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Electric circuit breakerDescription

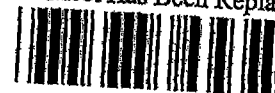
10 The invention relates to an electric circuit breaker with a main contact point having a movable and a fixed contact piece, which circuit breaker has an auxiliary contact point or secondary contact point driven by the movable contact piece, in accordance with the preamble of Claim 1.

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Such an electric contact breaker is known per se. It has a housing which is subdivided by a partition; the main contact point is located in the space facing the front side, and the secondary contact point is located
20 in the space facing the base side, said two contact points being mechanically interconnected by means of a slider. This arrangement is configured such that in the case of a breaking operation firstly the main contact point and thereafter the secondary contact point open,
25 and in the case of a making operation firstly the secondary contact point and thereafter the main contact point close.

This arrangement is a specific structural
30 configuration, and elements of a commercially available circuit breaker cannot be used directly.

DE 197 25 000 A1 has already disclosed a service
switching device in which a secondary contact point is
35 arranged in the space between the main contact point and the associated narrow side; the movable secondary contact piece is actuated by means of a slider which runs approximately perpendicular to the contact lever



of the main contact point and bears directly against the movable contact piece of the main contact point.

5 In this arrangement, it is not possible to provide a supply terminal in the region of the secondary contact point, because the space for such a supply terminal is filled up by the slider and the secondary contact point.

10 A circuit breaker in which a secondary contact point is not present is, for example, the S2 circuit breaker from ABB Stotz-Kontakt GmbH, Heidelberg, which has a contact point which is actuated by a breaker mechanism which is arranged to/ the side of or above the
15 electromagnetic trip element, that is to say on its side facing the front wall. An arc-quenching chamber is located between the base side or fastening side and the electromagnetic trip element.

20 It is the object of the invention to create a circuit breaker of the type mentioned at the beginning in which the essential parts of a commercially available circuit breaker can be used, the aim being, in addition, for there to be space available for a supply terminal.

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

30 According to the invention, the fixed secondary contact piece is coupled to a lug projecting from the base of the circuit breaker, so that the electric connection to busbars is constructed as a plug-in connection. Of course, the fixed secondary contact piece can also be connected to a screw-type or clamp-type terminal.

35 It is advantageous to provide in the slider between the slider and the contact lever a spring arrangement acting in the making direction of the secondary contact point, in order to provide adequate contact pressure



between the fixed secondary contact piece and the movable contact piece.

5 The arrangement according to the invention creates a circuit breaker in which the secondary contact point is arranged in the region of the fastening side of the circuit breaker, in which case the slider is displaceably guided at a spacing from the associated narrow side which corresponds to the corresponding
10 width of a commercially available supply terminal, with the result that there is present and formed between the narrow side and the slider and the secondary contact point a space which can be used to hold a commercially available screw-type or clamp-type supply terminal.

15 The invention and further advantageous refinements and improvements are to be explained in more detail and described with the aid of the drawing, in which an exemplary embodiment of the invention is represented.

20 In the drawing:

Figure 1 shows a view into a circuit breaker in accordance with a first embodiment of the invention, in the open position, and
25

Figures 2 and 3 show the breaker mechanism of the circuit breaker in accordance with Figure 1 with the secondary contact point shortly before the breaking or making of the main contact point and in the closed state.
30

35 The view into a circuit breaker 10 is shown in Figure 1, only a few essential parts being represented. The individual components of the circuit breaker 10 are inserted into a shell-shaped housing part 11 which is assembled with a housing part of identical construction



(not shown) to form the housing of the circuit breaker 10.

A toggle switch 13 which can be pivoted about a spindle 14 is provided in the region of the front wall 12. This spindle 14 is mounted in a fixed fashion on metal sheets 15 of a breaker mechanism, which is denoted overall by 16 and is known per se, and which belongs to the abovementioned switch S2. Rotatably mounted in the metal sheets 15 is a movable contact lever 17 on whose free end the movable contact piece 18 is integrally formed. The portion of space 19 holds an electromagnetic trip element, the portion of space 20 holds a thermal trip element, and the portion of space 21 holds an arc-quenching arrangement. Furthermore, the circuit breaker 10 has holding spaces 22 and 23 for supply terminals as well as, on the base side, a cutout 24 with a fixed nose 25 and a movable nose (not shown), which noses can be snapped behind a longitudinal edge of a top-hat rail.

