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## (54) Safety plug-socket of bayonet type.

(57) A safety socket for using with a Bayonet type plug including a cover (2), a base (1) and at least two units (A, B, C) which are repectively consisted of one pairs of connectors ($C_1$, $C_2$, $C_3$) which are adapted to receives the plug and a switch $SW_1$, $SW_2$, $SW_3$, of double-pole single-throw type, as well as a indicator $I_1$, $I_2$, $I_3$.

The switch includes two input terminals $Ti_1$, $Ti_2$ and two output terminals $To_1$, $To_2$, as well as a wiper strip of bow form. Any conventional socket can be replaced with the safety socket for accomplishing a complete safety from electric shock 5 and a convenience for controlling power to any electric apparatus connected thereto.

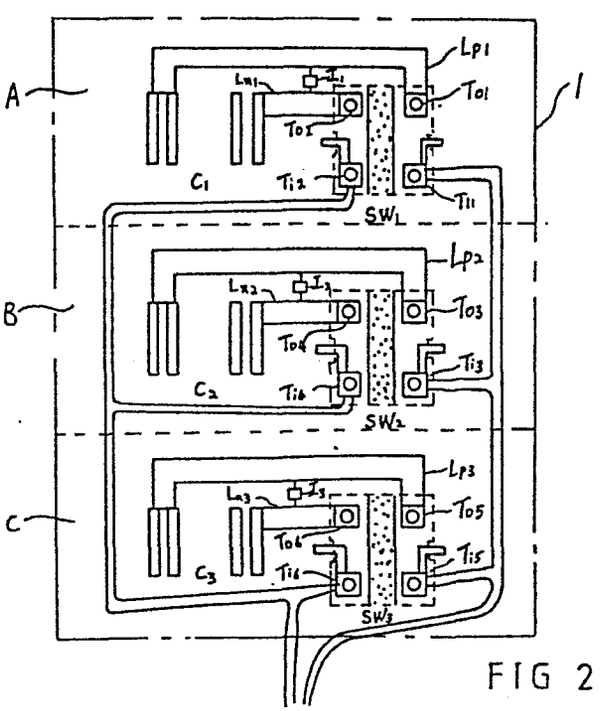


FIG 2

EP 0 142 569 A1

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# SAFETY PLUG-SOCKET OF BAYONET TYPE

The present invention generally relates to a Bayonet type socket and in particularly relates to an improved safety socket according to the preamble of claim 1.

In the prior art, there are a variety of safety sockets of exposure type. Also, it has become known that also buried type safety sockets are developed. These sockets consist of at least one pair of connectors for connecting at least one plug thereto. In these prior sockets, it is a great disadvantage that a user has to turn off at first a power switch mounted on an electric apparatus which is connected to the socket by a plug thereof and then has to pull out the plug from the socket for a safety handling of the electric system, when it is

needed to turn off the electric apparatus. Of course, these two steps cause much inconvenience to the user.

For removing the above mentioned inconvenience, it is known from Japanese laid-open Utility Model publication No. So 56-37835 that a socket of Bayonet type is provided with a switch, which is a single pole single-throw switch, for switching on/off the whole power connection thereto. Also, the switch can connect or disconnect only one of the power terminals. If the technical idea is applied to a single mode socket having only one pair of connectors this is convenient to user because of one electric apparatus plugged-in the single mode socket. However, if the technical idea is applied to a multiple mode socket having two or more pairs of connectors, it is no longer used to switch off only one electric apparatus plugged-in the socket because turning off the switch disconnects the whole electric apparatuses plugged therein. In other words, the function of power control of the socket should be limited to only one pair of connectors, even when teh socket consists of two or more pairs of connectors. Hereinafter, for the convenience of the explanation, one of two terminals will be referred as an ungrounded lead and the other as a grounded lead.

Also, in the prior art sockets, the grounded power line and the ungrounded power line are directly connected to the grounded one and ungrounded one respectively and only one of the power lines can be switched on/off, so that even when the switch is turned off, the other power line remains always directly connected to the corresponding lead. Thus, there are always safety problems and especially the danger of an electric shock to a child or an infant, when they put a finger or an iron stick held in the hand into the socket eyes.

