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Connecting terminal arrangement

Description

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- The invention relates to a connecting terminal arrangement according to the precharacterizing clause of Claim 1.
- 10 A connecting terminal arrangement of the type mentioned initially has become known from DE 195 29 028 A1. There, the spring force terminal is provided with a clamping element which contains a control cam so that the terminal spring is fixed in two stable positions,
- 15 namely in that position in which a conductor can be inserted, and in that position in which the conductor is firmly clamped. A screwdriver is provided in order to operate this clamping element with the suitably designed control cam, and this screwdriver engages in
- 20 an opening on the clamping element in order to allow it to operate the latter. According to DE 195 29 028 A1, this spring terminal arrangement is used in a so-called terminal block.
- 25 DE 29 42 613 A1 has disclosed an electromagnetic switching device whose stationary contact pieces are mounted on a busbar to which a spring terminal is connected, which is used for connection of electrical conductors and in which case the spring terminal can be
- 30 operated for opening by means of a tool, in particular a screwdriver.

The object of the invention is to provide a connecting terminal arrangement of the type mentioned initially

35 and in which it is easier to connect electrical conductors.

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This object is achieved according to the invention by the characterizing features of Claim 1.

Thus, according to the invention, the terminal spring
5 is accommodated at least in the housing lower part of a service switching device and is held in it by means of a pin which passes through the terminal spring, with the pin running at right angles to the broad face of the switching device. The clamping element has a
10 manually operable pressure surface and is mounted at one end such that it can pivot, by which means the clamping element can be pressed manually against the terminal spring, in order to open the terminal spring for insertion of a connecting conductor.

15 In this case, the clamping element can be provided with an internal projection, by means of which it acts on the terminal spring. According to a further refinement of the invention, the clamping element may have a
20 planar, convex or concave pressure surface.

The clamping element is in this case aligned approximately at right angles to the mounting plane and can pivot about a fixed-position rotation axis, which
25 is arranged at the mounting end of the clamping element. At least one tab is provided at the front end of the clamping element and engages behind a backward projection on the housing lower part, so that the clamping element is fixed by the shaft and the backward
30 projection in the so-called relaxed position of the terminal spring.

The operation for insertion of an electrical conductor is simple: the fitter uses a finger, preferably the
35 thumb, to push on the pressure surface and to load the terminal spring, thus opening the terminal spring opening for insertion of the conductor end, after stripping if necessary. As soon as the conductor has been inserted, the clamping element is released so that



the connecting conductor is pressed by the terminal spring against the busbar.

According to a further refinement of the invention, one
5 spring terminal with the clamping element is provided on the housing lower part and on the housing upper part in each case; in consequence, it is possible for the spring terminals to be arranged offset in height with respect to the mounting surface.

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The invention and further advantageous refinements and improvements of the invention will be explained and described in more detail with reference to the drawing, which shows one exemplary embodiment of the invention.

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In the figures:

Figure 1: shows a perspective view of two spring terminals, one of which spring terminals is partially cut away, and

20 Figure 2: shows a variant of the clamping element.

The single figure shows a partial view of a circuit breaker 10 with a housing lower part 11 and a housing upper part 12, the two of which are associated with one
25 another in the form of shells, with appropriate components of a circuit breaker being located in the interior of the half shells. The two housing parts are, for example, held together by means of rivets 13. The lower area of the drawing shows the mounting face 14
30 with a recess 15 on whose one side wall a fixed tab 16 is formed which can be latched to a moving tab, which is not shown, behind a top-hat profile rail (not shown).

35 On its narrow side wall 17 associated with the mounting face 14, the housing upper part 12 has a projection 18 which is in the form of a wall, runs parallel to the broad face 19 of the circuit breaker 10 and is fitted with a pin 20, which runs at right angles to the broad



face 19. The wall-like projection 18 is located approximately in the area of the separating joint 21 between the housing lower part 11 and the housing upper part 12.

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On the same side of the wall-like projection 18 on which the pin 20 is located, a strip 22 is formed, runs approximately parallel to the mounting face 14, and has a backward projection 23 on the side facing away from the mounting face 14. An inclined surface 24 is provided on the sides of the strip 22 facing the mounting face, against which inclined surface 24 a horn 25 of a busbar 26 which runs at right angles to the mounting surface rests.

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A terminal spring 27 is provided on the busbar 26, on the outside of said busbar 26, and is described as a so-called cage tension spring, for example in DE 195 29 028 A1. The terminal spring 27 has a sprung loop 28 which engages over a section 29 mounted on the busbar 26; this then results in provision of that opening between the sprung section 28 and the busbar 26 which is used for sprung clamping of a conductor. Such a cage tension spring is known per se. It is fixed and held on the one hand by the pin 20 which passes through the loop 28, and on the other hand by the busbar 26.

On the wall-like projection 18, a guide projection 30 is integrally formed at a distance from the strip 22 in the area of the mounting face 14, which guide projection 30 has a concave cut-out 31 towards the pin 20, the centre point of which cut-out 31 corresponds approximately to the centre point of the pin 20 so that a curved gap 32 is formed between the pin 20 and the concave wall 31, and the loop 28 is located in this gap.

