

Description

[0001] The present invention relates to a cable clamping device, particularly for clamping bundles of electric cables of different sizes.

[0002] As is known, electric standards require that machines, particularly electric household appliances such as refrigerators, washing-machines, etc., be provided with a cable clamping device to prevent the main supply and/or service cables from being disconnected, e.g. pulled, accidentally from the respective terminal boards. Known cable clamping devices - which may be produced and assembled as separate parts, or be integrated in one piece with the terminal boards - comprise a base with a seat through which the cable/s is/are housed; and a pressure member, possibly wedge-shaped, which is inserted inside a mouth in the base facing the seat, to press and so clamp the cable/s by friction against a bottom wall of the seat. The clamping force required is provided by one or more screws, which secure the pressure member to the base, and which, when tightened, ease the pressure member inside the seat through the mouth, so that the same cable clamping device can be used for equally effectively clamping cables of different diameters.

[0003] Cable clamping devices of the above type - which are normally molded from thermoplastic synthetic plastic resin, so as to be electrically insulating - are unsuitable, however, for effectively clamping bundles of cables, particularly of different diameters. In which case, the pressure of the clamping member on the cables produces an unbalanced reaction, due to the asymmetric nature of the cable bundle, which so deforms the clamping device as a whole as to seriously impair its efficiency or even result in failure of the device. On the other hand, cost and technical considerations rarely enable clamping devices to be made of more rigid materials.

[0004] It is an object of the present invention to provide a cable clamping device designed to eliminate the aforementioned drawback, but which can still be molded cheaply and easily from thermoplastic resin. It is a further object of the present invention to provide a cable clamping device which, when necessary, can be used for clamping a bundle of cables with no need for screws.

[0005] According to the present invention, there is provided a cable clamping device comprising a base having a seat through which one or more electric cables, e.g. supply cables of an electric household appliance, are housed; and a clamping member, which is insertable inside the base, crosswise to said seat, through a mouth formed in the base and directly facing the seat, to clamp said cables against a bottom wall of the seat; characterized in that the clamping member is secured to the base by a jack device comprising a rib formed in one piece with the clamping member and having transverse teeth; and a recess formed in the base, alongside said seat, to receive the whole length of said rib, and having, internally, at least one elastically deformable tooth located

so as to click onto said transverse teeth.

[0006] The cable clamping device preferably also comprises a conventional screw device for securing the clamping member to the base, and located on the opposite side to the jack device.

[0007] Using both the screw and jack devices therefore produces a balanced reaction of even a highly asymmetric cable bundle, and the stress on the screw is in any case greatly relieved, thus preventing deformation of the base and/or clamping member, even if made of relatively weak thermoplastic material. Finally, if standards do not call for use of screw, the cable clamping device according to the invention may dispense with the screw, while still preventing accidental movement of the clamping member. The jack device employed, in fact, is irreversible, in the sense that, once the required clamping position is reached, the clamping member can only be withdrawn from the seat, as will be seen, voluntarily by the user with the aid of a tool.

[0008] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view in cross section of a cable clamping device in accordance with the invention and in the open configuration;

Figure 2 shows a top plan view, with part removed, of the Figure 1 cable clamping device;

Figure 3 shows an exploded isometric view of the Figure 1 cable clamping device.

[0009] Number 1 in Figures 1 to 3 indicates a cable clamping device comprising a base 2 having a seat 3, through which are housed one or more electric cables, e.g. a bundle of cables 4a, 4b, 4c for supplying an electric household appliance (not shown) and differing widely in size - in the example shown, in diameter. Cable clamping device 1 also comprises a clamping member 5, which is insertable inside base 2, crosswise to seat 3, through a mouth 6 formed in base 2 and directly facing the seat 3, to clamp cables 4 against a bottom wall 7 of seat 2.

[0010] Clamping member 5 and base 2 are defined, in the example shown, by respective cup-shaped, substantially parallelepiped-shaped bodies molded from synthetic plastic, preferably thermoplastic, material and insertable the first inside the second. The through seat 3 for cables 4 includes part of an inner cavity 8 of the cup-shaped body defining base 2; and two facing U-shaped openings 9 formed through respective peripheral lateral walls 10 of base 2, with their respective concavities facing mouth 6 of base 2, defined on the open side of the cup-shaped body defining base 2.

