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

(11) EP 1 245 337 A2

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
02.10.2002 Bulletin 2002/40

(21) Application number: **00954685.4**

(22) Date of filing: **17.08.2000**

(51) Int Cl.[7]: **B25B 1/00**

(86) International application number:
PCT/ES00/00326

(87) International publication number:
WO 01/012388 (22.02.2001 Gazette 2001/08)

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **17.08.1999 ES 9902193 U**

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(54) GRIPPER FOR EXTRACTING FUSES AND RELAYS

(57) Gripper for extracting fuses and relays, comprising a substantially U-shaped body which defines a first pair of arms and a second pair of arms joined to said body at the Junction zone of the first pair of arms.; the free extremlties of said first pair of arms are provided with a groove to house the extremity of a fuse; the free extremities of said second pair of arms are provided with a groove to house the extremity of a larger fuse; the gripper is characterized in that at least one of said pair of arms has a notch at its free end to house the extremity of a relay.

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Description

[0001] The present patent application consists, as its title indicates, of "Pincers for extracting fuses and relays", whose new characteristics of construction, shape and design fulfill the object for which they have specifically been planned, with maximum safety and effectiveness and with many advantages, as described below.

[0002] Normally, the operation of extracting a fuse from the fuse box in which it is inserted is difficult and uncomfortable. Often, it cannot be done with the fingers.

[0003] When the fuse is arranged in the fuse box, there is no space between the body of the fuse and the edges of the fuse box in which to operate and extract said fuse.

[0004] When a fuse has to be replaced in maintenance operations of the electrical system of, for example, a vehicle, tools and implements are usually used that are often not appropriate, which results in the fuse body breaking and the fuse being rendered useless. Moreover, if the fuse body breaks while it is still inserted in the fuse box, its extraction becomes complicated, since there is insufficient base for holding it in order to extract it.

[0005] In the prior art, solutions have been proposed, such as the use of pincers for extracting fuses, which typically comprises a body which is basically U-shaped and defines a first pair of arms, and a second pair of arms joined to said body in the joining area of said first pair of arms. This body is made of plastic material so that the ends of both pairs of arms can be brought together in order to work as pincers. Said ends of the first pair of arms of conventional pincers have a slot which serves to hold the end of a small fuse. The free ends of the second pair of arms have a slot which serves to hold the end of a large fuse.

[0006] This type of pincers allows fuses of two sizes to be handled effectively and simply. However, in the market there are currently three types of fuses according to their size: large fuses, medium-sized fuses and small fuses. Thus, if fuses of the three types are fitted in the electrical system of, for example, a vehicle, users must necessarily use a minimum of two pincers of the type described if they wish to handle said fuses. In the event that the pincers to be used are made up of two pairs of arms, of which only the ends of one pair are provided with said slots, users (or operators) will have to use three kinds of pincers, one for each fuse size.

[0007] The present invention has been developed in order to resolve this drawback, by providing universal pincers, capable of coupling with the different types of pincers currently existing in the market. The pincers that are the object of the present invention provide other advantages which will be made clear hereinbelow.

[0008] In general terms, the pincers for extracting fuses and relays in accordance with the present invention are of the type mentioned above, that is, made up of a basically U-shaped body that defines a first pair of arms. The body of conventional pincers also comprises a second pair of arms joined to said body in the joining area of said first pair of arms. The free ends of said first pair of arms have a slot for holding the end of a fuse, while the free ends of said second pair of arms have a slot for holding the end of a larger fuse.

[0009] The peculiarity of the pincers of the invention lies in the fact that at least one of said pairs of arms includes a slot at its free end for holding the end of a relay. These transverse slots are made approximately in the central area of the free end of said second pair of arms.

[0010] Additionally, the free ends of the two arms of said first pair of arms have two parallel projections which define a small channel which extends perpendicularly with respect to said slot of the arms of said first pair of arms and which are adapted to be housed in slots in the body of a fuse. The arrangement of these projections allows the first pair of arms to extract fuses of two different sizes which, together with the fuses which may be extracted by using the second pair of arms, make three different types of fuses which may be handled with the pincers of the present invention. The combination of said projections and said slots make the pincers of the present invention versatile, since relays can also be handled by means of the same, which convert the pincers of the invention into a very useful and effective tool.

