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Connecting terminal for electric conductors

This invention relates to an electric connecting terminal detachably connecting an electric conductor in form of a wire or strand with an electroconductive contact bar wherein a pivoted terminal disk is forcing the conductor against the contact bar when swiveled.

Such a connecting terminal is known from the German patent 904304. In this known rocking lever terminal the conductor is forced against the contact bar by a rocking lever under intermediate action of a spring. One disadvantage of the known device is that the conductor has to be stripped beforehand. In addition the contact achieved by the spring is not optimal (contact area).

From US-patent 30 64 227 a terminal is known in which the conductor has not to be stripped from its insulation beforehand. Since with this kind of connection the contact element has to be forced between the conductor and the insulation like a lance this connection is only suitable with a soft and flexible insulation. Thereby a strong contact is only achieved when an increased contact force is produced by applying a tensile force at the conductor by means of a bracing spring.

In German patent application DE 29 22 447 A1 a terminal is described, in which a previously stripped conductor is forced against a contact surface by resilience. The lever which is present serves to push away the friction spring thereby releasing the conductor.

From German patent 29 02 536 a terminal is known into which a

conductor can be inserted without being stripped beforehand. The contact is achieved by cutting the insulation with the cutting edge of a fork-like receptacle. The conductor is pinched against the cutting edge with an insert device.

The object of the invention is to develop a multipurpose connecting technique (usable in terminal blocks, printed circuit connecting terminals or clamping blocks) which as a cost reduction for the user makes it unnecessary to strip the conductor beforehand or to use any tools during the clamping operation. Simultaneously the connection shall provide a safe and large area contact site, protect the conductor from being damaged at the cutting sites as well as provide a production as simple as possible with few components and furthermore permit a fast and easy handling which also reduces the costs both for the producer and the user.

The subject matter of the invention is a connecting terminal having the features as given in claim 1. Preferred and advantageous embodiments are defined in subclaims 2 to 10.

In order to support to remove the insulation portions it is thus advantageous that the terminal disk has a serrated gripping region before the knife which in addition acts on the insulation portion. It is also suitable to secure the clamping position by locking or snap-in projections fixed in the housing which act either on the terminal disk or on a slide actuating the terminal disk and which are detachable. For bedding of the terminal disk it is advantageous if guiding means are provided in the housing on which the outer contour of the terminal disk is supported. The clamping region of the terminal disk and the knife for cutting the insulation suitably are adapted to the cross section of the conductor. Further it is advantageous to simultaneously contact several conductors with one clamping operation by connecting several adjacent slides. To improve the effectiveness of clamping it is favourable when in the clamping region the contact bar bridges a cavity in the housing like a

coach spring and thus performs a resilience. The clamping joint, if required, can be detached with a suitable tool, e.g. a screwdriver, by pushing in housing direction against the locking or snap-in nose.

In the following a preferred embodiment of the invention is described with reference to the drawings, in which:

Fig. 1 shows the connecting terminal, the conductor introduced therein without being clamped.

Fig. 2 shows the connecting terminal in action of the knives on the insulation during the clamping operation.

Fig. 3 shows the connecting terminal in the clamping state.

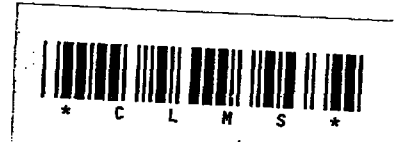
The embodiment schematically shows a series terminal in which two conductors 14 are connected by a contact bar 8. Within an insulated housing 1 a terminal disk 3 is pivotally positioned by guiding means 2 fixed in the housing. The terminal disk 3 shows a serrated (thoothed) region 9, a knife 7 and a clamping surface 6. By means of a slide 5 the terminal disk is moved into its clamping position, the slide 5 acting on the upper surface 10 of the terminal disk 3 by means of a plunger (Fig. 1).

