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

(11) EP 0 535 975 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
04.06.1997 Bulletin 1997/23

(51) Int Cl.[6]: **H01R 13/24**

(21) Application number: **92309004.7**

(22) Date of filing: **02.10.1992**

(54) **Battery connector**

Batterie-Verbinder

Connecteur de batterie

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

(30) Priority: **04.10.1991 JP 80609/91**

(43) Date of publication of application:
07.04.1993 Bulletin 1993/14

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Description

The present invention relates to an electrical connector for detachable connection to a battery pack or cassette type electronic package.

Figure 5 shows an example of a known connector for achieving an electrical connection to a battery pack. Referring to Figure 5, the known structure includes a contact member 10' including contact portion 11' for making and electrical contact with an electrode 41' of a battery pack 40'. A connecting portion 12' retains a wire 30' soldered thereto, and a fixing portion 13' (anchoring portion) for fixing, for example, by caulking the contact member to the body of a housing or terminal base 20'.

Fixing of the contact member to the main part by caulking is not only troublesome but is also extremely complicated since the caulking force has to be controlled considering its state after caulking, e.g., a state in which the contact member may rotate to the left or right but is fixed without any play against vertical movement.

DE-A-1765922 discloses a connector in which contacts are secured to a housing without caulking. DE-A-1765922 discloses a connector for connecting to a battery comprising a plurality of contact members and a housing mounting the contact members, each contact member including a contact portion for electrically connecting to a battery electrode, a connecting portion for connecting a wire member thereto, a fixing portion interconnecting the contact portion and the interconnecting portion and fixing the contact member to the housing, the fixing portion having an inverse U-shaped cross section with an opposing pair of side walls and an engaging arm extending therefrom towards the contact portion, the housing including recesses for receiving and holding the fixing portions of the contact members and an engaging portion for engaging with the engaging arms of the contact members.

In DE-A-1765922, the fixing portion with an inverse U-shaped cross section has flanges which extend outwardly from the free edges of the opposing side walls. Securement of a contact in the housing is achieved by inserting the flanges in the recesses, pressing the flanges beneath lips formed over part of the recesses and sliding the flanges under the lips until the engaging arm can locate in a recess (engaging portion) to lock the fixing portion in place.

This complex sliding and pressing movement combination presents a drawback, and connectors according to the invention aim to overcome this problem by providing a connector with contacts which can be secured in place simply by pressing the contact member into the housing, and without the need for caulking.

To this end, according to the present invention, there is provided a connector for connecting to a battery, comprising: a plurality of contact members and a housing mounting said contact members, each said contact member including a contact portion for electrically connecting to a battery electrode, a connecting portion for connecting a wire member thereto, and a fixing portion interconnecting said contact portion and said connecting portion and fixing said contact member to said housing, said fixing portion having an inverse U-shaped cross-section with opposing pair of side walls and an engaging arm extending therefrom towards said contact portion, each said side wall having an aperture, said housing including a recess for receiving and holding said fixing portions of said contact members and an engaging portion for engaging with said engaging arms of said contact members, inner wall surfaces of said recess having projections which engage with said openings in said fixing portions of said contact members.

By way of example, one embodiment of an electrical connector will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of an electrical connector showing a contact member exploded therefrom in accordance with the present invention for electrical connection to a battery pack.

Figure 2 is a longitudinal sectional view of an embodiment of the connecting structure in accordance with the present invention.

Figure 3 is a sectional view taken along the line A-A of Figure 2.

Figure 4 is a sectional view illustrating the state of connection between the contact member of the electrical connector and the battery pack as shown in Figure 2.

Figure 5 is a perspective view of an example of a known electrical connector and a battery pack.

Figure 1 shows an electrical connector having a contact member 10 provided on a terminal plate and a battery pack 40 (or other electronic package of cassette type) which contacts the contact member 10 for electrical contact therewith. Terminal plate of Figure 1 is secured to a predetermined portion of the apparatus body on which the battery pack is to be mounted. There are a plurality of contact members 10 which are arrayed to extend in the longitudinal direction of the housing 20 as shown in Figure 1.

Each contact member 10 has a contact portion 11 which also serves as a leaf spring, a connecting portion 12 for connection to a wire 30, and a fixing portion 13 which interconnects the contact portion and the connecting portion and fixes the contact portion to the housing. In the illustrated embodiment, the contact portion 11 is disposed so as to be exposed externally.

