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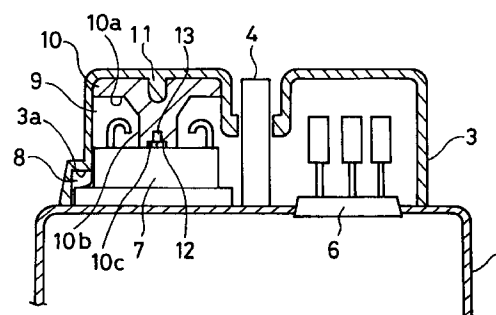
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(54) **Electrical component protection device**

(57) By pressing the periphery of an overload relay 7 by a rib 8 formed integrally with a terminal cover 3 and pressing the center of the overload relay 7 by a retainer bushing 10 against an upper surface of a hermetic casing 1, the rear surface of the overload relay 7 is securely made to adhere closely to the upper surface of the hermetic casing 1.

FIG.2



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an electrical component protection device.

2. Description of the Prior Art

Describing a prior art electrical component protection device taking a closed type compressor as an example, it is as shown in Figs. 4 and 5. In Figs. 4 and 5, a fixing bolt 51 is provided at an upper portion of an outer surface of a hermetic container 50 which constitutes a casing of the closed type compressor, and the fixing bolt 51 serves to fix a terminal cover 52 to an upper portion of the hermetic container 50 by screwing a nut 53. A through hole 52a which extends vertically and through which the fixing bolt 51 is to penetrate is formed at the terminal cover 52.

The hermetic container 50 is provided with a sealed terminal 54, where a portion of the sealed terminal 54 is buried in a hole formed at a top panel of the hermetic container 50 and the other portion is made to protrude outwardly of the hermetic container 50. The sealed terminal 54 has a plurality of connection terminals 55 which protrude upwardly.

The terminal cover 52 is formed of a material such as rubber or resin having an electrical insulating property and an elasticity, and it is internally provided with a terminal chamber 56 for housing therein the connection terminals 55 and a protector chamber 58 for housing therein an overload relay 57. In the protector chamber 58 of the terminal cover 52, a coil spring 59 provided around the overload relay 57 is pressed by a stepped portion 60 of the terminal cover 52, by which the overload relay 57 adheres closely to the upper surface of the hermetic container 50.

In the aforementioned prior art structure, the coil spring 59 is used as a means for pressing the overload relay 57, and it presses the periphery of the overload relay 57. However, the operation of force applied from the coil spring 59 does not uniformly exert on the entire periphery of the overload relay 57. Therefore, a sufficient adhesion of the overload relay 57 to the upper surface of the hermetic container 50 cannot be secured, and this has caused a problem that the operation of the overload relay 57 becomes unstable. Furthermore, the coil spring 59 has been used on condition that the overload relay 57 has a circular configuration. Therefore, the spring cannot be used when the relay has an oval configuration, and this means that the structure lacks versatility.

SUMMARY OF THE INVENTION

In order to solve the aforementioned problems, the

present invention provides a protection device having a terminal cover for housing therein an electrical component and an overload relay, the terminal cover being mounted on an outer surface of an objective equipment to which it is to be mounted,

wherein a plurality of ribs which serve as a means for pressing the overload relay against an outer surface of a compressor are formed integrally with the terminal cover on an inner surface of a housing section of the terminal cover for housing therein the overload relay, and the ribs are located in positions symmetrical about a center of the overload relay.

With the above-mentioned arrangement, the ribs formed integrally with the terminal cover function to press the overload relay. Therefore, in regard to the state of abutment of the overload relay on the outer surface of the objective equipment to which it is to be mounted, the relay abuts with a uniform force on the entire abutment surface. For the above reasons, a sufficient adhesion of the overload relay to the outer surface of the objective equipment to which it is to be mounted can be secured to allow the operation of the overload relay to be stabilized. Furthermore, since the ribs can be arranged in arbitrary positions according to the configuration of the overload relay, there can be achieved a structure having a versatility superior to the prior art structure employing a coil spring.

According to a preferred embodiment, a tip end of each rib fronting the overload relay is formed in an arc configuration.