[0011] Clamping member 5 and base 2 are preferably connected integrally to each other by a deformable tongue 11 - shown by the dash line in Figure 1 - so they can be molded in known manner in one operation, with the respective concavities facing the same way, and

then positioned, in use, with the concavities facing, as shown in the drawings. As also shown by the dash line in Figure 1, base 2 comprises known click-on retaining means 12 for connection to a support 13, e.g. the casing of an electric household appliance, and may be formed as a separate part, or integrally with a body 14 of a known terminal board (not shown for the sake of simplicity), so that device 1 is integrated in the known terminal board.

[0012] According to the invention, device 1 also comprises a jack device 18, by which clamping member 5 is secured adjustably to base 2, at least partly inside seat 3.

[0013] Jack device 18 is formed at the end 19 of cable clamping device 1 opposite tongue 11, and comprises an L-shaped rib 20 formed in one piece with clamping member 5 and having transverse teeth 21; and a recess 22 formed in base 2, alongside seat 3, to longitudinally accommodate the whole length of rib 20, and having, internally, at least one elastically deformable tooth 23 located so as to click, in use, onto teeth 21.

[0014] Clamping member 5 also comprises, on the opposite side to rib 20, at least one hole 24 for receiving a respective screw 25 (shown only partly in Figure 3) or other similar removable fastening member; and base 2 comprises, on the opposite side to recess 22, at least one fastening seat 26 for receiving screw 25, and which is defined, in the example shown, by a tubular stem projecting inside cavity 8, between walls 10 and on one side of openings 9, which are therefore interposed between fastening seat 26 and recess 22.

[0015] Recess 22 is separated from seat 3 by a wall 29 parallel to seat 3, and is therefore defined by the part of cavity 8 separated by wall 29 from the part of the cavity defining seat 3. Tooth 23 is formed in one piece with base 2 at end 19 and at a mouth 30 of recess 22 aligned with mouth 6 of seat 2.

[0016] Tooth 23 projects inside recess 22, on the opposite side to and parallel to wall 29, and is defined, towards wall 29, by a sloping surface 33, which extends partly inside mouth 30 so as to at least partly occupy mouth 30 when viewed from above (Figure 2).

[0017] Rib 20 projects laterally from clamping member 5 in such a position (Figures 1 and 3) as to rest, in use, on and astride wall 29, and to interfere with tooth 23 - in particular, by teeth 21 interfering with sloping surface 33 - when clamping member 5 is inserted in the direction of arrow A inside base 2; for which purpose, teeth 21 are formed on the face of rib 20 facing tooth 23 in use.

[0018] Teeth 21 are serrated, and comprise a number of triangular teeth defined by respective sloping surfaces 34, which, in use, when rib 20 is positioned parallel to wall 29, are oriented parallel to and facing sloping surface 33. To clamp cables 4, member 5 has a contact edge 35, which, in the example shown, is semicircular, but which may be any shape, e.g. wedge-shaped.

[0019] In actual use, once the bundle of cables 4 to

be clamped is inserted through seat 3 in base 2, tongue 11 is bent to position member 5 as shown, facing base 2, with rib 20 facing cavity 8 - in the example shown, facing recess 22. Member 5 is then pressed manually in the direction of arrow A to ease it inside seat 3, so that rib 20 interferes with tooth 23. More specifically, the complementary surface 34 of the first of teeth 21 pushes against sloping surface 33 to flex tooth 23 in the direction of arrow B (Figure 1); tooth 23 thus frees mouth 30 to permit insertion of rib 20 inside recess 22, and then springs back immediately into the interference position to engage teeth 21 and so prevent withdrawal of rib 20 from recess 22. As further pressure is applied, the same sequence is repeated, and tooth 23 successively engages teeth 21 to insert rib 20 gradually until member 5 contacts and presses cables 4 against wall 7, possibly provided with one or more ribs 36. At this point, member 5 is arrested, and tooth 23 engaging teeth 21 holds member 5 in position, and maintains pressure on, and so ensures firm clamping of, cables 4. In the case of a highly asymmetric bundle of cables 4, or if required by regulations, member 5 is also retained the normal way by means of one or more screws 25.

