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(54) **SUSPENSION DEVICE FOR SUBMERSIBLE PUMPS**

(57) The invention relates to a suspension device for submersible pumps which comprises the elongated supporting means (1) and at least one transverse lashing means (2). The lashing means (2) is attached to the elongated supporting means (1) at one end, whereby the lashing means (2) is at both ends provided with one component (3, 4) of a velcro fastener.

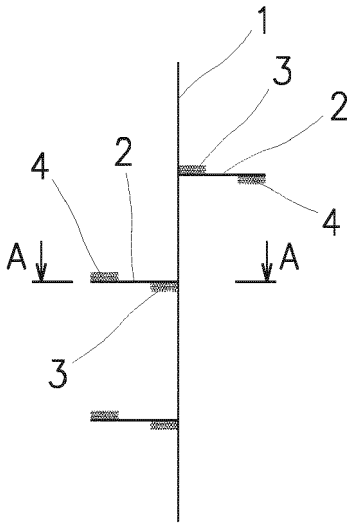

Fig. 1

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Description

Technical field

[0001] The invention relates to a suspension device for submersible pumps, comprising an elongated supporting means and at least one transverse lashing means.

Background art

[0002] Known are suspension devices for submersible pumps in which the submersible pump is suspended at the end of an elongated supporting means. The submersible pump is connected by an electric cable to a source of electrical energy and the outlet of the pumped fluid is led out by a suitable hose or pipe to a required place, e.g. to a tank, a distribution system of the pumped fluid, etc. The electric cable and the hose or pipe are "tied" together with the supporting means in more or less regular sections, so that the electric cable and the hose or pipe are guided along the supporting means and are attached to it.

[0003] CZ UV 19 611 discloses a suspension device for submersible pumps whose principle consists in that at least one lashing means is attached to an elongated supporting means, preferably at regular intervals. The lashing means are tied to the supporting means and/or glued and/or sewn and/or welded and/ or attached to the supporting means by mechanical means. The elongated supporting means is formed by a knitted strip of artificial fibres and the lashing means are formed by straps which are fastened by sewing to the elongated supporting means by their central part, the straps being provided at each of the two ends with one side of a velcro fastener.

[0004] The disadvantage of this embodiment of the suspension device is the difficulty of automating the production, in particular fastening the lashing means by their central part to the elongated supporting means, because the hitherto used embodiment has been produced entirely by hand, by placing the ends of two parts of the lashing means on top of one another, each part extending to a different side of the elongated supporting means. The straps with velcro fasteners used are very slippery when stacked and slide on each other, so they must be held by the operator when being attached to the elongated supporting means, e.g., by sewing, to prevent one or both Velcro fasteners from slipping which would lead to disrupting the connection of one or both straps with velcro fasteners to the elongated supporting means. On the one hand manual work entails the reliability and accuracy of the connection, but on the other hand the need to use manual work means that a limited number of connections is produced per unit of time. In addition, human labour of this nature increases the strain on workers, which is also disadvantageous.

[0005] The object of the invention is to eliminate or at least minimize the disadvantages of the background art.

Principle of the invention

[0006] The object of the invention is achieved by a suspension device for submersible pumps, whose principle consists in that a lashing means is connected by one end to an elongated supporting means, whereby the lashing means is provided at both ends with one part of a Velcro fastener.

[0007] For a more comfortable closing of the Velcro fastener, it is advantageous if both parts of the velcro fastener at the ends of the lashing means are arranged on opposite surfaces of the lashing means.

[0008] Preferably, the lashing means consists of two separate straps, which are connected to each other by a joint, e.g. in the middle part of the length of the lashing means, whereby on each of the straps is arranged one Velcro **component** of both components of the Velcro fastener of the lashing means.

[0009] In a preferred embodiment, the two straps of the lashing means are joined by a sewn and/or welded joint.

[0010] In another preferred embodiment, the lashing means is connected to the elongated supporting means by a sewn and/or welded joint.

[0011] The advantage of such a suspension device is that the individual joints of the individual parts of the suspension device always connect only 2 layers which are significantly more stable when stacked and do not slide on each other, so it is possible to better automate the production process and reduce human labour while maintaining quality and productivity, possibly even increasing productivity and/or improving quality.

Description of the drawings

[0012] The invention is schematically represented in the enclosed drawings, wherein Fig. 1 shows an exemplary embodiment of a suspension device for submersible pumps and Fig. 2 shows a cross-sectional view of the suspension device for submersible pumps taken in plane A-A of Fig. 1.

Examples of embodiment

[0013] A suspension device for submersible pumps comprises an elongated supporting means **1** which is formed by a rope, cable, belt, etc. The elongated supporting means **1** is made of a metallic or non-metallic material or from a combination of a metallic and non-metallic material. The metallic material is steel or another material which is suitable especially in terms of tensile strength. Non-metallic materials include particularly polypropylene or polyethylene or polyamide, or another material which is suitable especially in terms of tensile strength. In an especially preferred embodiment, the elongated supporting means **1** consists of a knitted strip of artificial fibres, such as polyamide or polypropylene, etc.