With the above-mentioned arrangement, even if any rib makes contact with a lead wire or the like attached to the overload relay when housing the overload relay into the terminal cover, the lead wire is not damaged. Therefore, the terminal cover can be set more securely and surely on the overload relay.

According to a more preferred embodiment, a retainer bushing having an insulating property and an elasticity is interposed between a top panel of the terminal cover and the overload relay while serving as a means for pressing the overload relay against the outer surface of the compressor.

With the above-mentioned arrangement, in a state in which the ribs hold down the periphery of the overload relay, the retainer bushing holds down the center portion of the overload relay. In this case, since the retainer bushing has an elasticity, it does not hinder the pressing operation of the ribs against the overload relay, and both the pressure force of the ribs and the pressure force of the retainer bushing exert effectively on the overload relay. The above arrangement provides an electrical component protection device having a terminal cover in which the overload relay is made to more securely adhere closely to the outer surface of the objective equipment to which it is to be mounted so as to further ensure the operation of the overload relay.

According to a more preferred embodiment, a projection having a round tip end is provided on an inner surface of the terminal cover in a position corresponding

to a center position of the overload relay, the retainer bushing is provided with a hole to be interlocked with the projection of the terminal cover, and the projection and the hole are interlocked with each other to fix and hold the retainer bushing on the terminal cover.

With the above-mentioned arrangement, by fitting the retainer bushing into the terminal cover with the projection inserted into the retainer bushing, the retainer bushing mounting operation can be achieved with a one-touch motion.

According to a more preferred embodiment, the retainer bushing comprises: a base section having a circular peripheral surface configuration corresponding to an inner surface configuration of the terminal cover; a cylindrical pressure section which abuts on the overload relay; a hole which is provided at a tip end of the pressure section and houses therein a nut and a shaft section located in a center position of the overload relay; and a tapered connection section located between the pressure section and the base section.

With the above-mentioned arrangement, by making the peripheral surface of the base section of the retainer bushing have a circular configuration corresponding to the inner surface configuration of the terminal cover, the retainer bushing can be stably held. The pressure section presses the center portion of the overload relay with the nut and shaft section housed in the hole provided at the tip end, and therefore, the overload relay can be stably held down. Since both the base section and the pressure section of the retainer bushing have circular configurations around the axial center, the retainer bushing has no directional property in being mounted to the terminal cover, meaning that it is excellent in workability.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an external view of an electrical component protection device according to an embodiment of the present invention;

Fig. 2 is a sectional view of the above protection device;

Fig. 3 (a) is a rear view of the above protection device;

Fig. 3 (b) is a sectional view of the above protection device taken along the line A - A;

Fig. 4 is an exploded perspective view of a prior art electrical component protection device; and

Fig. 5 is a sectional view of the prior art protection device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

An embodiment of the present invention will be described below with reference to Figs. 1, 2, 3 (a) and 3 (b).

A cylindrical hermetic casing 1 is to house therein an electrical compressor body (not shown), and its

upper surface is provided with a protection device 2. The protection device 2 is comprised of a terminal cover 3, a shaft section 4 and a nut 5 for fixing the terminal cover 3 on the upper surface of the hermetic casing 1. The terminal cover 3 houses therein a sealed terminal 6 and an overload relay 7.

The terminal cover 3 has at its base portion a stepped section 3a corresponding in configuration to the overload relay 7, and a plurality of ribs 8 are integrally formed on an inner surface of the stepped section 3a in order to press the overload relay 7 against an upper surface of the hermetic casing 1 for the achievement of adhesion. With this arrangement, the overload relay 7 can be pressedly fixed on the upper surface of the hermetic casing 1 only by the terminal cover 3, so that the reduction in number of components can be achieved, thereby allowing a cast reduction to be achieved. Further, the terminal cover 3 has a housing section 9 for housing the overload relay 7, and the ribs 8 are located in positions symmetrical about the center line of the housing section. With this arrangement, the terminal cover 3 can uniformly press the overload relay 7 against the upper surface of the hermetic casing 1 for the achievement of adhesion.

The overload relay 7 can be pressed by providing the ribs 8, however, it is feared that an electrical component such as a lead wire will be possibly damaged by any rib 8 when the overload relay 7 is set on the upper surface of the hermetic casing 1 and then the terminal cover 3 is put on it.