[0020] To open device 1 and release cables 4, screw 25, if provided, is first removed, and a tool, e.g. a screwdriver 38 illustrated by the fine line in Figure 1, is inserted inside mouth 30 in the sloping direction indicated by arrow C, is pressed against sloping surface 33, and is rotated in the direction of arrow R to flex tooth 23 and so release teeth 21. When removing the screwdriver, rib 20 can therefore also be withdrawn from recess 22.

Claims

1. A cable clamping device (1) comprising a base (2) having a seat (3) through which one or more electric cables (4), e.g. supply cables of an electric household appliance, are housed; and a clamping member (5), which is insertable inside the base, cross-wise to said seat, through a mouth (6) formed in the base and directly facing the seat, to clamp said cables against a bottom wall (7) of the seat; **characterized in that** the clamping member (5) is secured to the base (2) by a jack device (18) comprising a rib (20) formed in one piece with the clamping member (5) and having transverse teeth (21); and a recess (22) formed in the base (2), alongside said seat (3), to receive the whole length of said rib (20), and having, internally, at least one elastically deformable tooth (23) located so as to click onto said transverse teeth (21).
2. A cable clamping device (1) as claimed in Claim 1, **characterized in that** said clamping member (5) comprises, on the opposite side to said rib, at least one hole (24) for receiving a respective screw (25); said base (2) having at least one respective fasten-

ing seat (26) for receiving the screw and formed on the opposite side to said recess (22).

3. A cable clamping device (1) as claimed in Claim 2, **characterized in that** said clamping member (5) and said base (2) are defined by respective cup-shaped bodies molded from synthetic plastic material and insertable the first inside the second; said seat (3) for the cables comprising two U-shaped openings (9) interposed between said at least one fastening seat (26) and said recess (22), and formed through respective lateral walls (10) of the base (2), with the respective concavities facing said mouth (6) of the base.

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4. A cable clamping device (1) as claimed in any one of the foregoing Claims, **characterized in that** said recess (22) is separated from said seat (3) by a wall (29) parallel to the seat; said at least one elastically deformable tooth (23) being formed in one piece with the base (2), at a respective mouth (30) of said recess (22) aligned with the mouth (6) of said seat (3), and projecting inside said recess, on the opposite side to said wall (29) parallel to the seat.

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5. A cable clamping device (1) as claimed in Claim 4, **characterized in that** said elastically deformable tooth (23) is defined, towards said wall (29) parallel to the seat, by a sloping surface (33) extending partly inside the mouth (30) of said recess.