It is therefore an object of the present invention to provide for a safety socket including at least two

pairs of connectors avoiding the above mentioned problems in particular, the safety socket is to prevent from electric shocks even when some connectors are used while other connectors are not used.

It is also desirable to provide for a safety socket having a number of indicators corresponding to the number of pairs of connectors, which can display it there is an electric voltage applied to.

This object is solved by the features of claim 1. Further developments and embodiments of the invention are given in the subclaims.

The present invention provides for a safety socket for conveniently controlling the connected electric apparatus without pulling out of the plugs thereof.

Other detailed features and advantages of the instant invention will become apparent from the accompanying drawings taken in conjunction with the detailed description of the presently preferred embodiments of the invention. Also it is noted that the invention should not be limited by the described preferred embodiments in the drawings but only by the claims which are attached.

In the drawings:

Fig. 1 is a perspective view of an embodiment of the instant invention, which includes three pairs of connectors, three switches and three indicators;

Fig. 2 is a plan view of inner side of an embodiment of Fig. 1 without a cover of the socket;

Fig. 3 illustrates an operating status of double-pole single-throw switch which is utilized in the instant invention;

Fig. 4 schematically illustrates a construction of a change over-strip which is built in the switch of Fig. 3; and

Fig. 5 illustrates an equivalent circuit for the safety socket in Fig. 1 and Fig. 2.

Referring to Fig. 1, a safety socket of Bayonet type is perspectively illustrated as an embodiment according to the present invention, said socket, comprising three pairs of connectors, three double pole single throw switches and three indicators such as a light emitting diode, a luminance tube, a neon dischange tube, etc.. The socket consists of a base 1 and a cover 2, which is made of suitable materials such as plastics. The cover 2 is provided with three openings for exposing three pairs of connectors $C_1$, $C_2$, and $C_3$ to exterior, and also with three small openings for exposing knobs of three switches $SW_1$, $SW_2$ and $SW_3$ to exterior. Between the connectors and knobs of the switches, three indicators $I_1$, $I_2$ and $I_3$ are mounted.

Power input lines 3 are respectively connected through the switches $SW_1$, $SW_2$ and $SW_3$ to the three units A, B and C in order to control each connection of input power thereto. Thus, each three units A, B and C are respectively controlled by the corresponding switches $SW_1$, $SW_2$ and $SW_3$, respectively, so that the turning on/off of one of switches $SW_1$, $SW_2$ and $SW_3$ controls one power input of the connected electric apparatuses, i. e. electric loads.

Now, referring to Fig. 2, a plan view of the socket of Fig. 1 without the cover 2 is illustrated as a base 1. On the base 1, three units A, B and C are mounted. The mechanical construction of each unit is all same. Thus, only the structure of unit A will be described in detail hereinafter.

The unit A consists of two connectors C, switch $SW_1$, power supply lines $Ln_1$ and $Lp_1$ and indicator $I_1$. The switch $SW_1$ can change over the connection between the connectors $C_1$ and the power supply lines $Ln_1$ and $Lp_1$. The construction of the connectors C is the same as in the prior Bayonet type connectors. The switch $SW_1$ is a double-pole single-throw switch and turns on/off respectively the electrical connections between the connectors C and the power supply lines $Ln_1$ at the same time. The indicator $I_1$ may bemounted on the knob of the switch $SW_1$ or on the outer surface of the cover 2. Also Fig. 3 illustrates that the switch $SW_1$ consists of two output terminals $To_1$ and $To_2$, two input terminals $Ti_1$ and $Ti_2$ and a change over-strip 5. The output terminal $To_1$ is connected to one of the connectors C via the power supply line $Lp_1$ and then the other one of the connectors C through the power supply line $Ln_1$. The input terminal $Ti_1$ is connected to a grounded line of a power source and the other terminal $Ti_2$ is connected to an ungrounded line of the power source and vice versa. The indicator $I_1$ is connected between the output terminals $To_1$ and $To_2$.

