



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 075 056 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.02.2001 Bulletin 2001/06

(51) Int. Cl.⁷: **H01R 13/74**

(21) Application number: **00116721.2**

(22) Date of filing: **02.08.2000**

(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: **04.08.1999 IT MI991759**

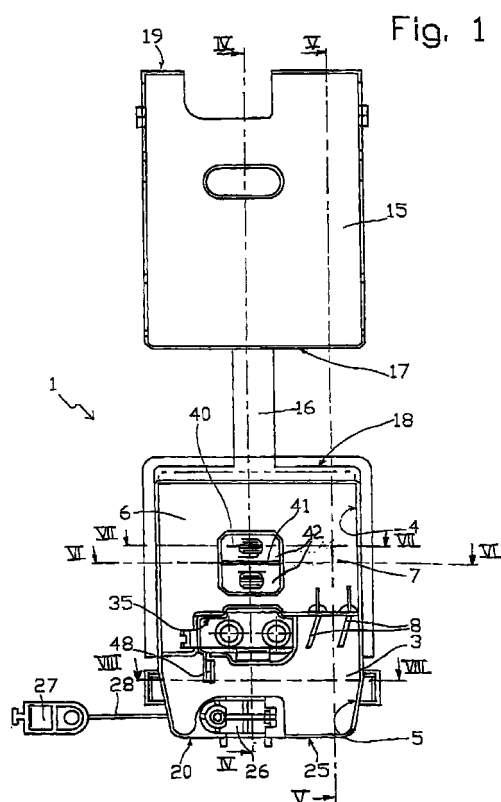
(71) Applicant:
I.T.W. Fastex Italia S.p.A.
10156 Torino (IT)

(72) Inventors:
• **Buscella, Claudio**
10038 Verolengo (IT)
• **Bassi, Alberto**
10100 Torino (IT)

(74) Representative:
Eccetto, Mauro et al
Studio Torta S.r.l.,
Via Viotti, 9
10121 Torino (IT)

(54) **Integrated terminal board-filter safety assembly, in particular for electrical household appliances**

(57) A terminal board-filter assembly (1) defined by a cup-shaped box body (3) made of electrically insulating material and divided internally into two side by side cavities (4, 5), a first (4) housing the components (6) of an electronic filter (7) preferably preassembled on a printed circuit, and the second (5) housing a first number of electrical contacts (8) assembled and wired to one another and to the filter (7) and including at least one ground contact (48); the box body (3) is provided with a removable cover (15) on an open side of the box body (3) defining a common chamber (13) for access to the cavities (4, 5); a second number of electrical contacts (52), also wired to the components (6) of the filter (7), are provided on the outside of the box body (3), on a bottom wall (10) of the box body, at the first cavity (4) and on the opposite side to the cover (15), and are preferably housed inside a collar (40) formed in one piece with the bottom wall (10); and the bottom wall also has an opening (33) formed at the second cavity (5) and housing a plate portion (49) of the ground contact (48), which plate portion has at least one hole (50) for receiving a fastening member and is positioned parallel to and projecting slightly with respect to an outer surface (30) of the bottom wall (10).



EP 1 075 056 A2

Description

[0001] The present invention relates to an integrated terminal board-filter safety assembly for electrically supplying an electrical household appliance, such as a washing-machine, dishwasher, etc.

[0002] European Patent n. 0805617 describes an integrated terminal board-filter assembly designed to conform with recent regulations requiring electronic noise filters on all electrical household appliances. Though compact and relatively cheap, the assembly described in European Patent n. 0805617 still leaves room for improvement as regards fast, troublefree connection to the appliance and production cost. In particular, the assembly in the above patent is specifically designed to be mounted inside the appliance casing, and is difficult to assemble quickly and effectively - especially as regards connection of the electrical contacts and in particular the ground contact - straight onto the outside of the casing, as currently required by electrical household appliance manufacturers.

[0003] It is an object of the present invention to provide an integrated terminal board-filter assembly which is cheap and easy to produce, and which can be fitted quickly and easily to the relative appliance.

[0004] According to the present invention, there is provided an integrated terminal board-filter safety assembly, in particular for electrical household appliances, comprising a substantially cup-shaped box body made of electrically insulating material; a cable clamping device carried by said box body; and click-on connecting means for connecting said box body to a support casing; said box body supporting a first number of electrical contacts, including at least one ground contact, and housing the components of an electronic filter assembled and wired to one another and to said electrical contacts; and said assembly being characterized in that said cup-shaped box body is divided internally into two side by side cavities, a first housing said components of the filter, and a second housing said first number of electrical contacts, and is provided, on an open side defining a common chamber for access to said side by side cavities, with a removable cover for closing said cavities; said assembly also comprising a second number of electrical contacts which are also wired to said components of the filter, are located outside said box body, on a bottom wall of the box body at said first cavity, and face the opposite way to said cover.

