

APPLICATION ACCEPTED AND AMENDMENTS
ALLOWED 20.6.90

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

60 09 87

CONVENTION APPLICATION FOR A PATENT

We, E.I. DU PONT DE NEMOURS AND COMPANY., a corporation organized and existing under the laws of the State of Delaware, of Wilmington, Delaware, 19898, United States of America., hereby apply for the grant of a patent for an invention entitled "HEADER DEVICE", which is described in the accompanying complete specification.

This application is a Convention Application and is based on the application for a patent or similar protection made in Japan on 7 November 1986 numbered 171260/86.

Our address for service is: Care of JAMES M. LAWRIE & CO., Patent Attorneys of 72 Willsmere Road, Kew, 3101, Victoria, Australia.

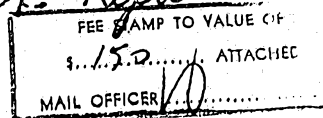
DATED This 28 day of October 1987.



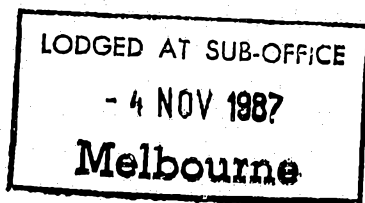
JAMES M. LAWRIE & CO

By:

Jeffrey A. Rider



Patent Attorneys for
E.I. DU PONT DE NEMOURS AND COMPANY



Declaration in Support of an Application for a Patent

(Combined Form - Convention ~~and Non-Convention~~)

* Strike out for
non-convention

In support of the ~~Convention~~ application made for a ~~patent~~ ~~XXXXXX~~ for an
invention entitled HEADER DEVICE

Insert full
name and address
of declarant

I, James Joseph Flynn, Asst. Secretary of the Patent Board of
E. I. DU PONT DE NEMOURS AND COMPANY, 2604 Montchanin Bldg.,
Wilmington, Delaware 19898, United States of America

do solemnly and sincerely declare as follows:-

1. ~~XXXXX~~ ~~the applicant(s) for the~~ ~~patent~~
~~XXXXX~~ ~~XXXXX~~ ~~XXXXX~~
~~(or in the case of an application by a body corporate)~~

1. I am authorised by E. I. DU PONT DE NEMOURS AND COMPANY
the applicant for the ~~patent~~ ~~XXXXXX~~ to make this declaration on its behalf.

Strike out Para. 2.
for non-convention

2. The basic application(s) as defined by section 141 of the Act ~~was~~ ~~were~~ made in
JAPAN Utility Model Appln.
on the 7th day of November 19 86, No. 171260/86,
by DU PONT JAPAN LTD., and
on the day of 19....., No.,
by and
on the day of 19....., No.,
by

Insert full
name(s) and
address(es) of
inventor(s)

3. ~~XXXXX~~ ~~the inventor(s) of the invention~~
~~XXXXX~~ ~~XXXXX~~ ~~XXXXX~~
~~(or in the case of an application by a body corporate)~~
3. Hiroshi NARITA
of 1-16-15-202 Higashigaoka
Meguro-ku
Tokyo, Japan

~~is~~ ~~are~~ the actual inventor(s) of the invention and the facts upon which ~~XXXXX~~ ~~XXXXX~~ the
said Corporation is entitled to make the application are as
follows:-

Applicant is the assignee of the invention from
Du Pont Japan Ltd., who is, in turn, the assignee
of the invention from the said actual inventor.

Strike out Para. 4
for non-convention

4. The basic application(s) referred to in paragraph 2 of this Declaration ~~was~~ ~~were~~ the
first application(s) made in a Convention country in respect of the invention the subject of the
application.

DECLARED AT Wilmington, Delaware, U.S.A.

this 8th day of January 1988

To:

The Commissioner of Patents.