The contact portion 11 projects into a cavity for receiving the battery pack and connects an electrode exposed on the bottom of the battery case in the cavity for electrical contact therewith.

Referring to Figures 2 and 3, the fixing portion 13 has a main part composed of a pair of opposing side walls 13A which define an inverse U-shaped cross-sec-

tion and an engaging arm 13B which extends downward from the main part towards the contact portion. Each side wall 13A of the fixing portion 13A has an opening 13C.

The housing 20 includes a recess 21 for receiving and holding the fixing portion of each contact and an engaging portion 22 for engaging with the engaging arm 13B of the contact member. In the illustration, the engaging portion 22 of the housing has a tapered wall surface 22A. Projections 21A, for engaging with the openings in the fixing portion of the contact members, are formed in the inner wall surfaces of the recess 21.

Figure 4 illustrates the manner in which the contact portion 11 contacts an electrode 41 of the battery pack. The arrangement is such that, when the battery pack is mounted on a device, the electrode 41 presses the contact portion 11 of the contact so as to be held in contact therewith as illustrated.

For mounting the contact member 10 in accordance with the present invention, the pair of opposing side walls 13A of the fixing portion 13 of the contact member is fitted in the recess 21 of the housing. In this state, the projections 21A on the inner wall surface engage with the openings 13A in the side walls. Since the side walls tend to expand outward, the fixing portion of the contact member are fixed and held in the recess of the housing. At the same time, the engaging arms 13B engage with a step which is presented by the tapered wall surface 22A of the engaging portion of the housing.

As has been described, the connecting structure in accordance with the present invention, makes it possible to securely mount the fixing portion of the contact member in a recess of a housing simply by pressing the contact member into the housing, without requiring caulking, by virtue of the specific structure of the contact member and the housing, thus significantly improving the mounting efficiency of the contact member.

Having described the preferred embodiment herein, it should be appreciated that variations may be made thereto without departing from the contemplated scope of the invention. Accordingly, the preferred embodiment described herein is illustrative and not limiting, the true scope of the invention being set forth in the claims appended hereto.

Claims

1. A connector for connecting to a battery, comprising: a plurality of contact members (10) and a housing (20) mounting said contact members (10), each said contact member including a contact portion (11) for electrically connecting to a battery electrode, a connecting portion (12) for connecting a wire member thereto, and a fixing portion (13) interconnecting said contact portion and said connecting portion and fixing said contact member to said housing, said fixing portion (13) having an inverse U-shaped cross-section with opposing pair of side walls (13A) and an engaging arm (13B) extending therefrom towards said contact portion, each said side wall having an aperture (13C) , said housing including a recess (21) for receiving and holding said fixing portions of said contact members and an engaging portion (22) for engaging with said engaging arms of said contact members, inner wall surfaces of said recess having projections (21A) which engage with said openings in said fixing portions of said contact members.

2. A connector according to claim 1, wherein said engaging portion of said housing comprises an inclined wall surface (22A).

3. A connector according to claim 1 or claim 2, wherein said contact portions of said contact members are arranged to project outwardly therefrom.

4. A connector according to any one of claims 1 to 3, wherein said contact portion (11) of said contact members are arranged in a general configuration of a leaf spring.

Patentansprüche

1. Ein Verbinder zum Anschließen einer Batterie mit einer Vielzahl von Kontaktgliedern (10) und einem Gehäuse (20) zu deren Befestigung, wobei jedes Kontaktglied einen Kontaktabschnitt (11) zum elektrischen Anschließen an eine Elektrode der Batterie, einen Anschlußabschnitt (12) zum Anschließen eines Drahtgliedes an diese und einen den Kontaktabschnitt mit dem Verbindungsabschnitt verbindenden und das Kontaktglied an dem Gehäuse befestigenden Befestigungsabschnitt (13) aufweist, der im Querschnitt die Form eines umgekehrten U mit zwei einander gegenüberliegenden Seitenwänden (13A) und einem von dort in Richtung auf den Kontaktabschnitt verlaufenden Anlageschenkel (13B) aufweist, wobei jede Seitenwand eine Öffnung (13C) aufweist, das Gehäuse eine Ausnehmung (21) zur Aufnahme und zum Halten der Befestigungsabschnitte der Kontaktglieder und einen Anlageabschnitt (22) zur Anlage an den Anlageschenkeln der Kontaktglieder aufweist und die Innenseiten der Ausnehmung Vorsprünge (21A) aufweisen, die mit den Öffnungen in den Befestigungsabschnitten der Kontaktglieder in Anlage liegen.

