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(71) Applicant: **KONE Corporation**
00330 Helsinki (FI)

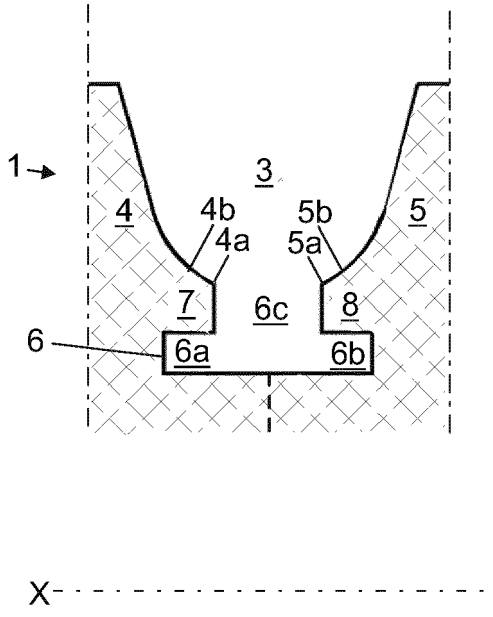
(72) Inventors:
- **Helenius, Juha**
  00330 Helsinki (FI)
- **Räsänen, Matti**
  00330 Helsinki (FI)

(74) Representative: **Kolster Oy Ab**
(Salmisaarenaukio 1)
P.O. Box 204
00181 Helsinki (FI)

(54) **TRACTION SHEAVE, DRIVE MACHINERY AND ELEVATOR**

(57) The invention relates to a rotatable traction sheave (1) of an elevator for driving one or more ropes (2) of an elevator, the traction sheave (1) comprising one or more rope grooves (3) for receiving a rope (2), wherein each said rope groove (3) is delimited on one side thereof by a first side wall (4), and on the other side thereof by a second side wall (5), the rope groove (3) narrowing towards the rotational axis of the traction sheave (1); each side wall (4,5) being slanted and having an edge (4a,5a), the groove (3) being an undercut groove, a cavity (6) being provided between the aforementioned edges (4a,5a)of the side walls, which cavity (6) extends radially towards the rotational axis (X) of the sheave (1) between the aforementioned edges (4a,5a) of the side walls (4,5). The cavity (6) extends behind the side walls (4,5) as seen in radial direction of the traction sheave (1). The invention also relates to a drive machinery of an elevator as well as an elevator, which implement the traction sheave (1).

Fig. 1



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Description

FIELD OF THE INVENTION

[0001] The invention relates to a traction sheave, a drive machinery and an elevator utilizing the drive machinery. The elevator is preferably an elevator for transporting passengers and/or goods.

BACKGROUND OF THE INVENTION

[0002] Elevators typically comprise a traction sheave and ropes connected with the elevator car and passing around the traction sheave. Via the ropes traction force can be transmitted from the traction sheave to the car. Thereby, car movement can be achieved and controlled by aid of the traction sheave. The traction sheave can be rotatable by an electric motor, for example. This kind of elevators can be referred to as traction sheave elevators.

[0003] The ropes driven by the traction sheave are typically connected on one side of the traction sheave with the elevator car and on the other side with a counterweight. However, also counterweightless traction sheave elevators exist.

[0004] Typically ropes having round cross section are placed in rope grooves of the traction sheave. By geometry of the rope groove, the firmness of the engagement between the ropes and the traction sheave can be controlled. In prior art, a conventional method to increase traction is to use undercut rope groove. In this kind of a rope groove there is a cavity at the bottom of the groove between the radially inner edges of the side walls delimiting the groove. The cavity extends radially towards the rotational axis of the sheave thereby forming a depression in the bottom of the groove. The cavity has the drawback that it increases the surface pressure between rope and the sheave such that sheave and rope lifetime is reduced. The surface pressure between rope and the sheave is further increased such that sheave and rope lifetime is reduced when the traction sheave diameter is reduced. This sets limits for how small diameter the traction sheave can have.

[0005] Also such elevators exist where an element of polymer material is placed in the undercut cavity. The polymer material element is used to enhance friction in emergency stop.