[0005] More specifically, the box body has an opening formed through said bottom wall at said second cavity, and a hollow channel housing said ground contact; said channel projecting from an edge of said opening into said second cavity; said ground contact being housed in said channel and comprising a plate portion housed through said opening and substantially parallel to and projecting slightly with respect to an outer surface of said bottom wall; and said outer surface of the bottom wall defining a connecting surface for connect-

ing said box body to said casing.

[0006] In a preferred embodiment, the channel is defined by two tubular half-elements formed integrally in one piece with said box body and said cover respectively, and connectable end to end when said cover is positioned closing said cavities; said plate portion of said ground contact having at least one hole for receiving a fastening member insertable through said channel when the cover is closed.

[0007] The assembly according to the invention therefore not only provides for compactly and cheaply integrating the functions of a filter, terminal board and cable clamp, but can also be fitted extremely quickly and easily, in any position, to the relative appliance. Both the filter components and the electrical contacts defining the terminal board are housed in the box body, which, being closed by the cover, can be handled safely with no risk of accidentally damaging the components inside during assembly to the appliance. Separating the filter from the electrical contacts also ensures efficient operation of all the components of the assembly.

[0008] Besides enabling fast, efficient connection, the particular design of the ground contact also safeguards against the screws - to be tightened once the assembly is fitted together and the cover closed - getting lost inside the box body. The screws (or equivalent fastening members), in fact, remain confined inside the channel housing the ground contact, and are therefore easily recoverable.

[0009] A non-limiting embodiment of the invention will be described purely by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a plan view of an integrated terminal board-filter assembly in accordance with the invention and in the open configuration;

Figures 2 and 3 show respectively, with parts removed for clarity, three-quarter top and bottom views in perspective of the Figure 1 integrated assembly;

Figure 4 shows a section along line IV-IV in Figure 1 illustrating, schematically, the assembly according to the invention fitted to the casing of an electrical household appliance;

Figures 5, 6, 7 and 8 show further sections, along lines V-V, VI-VI, VII-VII and VIII-VIII in Figure 1, of the integrated assembly according to the invention.

[0010] Number 1 in the accompanying drawings indicates an integrated terminal board-filter safety assembly fittable in use to, and preferably to the outside of, a metal casing 2 of an electrical appliance, e.g. a known electrical household appliance not shown in detail for the sake of simplicity. Assembly 1 - which, in Figure 1, is viewed from the opposite side to that connected to casing 2 (i.e. from the side facing outwards of the appliance in use) - comprises a cup-shaped, substantially parallelepiped-shaped box body 3 made of

electrically insulating material (e.g. plastic or ceramic) and defining, internally, two side by side cavities 4, 5 respectively housing - already assembled and wired - the components 6 of a known electronic radiofrequency filter 7 not described or shown in detail for the sake of simplicity, and a first number of substantially known electrical contacts 8 already wired to filter 7.

[0011] With particular reference to Figures 1 to 3, cup-shaped box body 3 comprises a flat rectangular bottom wall 10; two pairs of lateral walls 11a, 11b and 12a, 12b perpendicular to bottom wall 10; and, on the opposite side to bottom wall 10, an open side defining a common chamber 13 for access to cavities 4, 5. Cavities 4 and 5 are separated by a partition 14 projecting perpendicularly from bottom wall 10 and connecting lateral walls 12a, 12b, and which, viewed from above, is substantially in the form of a right-angle Z in the non-limiting example shown.

[0012] Box body 3 is provided with a removable cover 15 for closing common chamber 13 and, hence, cavities 4, 5. More specifically, cover 15 is connected integrally to box body 3 by a flexible strap 16 connecting respective first ends 17, 18 of cover 15 and box body 3, and long enough for cover 15 to close common chamber 13. At respective second ends 19, 20 opposite ends 17, 18 respectively, cover 15 and box body 3 comprise click-on fastening means defined, for example, by two flexible tabs 22 formed integrally with cover 15 and which click inside respective seats 23 formed integrally with lateral walls 12a, 12b of box body 3.