[0011] In accordance with another feature of the invention, the free ends of the two arms of the second pair of arms have two parallel projections adapted to be housed in slots in the body of a larger fuse.

[0012] Advantageously, said second pair of arms is provided on its outer part with two series of outer ribs which are arranged in parallel. These two series of ribs serve to facilitate gripping of the pincers, that is, to be able to join the ends of the first or second pair of arms of the pincers comfortably.

[0013] In accordance with a preferred embodiment of the pincers for extracting fuses and relays of the present invention, the second pair of arms comprises, at its free end, a slot which has a shape adapted to receive a longitudinal projection with a T-shaped cross-section made in the end of a relay.

[0014] Other features and advantages of the pincers for extracting fuses and relays that is the object of the present invention will be clearer from the detailed description of a preferred embodiment of said pincers. Said description will be given, from here on, by way of non-restrictive example, with reference to the drawings which accompany it, in which:

Figure 1 is a perspective view of pincers for extracting fuses and relays in accordance with the present invention.

Figure 2 is a perspective view of the pincers of the invention, in which two types of fuses of different sizes are represented, which may be extracted with the first and the second pair of arms of the pincers.

Figure 3 is a perspective view of the pincers of the invention, in which a third type of fuse which may be extracted with the pincers is represented.

Figure 4 is a perspective view of the pincers of the invention in which a relay which may conveniently be extracted with the second pair of arms of the pincers is represented.

[0015] The elements which appear in the attached drawings are the following: (1) pincers for extracting fuses and relays, (2) U-shaped body, (3) first pair of arms, (4) second pair of arms, (5) joining area of the arms, (6) ends of the first pair of arms, (7) medium-sized fuse, (8) small fuse, (9) slot of the first pair of arms, (10) end of the medium-sized fuse, (11) body of medium-sized fuse, (12) projections of the first pair of arms, (13) channel of the first pair of arms, (14) inner part of the first pair of arms, (15) slots of the small fuse, (16) body of the small fuse, (17) end of the second pair of arms, (18) slots of the second pair of arms, (19) end of the large fuse, (20) body of the large fuse, (21) large fuse, (22) projections of the second pair of arms, (23) slots of the large fuse, (24) relay, (25) slot of the second pair of arms, (26) longitudinal projection of the relay, (27) body of the relay and (28, 29) ribs of the second pair of arms.

[0016] The pincers (1) for extracting fuses and relays in accordance with the present invention consist, in their most general form, of a body (2) that is basically U-shaped, which is made up of a first pair of arms (3) and a second pair of arms (4). The second pair of arms (4) is joined to said body (2) in a joining area (5) of the first pair of arms (3), as may be observed in figure 1.

[0017] The first pair of arms (3) has ends (6) whose geometry allows two types of fuses to be held: medium-sized fuses (7) (figure 2) and small fuses (8) (upper part of figure 3). To achieve this, the end (6) of each arm (3) is provided with a slot (9) of approximately rectangular shape. The combination of the slots (9) of the two arms (3) defines a housing for receiving the end (10) of the body (11) of a medium-sized fuse (7), such as that represented in the upper part of figure 2.

[0018] At the same time, the end (6) of each arm (3) is also provided with two parallel projections (12) which define a channel designated by (13). This channel (13) is made in the inner part (14) of the first pair of arms (3) in such a way that it extends perpendicularly to the slot (9) mentioned above.

[0019] Said two projections (12) of each arm (3) are housed in slots (15) made in the body (16) of a small fuse (8) such as that represented in figure 3.

[0020] The configuration of the second pair of arms (4) is defined by plates arranged basically parallel to each other, each one being joined, as described above, to the arms (3) at the joining area (5).

[0021] The ends (17) of each of said arms (4) include a slot (18) which is basically parallel to the slot (9) of the arms (3). The slot (18) has the same configuration as the slot (9), although said slot (18) is larger in order to house the end (19) of the body (20) of a large fuse (21), as represented in the lower part of figure 2.

[0022] As in the case of the channel (9) of the arms (3), the combination of the channels (18) of the arms (4) (see figure 1) allows said end (19) of the fuse (21) to be conveniently housed, as illustrated in figure 2. This end (10) is defined by an extension of small height that emerges from the upper part of the body (20) of said fuse (21), as may be observed in figure 2 of the drawings.