2. Ein Verbinder nach Anspruch 1, wobei der Anlageabschnitt des Gehäuses eine geneigte Wandfläche (22A) aufweist.

3. Ein Verbinder nach Anspruch 1 oder Anspruch 2, wobei die Kontaktabschnitte der Kontaktglieder so

angeordnet sind, daß sie von diesen nach außen vorstehen.

4. Ein Verbinder nach irgendeinem der Ansprüche 1 bis 3, wobei der Kontaktabschnitt (11) der Kontaktglieder in der allgemeinen Form einer Blattfeder ausgebildet ist.

Revendications

1. Connecteur destiné à la connexion avec une batterie, comprenant : une pluralité d'éléments de contact (10) et un logement (20) dans lequel sont montés lesdits éléments de contact (10), chaque dit élément de contact comprenant une partie de contact (11) destinée à être reliée électriquement à une électrode de batterie, une partie de liaison (12) permettant d'y relier un élément de câble, et une partie de fixation (13) reliant ladite partie de contact et ladite partie de liaison. et fixant ledit élément de contact audit logement. ladite partie de fixation (13) présentant une section transversale en forme de U inversé comportant une paire de parois latérales opposées (13A) et un bras d'enclenchement (13B) s'étendant à partir de celle-ci en direction de ladite partie de contact, chaque dite paroi latérale comportant une ouverture (13C), ledit logement comprenant un évidement (21) destiné à recevoir et à maintenir lesdites parties de fixation desdits éléments de contact, et une partie d'enclenchement (22) destinée à s'enclencher avec lesdits bras d'enclenchement desdits éléments de contact, les surfaces de parois intérieures dudit évidement comportant des saillies (21A) qui s'engagent dans lesdites ouvertures ménagées dans lesdites parties de fixation desdits éléments de contact.

2. Connecteur selon la revendication 1, dans lequel ladite partie d'enclenchement dudit logement comprend une surface de paroi inclinée (22A).

3. Connecteur selon la revendication 1 ou la revendication 2, dans lequel lesdites parties de contact desdits éléments de contact sont agencées de manière à dépasser vers l'extérieur de celui-ci.

4. Connecteur selon l'une quelconque des revendications I à 3, dans lequel ladite partie de contact (11) desdits éléments de contact est agencée suivant la configuration générale d'un ressort à lame.

