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(54) Ladder articulation

(57) This invention covers an ARTICULATION suitable for simple articulated ladders with two or more step sectors, extension articulated ladders or telescopic ladders. This articulation has elongated arms with castings near the ends of a varied geometric configuration, whereby this geometric configuration is always the same as the periphery of the members used for the ladder steps. The castings (1 and 2) allow the step closest to the articulation (3) to be applied by crossing the articulation arm and the flange where it was inserted, such that it is flared on the outside (4), adjusting and fastening the articulation.

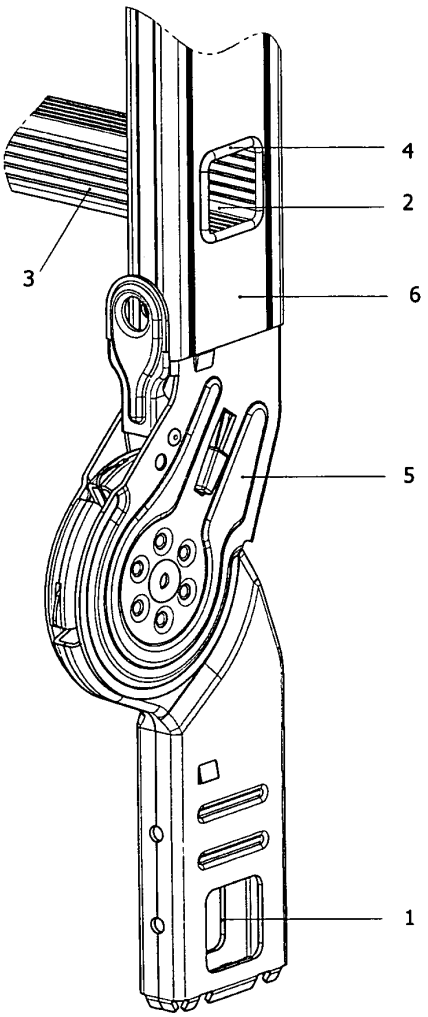

Fig. 1

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Description

[0001] This invention covers an articulation for simple articulated ladders or for extension and telescopic articulated ladders.

[0002] This type of ladder generally consists of two or more ladder sections joined by one or more articulations, so that a long ladder may be folded, transported or stored in a small space, but also to adapt the ladder to the location and the various work conditions.

[0003] Currently, articulations for these ladders are generally small, in order not to create a long interval between the steps at the fastening spots. Generally, they also have very short arms so that they may be joined and fastened to the ends of the members comprising the ladder flanges, whereby the articulation arms are joined close to the first step. After the joint, a variable number of holes are drilled for the rivets that are placed from the exterior. The rivets cross only the walls that are side by side - the external wall of the ladder side and the inner wall of the articulation arm. Since the rivets are of a relatively small diameter, and since the lateral member commonly applied for these ladders has a wall of about 1.00 mm, it can be easily seen that the material's resistance to wear and torsion forces is always precarious in this small joint area, and even if the rivet is made of steel, which is rare, the safety of persons using this type of ladder is always minimum. Most users agree that the main problem with these ladders is that they develop loose fittings between the member and the articulation joint arm due to constant use that causes constant oscillation and, in time, loosen the rivet holes or shear them.

[0004] The common method of fastening the articulation to the member decreases the ladder's resistance, particularly when it is totally open, since, if the user is at the top of the ladder, or on the step next to the articulation, strong pressure is placed on the member area at the end of the articulation, whereby the rivets are the only connection parts that disperse the forces between those two elements. When the ladder is used on a regular basis, there is a constant variation in load direction that eventually causes play and wear in that area.

[0005] This is a technical problem that has restricted the use of larger ladders equipped with articulations, and thus most ladders on the market are about 4.5 metres high. The constant day-to-day bustle and the growing lack of time for performing work generally leads to a situation in which users, not familiar with the fragility of the fittings, always overload these types of ladders.

[0006] This invention resolves the problem of the fastening and resistance of ladder articulations and arises, not only due to a demand for a solution to the problem of safety sought by most users, but also due to the growing demand for larger articulated ladders by professional users.

[0007] This innovative articulation for ladders (fig. 1) results from lengthy studies and a series of drawings taking into account the resistance of the respective materials, combined with technical know-how on the production of this type of tool, making it possible to manufacture prototypes of experimental articulations successively submitted to strict workshop trials.