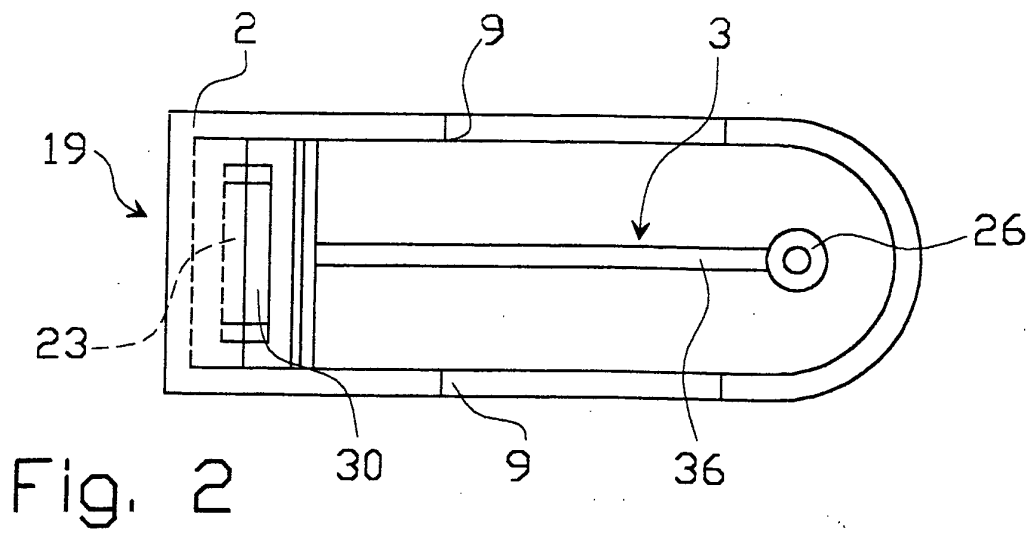
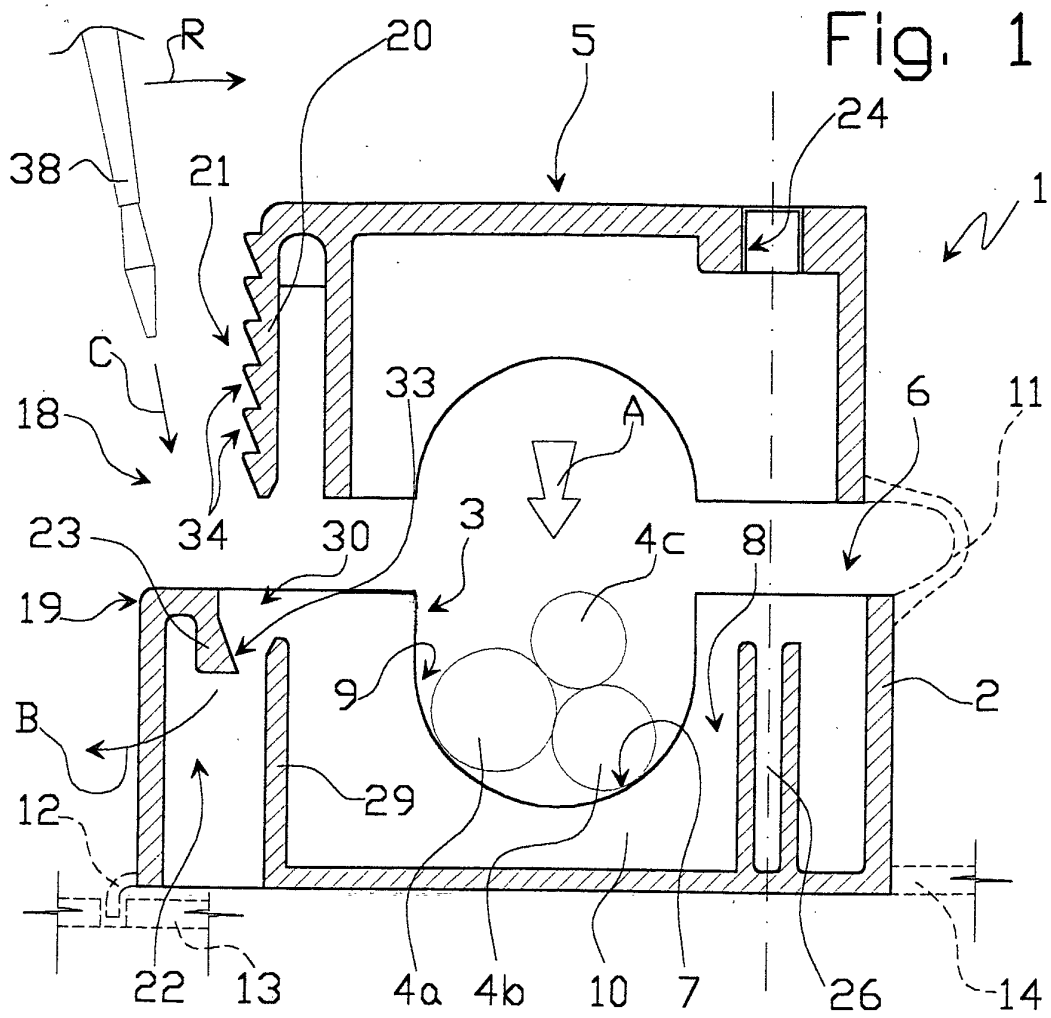
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6. A cable clamping device (1) as claimed in Claim 5, **characterized in that** said rib (20) projects laterally from said clamping member (5) in such a position as to rest, in use, on and astride said wall (29) parallel to the seat (3), when the clamping member (5) is inserted inside the base (2); said transverse teeth (21) being formed on a face of said rib (20) facing, in use, said elastically deformable tooth (23), and being serrated with respective sloping surfaces (34) oriented, in use, parallel to and facing said sloping surface (33) of the elastically deformable tooth.

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7. A cable clamping device (1) as claimed in any one of the foregoing Claims, **characterized in that** said clamping member (5) and said base (2) are connected integrally to each other by a deformable tongue (11).