In view of the above, a tip end of each rib 8 is formed into an arc configuration to allow the terminal cover 3 to be set securely and surely in the present invention.

By pressing the entire periphery of the overload relay 7 by the plurality of ribs 8, the periphery of the overload relay 7 can be made to closely adhere to the upper surface of the compressor body. However, in order to more surely operate the overload relay 7, it is required to make the overload relay 7 and the upper surface of the hermetic casing 1 closely adhere to each other throughout at the entire contact surface.

For the above reasons, according to the present invention as shown in Fig. 2, a retainer bushing 10 made of rubber or the like having an insulating property and an elasticity is interposed between a top panel of the terminal cover 3 and the overload relay 7 while serving as a means for pressing the overload relay 7 against the upper surface of the hermetic casing 1.

The retainer bushing 10 presses the overload relay 7 when the terminal cover 3 is set. Therefore, the overload relay 7 and the upper surface of the hermetic casing 1 are made to closely adhere to each other, thereby allowing the operation of the overload relay 7 to be further ensured. In this case, since the retainer bushing 10 has an elasticity, it does not hinder the pressing operation of the ribs 8 against the overload relay 7, and both the pressure force of the ribs 8 and the pressure force of the retainer bushing 10 exert effectively on the overload

relay.

As shown in Figs. 2, 3 (a) and 3 (b), a projection 11 having a round tip end is provided on the top panel of the housing section 9 of the terminal cover 3, and a hole 12 to be interlocked with the projection 11 is provided in the retainer bushing 10. With this arrangement, the retainer bushing 10 can be inserted and fixed into the terminal cover 3 with a one-touch motion, thereby allowing the workability to be improved.

Next, as shown in Fig. 2, in regard to the retainer bushing 10, its base section 10a has a circular peripheral surface configuration corresponding to the inner surface configuration of the terminal cover 3, and a pressure section 10b which is to abut on the overload relay 7 has a cylindrical configuration. The pressure section 10b has at its tip end a hole 10c for housing therein a nut 12 and a shaft section 13 located in the center position of the overload relay 7, and a connection section located between the pressure section 10b and the base section 10a has a tapered configuration.

With the above-mentioned arrangement, the peripheral surface of the base section 10a of the retainer bushing 10 has a circular configuration corresponding to the inner surface configuration of the terminal cover 3, and therefore, the retainer bushing can be stably held on the terminal cover 3. The pressure section 10b presses the center portion of the overload relay 7 with the nut 12 and shaft section 13 housed in the hole 10c located at its tip end, and therefore, the overload relay 7 can be stably held down. Since both the base section 10a and the pressure section 10b of the retainer bushing 10 have circular configurations around the axial center, the retainer bushing has no directional property in being mounted to the terminal cover 3, meaning that it is excellent in workability.

Claims

1. An electrical component protection device having a terminal cover for housing therein an electrical component and an overload relay, the terminal cover being mounted on an outer surface of an objective equipment to which it is to be mounted, wherein a plurality of ribs which serve as a means for pressing the overload relay against an outer surface of a compressor are formed integrally with the terminal cover on an inner surface of a housing section of the terminal cover for housing therein the overload relay, and the ribs are located in positions symmetrical about a center of the overload relay.
2. An electrical component protection device as claimed in Claim 1, wherein a leading end of each of the ribs fronting the overload relay is formed in an arc configuration.
3. An electrical component protection device wherein a retainer bushing having an insulating property

and an elasticity is interposed between a top panel of the terminal cover and the overload relay while serving as a means for pressing the overload relay against the outer surface of the compressor.

4. An electrical component protection device as claimed in Claim 3, wherein a projection having a round tip end is provided on an inner surface of the terminal cover in a position corresponding to a center position of the overload relay, the retainer bushing is provided with a hole to be interlocked with the projection of the terminal cover, and the projection and the hole are interlocked with each other to fix and hold the retainer bushing on the terminal cover.
5. An electrical component protection device as claimed in Claim 4, wherein the retainer bushing comprises: a base section having a circular peripheral surface configuration corresponding to an inner surface configuration of the terminal cover; a cylindrical pressure section which abuts on the overload relay; a hole which is provided at a tip end of the pressure section and houses therein a nut and a shaft section located in a center position of the overload relay; and a tapered connection section located between the pressure section and the base section.