[0008] The new articulation's main novelty for ladders is the longer arms that, when totally open, are always longer than the normal distance between the ladder steps. Both articulation arms have castings (1 and 2) of a square, rectangular, triangular or oval geometric shape, but always the same as the member's peripheral configuration (3) used on the ladder steps. These castings make it possible for the articulation arms, after being deeply inserted into the corresponding ladder flanges (6), that is, the arm and the flange, to be simultaneously crossed by the ladder step (3), and then the step is flared outside the flange (4).

[0009] The controlled flared exterior (4), allows for a perfect adjustment and total consolidation of the respective parts (articulation, flange member and step member): By eliminating focal load concentration points, the risk of rupture in that ladder area is eliminated because there are no longer dispersed contact points, which are replaced by a large contact surface dispersing the forces and thus providing greater robustness along the whole ladder length, regardless of its number of articulations or of the length or number of steps of each of its parts, an important user-safety factor.

[0010] With the solid construction provided by this new articulation, at the end of the ladder's elongation, when the user passes through the centre area, the natural flexing is distributed along the ladder's whole length. In localised loads, when the user is at the highest spot of the ladder or when he places his whole weight on the step closest to the articulation, the pressure loads are absorbed directly by the ladder's lateral structure and do not create dispersed focal points of rupture forces, neither on the flange nor on the articulation arm, and this will be the case whatever the user's position.

[0011] This technical feature called for suitable inlaid saliencies, grooves and external structural ribs (5 fig.1) to compensate for the elongation of the arms, that is, the increased distance between the load-supporting point, the fastening step and the articulation axis.

[0012] It must be noted that in this type of ladder, all the stress loads are generally supported where the ladder is joined to the articulation, which makes fastenings with rivets fragile. With this technical solution, the whole area where the articulation arm and the ladder's flange are joined is reinforced by doubling the structure and, with this innovation, that area is transformed into a solid and highly resistant structural area, much contrary to the case of the various articulations fastened with rivets available on the market.

NOMENCLATURE

[0013]

1 Casting of the articulation arm
2 " " "
3 Ladder step member
4 Exterior flaring of the step member
5 Reinforcement ribs
6 Ladder flange member

Claims

1. ARTICULATION FOR LADDERS suitable for application in simple articulated ladders with two or more step sectors, in articulated extension ladders or telescopic ladders, **characterised by** having elongated arms with castings of a varied geometric configuration near the ends, whereby this geometric configuration is always the same as the periphery of the member used for the ladder steps, the castings (1 and 2) allow the step closest to the articulation (3) to be applied by crossing the articulation arm and the flange where it was inserted, such that it is flared on the outside (4), adjusting and fastening the articulation.

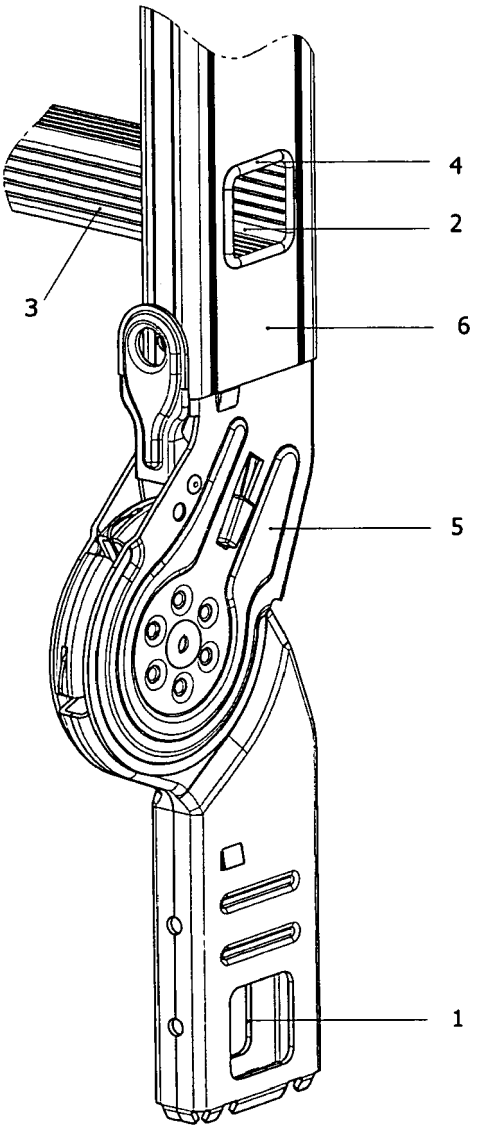

Fig. 1