[0023] The ends (17) of said arms (4) have projections (22) adapted to be housed appropriately inside slots (23) made in the body (20) of the fuse (21) represented in said figure 2.

[0024] The versatility of the pincers of the invention is completed by its ability to extract relays (24) of the type represented in figure 4.

[0025] To achieve this, each end (17) of the arms (4) includes a slot (25) which allows a longitudinal projection (26) of the body (27) of the relay (24) with a T-shaped cross-section to be housed. With reference to figures 1 and 4, the longitudinal projection (26) may appropriately be introduced into both slots (25), remaining' in a perpendicular position with respect to the slot (18).

[0026] As may be observed, the second pair of arms (4) is provided on the outer part with two series of parallel ribs (28, 29), which serve to facilitate gripping of the pincers (1). Thus, by pressing on the ribs (28), the ends (6) of the first pair of arms (3) are joined in order to hold a medium-sized fuse (7) or a small fuse (8), or to release a large fuse (21) or a relay (24). By pressing on the ribs (29), the ends (17) of the arms (4) are joined to hold a large fuse (21) or a relay (24), or to release a medium-sized fuse (7) or a small fuse (8).

[0027] The materials of the elements that make up the pincers for extracting fuses and relays of the invention, as well as the shapes, dimensions and other accessory elements may conveniently be replaced by others that are technically equivalent, provided that they do not depart from the essential nature of the present invention, nor from the inventive concept of the same, as defined in the claims included below.

Claims

1. Pincers for extracting fuses and relays, which consist of a basically U-shaped body (2) which defines a first pair of arms (3), and a second pair of arms (4) joined to said body (2) at the joining area (5) of said first pair of arms (3), the free ends (6) of said first pair of arms (3) having a slot (9) to house the end of a fuse, and the free ends (17) of said second pair of arms (4) having a slot (18) to house the end of a larger fuse, **characterised in that** at least one of said pair of arms (3, 4) includes a slot (25) at its free end (17) for housing the end (26) of a relay (24).

2. Pincers for extracting fuses and relays in accordance with claim 1, **characterised in that** the free ends (6) of the two arms (3) of said first pair of arms (3) have two parallel projections (12) defining a channel (13), which extends perpendicularly to said slot (9) of the arms (3) of said first pair of arms (3), which can be housed in corresponding slots (15) in the body (16) of a fuse (8).

3. Pincers for extracting fuses and relays in accordance with claim 1, **characterised in that** the free ends (17) of the two arms (4) of said second pair of arms (4) have two parallel projections (22) adapted to be housed in slots (23) in the body of a larger fuse (21).

4. Pincers for extracting fuses and relays in accordance with claim 1, **characterised in that** the second pair of arms (4) comprises two series of outer ribs (28, 29), arranged in parallel to facilitate gripping of the pincers (1).

5. Pincers for extracting fuses and relays in accordance with claim 1, **characterised in that** the second pair of arms (4) comprises, at its free end (17), a slot (25) that has a shape adapted to receive a longitudinal projection (26) with a T-shaped cross-section made in the end of a relay (24).