[0013] Assembly 1 also comprises a cable clamping device 25 formed integrally in one piece with box body 3 at end 20 and housed through lateral wall 11b. Cable clamping device 25 may be of any known type, and preferably comprises a first portion 26 formed integrally in one piece with box body 3; and a second portion 27 connectable to first portion 26 and connected integrally to box body 3 by a flexible tongue 28.

[0014] An outer surface 30 of bottom wall 10, facing the opposite way to cavities 4, 5, defines a connecting surface for connecting box body 3 to casing 2; and, at lateral walls 11a, 12a, 12b, a slightly sloping flexible rim 32 projects from a peripheral edge 31 of outer surface 30, on the opposite side to cavities 4, 5, to keep outer surface 30, in use, detached a small given distance from casing 2, as shown particularly in Figures 6 and 7.

[0015] With reference also to Figures 4 and 5, box body 3 comprises an opening 33 formed through bottom wall 10 at cavity 5 and defined by an edge 34; and a hollow channel 35 projects into cavity 5 from edge 34, and is defined by two tubular half-elements 36, 37 formed integrally in one piece with box body 3 and cover 15 respectively, and connectable end to end when cover 15 is positioned closing cavities 4, 5.

[0016] At and on the opposite side to first cavity 4, a collar 40, formed integrally in one piece with box body 3, projects from outer surface 30 alongside opening 33. In the example shown, collar 40 has a substantially square

cross section with beveled edges, and defines internally a hollow conduit divided by a longitudinal partition 41 into two side by side tubular portions 42. Collar 40 is insertable through a through opening 43 in casing 2, and comprises click-on connecting means 44 for connecting box body 3 to casing 2 and defined, for example, by a pair of elastic tabs formed integrally with collar 40, projecting from two opposite lateral walls of the collar, and which click onto the edge of opening 43.

[0017] As stated, cavity 4 houses components 6 of filter 7, e.g. preassembled in known manner on a printed circuit carried by a plate 45 fitted inside cavity 4, close to common chamber 13 permitting access to cavities 4, 5. Components 6 extend from plate 45 towards bottom wall 10, and are embedded in a solid insulating resin 46 (shown schematically in Figure 8) which fills cavity 4 to ensure fluidtight sealing of filter 7. Cavity 5, on the other hand, houses electrical contacts 8 already connected to filter 7 and including at least one ground contact 48. More specifically, ground contact 48 is at least partly housed inside channel 35, and comprises a plate portion 49 housed through opening 33 and substantially parallel to and projecting slightly with respect to outer surface 30 of bottom wall 10 so as to rest, in use, against casing 2. Plate portion 49 comprises two through holes 50 for the insertion of respective fastening members, e.g. two screws, insertable through channel 35 even when cover 15 is closed.

[0018] With particular reference to Figures 4 to 8, when assembly 1, complete with all the internal components, is fitted to casing 2 by inserting collar 40 through opening 43 so that elastic tabs 44 engage the edge of opening 43, box body 3 rests against casing 2 on flexible rim 32 which detaches outer surface 30 slightly from casing 2; plate portion 49 of ground contact 48 projecting from bottom wall 30, on the other hand, rests on casing 2 to ground assembly 1; and the screws for fastening plate portion 49 to casing 2 are insertable through channel 35.

[0019] A second number of electrical contacts 52, also wired to components 6 of filter 7, are provided on the outside of box body 3, on bottom wall 10 at cavity 4 housing filter 7, and face the opposite way to cover 15. More specifically, electrical contacts 52 are housed in collar 40 and connected mechanically and electrically to components 6 of filter 7 through bottom wall 10, and are preferably defined by respective metal blades housed in tubular portions 42 of collar 40.

[0020] Clearly, changes may be made to the integrated terminal board-filter safety assembly as described and illustrated herein without, however, departing from the scope of the present invention.

[0021] In particular, click-on connecting means 44 for connecting box body 3 to casing 2 may be of any type and located otherwise than as described herein, providing they ensure fast, troublefree assembly to casing 2. Filter 7 may also be of any known type. In particular, components 6 of filter 7 need not be

preassembled, as described above, on a printed circuit (in which case, plate 45 may be dispensed with).

