

BATTERY CONNECTOR1 FIELD OF THE INVENTION:

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

5 BACKGROUND OF THE INVENTION:

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 an 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'.

15 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.

20 In order to solve the above-described problem, the present invention is aimed at making it possible to secure the contact member without requiring caulking, by employing a specific form and construction of the contact member, as well as the structure of a terminal base or a housing which receives the contact member.

SUMMARY OF THE INVENTION:

30 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 the contact members, each contact member including a contact portion for electrically connecting to a battery electrode. A connecting portion is provided for connecting a wire member. A fixing portion interconnects the contact portion and the connecting portion, and fixes the contact

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1 member to the housing. The fixing portion has an inverse U-
shaped cross-section with an opposing pair of side walls and
an engaging arm extending therefrom towards the contact
portion. Each side wall has an aperture, the housing
5 including a recess 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. The
inner wall surfaces of the recess have projections which
engage with the openings in the fixing portions of the
10 contact members.

BRIEF DESCRIPTION OF THE DRAWINGS:

Figure 1 is a perspective view of an electrical
connector showing a contact member exploded therefrom in
accordance with the present invention for electrical
15 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
20 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
25 known electrical connector and a battery pack.

An embodiment of the present invention will be
described hereinafter.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

Figure 1 shows an electrical connector having a
30 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
35 predetermined portion of the apparatus body on which the
battery pack is to be mounted. There are a plurality of





1 contact members 10 which are arrayed to extend in the longitudinal direction of the housing 20 as shown in Figure 1.

5 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
10 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.

15 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-section and an engaging arm 13B which extends downward from the main part towards the contact portion. Each side wall 13A of the
20 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
25 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.

30 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.

35 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

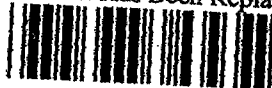
1 in the recess 21 of the housing. In this state, the
projections 21A on the inner wall surface engage with the
openings 13A in the side walls. Since the side walls tend
to expand outward, the fixing portion of the contact member
5 are fixed and held in the recess of the housing. At the
same time, the 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
10 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
15 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
20 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.

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CLAIMS

- 1 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
5 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-
10 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
15 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.
- 1 2. A connector according to claim 1, wherein said
engaging portion of said housing comprises an inclined wall
3 surface (22A).
- 1 3. A connector according to claim 1 or claim 2, wherein
said contact portions of said contact members are arranged to
3 project outwardly therefrom.
- 1 4. A connector according to any one of claims 1 to 3,
wherein said contact portion (11) of said contact members are arranged
3 in a general configuration of a leaf spring.

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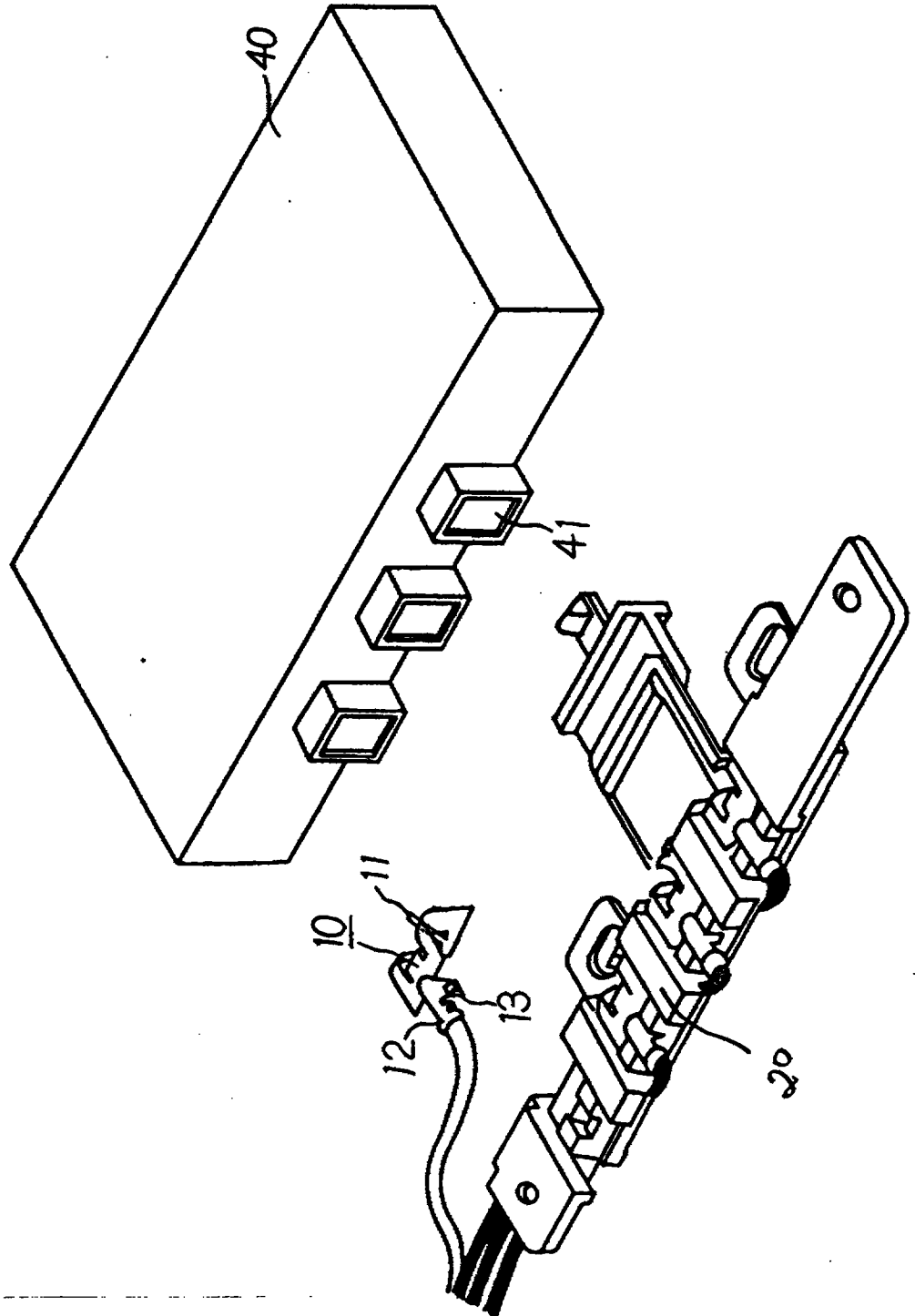


BATTERY CONNECTORABSTRACT:

5 A battery connector includes a contact member (10) having a contact portion (11), which also serves as a leaf spring, a connecting portion (12) for connecting a wire and a fixing portion (13) for fixing the contact member to the housing (20). Each fixing portion (13) has a pair of
10 opposing side walls (13A) and an engaging arm (13B) which extends downwardly towards the contact portion (11). Each side wall has an opening (13C) formed therein. The housing has a recess (21) for receiving and holding the contact member (10) therein, and an engaging portion (22) for
15 engaging the engaging arms (13B) of the contact members (10). Projections (21A) for engagement with the openings (13C) in the fixing portions are provided on inner wall surfaces of the recess.