James Joseph Flynn
Signature of Declarant

(12) PATENT ABRIDGMENT (11) Document No. AU-B-80651/87
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 600987

(54) Title
HEADER DEVICE

International Patent Classification(s)
(51)⁴ **H01R 023/70 H01R 013/62 H05K 007/10**

(21) Application No. : **80651/87** (22) Application Date : **04.11.87**

(30) Priority Data

(31) Number (32) Date (33) Country
61-171260 07.11.86 JP JAPAN

(43) Publication Date : **12.05.88**

(44) Publication Date of Accepted Application : **30.08.90**

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(72) Inventor(s)
HIROSHI NARITA

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(56) Prior Art Documents
US 4836790
EP 267001

(57) Claim

1. A header device for a flat IC pack having at least one electrical terminal, comprising:

a header housing including an IC-pack holder, an opening, communicating with the IC-pack holder so that the IC pack is inserted or withdrawn through the opening, and an electrical terminal adapted to fittingly engage the electrical terminal of the IC pack in the IC-pack holder; and

at least one operating means including a first free end located inside the IC-pack holder of the header housing, a second free end located outside the IC-pack holder, and support means rotatably supporting the first and second free ends so that the second free end rotates as the first free end rotates, wherein

said first free end being rotated as the IC pack is inserted into the IC-pack holder in a first direction, and said second free end being rotated by a force

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(10) 600987

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acting in the first direction in order that the IC pack in the IC-pack holder of the header housing is pushed in the direction opposite to the first direction, by the first free end.



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Form 10

PATENTS ACT 1952-1973

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Class:

Int. Cl:

Application Number:

Lodged:

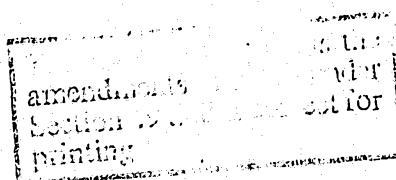
Complete Specification—Lodged:

Accepted:

Published:

Priority:

Related Art:



TO BE COMPLETED BY APPLICANT

Name of Applicant: E.I. DU PONT DE NEMOURS AND COMPANY., a corporation
organized and existing under the laws of the State

Address of Applicant: of Delaware, of Wilmington, Delaware, 19898, United
States of America

Actual Inventor: Hiroshi NARITA

Address for Service: Care of JAMES M. LAWRIE & CO., Patent Attorneys of
72 Willsmere Road, Kew, 3101, Victoria, Australia.

Complete Specification for the invention entitled: HEADER DEVICE

The following statement is a full description of this invention, including the best method of performing it known to me:—

*Note: The description is to be typed in double spacing, pica type face, in an area not exceeding 250 mm in depth and 160 mm in width, on tough white paper of good quality and it is to be inserted inside this form.

Background of the Invention

[Field of the Invention]

The present invention relates to a header device,
and more particularly, to a header device which connects
5 an IC pack, having a semiconductor circuit therein, to
another semiconductor circuit.

[Description of the Prior Art]

Header devices of this type are used to connect a
flat IC pack or card to an external circuit, such as a
10 circuit of a main apparatus. The IC pack contains a
semiconductor circuit, e.g., a memory, CPU, etc. These
conventional header devices are arranged so that the IC
pack can be inserted into an IC-pack holder of a header
housing, which is formed of an insulator. A number of
15 conductive pins are arranged on an interior end face of
the housing opposite to an open face thereof. The con-
nector pins are connected to or disconnected from their
corresponding socket terminals, which are located on the
leading end portion of the IC pack. Thus, the IC pack
20 can be connected to or disconnected from the external
apparatus by inserting it into or drawing it out from
the IC-pack holder of the header housing.

In the prior art header devices described above, a
considerable force is required to remove the connector
25 pins on the header housing from the socket terminals on
the IC pack, in order to secure satisfactory electrical
contact between them. These pins and terminals have

come to be arranged with a higher density, with the increase of the packaging density of those semiconductor circuits which carry them.