Claims

1. An integrated terminal board-filter safety assembly (1), in particular for electrical household appliances, comprising a substantially cup-shaped box body (3) made of electrically insulating material; a cable clamping device (25) carried by said box body (3); and click-on connecting means (44) for connecting said box body (3) to a support casing (2); said box body (3) supporting a first number of electrical contacts (8), including at least one ground contact (48), and housing the components (6) of an electronic filter (7) assembled and wired to one another and to said first number of electrical contacts (8); and said assembly (1) being characterized in that said cup-shaped box body (3) is divided internally into two side by side cavities (4, 5), a first (4) housing said components (6) of the filter (7), and a second (5) housing said first number of electrical contacts (8), and is provided, on an open side defining a common chamber (13) for access to said side by side cavities (4, 5), with a removable cover (15) for closing said cavities (4, 5); said assembly (1) also comprising a second number of electrical contacts (52) which are also wired to said components (6) of the filter (7), are located outside said box body (3), on a bottom wall (10) of the box body at said first cavity (4), and face the opposite way to said cover (15).
2. An assembly as claimed in Claim 1, characterized in that said box body (3) has an opening (33) formed through said bottom wall (10) at said second cavity (5), and a hollow channel (35) housing said ground contact (48); said channel (35) projecting from an edge (34) of said opening (33) into said second cavity (5); said ground contact (48) being housed in said channel (35) and comprising a plate portion (49) housed through said opening (33) and substantially parallel to and projecting slightly with respect to an outer surface (30) of said bottom wall (10); and said outer surface (30) of the bottom wall (10) defining a connecting surface for connecting said box body (3) to said casing (2).
3. An assembly as claimed in Claim 2, characterized in that said channel (35) is defined by two tubular half-elements (36, 37) formed integrally in one piece with said box body (3) and said cover (15) respectively, and connectable end to end when said cover (15) is positioned closing said cavities (4, 5); said plate portion (49) of said ground contact (48) having at least one hole (50) for receiving a fastening member insertable through said channel (35) when the cover (15) is closed.
4. An assembly as claimed in Claim 2 or 3, characterized in that said box body (3) comprises, on said outer surface (30) of the bottom wall (10), at least one peripheral element (32) projecting from said outer surface (30) on the opposite side to said cavities (4, 5), and which, when said assembly (1) is fitted to said casing (2), keeps said outer surface (30) detached a given small distance from said casing (2); said plate portion (49) of the ground contact (48) projecting from said outer surface (30) so as to rest against said casing (2).
5. An assembly as claimed in Claim 4, characterized in that said peripheral element is defined by a continuous flexible rim (32) on a peripheral edge (31) of said bottom wall (10).
6. An assembly as claimed in one of the foregoing Claims, characterized in that said box body (3) also comprises a collar (40) formed in one piece with said box body (3) and projecting from said outer surface (30) of the bottom wall (10) at said first cavity (4) and on the opposite side to said cavities (4, 5); said second number of electrical contacts (52) being housed inside said collar (40).
7. An assembly as claimed in Claim 6, characterized in that said click-on connecting means (44) for connecting the box body (3) to said casing (2) are carried by said collar (40).
8. An assembly as claimed in one of the foregoing Claims, characterized in that said cover (15) is connected integrally to said box body (3) by a flexible strap (16) connecting respective first ends (17, 18) of said cover (15) and said box body (3); said cover (15) and said box body (3) also comprising mutual click-on fastening means (22, 23) located close to respective second ends (19, 20), opposite said first ends (17, 18), of said cover (15) and said box body (3).
9. An assembly as claimed in one of the foregoing Claims, characterized in that said box body (3) comprises, between the side by side said first (4) and second (5) cavities, a partition (14) substantially perpendicular to said bottom wall (10); said cable clamping device (25) being carried by said box body (3) at a lateral wall (11b), opposite and facing said partition (14), of said second cavity (5).
10. An assembly as claimed in Claim 9, characterized in that said cable clamping device (25) comprises a first portion (26) formed integrally in one piece with said box body (3); and a second portion (27) connectable to said first portion (26) and connected integrally to said box body (3) by a flexible tongue (28).

11. An assembly as claimed in one of the foregoing Claims, characterized in that said components (6) of the filter (7) are preassembled on a printed circuit carried by a plate (45) fitted inside said first cavity (4) and located close to said common chamber (13) 5 permitting access to said cavities (4, 5); said components (6) of the filter (7) extending from said plate (45) towards said bottom wall (10) of the box body (3), and being embedded in a solid insulating resin (46). 10