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FIG 1

FIG. 2

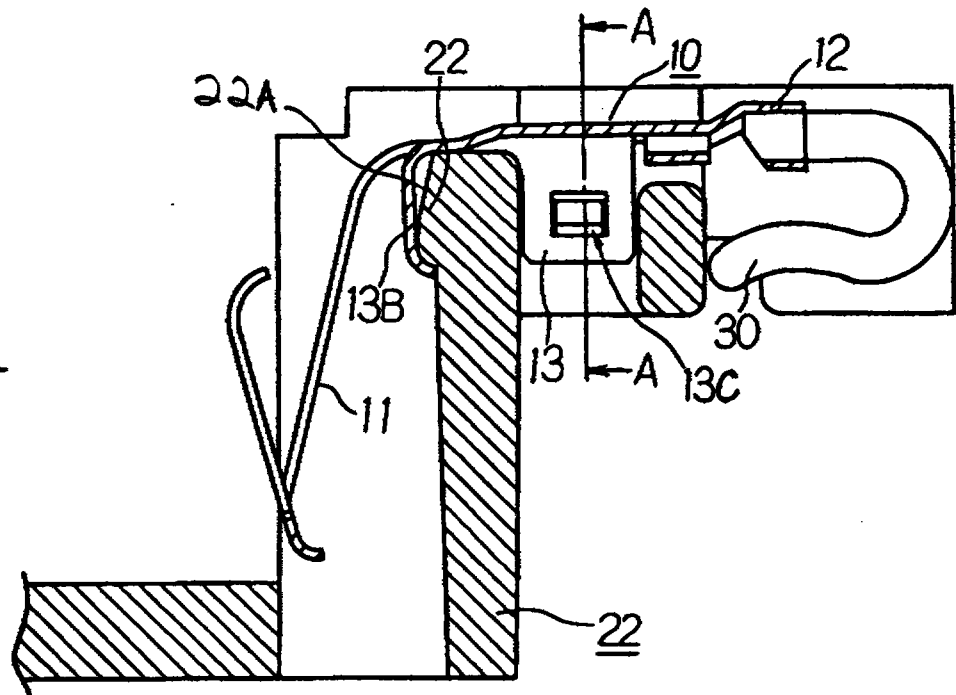
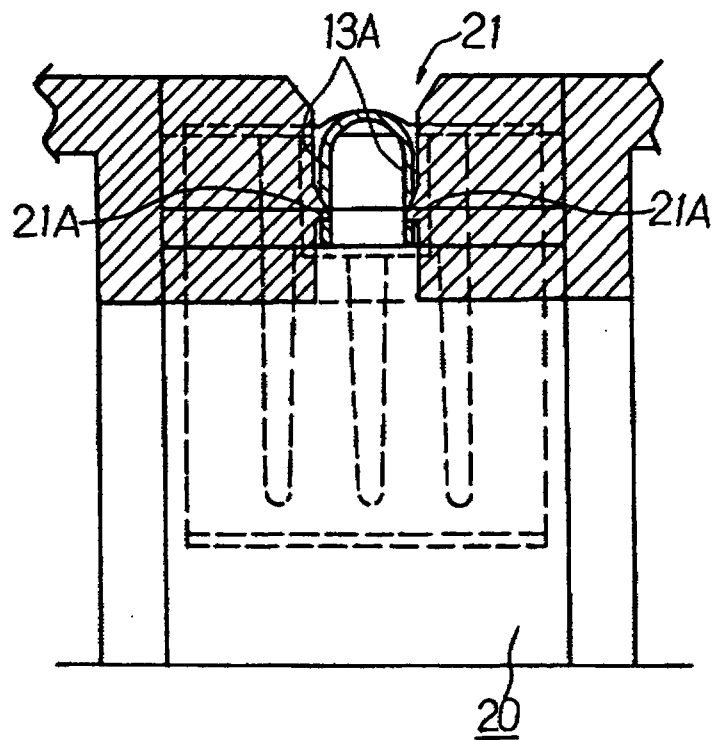


FIG. 3



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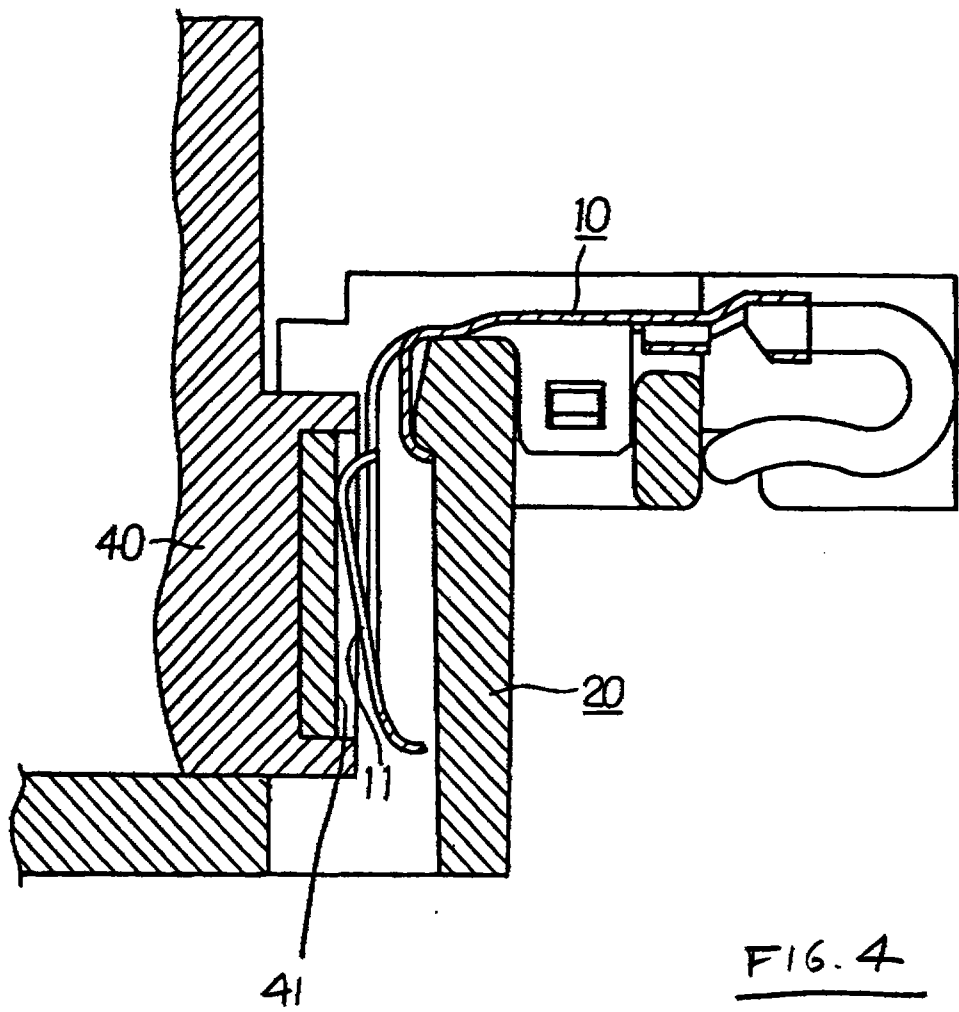
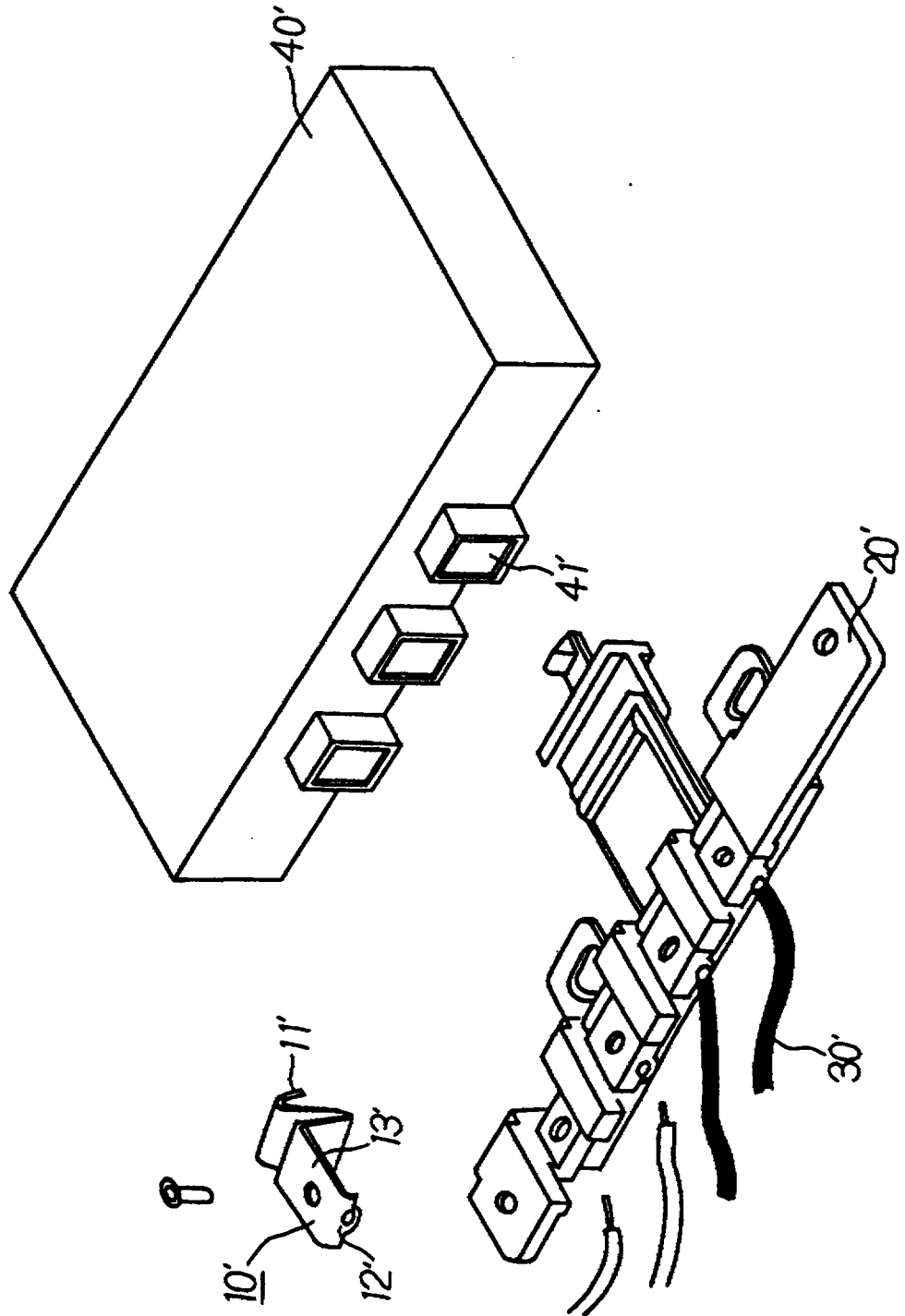


FIG. 4

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FIG. 5
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BATTERY CONNECTOR

FIELD OF THE INVENTION:

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

BACKGROUND OF THE INVENTION:

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 an 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.