The IC pack is pulled by hand when it is to be removed from the header housing. However, a number of connector pins and socket terminals are arranged densely, and the disconnection of the pins from the terminals requires a substantial force. In removing the IC pack from the housing, therefore, the pack must be pulled with a great force, against the fitting friction between the pins and terminals. Since the IC pack is removed manually, moreover, the direction of the removal is not fixed, so that the pins or terminals may possibly be broken or bent.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to provide a header device which permits easy removal of an IC pack therefrom, and more specifically, facilitates the removal of the IC pack despite the use of a number of connector pins. Another object of the invention is to provide a header device which permits the removal of the IC pack without entailing any damage to the pins or terminals.

According to a broad form of the invention there is provided a header device for a flat IC pack having at least one electrical terminal, comprising:

a header housing including an IC-pack holder, an opening, communicating with the IC-pack holder so that the IC pack is inserted or withdrawn through the opening, and an electrical terminal adapted to fittingly engage the electrical terminal of the IC pack in the IC-pack holder; and

at least one operating means including a first free end located inside the IC-pack holder of the header housing, a second free end located outside the IC-pack holder, and support means rotatably supporting the first and second free ends so that the second free end rotates as the first free end rotates, wherein

said first free end being rotated as the IC pack is inserted into the



IC-pack holder in a first direction, and said second free end being rotated by a force acting in the first direction in order that the IC pack in the IC-pack holder of the header housing is pushed in the direction opposite to the first direction, by the first free end.

5 In the header device of the invention constructed in this manner, if the IC pack is pushed deep into the IC-pack holder of the header housing, a first lever, having the first free end, is pushed and rotated rear-ward by the pack. At the same time, a second lever, having the second free end, rotates forward or toward the opening in the IC-pack holder. If the second lever is rotated rearward, the first lever moves toward the opening in the IC-pack holder. After
10 the IC pack is pushed out by the first lever, moving in this manner, it can be removed from the header housing.

Thus, with use of the header device constructed in



this manner, the IC pack can be both inserted and removed by a pushing operation.

Brief Description of the Drawings

Fig. 1 is a perspective view of a header device according to an embodiment of the present invention;

Fig. 2 is a perspective view showing operating means of the header device of Fig. 1;

Figs. 3A and 3B show a state such that an IC pack is fully inserted in the header device of Fig. 1, in which Fig. 3A is a schematic top view, and Fig. 3B is a sectional view taken along line X-X of Fig. 1; and

Figs. 4A and 4B, which correspond to Figs. 3A and 3B, respectively, show a state such that the IC pack is pushed out of the header device by operating means according to the invention.

Detailed Description of the Preferred Embodiments

A header device according to an embodiment of the present invention will now be described in detail with reference to the accompanying drawings. In the external perspective view of Fig. 1, header device 10 is composed basically of housing 11. Defined inside header housing 11 is IC-pack holder 12 in which IC pack 30 is to be held. A plurality of conductive pins 13 are arranged on that wall which is opposite to opening 121 of holder 12. Pins 13 are adapted to be connected individually to socket terminals (not shown), which are fixed to the leading end portion 31 of IC pack 30 in holder 12. Thus,

if pack 30 is inserted into holder 12 through opening 121, a semiconductor circuit mounted on pack 30 is connected to the circuit of a main apparatus (not shown) to which header device 10 is attached by pins 13.

5 Header housing 11 is provided with a pair of operating means 201 and 202 which are situated individually on two opposite sides of IC pack 30, with respect to the insertion direction thereof, at interior portion 122 of IC-pack holder 12. As shown in Fig. 2,
10 operating means 201 includes first and second levers 21 and 22 which are connected, at connecting ends 211 and 221, respectively, to coupling portion 24. First lever 23 has free end 212. Second lever has free end 222. Operating means 202 is also constructed in this manner.
15 Operating means 201 and 202 are fitted individually in a pair of apertures on IC-pack holder 12.

 Operating means 201 and 202 are rotatably supported by their corresponding shafts 23, which are mounted on housing 11 so as to extend perpendicular to the plane of
20 IC pack 30. First levers 21 are designed so that they can move from interior portion 122 of IC-pack holder 12 toward opening 121 (and in the reverse direction) when operating means 201 and 202 rotate. Second levers 22 are designed so as to rotate over top wall 14 of housing
25 11 as the operating means rotate.