15

20

25

30

35

40

45

50

55

Fig. 1

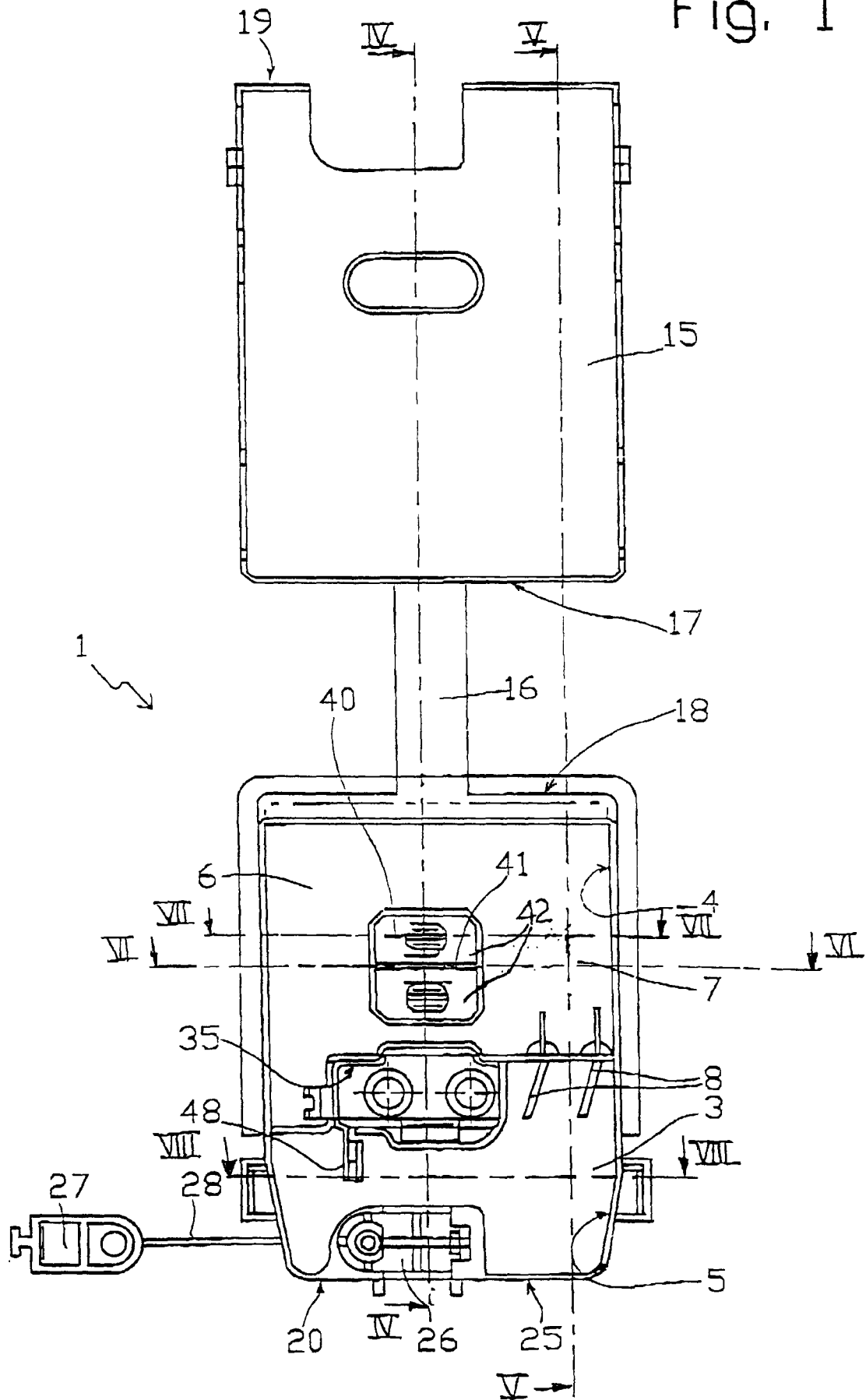