In order to solve the above-described problem, the present invention is aimed at making it possible to secure the contact member without requiring caulking, by employing a specific form and construction of the contact member, as well as the structure of a terminal base or a housing which receives the contact member.

SUMMARY OF THE INVENTION:

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 the contact members, each contact member including a contact portion for electrically connecting to a battery electrode. A connecting portion is provided for connecting a wire member. A fixing portion interconnects the contact portion and the connecting portion, and fixes the contact

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member to the housing. The fixing portion has an inverse U-shaped cross-section with an opposing pair of side walls and an engaging arm extending therefrom towards the contact portion. Each side wall has an aperture, the housing including a recess 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. The inner wall surfaces of the recess have projections which engage with the openings in the fixing portions of the contact members.

BRIEF DESCRIPTION OF THE DRAWINGS:

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.

An embodiment of the present invention will be described hereinafter.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

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

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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-section 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

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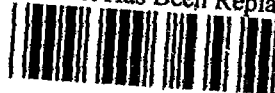
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in the recess 21 of the housing. In this state, the projections 21A on the inner wall surface engage with the openings 13A in the side walls. Since the side walls tend to expand outward, the fixing portion of the contact member are fixed and held in 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.

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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.

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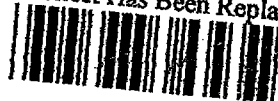
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BATTERY CONNECTORABSTRACT:

A battery connector includes a contact member (10) having a contact portion (11), which also serves as a leaf spring, a connecting portion (12) for connecting a wire and a fixing portion (13) for fixing the contact member to the housing (20). Each fixing portion (13) has a pair of opposing side walls (13A) and an engaging arm (13B) which extends downwardly towards the contact portion (11). Each side wall has an opening (13C) formed therein. The housing has a recess (21) for receiving and holding the contact member (10) therein, and an engaging portion (22) for engaging the engaging arms (13B) of the contact members (10). Projections (21A) for engagement with the openings (13C) in the fixing portions are provided on inner wall surfaces of the recess.

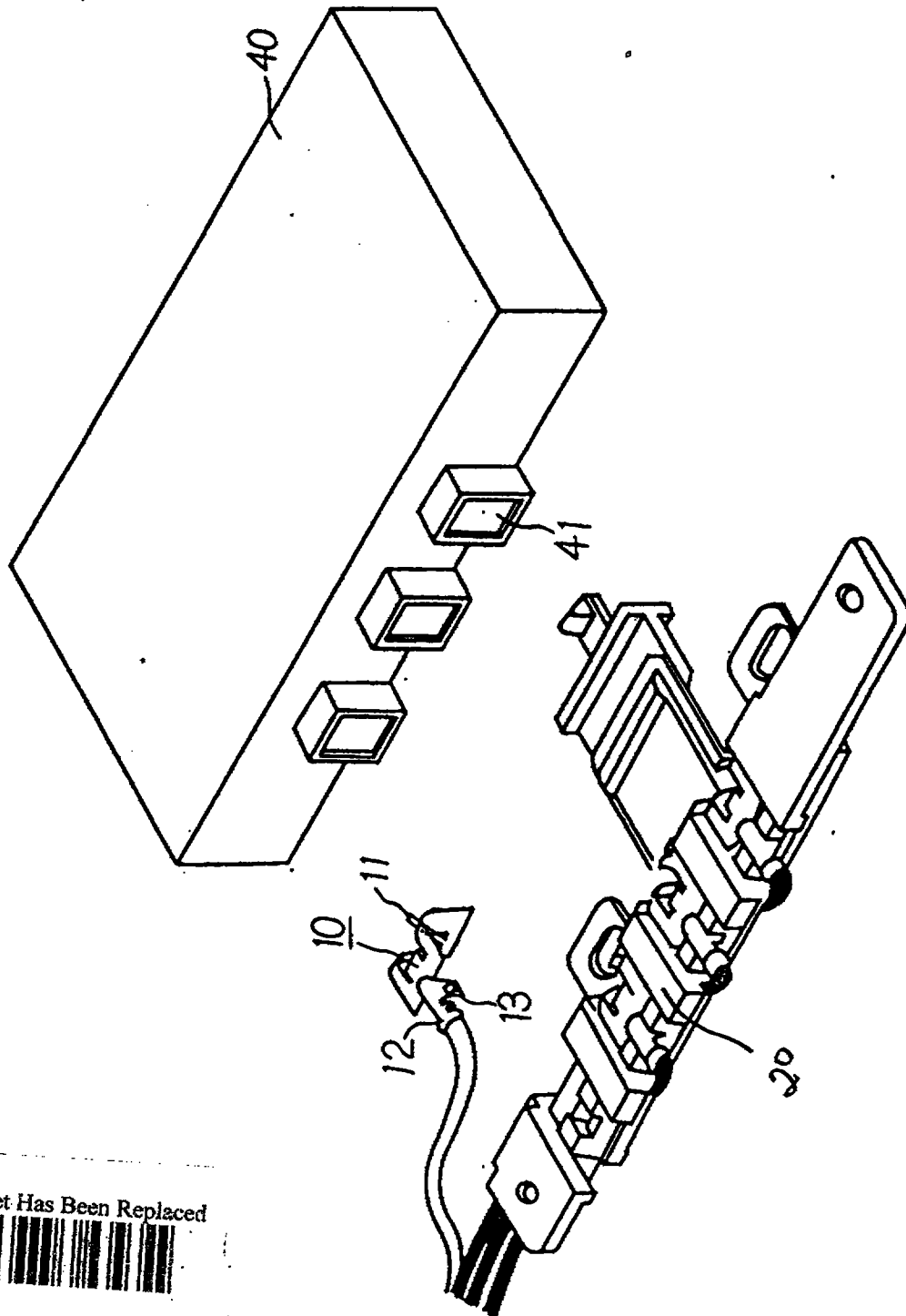
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FIG 1