As in Fig. 1, when the switch $SW_1$ is in on-position, the change over-strip 5 electrically connects the input terminals $Ti_1$ and $Ti_2$ to the output terminals $To_1$ and $To_2$, respectively, so that the indicator $I_1$ is turned on so as to indicate a voltage applied to the connectors C and when the switch $SW_1$ is in off-position, the change over-strip 5 respectively disconnects the electrical connection between the input terminals $Ti_1$ and $Ti_2$ and the output terminals $To_1$ and $To_2$. Therefore, when the switch is turned off, no one of the connectors C is connected electrical apparatus and the indicator $I_1$ are accordingly turned off, even when the plug of the apparatus has been inserted into the socket. Hence, it is a great advantage that, in the condition of the turned-off switch $SW_1$, even when no plug is inserted into the socket, any user,

especially infants can be fully protected from any electric shocks.

For more clearly understanding the function of the switch $SW_1$, the structure of the switch $SW_1$ will be described with reference to Fig. 3 and Fig. 4. The switch is of the push operation type and the change over-strip 5 consists of a supporting electrically insulated member 6 and metal strips 7 and 8. The metal strips 7 and 8 are supported securely on the supporting insulated member 6 at both sides thereof by a proper common way. The metal strip 7 and 8 are respectively provided with notches 9 at the intermediate positions of the both side thereof. The notches 9 of the metal strip 7 and 8 are electrically connected to pivot on the wall portions 10 of the input terminal $Ti_1$ and $Ti_2$.

The change over-strip 5 is formed as a bow, so that when the knob of the switch $SW_1$ is slided int the direction toward the output terminals, the knob may press one side of the strip 5 so that an electric connection between the input terminals and the output terminals can be accomplished. Accordingly, the desired voltage or current is supplied to the connected electric apparatus and to the indicator $I_1$ from the power source. Although the present invention is described on the above prefered embodiment, it is understood that the instant invention can be altered or changed without departing from the scope thereof. For example, the invention can be adopted to include at least two pairs of terminals of Bayonet type.

In Fig. 5, the equivalent circuit corresponding to the circuit of the safety socket shown in Fig. 1 and 2 is depicted for more easily understanding the functional effects of the embodiment. As shown in Fig. 5, if the switches $SW_1$, $SW_2$ and $SW_3$ are all turned off, the output terminals of the switches are not applied with any potential from the power source, even when plugs of

the electric apparatuses have been inserted into the connectors of the socket, so that no power can be supplied to the electric apparatuses from the power source. Hereby the electric disconnections between the electric apparatuses and the socket can be held continuously without extraction of the plugs therefrom. Therefore, this function can ensure a convenience to the user and also a safety from the electric shock.

If all the switches $SW_1$, $SW_2$ and $SW_3$ are turned-on, the grounded line and ungrounded line of the power source can be extended to the electric apparatuses and the indicator $I_1$, $I_2$ and $I_3$ through the switches and the connectors. Also the indicators $I_1$, $I_2$ and $I_3$ comprise of a circuit or element $R_1$, $R_2$ and $R_3$ for protecting the indicators, respectively.

Then, when any one of the connected electric apparatuses has to be runed off, it is only necessary that a switch corresponding to the apparatus is turned off.

From the above mentioned description, it will be recognized that while the instant invention has been described as having a pretexed design, it is capable of further modification without departing from the scope of the invention. The application therefore, intended to cover any variations, uses, or adaptations of the instant invention following the general principles thereof and including such depatures from the present disclosures as come within known or customary practice in the art to which this invention pertains, and as may be applied to the essential features hereinbefore set forth and fall within the scope of the instant invention or the limits of the claims.