BRIEF DESCRIPTION OF THE INVENTION

[0006] The object of the invention is to provide a solution which is improved in terms of the interaction between a rope and a rope groove of a traction sheave. An object is particularly to alleviate one or more of the above defined drawbacks of prior art and/or problems discussed or implied elsewhere in the description. Solutions are presented, *inter alia*, by which benefits of an undercut groove can be achieved without excessively shortening the life time of the rope and the traction sheave. Solutions are presented, *inter alia*, by which the diameter of the traction sheave with an undercut groove can have a reduced diameter and still achieve a reasonable life time of the rope and the traction sheave.

[0007] It is brought forward a new rotatable traction sheave of an elevator for driving one or more ropes of an elevator, the traction sheave comprising one or more rope grooves for receiving a rope, wherein each said rope groove is delimited on one side thereof, in particular in axial direction of the of the traction sheave, by a first side wall, and on the other side thereof, in particular in axial direction of the of the traction sheave, by a second side wall, the rope groove narrowing towards the rotational axis of the traction sheave; each side wall being slanted and having an edge, in particular a radially inner edge, the groove being an undercut groove, a cavity being provided between the aforementioned edges of the side walls, which cavity extends radially towards the rotational axis of the sheave, in particular thereby forming a depression in the bottom of the groove. The cavity extends behind the side walls as seen in radial direction of the traction sheave.

[0008] With this solution, it is possible to optimize distribution of surface pressure. Owing to this effect, one or more of the above mentioned advantages and/or objectives can be achieved. Particularly, it is possible to reduce the maximum surface pressure between rope and traction sheave without reducing the average surface pressure. Thus, advantageous traction can be ensured without damaging the rope or traction sheave.

[0009] Preferable further features are introduced in the following, which further features can be combined with the traction sheave individually or in any combination.

[0010] In a preferred embodiment, the cavity extends behind face portions of said side walls as seen in radial direction of the traction sheave, which face portions delimit the groove. The face portions are beside said edges.

[0011] In a preferred embodiment, the side walls form two ledges protruding towards each other. Thereby the rope is provided for being placed in the groove to be supported by two ledges protruding towards each other.

[0012] In a preferred embodiment, the ledges are arranged to (slightly) bend, in particular towards the rotational axis, by force of the rope directed on them, in particular wherein the rope rests against side walls of the rope groove.

[0013] In a preferred embodiment, the cavity comprises a neck between the ledges, and an extension compartment on the inner radial side of the neck, and the width (as measured in direction of said axis) of the extension compartment is substantially greater than the width of the neck, preferably at least 1 mm wider.

[0014] In a preferred embodiment, the cavity comprises a neck between the ledges, and the width (as measured in direction of the rotational axis X) of the neck is at least 20 %, preferably at most 60 %, most preferably 30-50 %, of the diameter of the rope. In this context, the advantages of the undercut are substantial and the ad-

vantages of reducing of the peak pressure is most beneficial.

[0015] In a preferred embodiment, the cavity extends behind each of the side walls to a depth measured in axial direction from the level (line drawn in radial direction at the point of the edge) of the edge in question, which depth is at least 1 mm, preferably at least 2 mm.

[0016] In a preferred embodiment, the cavity extends behind each of the side walls to a depth measured in axial direction from the level (line drawn in radial direction at the point of the edge) of the edge in question, which depth is at least 15 %, preferably at least 20% of the diameter of the rope cross section.

[0017] In a preferred embodiment, the cavity is at least 2 mm deep, preferably at least 3 mm deep as measured in axial direction from the level (line drawn in axial direction at the point of the edges) of the edges.

[0018] In a preferred embodiment, the side walls are made of a first material, said first material preferably being metal or composite material (such as fiber reinforced plastic). The metal can be cast iron, such as ADI, or steel (preferably hardened steel) to minimize sheave wear, for instance.

[0019] In a preferred embodiment, the cavity comprises a cavity portion behind each of the side walls which is not filled with material as hard as the first material, for example the cavity portion being empty or containing second material softer than the first material of the side walls.