FIG. 2

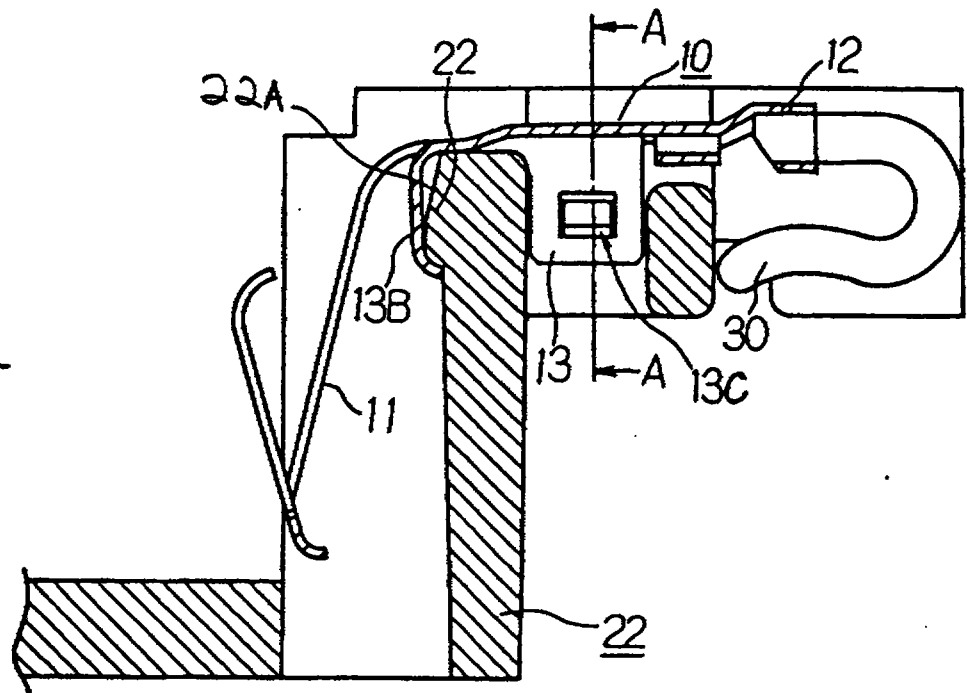
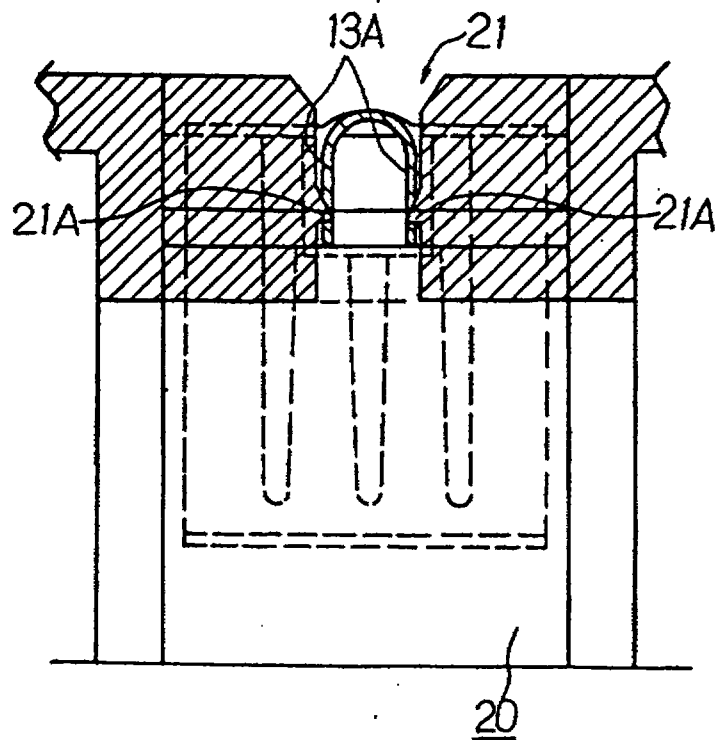
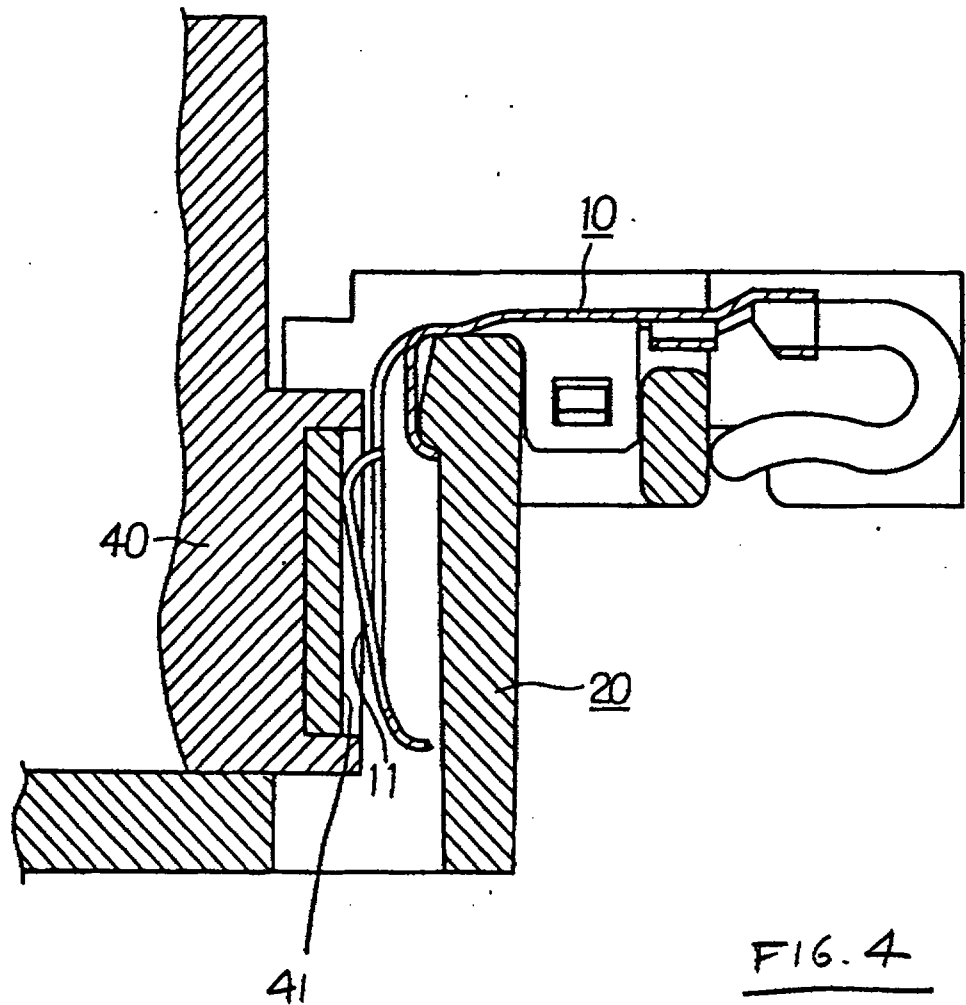


FIG. 3

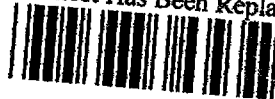


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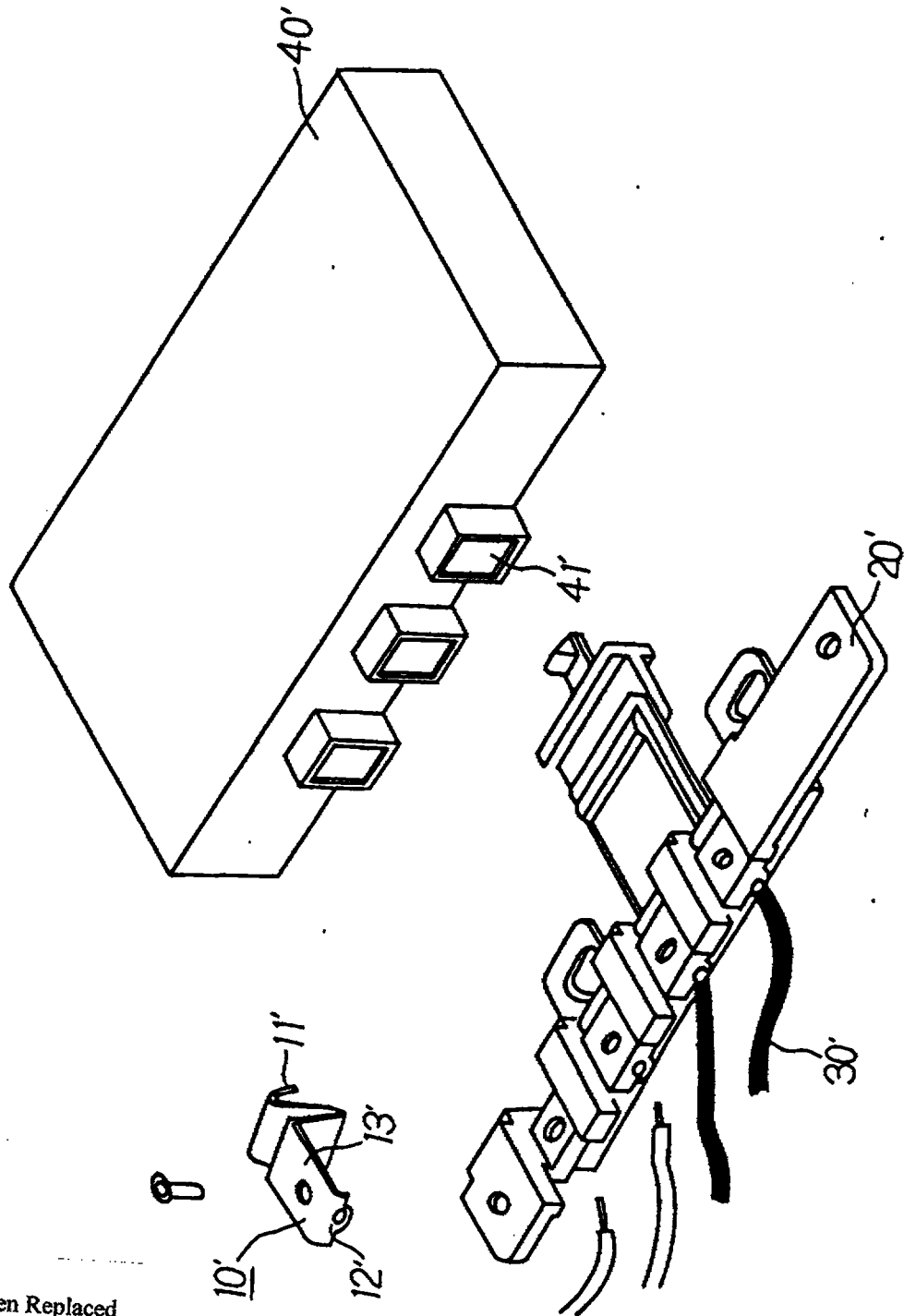


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FIG. 5
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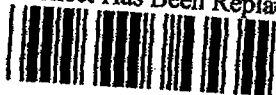
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BATTERY CONNECTOR

Description

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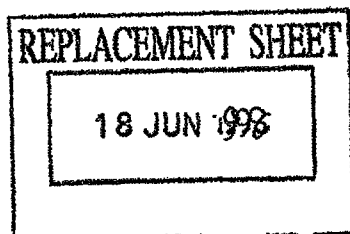


The present invention relates to an electrical connector for detachable connection to a battery pack or cassette type electronic package.