## Claims

1. A safety socket characterized by a cover (2), a base (1), and at least two units (A, B, C) consisting of one pair of connectors ($C_1$, $C_2$, $C_3$), one indicator ($I_1$, $I_2$, $I_3$) and a switch ($SW_1$, $SW_2$, $SW_3$), respectively, the number of said switches and indicators corresponding to the number of said pairs of connectors in said socket respectively, whereby the electrical connections between said pairs of connectors and the connected apparatuses are able to be controlled selectively by said switches.

2. The socket according to claim 1, characterized that said socket comprises at least two switches ($SW_1$, $SW_2$, $SW_3$) of double pole single-throw type and each of said switches consists of two input ($Ti_1$, $Ti_2$) terminals connected to a power source, two output terminals ($To_1$, $To_2$) connected to two connectors and one change over-strip (5).

3. The socket according to claim 1 or 2, characterized in that indicator $I_1$, $I_2$, $I_3$ is mounted on each knob of said switches and the number of said indicators is the same as the number of said switches.

4. The socket according to claims 1, 2 or 3, characterized in that each indicator ($I_1$, $I_2$, $I_3$) is located on the outer surface of said cover (2) of said socket.

5. The socket according to anyone of claims 1-4, characterized in that said switches ($SW_1$, $SW_2$, $SW_3$) are of the sliding type of a double-pole single-throw switch.

6. The socket according to anyone of claims 1-5, characterized in that said switches ($SW_1$, $SW_2$, $SW_3$) are of push-button type of double pole single-throw switch.

7. The socket according to anyone of claims 1-6, characterized in that said switches ($SW_1$, $SW_2$, $SW_3$) are of selecting type of double pole single-throw switch.

8. The socket according to claims 1 and 5, characterized in that the change over-strip (5) of said switch ($SW_1$, $SW_2$, $SW_3$) is of the bow form and consists of a body of insulating material (6) and of two metal strips (7, 8) supported rigidly on both sides of said body.

9. The socket according to claim 8, characterized in that said change over-strip (5) has two notches (9) on both metal strips for pivotally supporting it on wall portions (10) of the input terminal ($Ti_1$, $Ti_2$).