Fig. 2

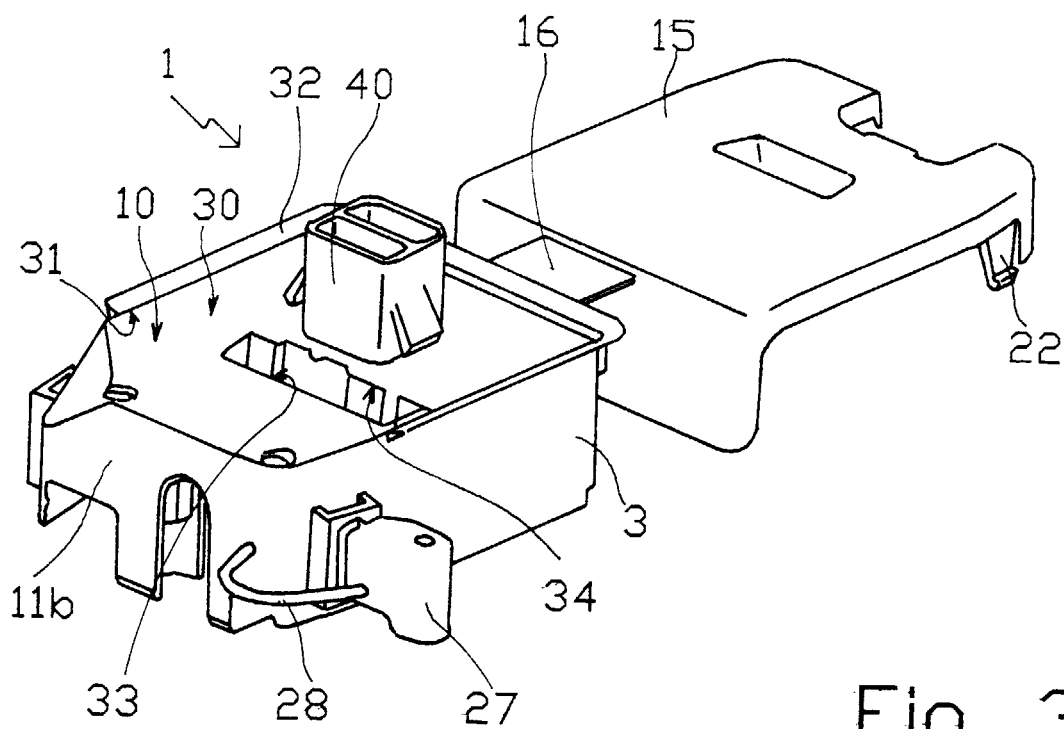
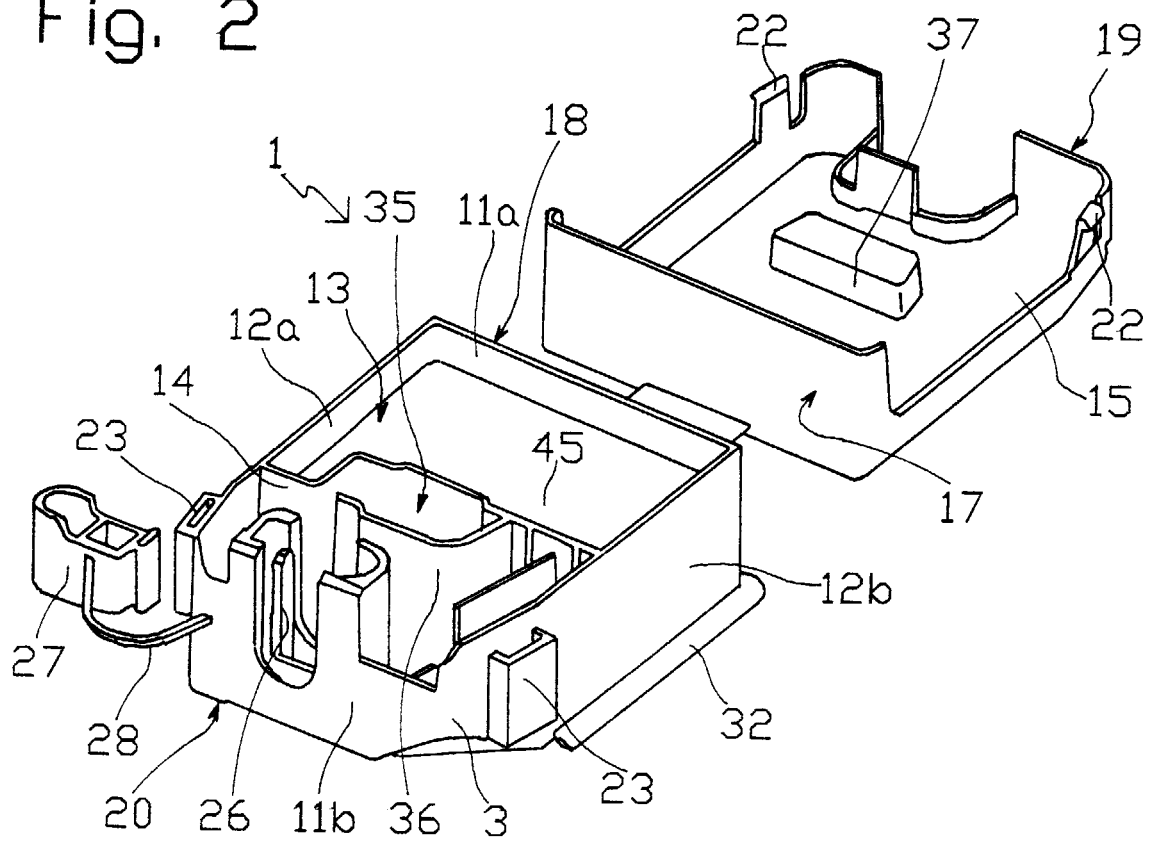