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





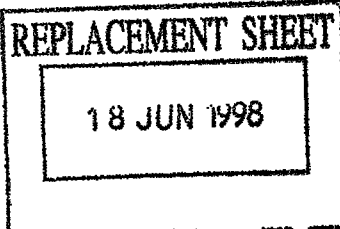
and an engaging portion for engaging with the engaging arms of the contact members.

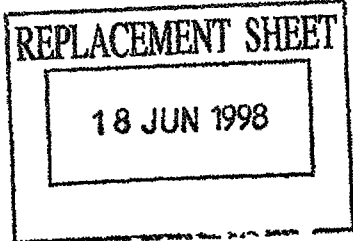
In DE-A-1765922, the fixing portion with an inverse U-shaped cross section has flanges which extend outwardly from the free edges of the opposing side walls. Securement of a contact in the housing is achieved by inserting the flanges in the recesses, pressing the flanges beneath lips formed over part 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:-





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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-section 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

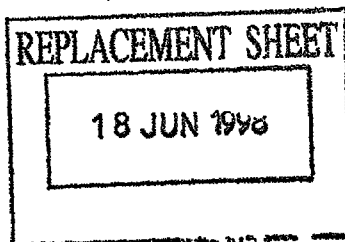
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member and the housing, thus significantly improving the mounting efficiency of the contact member.

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.

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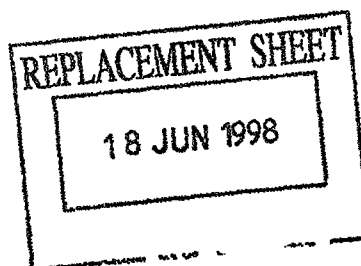


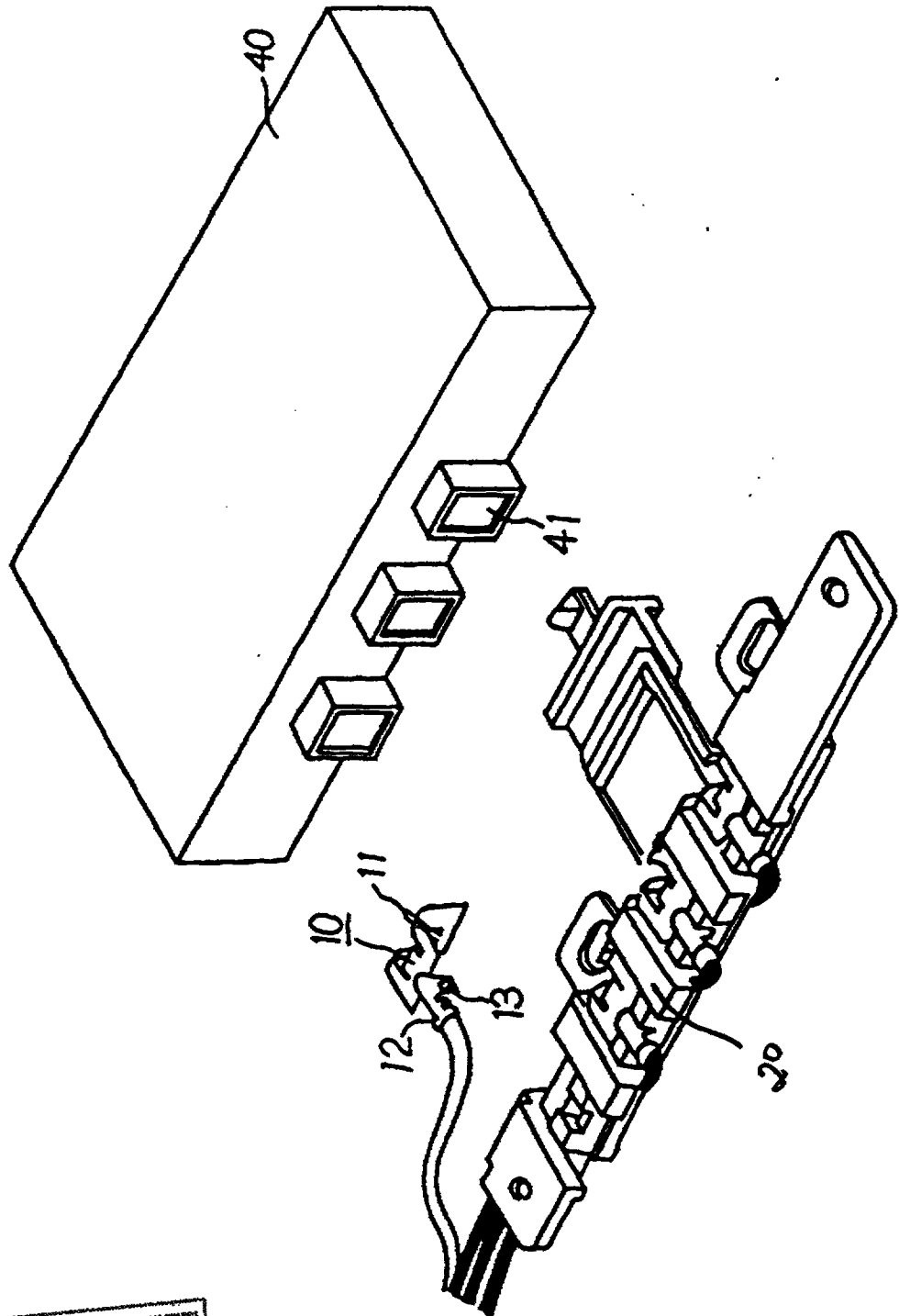


Claims

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.

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FIG 1

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FIG. 2

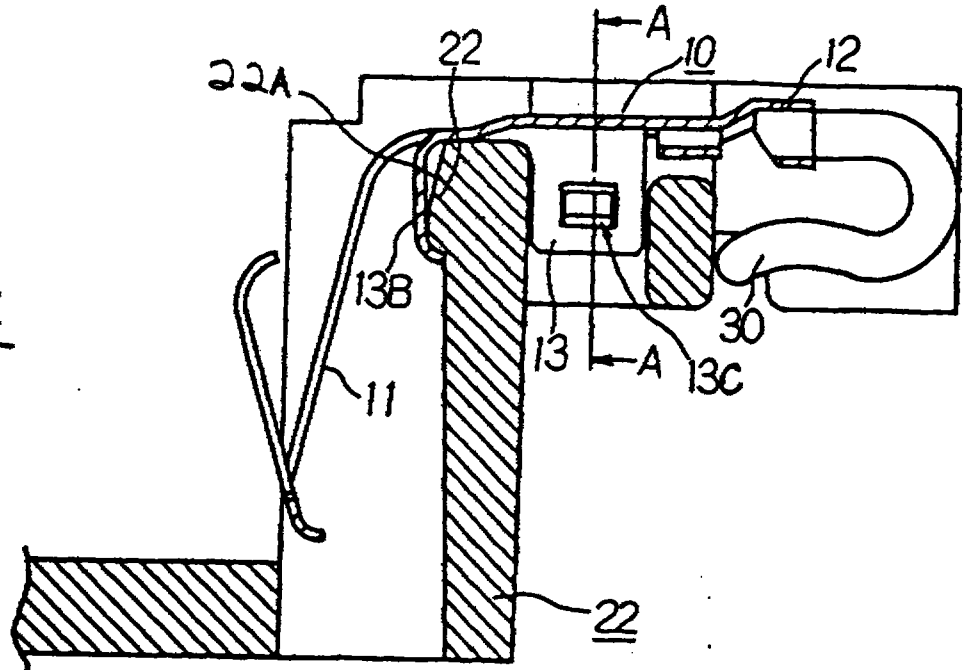
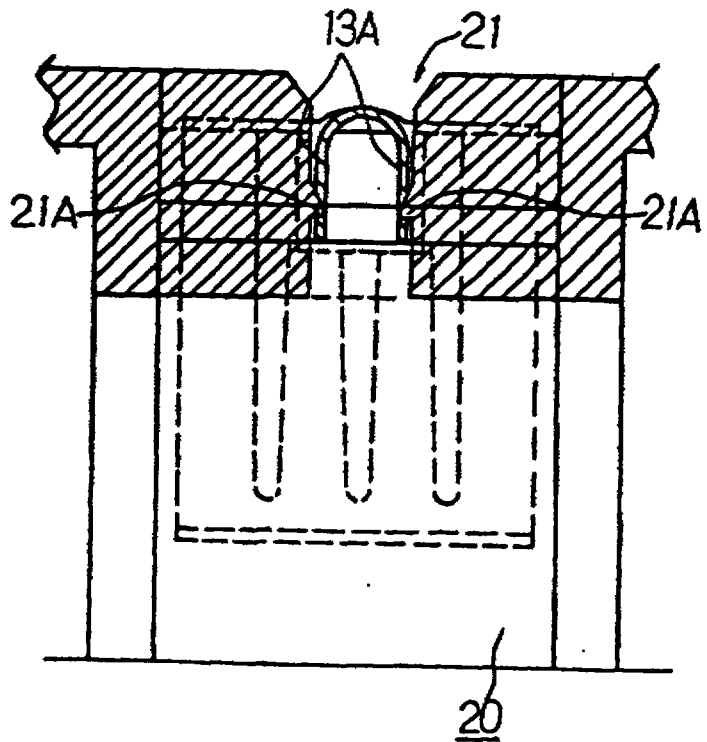
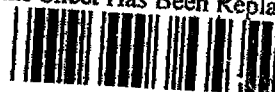