 In this embodiment, first and second levers 21 and 22 are fixed at an angle of about 120° to each other, as

shown in Fig. 2. When second lever 22 is rotated in the direction indicated by an arrow 1 in Fig. 2, first lever 21 moves in the direction opposite to the moving direction of the second lever. Second lever 22, which is used as an operating piece, is longer than first lever 21 which serves as a driving piece. In accordance with the ratio between the radii of the rotation of levers 21 and 22, the operative force of first lever 21 is enhanced by second lever 22, and is then transmitted as a driving force for IC pack 30.

In the header device constructed in this manner, if IC pack 30 is pushed manually into IC-pack holder 12 through opening 121, leading end face 31 of pack 30 first abuts against free end 212 of each first lever 21. If pack 30 continues to be pushed in further, first lever 21 is pushed deep into holder 12, and second lever 22, which is formed integrally with the first lever, moves towards opening 121. Figs. 3A and 3B show a state after IC pack 30 is inserted. In this state, the socket terminals (not shown) of pack 30 and the connector pins 13 of header device 10 are connected.

In removing IC pack 30, second levers 22 of operating means 201 and 202 are pushed in the direction of pack insertion. As levers 22 rotate in this manner, free ends 212 of first levers 21 push IC pack 30 toward opening 121 so that pack 30 further projects from the housing, as shown in Figs. 4A and 4B. In this state,

the conductive pins 13 of device 10 are off the socket terminals of pack 30, so that the pack can be removed easily by hand.

5 In the header device according to the embodiment described above, the IC pack can be inserted by being pushed in, and can be removed by pushing second levers 22. In general, a pushing operation is easier than a pulling operation. Thus, the IC pack can be inserted and removed more efficiently. In this embodiment, in
10 particular, second lever 22 is longer than first lever 21, so that it can be operated easily, even if the number of the conductive pins of the header device is so large that a great force would be required for the removal. The respective second levers of the paired
15 operating means can be operated simultaneously by means of one suitable operating member located halfway between the operating means.

The operating means of the header device of the present invention may be one in number. In this case,
20 it is situated in a position such that the IC pack can be removed easily by operating the second lever.

The claims defining the invention are as follows:

1. A header device for a flat IC pack having at least one electrical terminal, comprising:

a header housing including an IC-pack holder, an opening,
5 communicating with the IC-pack holder so that the IC pack is inserted or withdrawn through the opening, and an electrical terminal adapted to fittingly engage the electrical terminal of the IC pack in the IC-pack holder; and

at least one operating means including a first free end located inside the IC-pack holder of the header housing, a second free end located outside the
10 IC-pack holder, and support means rotatably supporting the first and second free ends so that the second free end rotates as the first free end rotates, wherein

said first free end being rotated as the IC pack is inserted into the IC-pack holder in a first direction, and said second free end being rotated by a force acting in the first direction in order that the IC pack in the IC-pack holder of the
15 header housing is pushed in the direction opposite to the first direction, by the first free end.

2. A header device according to claim 1, wherein said operating means includes a first lever having the first free end, at one end thereof, and a first connecting end, and a second lever having the second free end, at one end thereof, and a second connecting end; and said support means includes a
20 coupling member having



an axis, said first and second levers extending from the coupling member.

3. A header device according to claim 2, wherein said first and second levers extend on a plane parallel
5 to the plane of the IC pack, and said axis of said coupling member extends perpendicular to the plane of the IC pack.

4. A header device according to claim 3, wherein said operating means includes a shaft extending along
10 the axis of the coupling member, and supporting the coupling member so that the first and second free ends are movable.

5. A header device according to claim 2, wherein said first and second levers and said coupling member of
15 said support means are molded integrally.

6. A header device according to claim 2, wherein said first and second levers and said coupling member of said support means are formed of an insulating material.

7. A header device according to claim 2, wherein
20 the distance between the free end and the connecting end of said first lever is shorter than that between the free end and the connecting end of said second lever.

8. A header device according to claim 3, wherein said first and second levers extend in different direc-
25 tions, at a predetermined angle to each other.