Fig. 3

Fig. 4

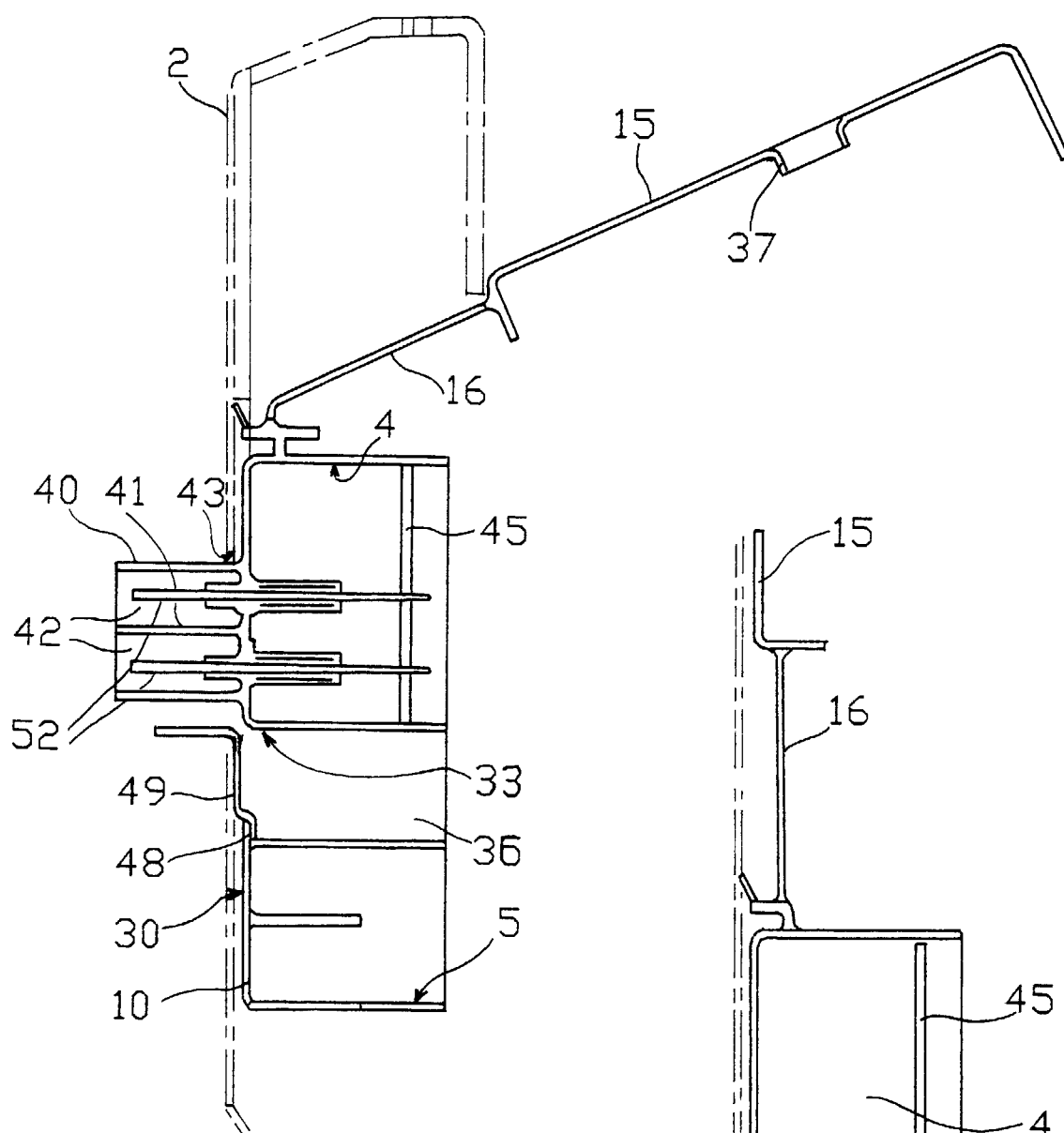
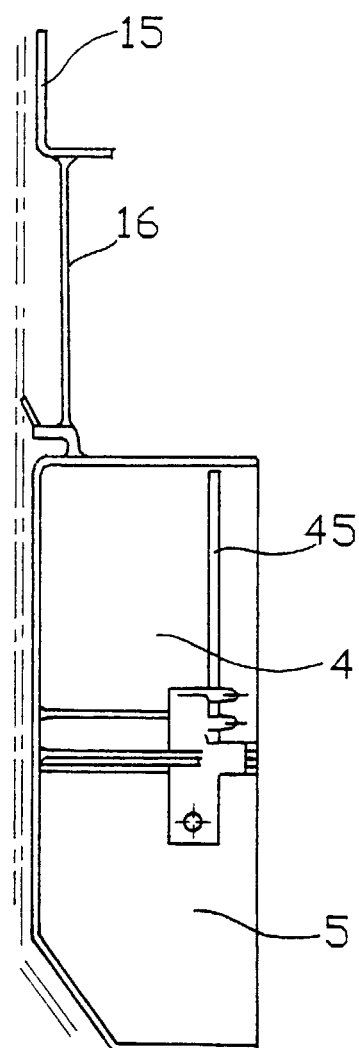