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1/3

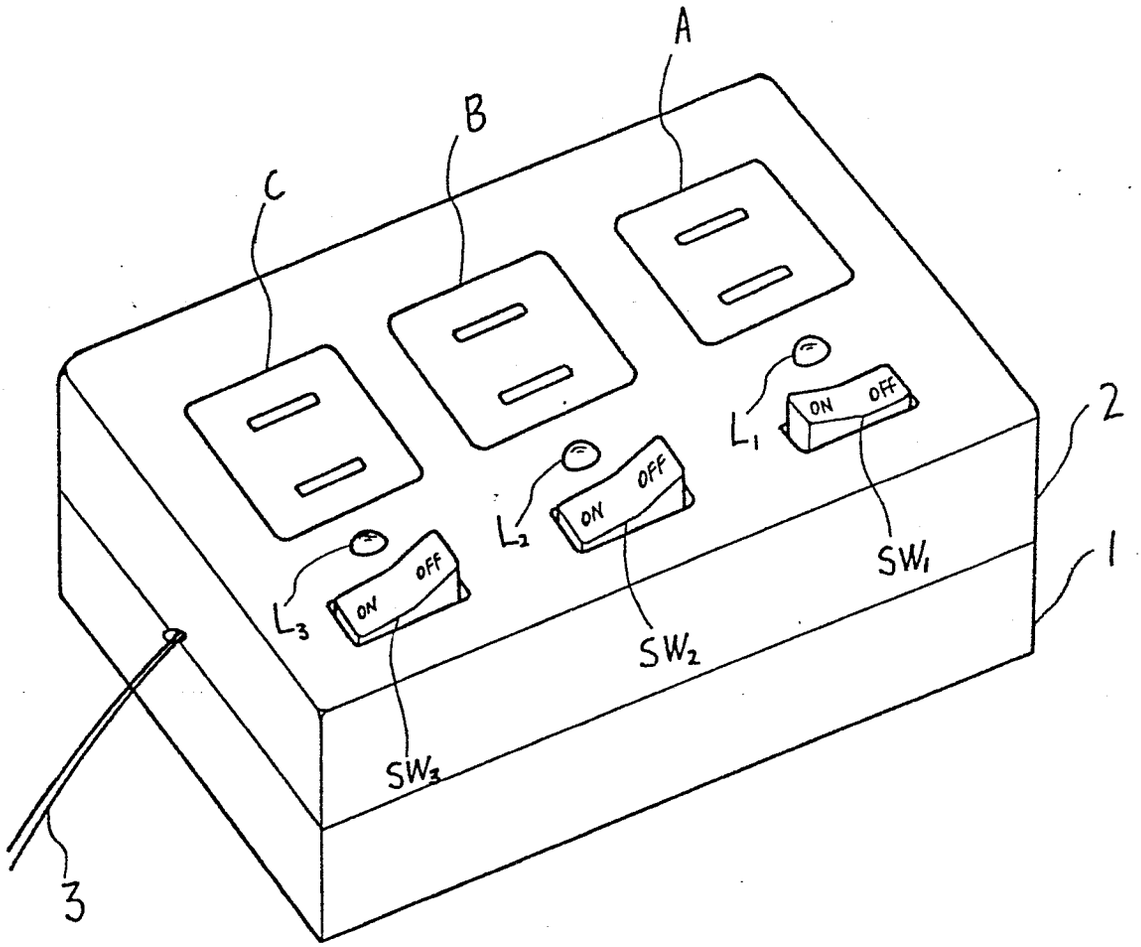
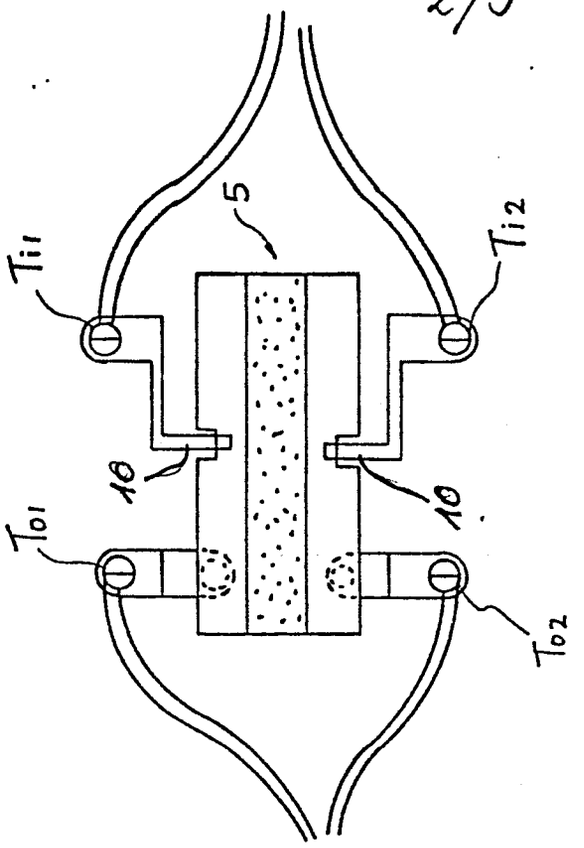