[0020] In a preferred embodiment, the cavity is completely or at least partially empty.

[0021] In a preferred embodiment, the cavity contains a filler element made of a second material softer than the material of the side walls, said second material preferably being non-metallic, such as polymer material, such as elastomer, such as polyurethane.

[0022] In a preferred embodiment, the filler element is for increasing frictional engagement between the rope and the traction sheave. The filler element preferably extends in radial direction of the traction sheave farther from the axis X than the aforementioned edges.

[0023] In a preferred embodiment, the filler element extends behind the side walls. Preferably, it fills a cavity portion behind the first side wall such that it radially supports the first side wall and it preferably moreover fills a cavity portion behind the second side wall such that it radially supports the second side wall.

[0024] In a preferred embodiment, the side walls are slanted in an arched manner, such that their steepness is reduced towards the bottom of the groove.

[0025] In a preferred embodiment, groove is suitable for receiving a rope round in cross section.

[0026] In a preferred embodiment, the first wall is comprised in a first wall element, and the second wall is comprised in a second wall element, said wall elements in particular being discrete pieces. The traction sheave preferably then comprises a frame on which the wall elements have been mounted. The frame can be cylindrical and connected or connectable to a rotor of a motor directly or by transmission.

[0027] In a preferred embodiment, the aforementioned wall elements delimit the cavity. Preferably, said first wall element delimits the cavity portion behind the first side wall and said second wall element delimit the cavity portion behind the second side wall. Preferably, said first wall element defines one or more faces of the cavity portion behind the first side wall. Preferably, said second wall element defines one or more faces of the cavity portion behind the second side wall.

[0028] It is also brought forward a new drive machinery for an elevator, the drive machinery comprising a rotatable traction sheave for driving one or more ropes of the elevator, and a motor for rotating the traction sheave, the traction sheave being as defined anywhere above. With this solution, one or more of the above mentioned advantages and/or objectives are achieved.

[0029] Preferable further features are introduced in the following, as well as above in context of description of the traction sheave, which further features can be combined with the drive machinery individually or in any combination.

[0030] It is also brought forward a new elevator comprising a drive machinery as defined anywhere above, and one or more ropes, wherein the one or more ropes are placed in the one or more rope grooves of traction sheave. With this solution, one or more of the above mentioned advantages and/or objectives are achieved.

[0031] Preferable further features are introduced in the following, as well as above in context of description of the traction sheave or drive machinery, which further features can be combined with the drive machinery individually or in any combination.

[0032] In a preferred embodiment, said one or more ropes are placed in the one or more rope grooves of traction sheave, only one rope per groove.

[0033] In a preferred embodiment, each rope rests against side walls of the rope groove.

[0034] In a preferred embodiment, the radially innermost point (i.e. in radial direction of the traction sheave innermost) of the rope is out of contact with the side walls.

[0035] In a preferred embodiment, the rope rests supported in radial direction of the traction sheave by the ledges.

[0036] In a preferred embodiment, the radially innermost point (i.e. in radial direction of the traction sheave innermost) of the rope is in contact with the filler element contained in the cavity or out of contact with any part of the traction sheave.

[0037] In a preferred embodiment, the elevator comprises an elevator car, the ropes being connected with the elevator car, possibly also with a counterweight the ropes thereby interconnecting the car and counterweight.

[0038] In a preferred embodiment, the elevator car is movable in a hoistway.

[0039] In a preferred embodiment, the drive machinery comprises a motor for rotating the traction sheave and the elevator moreover comprises an electronic control

system for automatically controlling rotation of the motor for thereby controlling rotation of the traction sheave. The electronic control system is preferably arranged to control rotation of the traction sheave in response to passenger input received via one or more user interfaces. Said control system preferably comprises one or more electrically powered microprocessors, for example.