Fig. 5



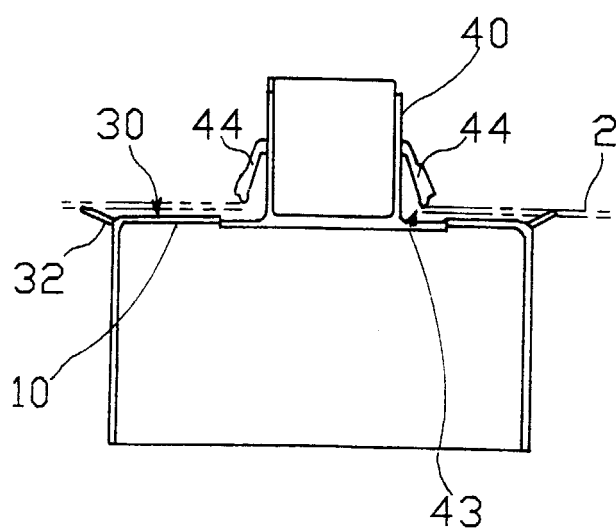


Fig. 6

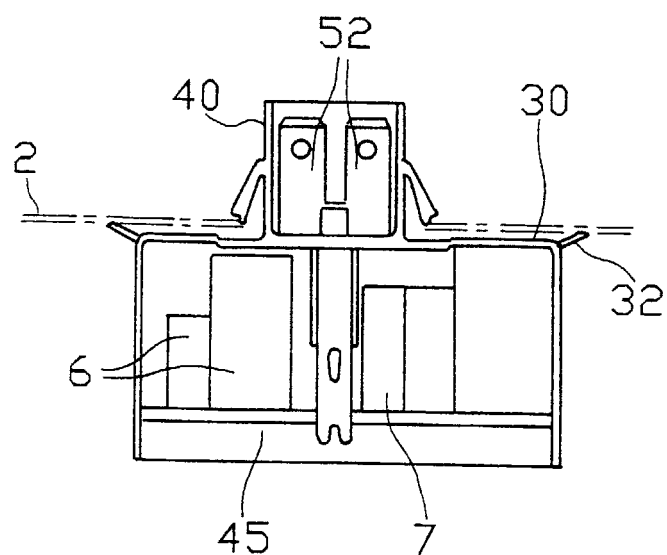


Fig. 7

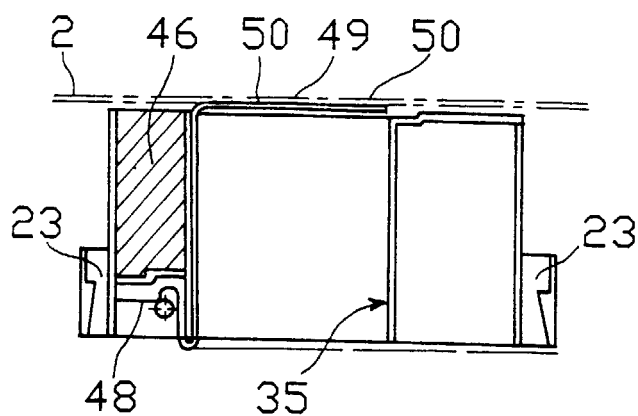


Fig. 8