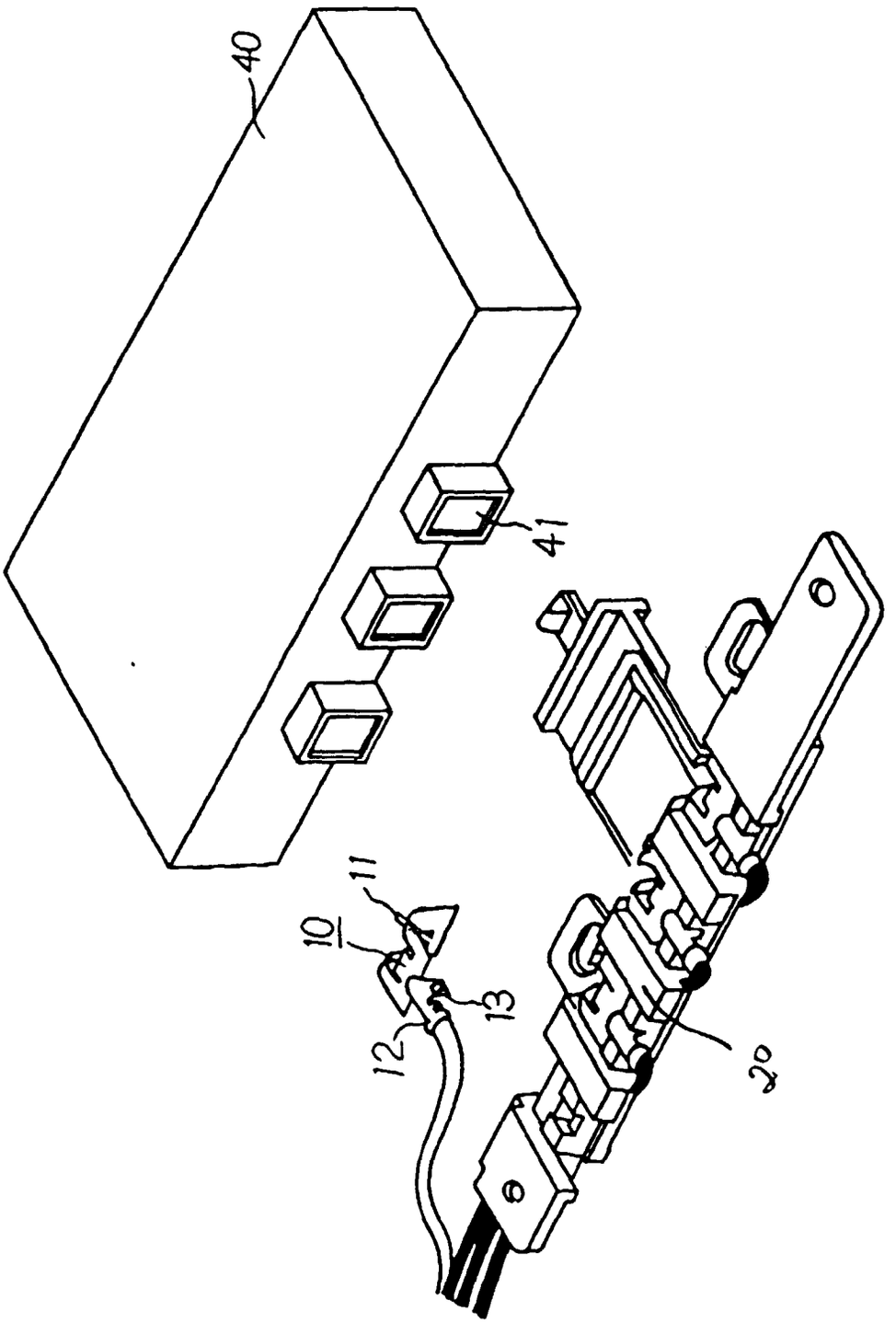


FIG 1

FIG.2