9. A header device according to claim 2, wherein said first free end includes an arcuate surface against

which the IC pack abuts, the point of contact between the IC pack and the arcuate surface being adapted to move as the IC pack moves.

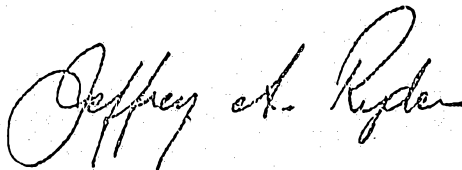
10. A header device according to claim 2,
5 wherein a pair of said operating means are arranged at a space in the direction at right angle to the direction of IC-pack insertion.

11. A header device, substantially as hereinbefore described with reference to Fig. 1 to Fig. 4B of the
10 accompanying drawings.

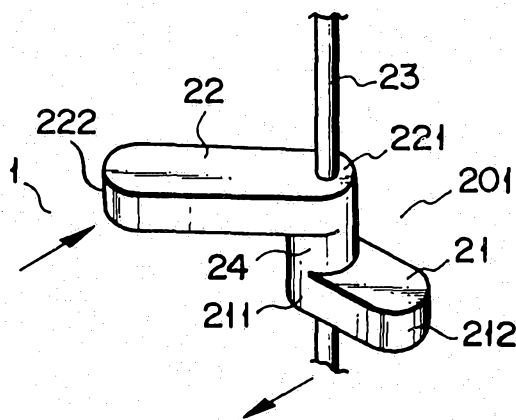
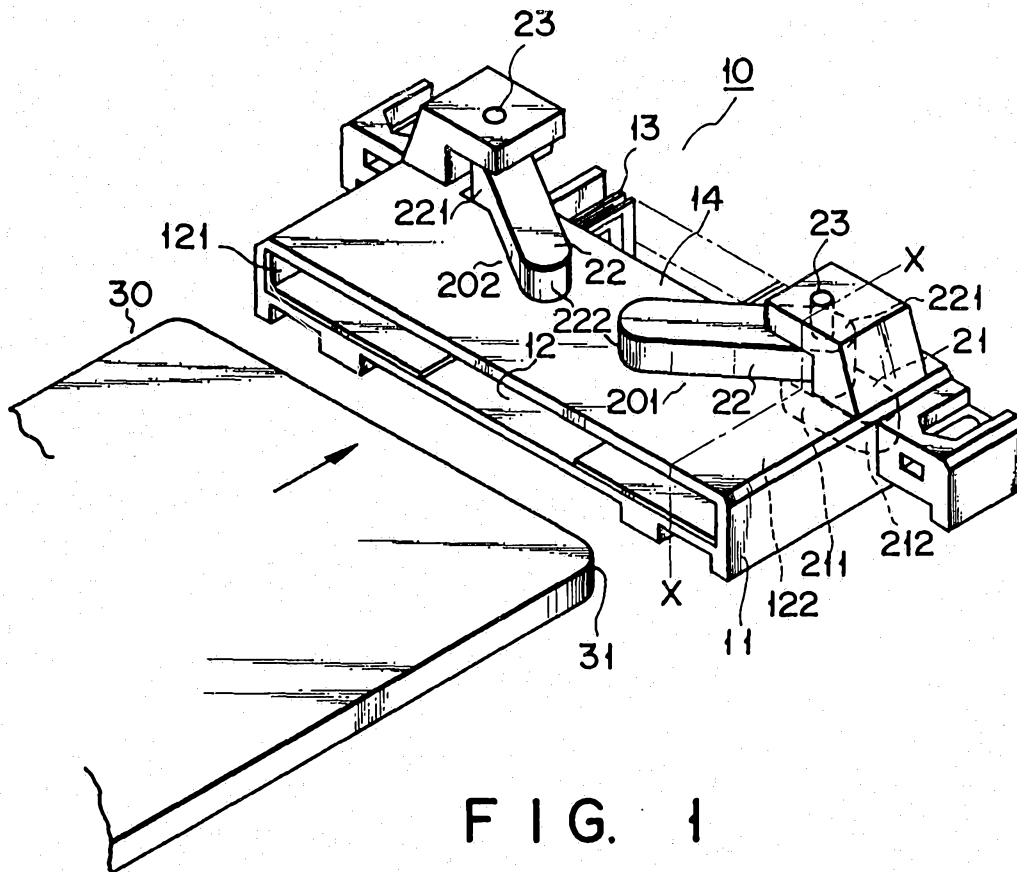
DATED this 28 day of October 1987.