FIG. 3



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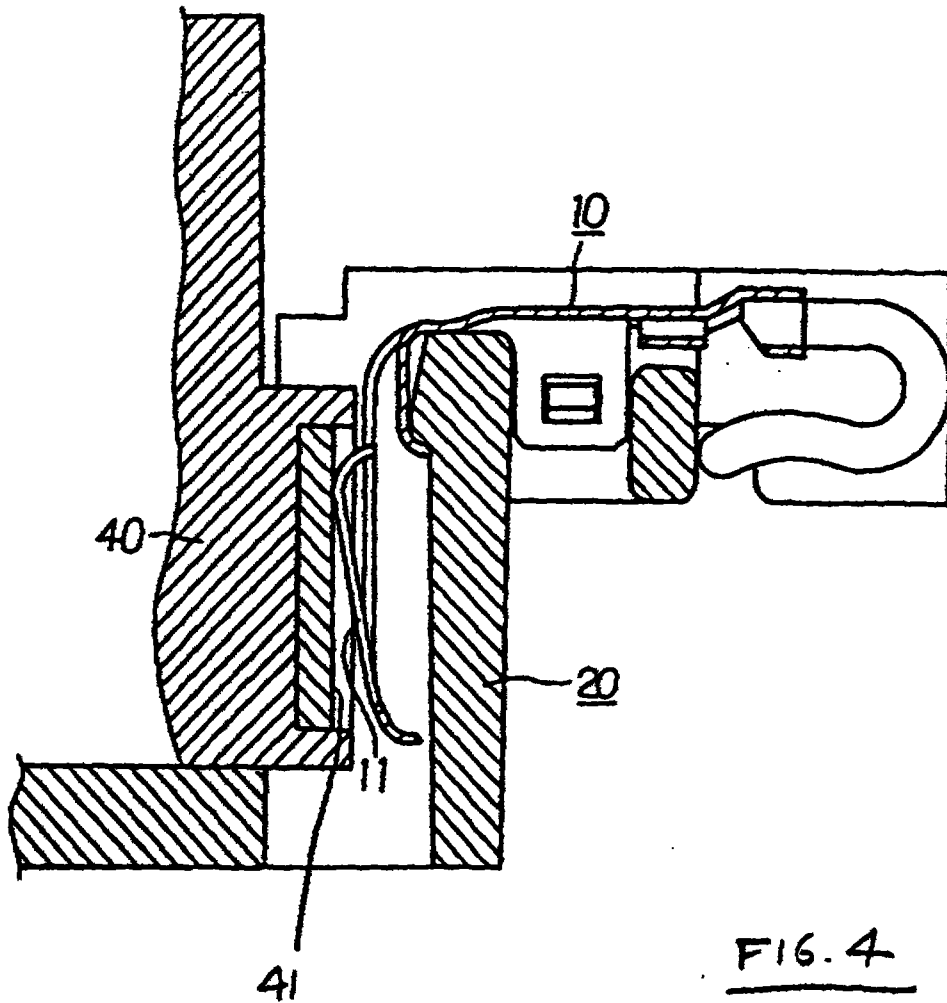
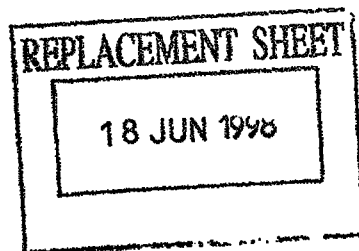
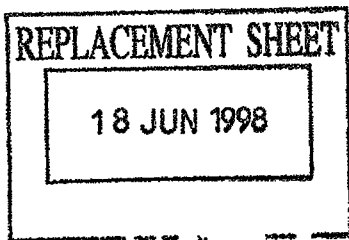
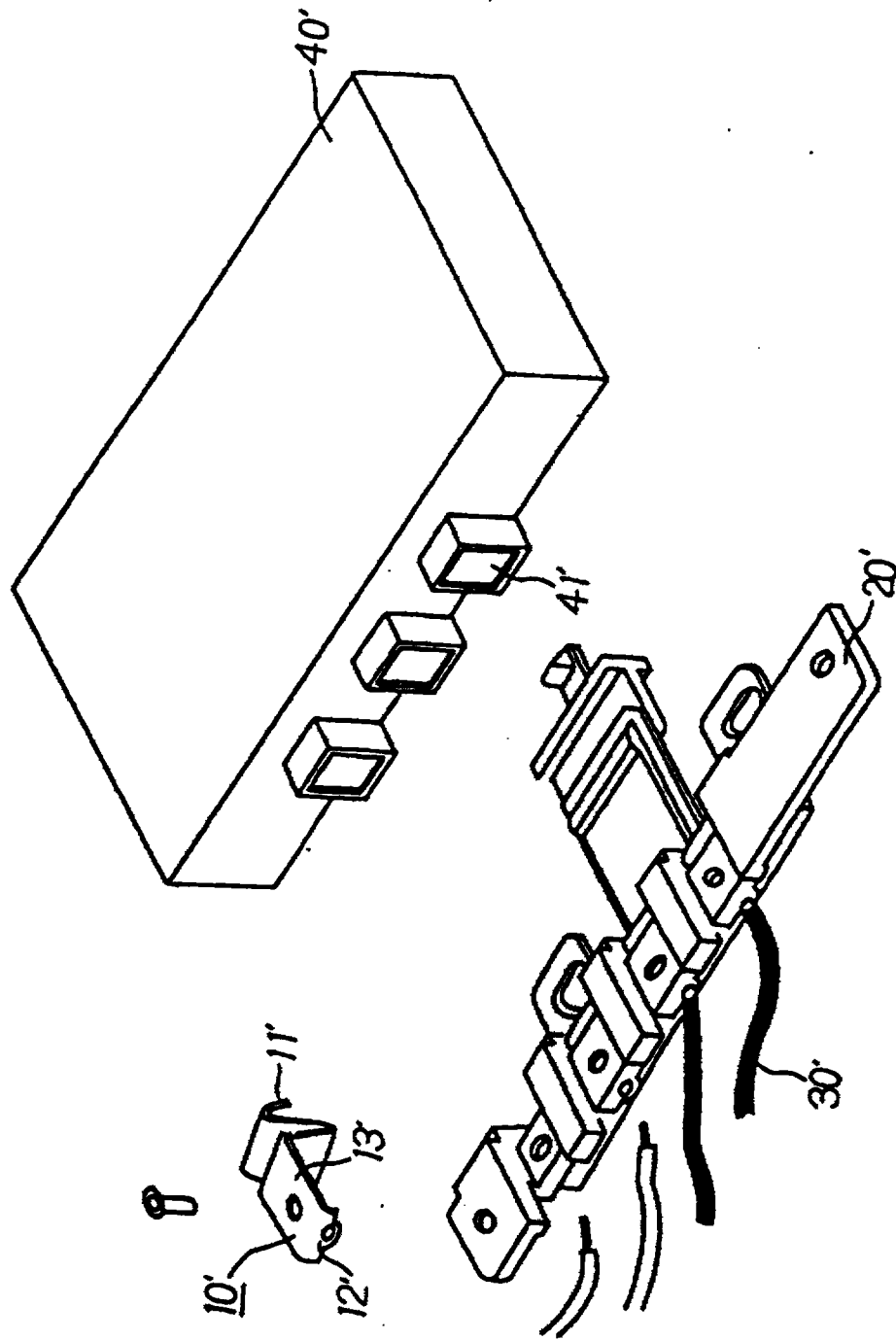


FIG. 4



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FIG. 5
(PRIOR ART)

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☒ Claim(s): page 5. to page 7.
☒ Drawing(s): page 1/4 to page 1/4
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BATTERY CONNECTOR**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.