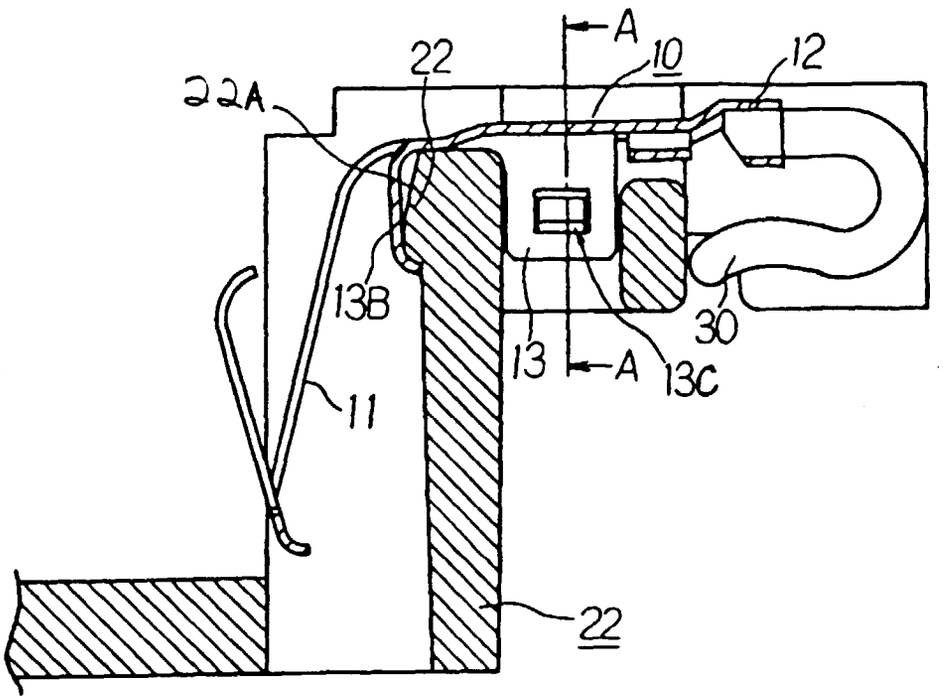
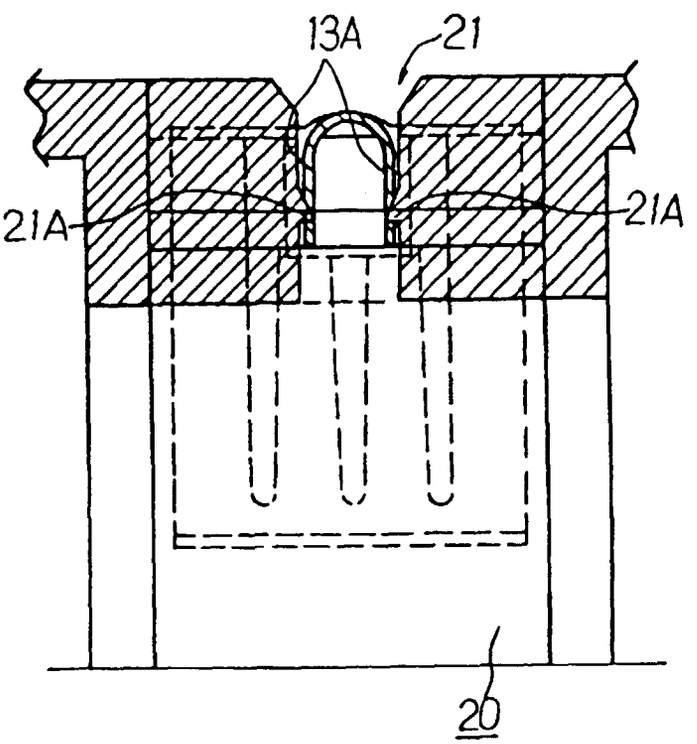


