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Articulated force-transmitting connection arrangement

Description

10 The invention relates to an articulated force-transmitting connection arrangement according to the pre-characterizing clause of Claim 1.

15 In circuit-breakers, electrical switchgear and other installation equipment, switch latches are provided, or, in general terms, gearings, in which the rotational or sliding movement of one lever is to be transmitted to another lever via an articulated connection arrangement.

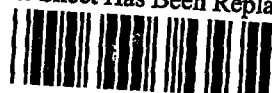
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In a particular version, one lever is a wire shackle, one end of which is bent in a L-shaped manner, so that it can be inserted into a prepared hole perpendicularly to the longitudinal extent of the shackle. Such a shackle is usually produced from rigid wire and has the great advantage that assembly is very simple on account of movement perpendicular to the longitudinal extent.

25 If the one lever consists of a flat strap, the connection arrangement is simple; if the one lever is U-shaped and the U-legs possess, at one end of the lever, two holes, into which the bent end of the shackle is inserted, in order to achieve greater force distribution and force transmission, there is then the problem that, due to unfavourable tolerances, the force is transmitted from the shackle to only one leg, with the result that a torque is exerted on the U-shaped lever.

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The object of the invention is to provide a connection arrangement of the type mentioned in the introduction, in which optimum force transmission to the U-shaped rotatable lever is achieved, whilst at the same time the same production and the same assembly are ensured.

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

Accordingly, the U-shaped lever possesses, in the region of its end, a recess on one of its legs and a hole on the other leg; the other lever is produced from flat material and is T-shaped, one end of the crossbar of the T-shape being inserted into the hole and the other end being guided in the recess.

The recess is, here, in the form of a circular arc, the diameter of the circular-arcuate shape corresponding to the diameter of the hole.

As a result, when force is transmitted from one lever to the other, the two ends of the crossbar are pressed against the inner edge of the recess and of the hole respectively, so that both legs of the U-shape of the lever are subjected to load.

The lever made of flat material is assembled in the same way as a wire shackle is assembled: one leg, oriented in a particular way, is inserted through the recess into the hole; assembly is then ended, the other end of the crossbar being guided in the recess.

Other advantageous embodiments and improvements of the invention may be gathered from the further subclaims.

The invention is described in more detail by means of the drawing which illustrates an exemplary embodiment of the invention and in which:

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Figure 1 shows a perspective view of the connection arrangement of the two levers, and

- 5 Figure 2 shows a top view of the end portion of the first lever in the direction of the arrow II.

The connection arrangement comprises a first lever 10 and a second lever 11 connected to the latter in an articulated manner. The first lever 10 is U-shaped and possesses a web 12, on which legs 13 and 14 are integrally formed on either side. The legs 13, 14 are removed at that end of the first lever 10 which is located on the right in the drawing, so that only the web 12 is present. Projections 15 and 16 are provided at the end of this web 12 perpendicularly to the latter, the first lever 10 being connected to part of a switch latch (not illustrated) by means of the said projections.

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At the other end of the lever 10, the legs 13, 14 project beyond the web 12, so as to form rounded leg lugs 17 and 18 which lie in the extension of the legs 13 and 14. The leg 14 possesses a hole 19 in the region of its leg lug, whereas the leg 13 has, in the region of its leg lug 17, a recess 20 which starts from the leg edge 13 and which possesses a circular-arcuate portion 21 aligned with a corresponding portion of the hole 19. That edge of the circular-arcuate portion 21 which faces away from the end of the leg lug 17 is prolonged as far as the end edge of the leg 13 and there forms a rectilinear portion 22 which forms an angle greater than 90° with the end edge.

35 The recess 20 forms, in the leg lug 17, a hook 23, the end of which projects beyond the line 30 running through the mid-point of the circular-arcuate portion 21 and parallel to the free edge of the leg 13 or 14



and forms an angle α of less than 90° with the line 30 (see Figure 2).

5 The second lever 11 is formed from flat material and, at its end which is located on the left in the drawing and which is denoted by the reference numeral 24, possess a region 25 of small width, the free end of which is T-shaped with a crossbar 26 and two ends of the crossbar 27 and 28.

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One end 28 engages into the hole 19 in the leg 14, whereas the other crossbar or the other end 27 engages into the recess 20.

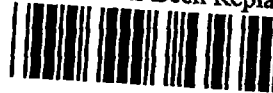
15 The figure illustrates the assembly position, in which the two levers 10 and 11 form between them an angle which is smaller than 90° . In this position, the second lever 11 is pushed in its longitudinal direction into the recess 20, the end 28 still being at a distance
20 from the inner face of the leg 14. This direction of displacement is designated by the arrow P_1 . When the crossbar 26 is aligned with the hole 19, the second lever 11 is then displaced downwards, perpendicularly to its longitudinal extent and perpendicularly to the
25 direction of displacement P_1 , in the direction of the arrow P_2 , that is to say in the direction of the plane formed by the inner face of the leg 14, so that the end 28 engages into the hole 19. For the final assembly of the arrangement inside a switch, the two levers 10 and
30 11 are stretched out, that is to say they are brought into a position in which they are approximately in alignment with one another. In this arrangement, the nose 23 engages round that edge 29 of the end 27 which points towards the lever, with the result that the
35 second lever 11 is also retained in the first lever 10.

In the arrangement according to Figure 1, assembly is just as simple as assembly of a shackle; however, the



transmission of force from the first lever to the second, or vice versa, takes place by means of the two ends 27 and 28 of the crossbar 26, with the result that a uniform load on the two legs 13 and 14 is achieved, without a torque being exerted on the first lever 20.

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Patent Claims

1. Articulated force-transmitting connection
5 arrangement of two rotatable levers, one of which is
U-shaped, in particular for a switch latch of
electrical installation switchgear, characterized in
that the U-shaped first lever (10) has, in the region
of its end, a recess (20) on one (13) of its legs and a
10 hole (19) on the other leg (14), and in that the second
lever is formed from flat material and has a T-shaped
end, one end (28) of the crossbar (26) being inserted
into the hole (19) and the other end (27) being guided
in the recess (20).
- 15 2. Connection arrangement according to Claim 1,
characterized in that the recess (20) has a
circular-arcuate portion (21), the inside diameter of
which corresponds to the hole diameter.
- 20 3. Connection arrangement according to Claim 2,
characterized in that the recess (20) forms a nose (23)
which, in the assembled state, at least partially
surrounds that end (27) of the crossbar (26) which is
25 located in the recess (20).
4. Connection arrangement according to Claim 3,
characterized in that the nose is arranged at the free
end of the leg (13).
- 30 5. Connection arrangement according to Claim 4,
characterized in that that portion (22) of the recess
(20) which leads to the edge of the leg (13) forms an
obtuse angle with the edge.
- 35 6. Connection arrangement according to one of the
preceding claims, characterized in that the nose (23)
projects beyond the line running through the mid-point



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of the circular-arcuate portion (21) of the recess (20) in the longitudinal direction of the first lever (10), so that an acute angle is formed between the line and the free end of the nose (23).

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