Through an opening 16 the conductor 14 is introduced into the housing 1 up to a stopper 4b. The conductor 14 with its end portion then sits close to a contact bar 8 provided at its front portion with a counter knife 13. Operating the slide 5 the insulation of the conductor 14 is cut by means of the knife 7 and the counter knife 13 (Fig. 2) and the insulation is removed from the end of the conductor 14 by means of the serrated region 9 of the terminal disk 3 upon subsequent rotation.

Upon further rotation of the terminal disk 3 by the slide 5 the clamping region comes into contact with the stripped end of the

conductor 14 and forces it against the contact bar 8 (Fig. 3). In the clamping region the clamping bar 8 like a coach spring bridges a cavity 15 in the housing 1. In the clamping position (Fig. 3) the terminal disk 3 is fixed by means of a resilient housing projection 4 behind which a locking (snap-in) nose 11 of the terminal disk 3 snaps in. In addition a further fixation can be produced by a locking projection 4a at the housing 1 which acts on the slide 5.

The locking (snapping) joints can be released, if necessary, by pushing against the locking nose 11 with a suitable tool thereby separating the joint. The separation of the locking joint can also be achieved by means of a push-button integrated in the housing 1, which is pushed against the locking nose 11 at the opening 16 between the conductor 14 and the resilient housing projection.



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Patent Claims

1. Connecting terminal detachable connecting an electric conductor in form of a wire or strand with an electroconductive contact bar, a pivoted terminal disk (3) in the housing (1) forcing the conductor (14) against the contact bar (8) when swiveled, characterized in that the terminal disk (3) has a knife (7) which together with a counter knife (13) at the contact bar (8) upon pivoting the terminal disk (3) separates the insulation from the conductor (14) and upon further rotation of the terminal disk (3) forces the stripped portion of the conductor (14) with a clamping region (6) adjacent to the knife (7) against the contact bar (8) and in that this joint, if necessary, can be separated with a suitable tool by pushing against a locking nose (11).
2. Connecting terminal according to claim 1, characterized in that the terminal disk (3) additionally has a serrated region (9) before the knife (7) supporting the transport of the separated insulation portion.
3. Connecting terminal according to claim 1 or 2, characterized in that a resilient housing projection (4) detachable fixes the terminal disk (3) in the clamping position.
4. Connecting terminal according to claim 1, 2 or 3, characterized in that the terminal disk (3) is operated by a slide (5) being guided in the housing (1) of the connecting terminal.
5. Connecting terminal according to claim 4, characterized in



that the slide (5) is fixed in the clamping position by a locking projection (4a) at the housing (1).

6. Connecting terminal according to claim 4 or 5, characterized in that by connecting several slides (5) several conductors (14) are simultaneously clamped by one clamping operation.

7. Connecting terminal according to any of the preceeding claims, characterized in that the bedding of the terminal disk (3) is achieved by guiding means (2) fixed in the housing, which act on the periphery of the terminal disk.

8. Connecting terminal according to any of the preceeding claims, characterized in that the clamping region (6) of the terminal disk (3) and the contact bar (8) have a longitudinal groove adapted to the cross section of the stripped conductor (14).

9. Connecting terminal according to any of the preceeding claims, characterized in that the shape of the knife (7) and the counter knife (13) is adapted to the cross section of the insulation to be separated.

10. Connecting terminal according to any of the preceeding claims, characterized in that in the clamping region the contact bar (8) bridges like a coach spring a cavity (15) in the housing (1) thereby supporting the contact with the conductor (14).

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Abstract

This invention relates to a connecting terminal detachable connecting an electric conductor in form of a wire or strand with an electroconductive contact bar, a pivotably positioned terminal disk in the housing forcing the conductor against the contact bar when swiveled. According to the invention the terminal disk has a knife which together with a counter knife at the contact bar separates the insulation from the conductor upon rotation of the terminal disk and forces the stripped portion of the conductor against the clamping region upon further rotation of the terminal disk. This joint can be separated with a suitable tool by pressing against a locking nose.