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8. A cable clamping device (1) as claimed in any one of the foregoing Claims, **characterized in that** said base (2) comprises click-on retaining means (12) for connection to a support (13).

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9. A cable clamping device (1) as claimed in any one of the foregoing Claims, **characterized in that** said base (2) is formed in one piece with a terminal board body (14).

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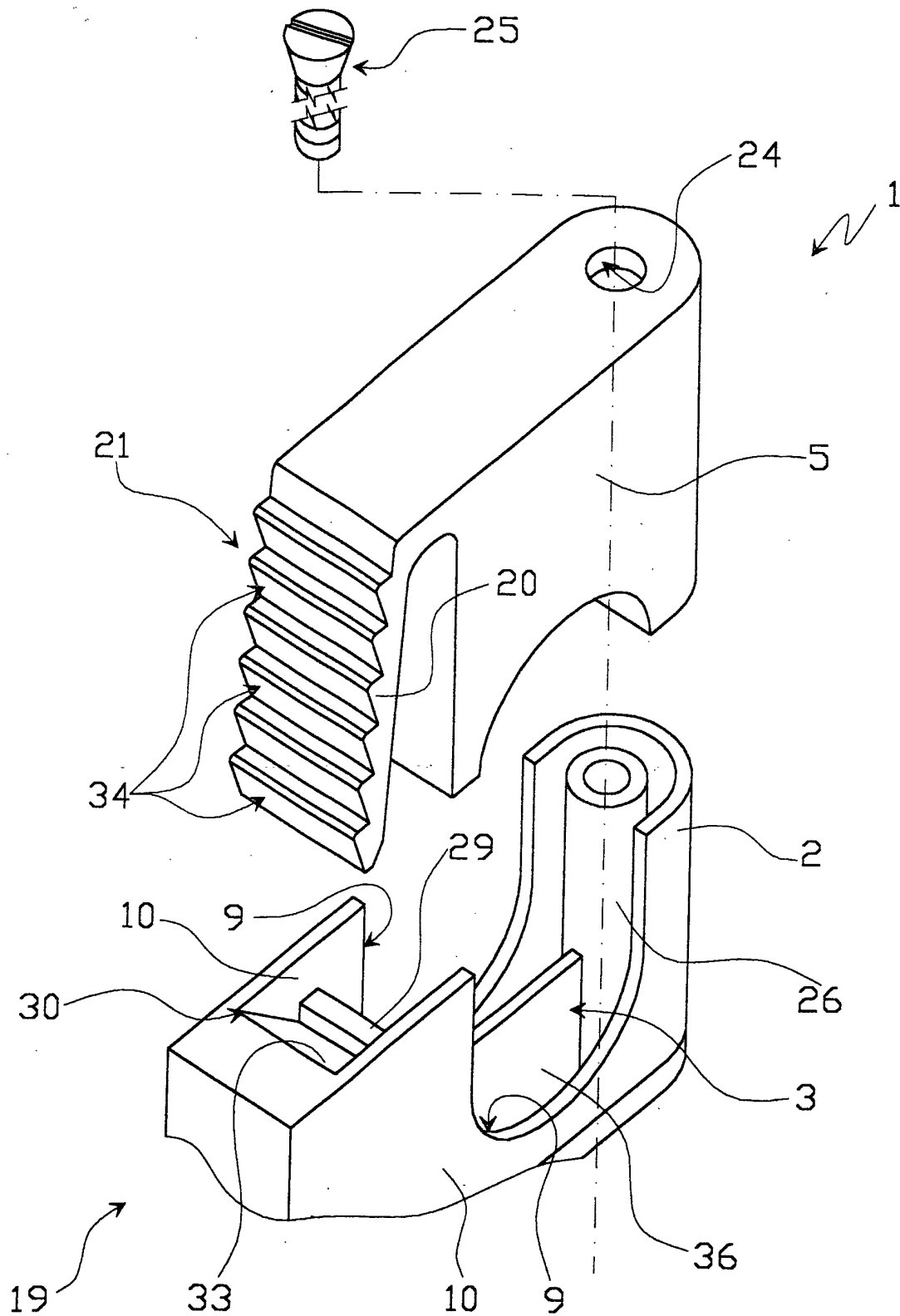


Fig. 3