FIG.1

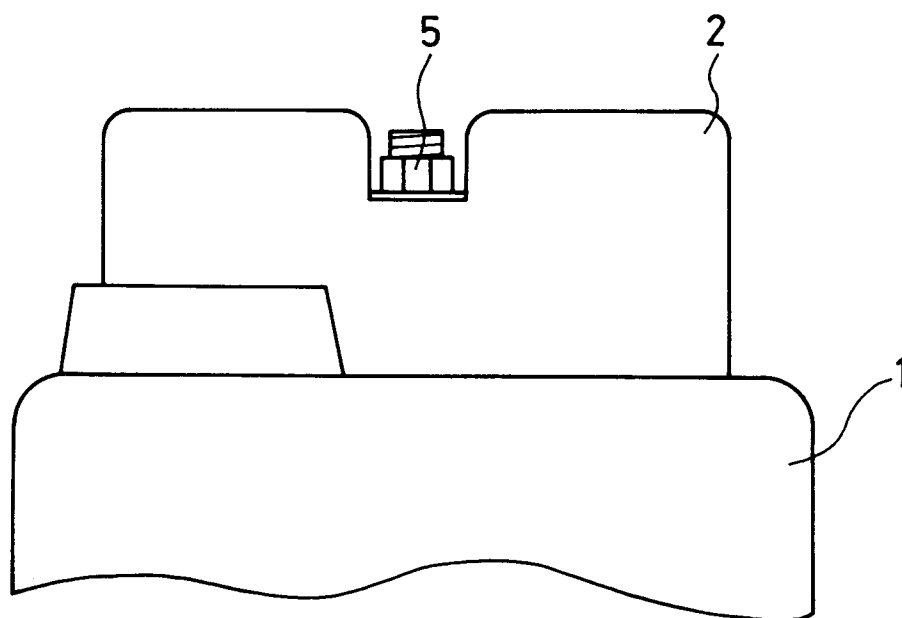


FIG.2

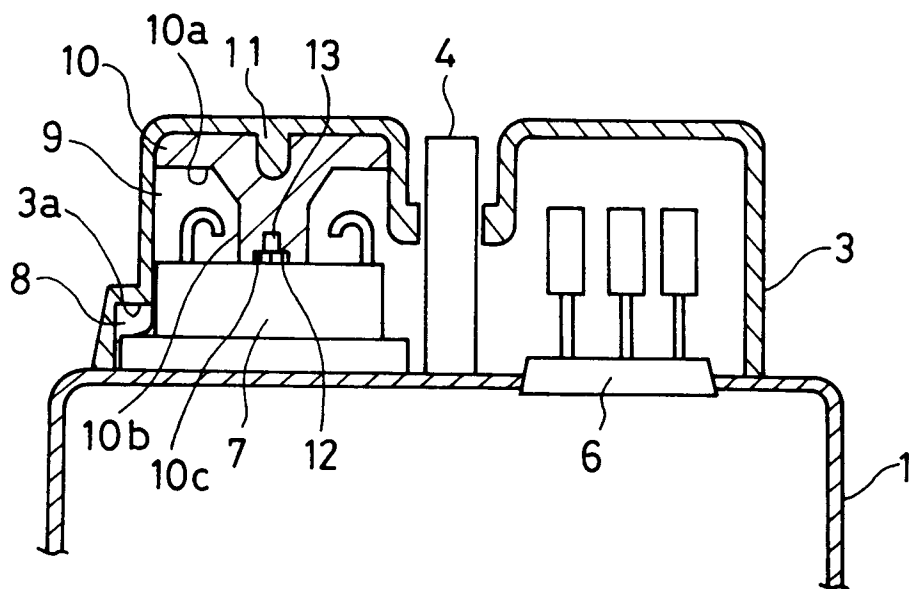