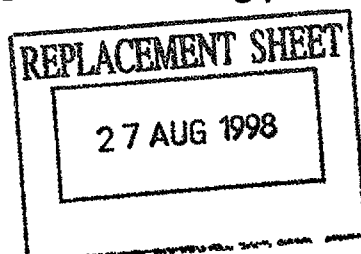
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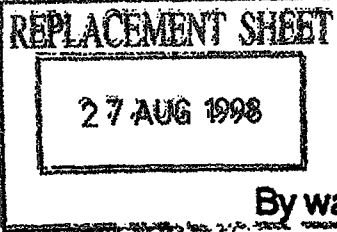
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In DE-A-1765922, the fixing portion with an inverse U-shaped cross section has flanges which extend outwardly from the free edges of the opposing side walls. Securement of a contact in the housing is achieved by inserting the flanges in the recesses, 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-section 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.

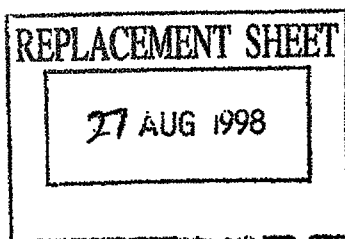
For mounting the contact member 10 in accordance with the present invention, the pair of opposing side walls 13A of the fixing portion 13 of the contact member is fitted in the recess 21 of the housing. In this state, the projections 21A on the inner wall surface engage with the openings 13A in the side 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.

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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.





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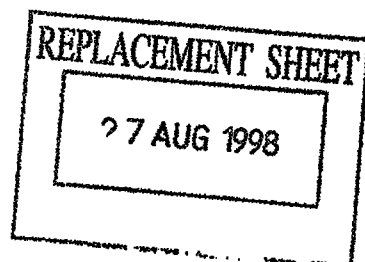
Claims

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.

BATTERY CONNECTORABSTRACT:

A battery connector includes a contact member (10) having a contact portion (11), which also serves as a leaf spring, a connecting portion (12) for connecting a wire and a fixing portion (13) for fixing the contact member to the housing (20). Each fixing portion (13) has a pair of opposing side walls (13A) and an engaging arm (13B) which extends downwardly towards the contact portion (11). Each side wall has an opening (13C) formed therein. The housing has a recess (21) for receiving and holding the contact member (10) therein, and an engaging portion (22) for engaging the engaging arms (13B) of the contact members (10). Projections (21A) for engagement with the openings (13C) in the fixing portions are provided on inner wall surfaces of the recess.

FIGURE 2.



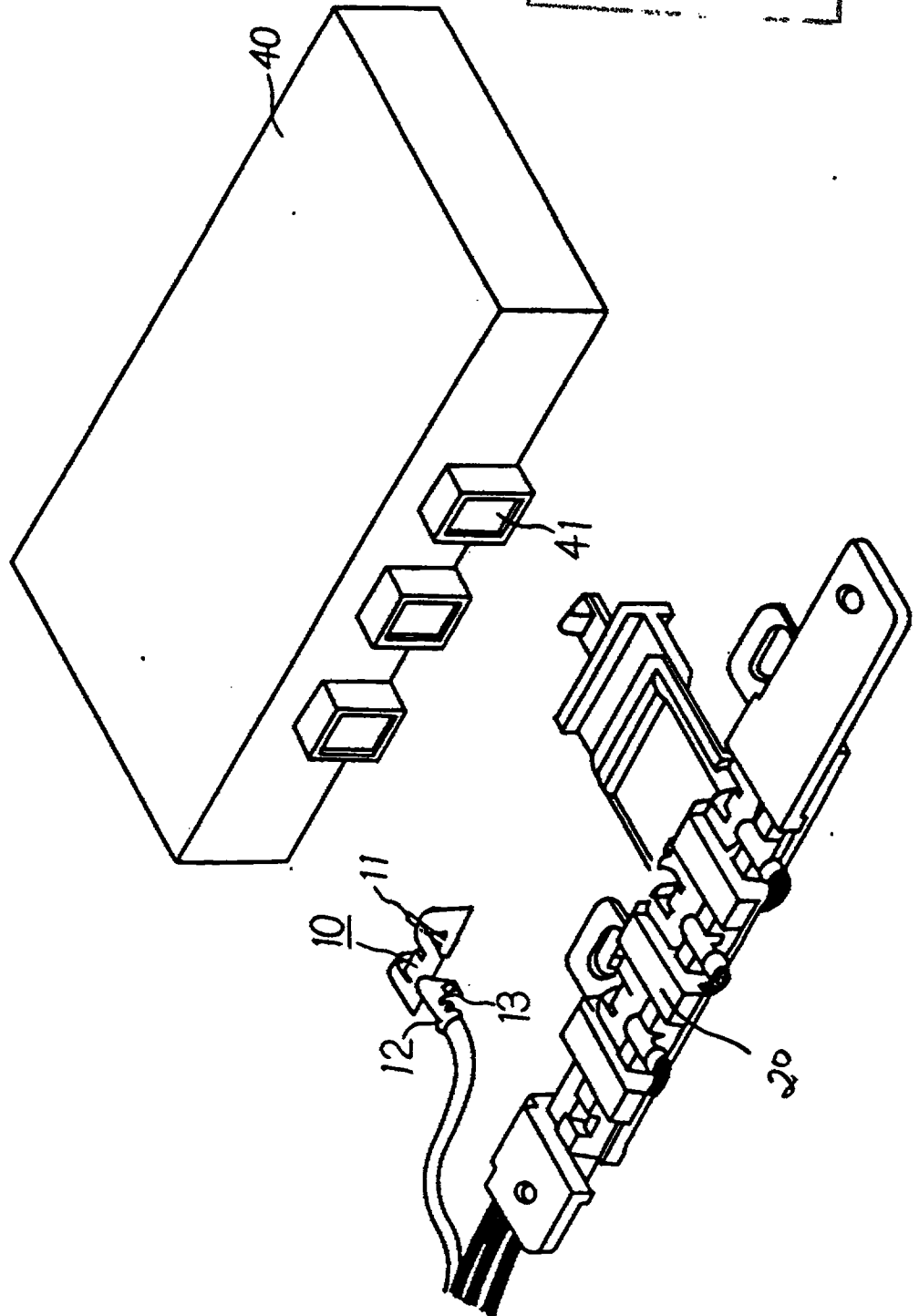
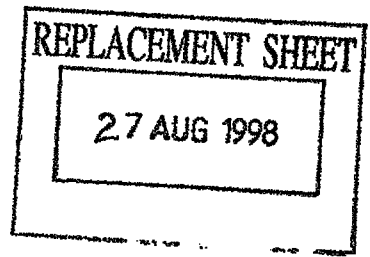


FIG 1

FIG. 2

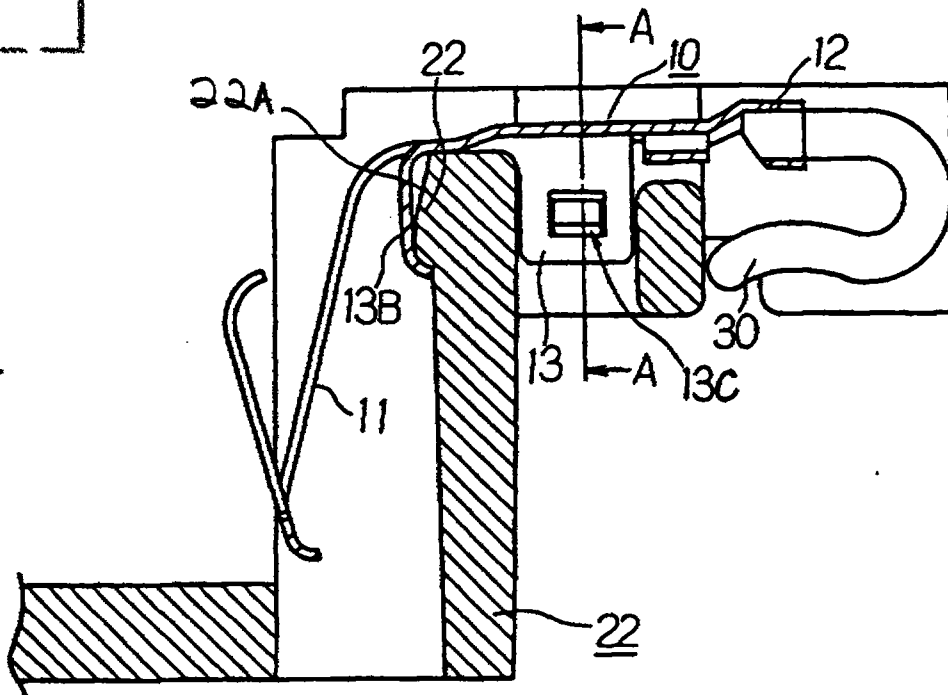
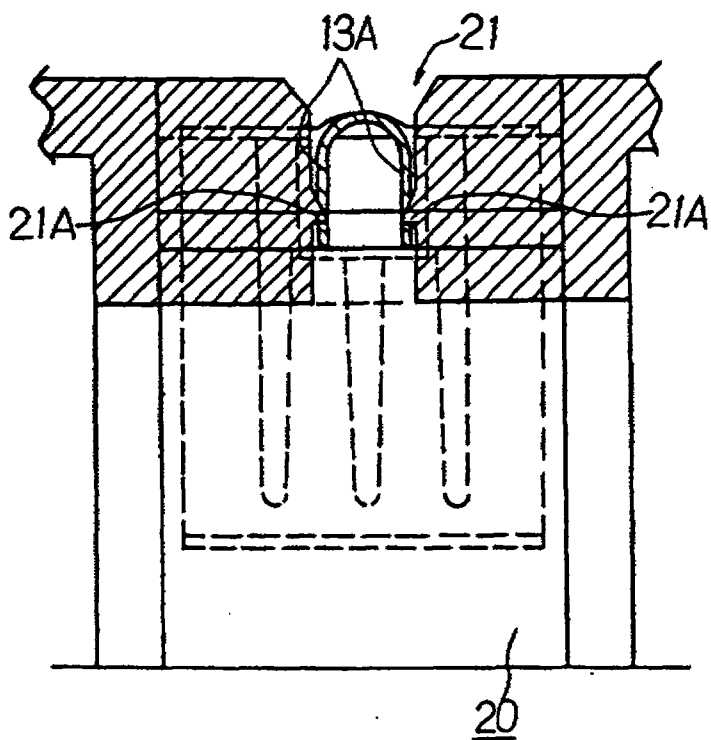