JAMES M. LAWRIE & CO

By:



Patent Attorneys for
E.I. DU PONT DE NEMOURS AND COMPANY



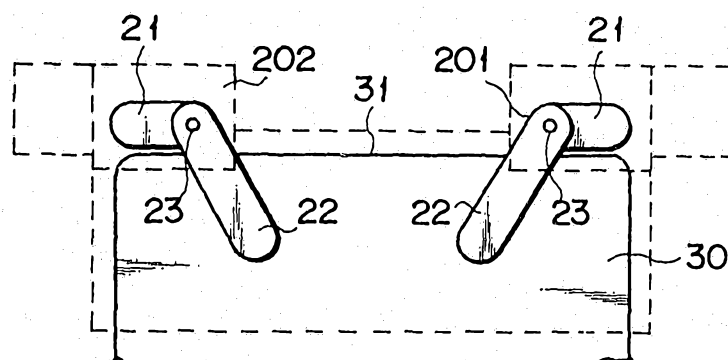


FIG. 3A

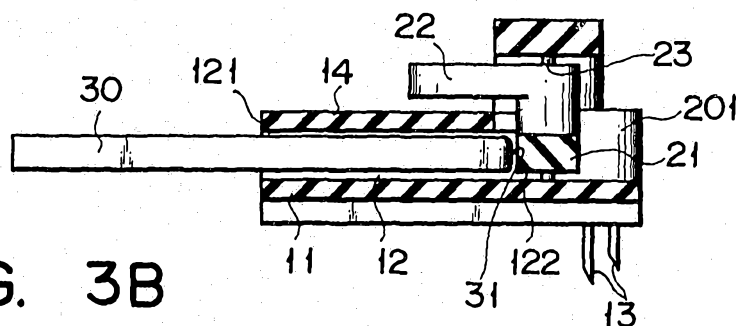


FIG. 3B

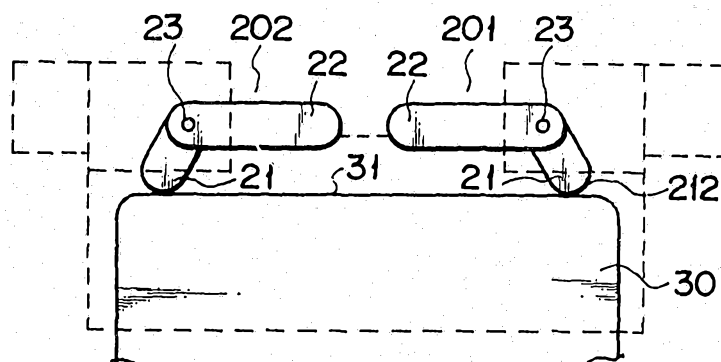


FIG. 4A

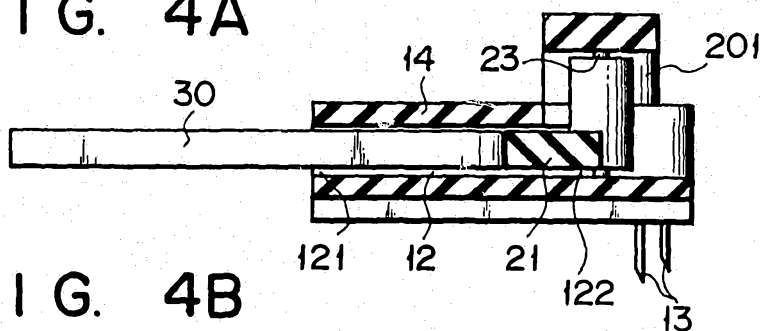


FIG. 4B