FIG.3

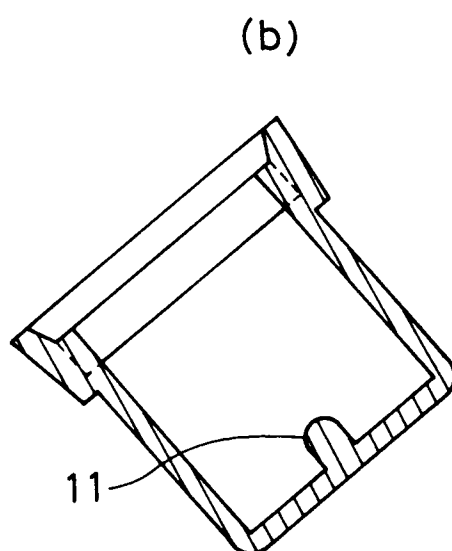
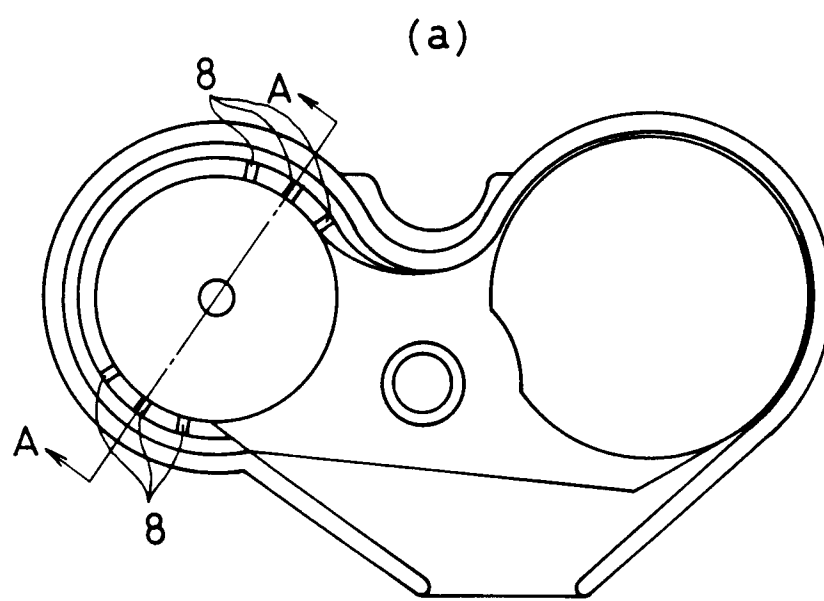