FIG. 3



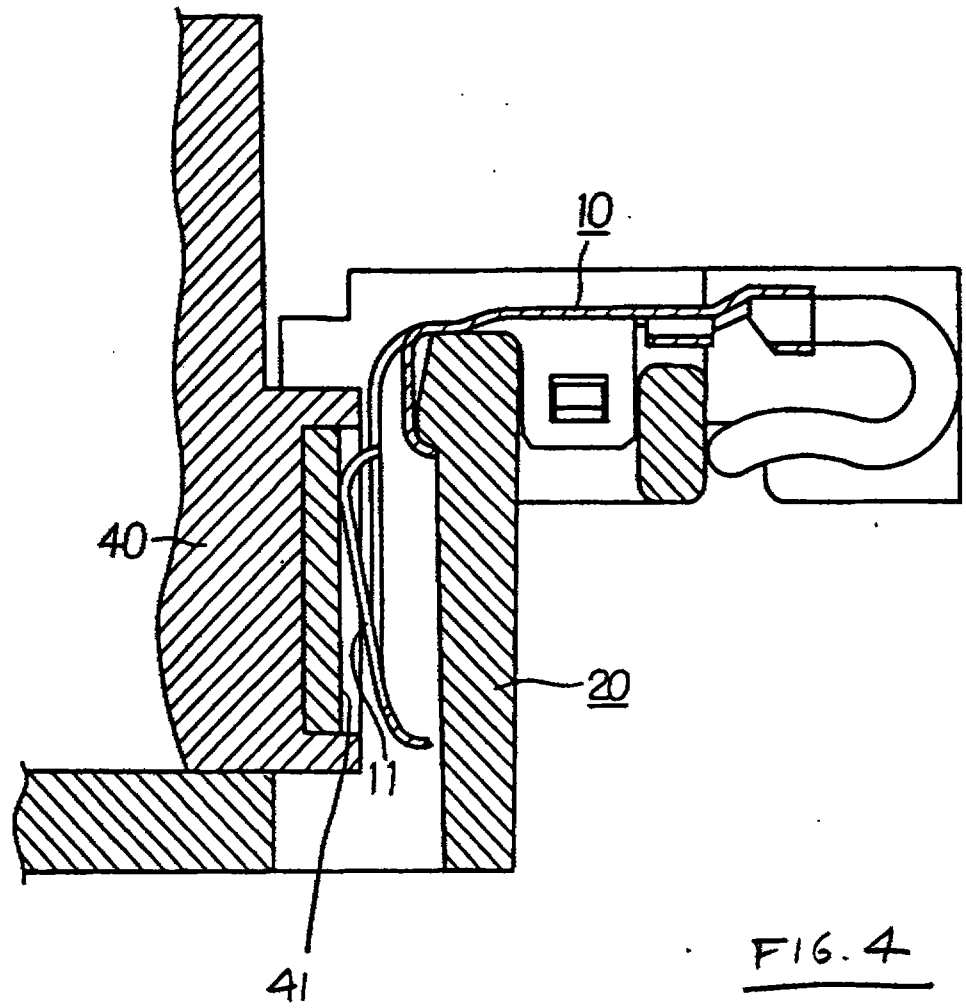
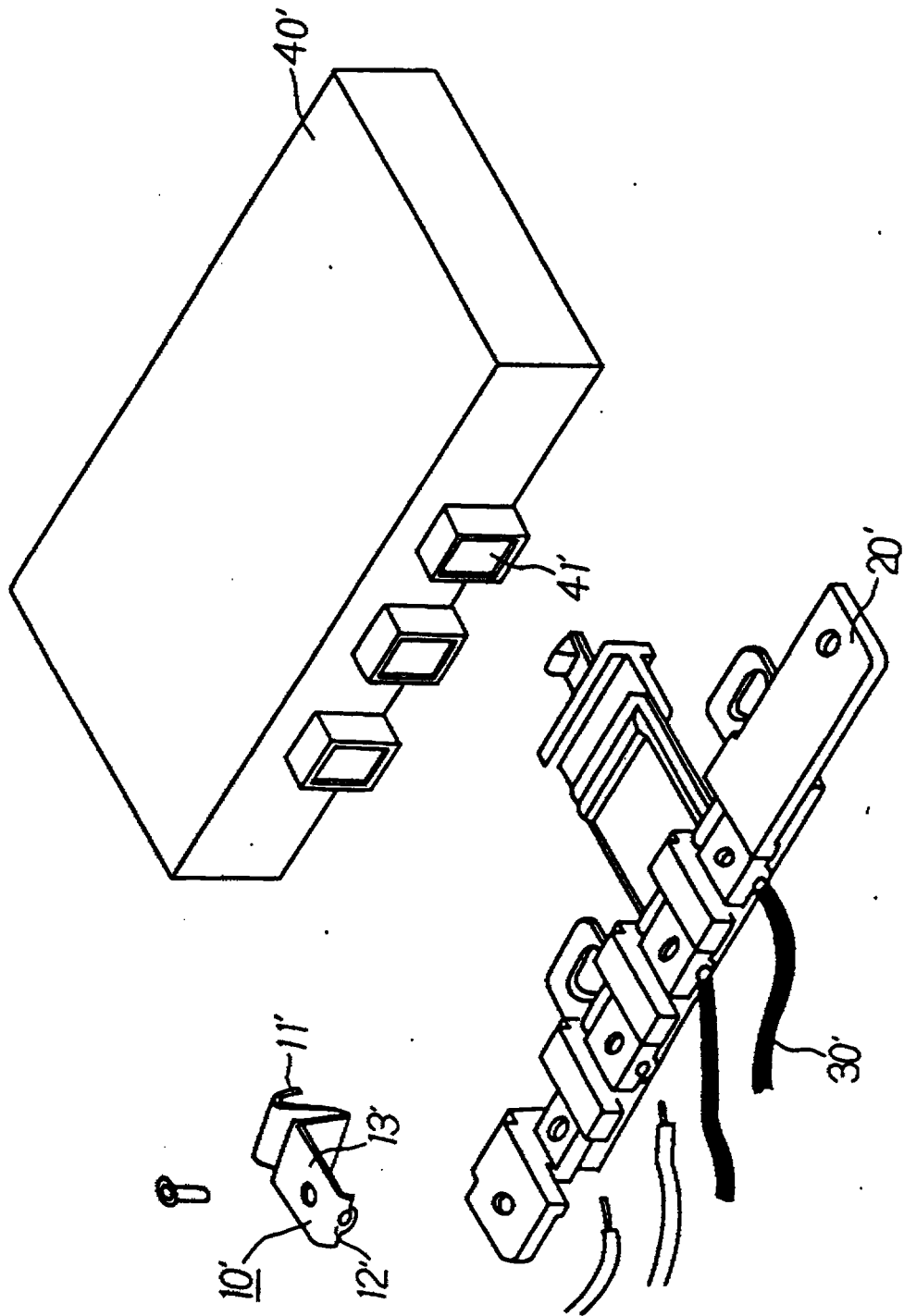


FIG. 4



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FIG. 5
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