FIG.1

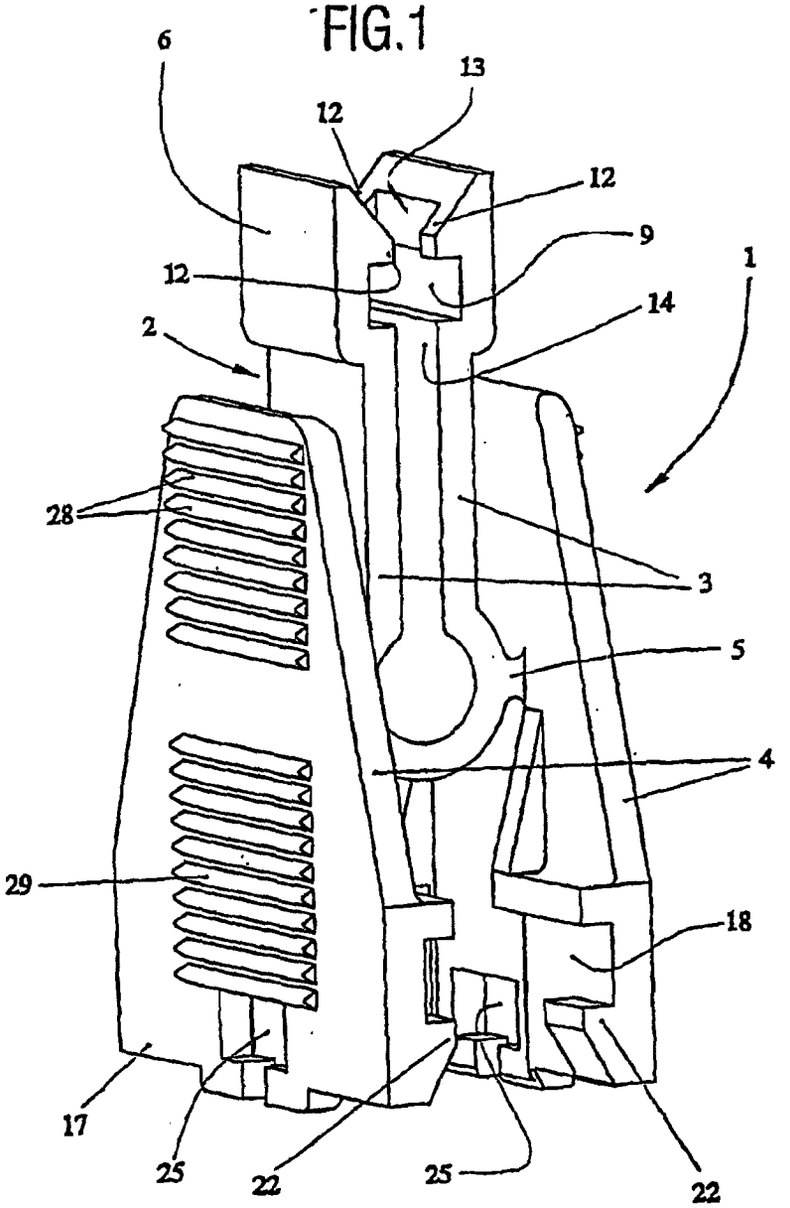

FIG.2

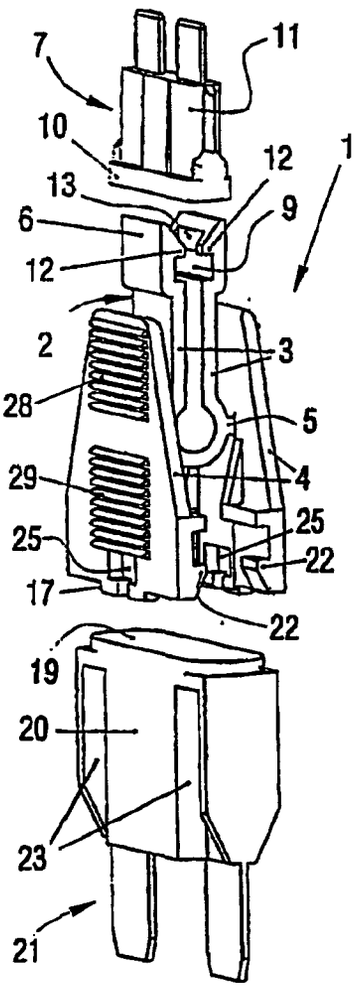

FIG.3

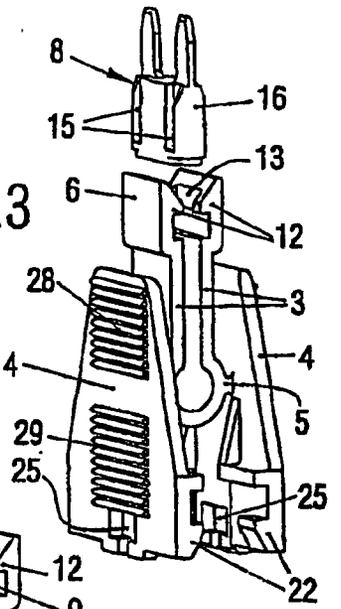

FIG.4