FIG.4

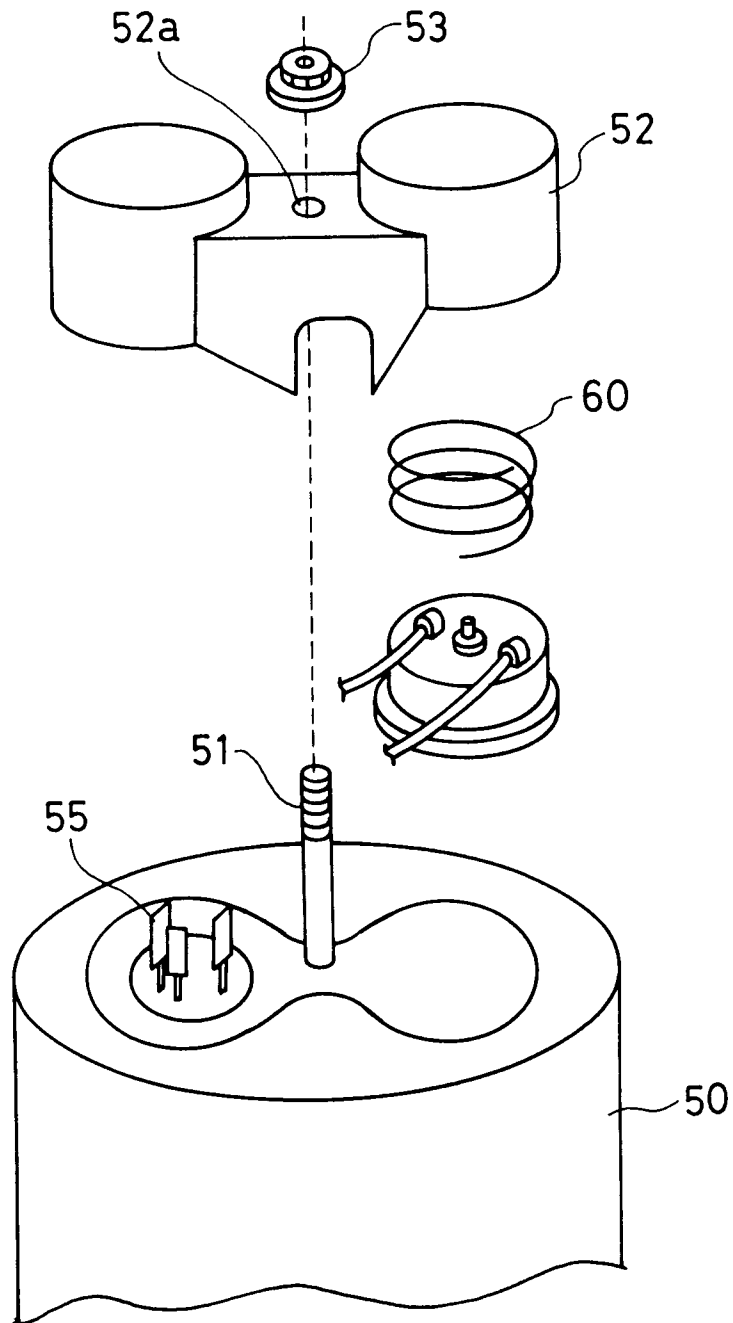
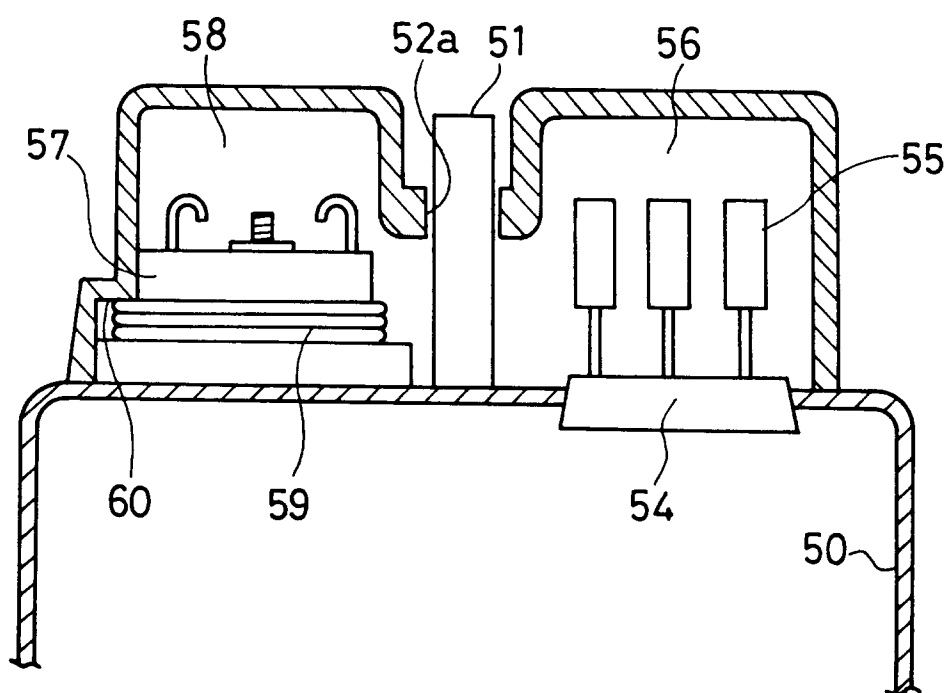


FIG.5





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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 6493

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	GB 2 104 732 A (ASPERA SPA) 9 March 1983 * page 2, line 33 - line 36 * ---	1	H01H61/00 H01H37/04
A	US 4 620 425 A (O'GRADY NORMAN J) 4 November 1986 * column 3, line 26 - column 4, line 31 * ---	1	
A	US 4 567 390 A (STEWART ROBERT S) 28 January 1986 * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H01H H02K
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 January 1997	Examiner Libberecht, L
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