Integrally formed on the movable contact lever 17 is a driver 26 which is in the shape of an L, there being integrally formed on the free end of the L shape a pin (not represented) which projects perpendicularly into the plane of the drawing and engages there in an elongated hole 27 of a slider 28 which can be displaced inside the housing 11 perpendicular to the base surface or fastening surface of the circuit breaker 10. The slider 28 has a central elongated guide hole 29 into which a projection 30 on the housing 11 or on the inner surface of the housing part 11 projects. At the free end, facing the fastening plane, the slider has an eye 31 through which there engages a movable contact lever 32 of a secondary contact point which has a movable secondary contact piece 33 fitted on the contact lever 32 and a fixed secondary contact piece 34. The end of the contact lever 32 opposite the movable secondary contact piece 33 engages in an opening 35 and is



supported there in an articulated fashion. So that the contact lever 32 does not slide out of the opening 35, it has in the middle region an offset 36 in which a nose 37 on the slider 28 engages, which nose 37 projects into the eye 31 and protrudes away from the fastening plane. Located in the region of the offset 36 between a shoulder 38 on the slider 28 and the movable contact lever 32 is a pressure spring 39 which serves as contact pressure spring for the secondary contact point 33, 34. The movable contact lever 32 of the secondary contact point 33, 34 is connected in an electrically conducting fashion via a flexible lead 32b to a lead 32a running on the base of the switching device 10; this lead 32a connects the contact lever 32 to a supply terminal (not represented in more detail).

The fixed contact piece 34 of the secondary contact point is connected to or provided with a terminal lug 40 which projects from the base surface of the circuit breaker 10 and engages in correspondingly shaped contact piece receptacles in a holder housing, as is described, for example, in EP 0 821 454.

Figure 1 shows the circuit breaker 10 with the main contact point and the secondary contact point in open position.

Figure 3 shows the arrangement in the closed position. The movable contact piece 18 fitted on the movable contact lever 17 bears against a fixed main contact piece 41 (not represented in Figure 1), and it can be seen that the driver 26, which is located in Figure 1 at the end of the elongated hole 27 on the left of the drawing, bears in the closed position against the right-hand end of the elongated hole 27. The movable secondary contact piece 33 is pressed against the fixed secondary contact piece 34, and a spacing y has been produced between the nose 37 and the contact lever 32; the contact pressure spring 39 is compressed by this



amount, and the contact pressure of the secondary contact point 33, 34 is produced because of this shortening of the length.

5 Figure 2 shows a middle position, specifically that position in which the movable secondary contact piece 33 just touches the fixed secondary contact piece 34. In this case, there is a spacing x between the movable main contact piece 18 and the fixed main contact piece
10 41, which means that the secondary contact pieces 18, 41 close during contact-making. Only after the distance y of the slider 28 is overcome and a contact pressure has been produced at the secondary contact point 33, 34 does the main contact point 18, 41 close.

15 When, conversely, the switch is to be opened, the main contact point 18, 41 then opens until the spacing x between the movable main contact piece 18 and the fixed main contact piece 41 is reached; not until then does
20 the secondary contact point 33, 34 open.

Since the secondary contact point requires half a module width of the switching device, it is possible to provide on the access side one access terminal each for
25 the main and secondary contact points.

As mentioned above, in the case of the arrangement according to the invention the slider runs perpendicular to the fastening plane of the circuit
30 breaker, and the contact lever 32 of the secondary contact point runs approximately parallel or at an acute angle to it. The fixed secondary contact piece 34 is situated between the secondary contact lever and the fastening plane, with the result that the movable
35 secondary contact piece moves towards the fastening plane during closing.

In this described refinement, the axis of rotation of the main contact lever is situated towards the front



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side of the switching device, and the main contact lever runs in the closed state approximately parallel to the slider, and the slider is driven by pivoting of the main contact lever.

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Patent claims

1. Electric circuit-breaker with a main contact point having a movable and a fixed main contact piece, which
5 circuit breaker has a secondary contact point which is driven by the movable main contact piece and is arranged inside the circuit breaker in such a way that during breaking firstly the main contact point and thereafter the secondary contact point close, and
10 during making firstly the secondary contact point and thereafter the main contact point close, the movable main contact piece being coupled to a slider which drives the movable secondary contact piece, characterized in that a driver is fastened on the
15 movable contact lever (17), in that the driver is coupled to the slider, in that the slider (28) runs perpendicular to the fastening plane of the circuit breaker (10) and in that the movable secondary contact lever (32) is arranged and guided approximately between
20 the slider and the fastening plane in the slider (28) approximately transverse to the displacement direction and approximately parallel to and near the fastening plane.
- 25 2. Circuit breaker according to Claim 1, characterized in that the slider (28) has an eye (31) through which the movable secondary contact lever (32) engages and in so doing is pressed in the making direction against a holding nose (37) by a spring (39).
- 30 3. Circuit breaker according to Claim 1, characterized in that the fixed secondary contact piece is connected in an electrically conducting fashion to a lug (40) projecting from the base surface of the circuit
35 breaker (10).
4. Circuit breaker according to one of the preceding claims, characterized in that the slider (28) is arranged at a spacing from the associated narrow side



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of the circuit breaker which corresponds to the width
of a commercially available supply terminal.



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