FIG.3



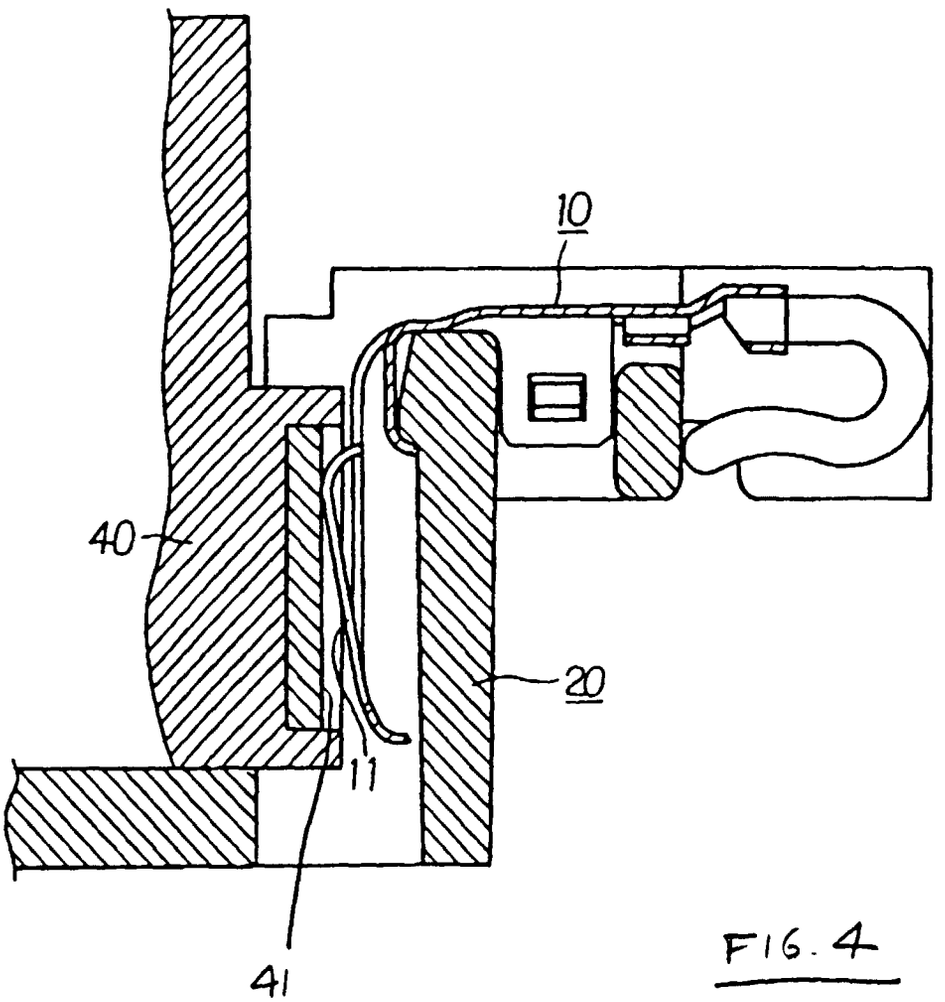


FIG. 4

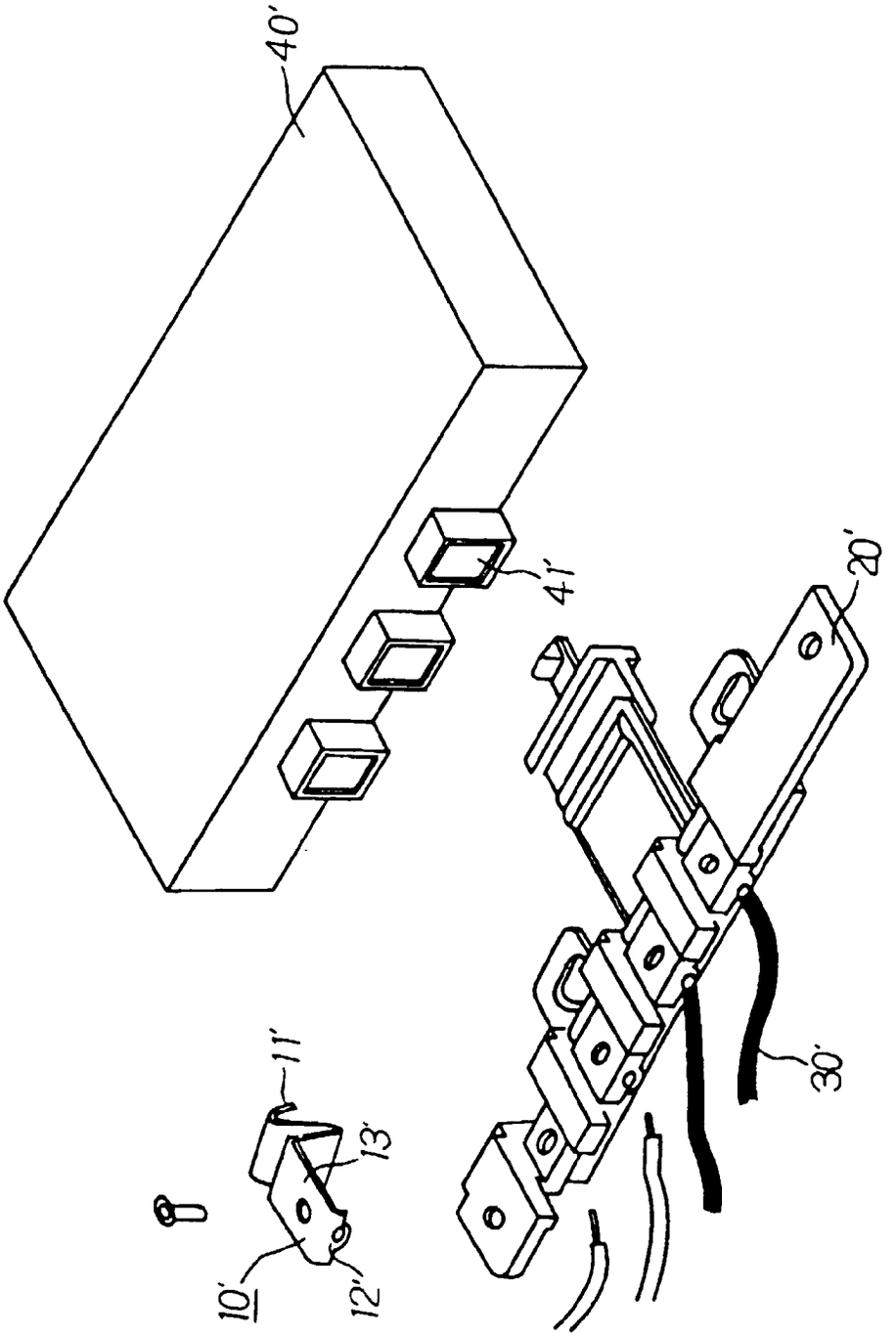


FIG. 5
(PRIOR ART)