragraph 2 -paragraph 3	1,2
A	DE,A,38 05 890 (OBO BETTERMANN) 3 May 1989 see abstract; figures 3,4	1,15

☐ Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
24 October 1994	28. 10. 94

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Janssens De Vroom, P

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern al Application No
PCT/AT 94/00094

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE-U-9305796	17-06-93	NONE		
EP-A-0436881	17-07-91	DE-A-	4000717	18-07-91
		DE-D-	59005271	11-05-94
DE-U-9010246	31-10-90	NONE		
DE-A-3805890	03-05-89	DE-A-	3805889	03-05-89
		DE-U-	8802447	23-02-89
		DE-U-	8802448	01-06-88
		DE-U-	8811986	10-11-88

INTERNATIONALER RECHERCHENBERICHT

Interne Aktenzeichen
PCT/AT 94/00094

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 6 H01H83/10 H01C7/12

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
IPK 6 H01H H01C H02H H01T

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	DE,U,93 05 796 (DEHN + SÖHNE) 17. Juni 1993 siehe Ansprüche; Abbildung 1	1,15
A	EP,A,0 436 881 (HERMANN KLEINHUIS GMBH) 1900 siehe Zusammenfassung; Abbildung 2	1
A	DE,U,90 10 246 (EDSAS BV) 31. Oktober 1990 siehe Seite 8, Absatz 2 -Absatz 3	1,2
A	DE,A,38 05 890 (OBO BETTERMANN) 3. Mai 1989 siehe Zusammenfassung; Abbildungen 3,4	1,15

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

☒ Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :

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"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

1

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
24. Oktober 1994	28. 10. 94

Name und Postanschrift der Internationale Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Janssens De Vroom, P

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Angaben zu Veröffentlichung, die zur selben Patentfamilie gehören

Interne Aktenzeichen
PCT/AT 94/00094

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
DE-U-9305796	17-06-93	KEINE		
EP-A-0436881	17-07-91	DE-A-	4000717	18-07-91
		DE-D-	59005271	11-05-94
DE-U-9010246	31-10-90	KEINE		
DE-A-3805890	03-05-89	DE-A-	3805889	03-05-89
		DE-U-	8802447	23-02-89
		DE-U-	8802448	01-06-88
		DE-U-	8811986	10-11-88