[0014] At least one lashing means **2** is fastened to the elongated supporting means **1** at one end transversely to the elongated supporting means **1** by a joint **5.** Due to the usual lengths of the suspension devices for submersible pumps, it is customary if along the length of the elongated supporting means **1** are arranged at least two lashing means **2** or even more than two lashing means **2.** The lashing means **2** are preferably arranged on the elongated supporting means **1** at regular intervals. In a preferred embodiment, the joint **5** which connects the lashing means **2** and the elongated supporting means **1** is formed by a sewn and/or welded joint.

[0015] The lashing means **2** is formed by a strap which is at both ends provided with one component **3, 4** of a velcro fastener. For a more convenient closing of the two components **3, 4** of the velcro fastener after encircling the cable and the pump hose, it is advantageous if each component **3, 4** of the velcro fastener at the ends of the lashing means **2** is arranged on the opposite surfaces of the lashing means **2,** i.e., e.g., one at the top and the other at the bottom, as shown in the drawing.

[0016] In a preferred embodiment, the lashing means **2** consists of two separate straps **20, 21,** which are mutually connected by a joint **22,** e.g. in the middle part of the length of the lashing means **2,** whereby on each of the straps **20, 21** is arranged one part **3, 4** of the velcro fastener of both parts **3, 4** of the velcro fastener of the lashing means **2.** In a preferred embodiment, the joint **22** of the two straps **20, 21** of the velcro fastener of the lashing means **2** is formed by a sewn and/or welded joint.

Claims

1. A suspension device for submersible pumps which comprises the elongated supporting means (1) and at least one transverse lashing means (2), **characterized in that** the lashing means (2) is attached to the elongated supporting means (1) at one end, whereby the lashing means (2) is at both ends provided with one component (3, 4) of a velcro fastener.

2. The suspension device for submersible pumps according to claim 1, **characterized in that** both components (3, 4) of the velcro fastener at the ends of the lashing means (2) are arranged on the opposite surfaces of the lashing means (2).

3. The suspension device for submersible pumps according to claim 1 or 2, **characterized in that** the lashing means (2) is formed by a pair of separate straps (20, 21), which are mutually connected by a joint (22), whereby on each of the straps (20, 21) is arranged one component (3, 4) of the velcro fastener of both components (3, 4) of the velcro fastener of the lashing means (2).

4. The suspension device for submersible pumps according to claim 3, **characterized in that** the two straps (20, 21) of the lashing means (2) are joined by a sewn and/or welded joint (22).

5. The suspension device for submersible pumps according to any of claims 1 to 4, **characterized in that** the lashing means (2) is joined to the elongated supporting means (1) by a sewn and/or welded joint (5).

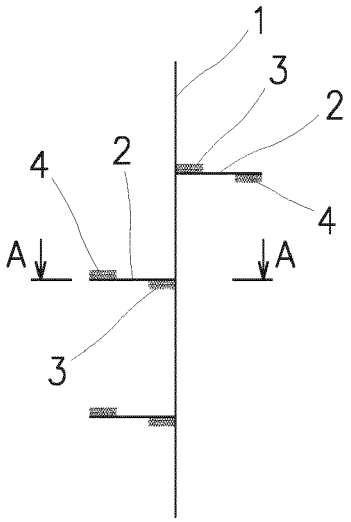

Fig. 1

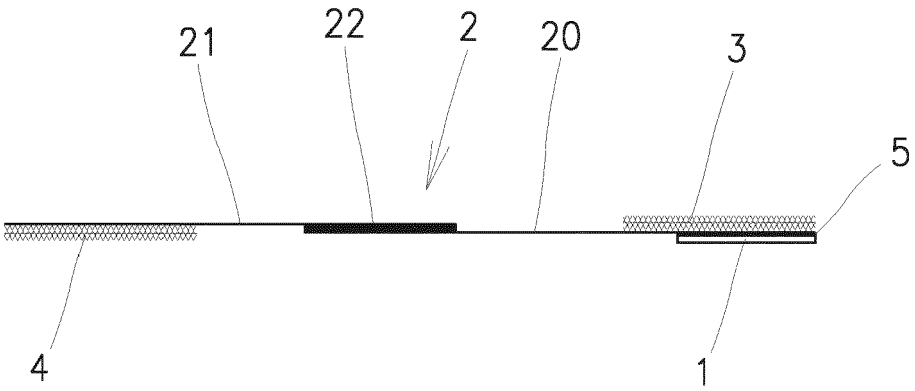

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 20 20 5377

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC) F04B F04D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 February 2021	Pinna, Stefano

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 20 5377

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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08-02-2021

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82