FIG 1

FIG 3



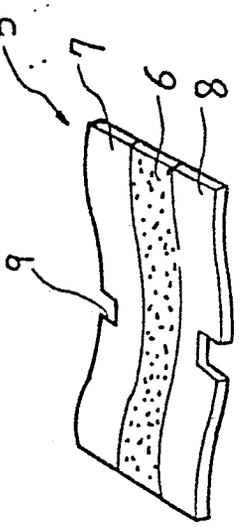




FIG 4

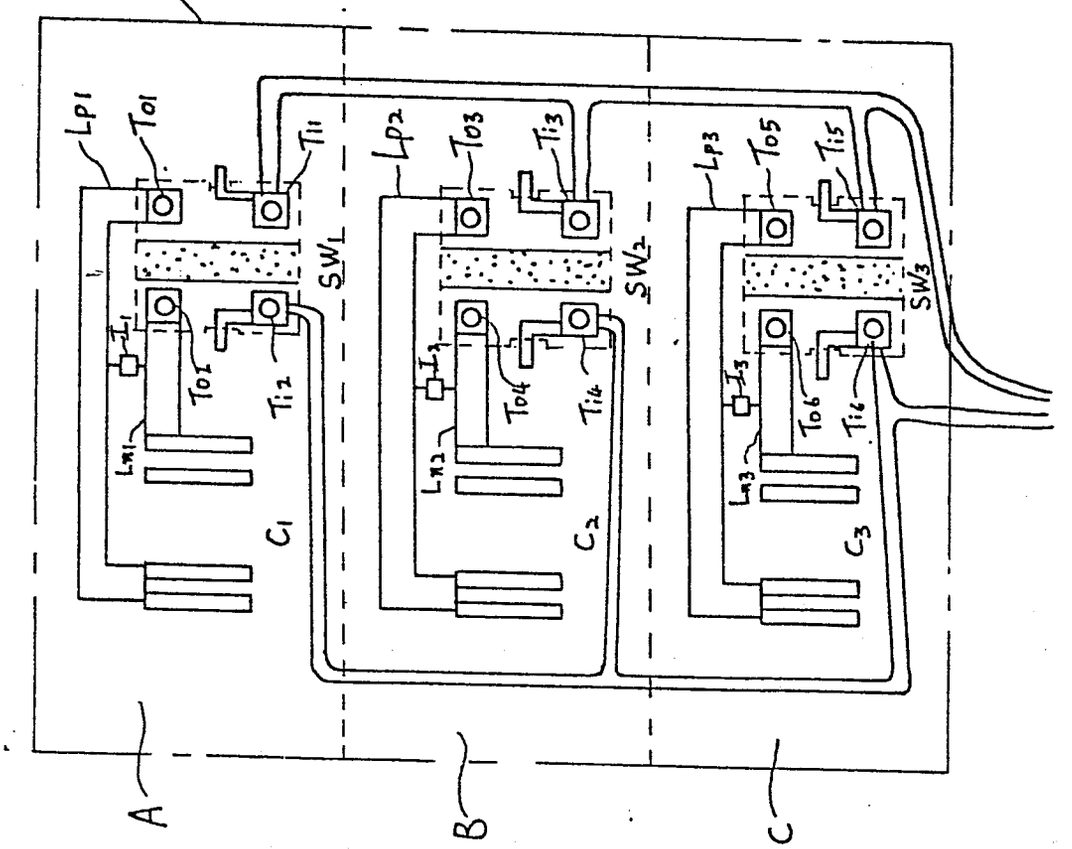



FIG 2

3/3

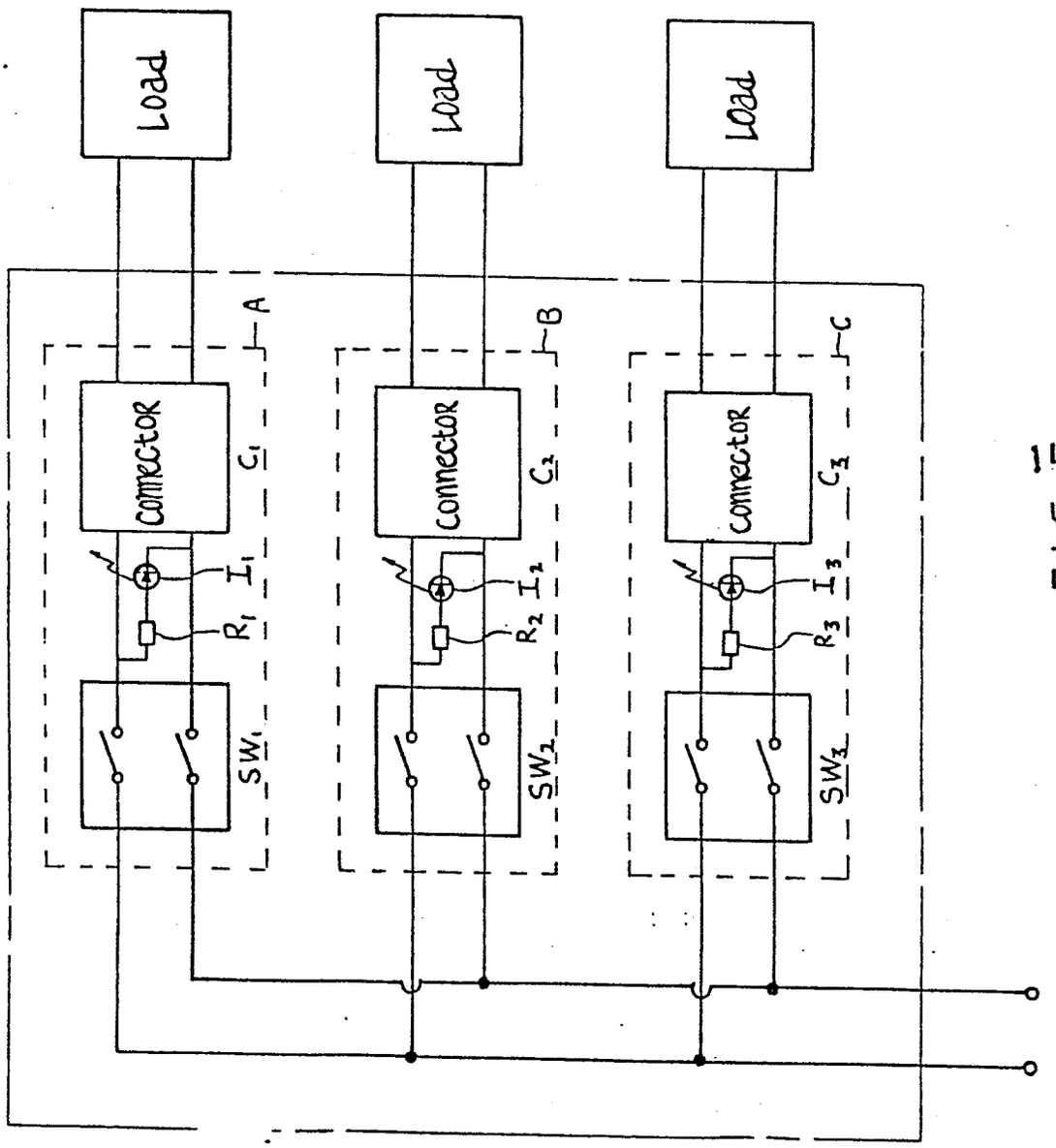

Load
Load
Load
connector
connector
connector
A
B
C
C1
C2
C3
I1
I2
I3
R1
R2
R3
SW1
SW2
SW3
Power Source

FIG 5

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# EUROPEAN SEARCH REPORT

0142569
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EP 83 10 7571

## 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.4) |
|---|---|---|---|
| A | DE-U-8 030 524 (AVEX)<br>* Page 3, line 3 - page 4, line 6; figures 1, 2 * | 1,2 | H 01 R 13/70<br>H 01 R 25/00<br>H 01 H 15/06 |
| A | US-A-3 806 685 (SEEGER et al.)<br>* Column 2, line 28 - column 3, line 58; figures 1-9 * | 2,5,8 | |
| A | US-A-3 787 653 (MAHER)<br>* Column 2, line 13 - column 5, line 22; figures 1-5 * | 2,5,6,8 | |
| A | US-A-3 846 596 (WOLF)<br>* Column 3, line 47 - column 4, line 17; figures 1, 11-13 * | 2,5,7,8 | |
| A | GB-A-2 056 792 (WHEELER)<br>* Page 1, line 99 - page 2, line 10; figure * | | |

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

H 01 R 13/70
H 01 R 19/14
H 01 R 25/00
H 01 H 15/06
H 01 R 31/04

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| BERLIN | 07-03-1984 | HAHN G |

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