On the side of the projection 30 opposite to the terminal spring 27, that is to say towards the mounting



surface 14, this has a cavity 33 which is open towards the mounting face and runs at right angles to the projection 18, in which a hinge pin 34 of an approximately C-shaped clamping element 35 is mounted
5 such that it can rotate. In this case, the clamping element covers the intermediate space between the projection 30 and the strip 22 and, at its end facing the front end, has a tab 36 which, when fitted, that is to say when the pin 34 is located in the cavity 33,
10 engages behind the backward projection 18. The clamping element 35 has a pressure surface 27 which can be pressed against manually so that the clamping element 35 pivots about the shaft 33/34 and can be pushed against the section 28 of the terminal spring 27 by
15 means of a projection 38 which is integrally formed on the inside of the clamping element 35, so that the opening located between the terminal spring 27 and the busbar 26 is released and a connecting conductor can be inserted in the direction of the arrow P through the
20 hole 39 in the housing upper part into the terminal arrangement, and can be fixed in it, by then releasing the clamping element 35.

Figure 1 shows the spring terminal on the housing upper
25 part; a spring terminal 40 is also provided on the housing lower part 11 and has the same design as the spring terminal on the housing upper part 12. The spring terminal on the housing upper part is located closer to the front face and is at a greater distance
30 from the mounting face 14 than the spring terminal 40. This means that it is possible for two conductors to be connected by means of the two spring terminals, so that the circuit breaker can be used as a low-tariff circuit
breaker.

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The special feature of the arrangement is that a type of housing for the terminal spring 27 is provided integrally formed on the housing upper part or lower part, whose open side facing the side surface of the



circuit breaker 10 is covered by means of the clamping element 35, with the clamping element 35 being held by a rotation axis and by means of the tab 36 behind the backward projection 18; through the opening 39 leading to the front face a connecting conductor can be connected by operating the clamping element 35 or the clamping element of the spring terminal 40. The connecting conductor is inserted at right angles to the mounting plane.

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The fact that the busbar 26 naturally has a bend 26a via which the busbar 26 is connected to components located inside the circuit breaker 10 is self-evident.

15 In the version shown in Figure 1, the clamping element can be operated only manually. According to Figure 2, the clamping element 35a, which in practice has the same reference number 35 as that in Figure 1, in order to denote equivalence, can be provided with a recess 50
20 so that the clamping element 35a can be operated manually or by means of a tool. The other spring terminal has the reference number 40a.

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Patent Claims

1. Connecting terminal arrangement for a service switching device having a housing formed on housing parts which are in the form of two shells, in particular for a miniature circuit breaker or circuit breaker, having at least one screwless spring terminal having a terminal spring formed from a sprung flat material which is mounted on an intrinsically stiff busbar inside the service switching device and clamps an electrical conductor which is introduced into a terminal point between the terminal spring and the busbar, against said busbar, and having a clamping element which is associated with the housing of the service switching device and which is used to operate the terminal spring, characterized in that the terminal spring is held in at least one housing (11,12) by means of a pin (20) which passes through the terminal spring (27) at right angles to the broad face of the service switching device, and in that the clamping element (35,35a) which has a manually operated pressure surface (37) is mounted at one end such that it can pivot and can be pressed against the terminal spring (27), in order to open the terminal spring (27) for insertion of the connecting conductor.

2. Connecting terminal arrangement according to Claim 1, characterized in that the clamping element (35,35a) is designed in a curved or C-shape and has the manually operable pressure surface (37) on the outer surface.

3. Connecting terminal according to Claim 4, characterized in that the pressure surface (37) is concave, convex or of planar design.

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4. Connecting terminal according to one of Claims 1 to 3, characterized in that the inner surface of the clamping element (35,35a) has a projection (38) which



presses against the terminal spring (27) on operation of the clamping element (35,35a).

5. Connecting terminal arrangement according to one
5 of Claims 1 to 4, characterized in that the clamping
element (35,35a) is aligned approximately at right
angles to the mounting face (14) and is arranged such
that it can pivot about a fixed-position rotation axis
(33,34), which is arranged at the end of the clamping
10 lever (35,35a) adjacent to the mounting face (14).

6. Connecting terminal arrangement according to Claim
5, characterized in that at least one tab (39) is
provided at the front-face end of the clamping element
15 (35,35a), hooks behind a backward projection (22) on
the housing part (11,12), and is thus held firmly on
the housing (10) of the service switching device.

7. Connecting terminal according to one of the
20 preceding claims, characterized in that one spring
terminal with clamping element is provided on each of
the two housing parts (11,12) of the housing.

8. Connecting terminal arrangement according to Claim
25 7, characterized in that the spring terminals are
arranged offset in height with respect to the mounting
face (14).

9. Connecting terminal according to one of the
30 preceding claims, characterized in that the clamping
element (35a) has a recess (50) into which a tool can
be inserted in order to operate it.



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