[0040] The elevator is in general preferably such that it comprises an elevator car vertically movable to and from plurality of landings, i.e. two or more vertically displaced landings. Preferably, the elevator car has an interior space suitable for receiving a passenger or passengers, and the car can be provided with a door for forming a closed interior space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] In the following, the present invention will be described in more detail by way of example and with reference to the attached drawings, in which

Figure 1 illustrates a cross section of a rope groove and its surroundings of a rotatable traction sheave for an elevator according to a first preferred embodiment.

Figure 2 illustrates a cross section of the rope groove of Figure 1 when a rope is placed in the rope groove thereof.

Figure 3 illustrates a cross section of a rope groove and its surroundings of a rotatable traction sheave for an elevator according to a second preferred embodiment.

Figure 4 illustrates a cross section of the rope groove of Figure 3 when a rope is placed in the rope groove thereof.

Figure 5 illustrates a preferred embodiment of an elevator.

Figure 6 illustrates first kind of structural details of the traction sheave cross section according to Figures 1-4 wherein integral structure is used.

Figure 7 illustrates second kind of preferred structural details of the traction sheave cross section according to Figures 1-4 wherein non-integral structure is used.

The foregoing aspects, features and advantages of the invention will be apparent from the drawings and the detailed description related thereto.

DETAILED DESCRIPTION

[0042] Figures 1 and 2 illustrate a cross section of a rope groove 3 and its surroundings of an elevator according to a first preferred embodiment. Figures 3 and 4 illustrate a cross section of a rope groove 3 and its surroundings of an elevator according to a second preferred embodiment. Figures 1-4 more specifically show a single rope groove 3 and its surroundings, but preferably the rotatable traction sheave 1 comprises plurality of rope grooves 3 of the kind showed disposed beside each other in direction of axis X, which axis X is the rotational axis of the rotatable traction sheave 1. The distance of the axis X from the groove is not in scale.

[0043] In each of the first and second embodiment, the traction sheave 1 is suitable for driving one or more ropes 2, and comprises a rope groove 3 for receiving a rope 2, wherein said rope groove 3 is delimited on one side thereof in direction of the rotational axis X of the traction sheave 1 by a first side wall 4, and on the other side thereof in axial direction (i.e. direction of the rotational axis X) of the of the traction sheave 1 by a second side wall 5, the groove 3 narrowing towards the rotational axis of the traction sheave 1; each side wall 4,5 being slanted and having an edge 4a,5a (also referred to as radially inner edge), the groove 3 being an undercut groove wherein a cavity 6 is provided between the radially inner edges 4a,5a of the side walls 4,5. The cavity 6 extends radially towards the rotational axis X of the sheave 1 between the aforementioned radially inner edges 4a,5a of the side walls 4,5, thereby forming a depression in the bottom of the groove 3. The cavity 6 extends behind the side walls 4,5 as seen in radial direction of the traction sheave 1. In the preferred embodiment, the cavity 6 more specifically extends behind face portions 4b,5b of the side walls 4,5 as seen in radial direction of the traction sheave 1, which face portions 4b,5b delimit the groove 3 and are beside the edges 4a,5a.

[0044] In Figures 1-4 the broken line illustrates possible seam between wall elements in case the walls 4,5 belong to discrete pieces.

[0045] Opening a cavity 6 behind the side walls 4,5 as seen in radial direction of the traction sheave 1 reduces radial stiffness of the walls 4,5 and the peak value of the surface pressure close to the edges 4a,4b. Reduced maximum surface pressure increases lifetime of the rope 2 and sheave 1. Advantageously, the average surface pressure can be maintained substantially unchanged, because the portions 6a,6b of the cavity 6 extending behind the side walls 4,5 do not substantially affect the contact area between rope 1 and the groove 3.

[0046] Owing to the cavity 6, the side walls 4,5 form two ledges 7,8 protruding towards each other. Thereby a rope 2 placed in the groove 3 is supported by two ledges 7,8 protruding towards each other. The tips of the ledges 7,8 do not contact each other, whereby they do not block slight movement of each other. The ledges 7,8 are arranged to (slightly) bend towards the rotational axis X by force of the rope 2 directed on them when the rope rests against side walls 4,5 of the rope groove 3, wherein said force has at least a force component pointing radially towards the rotational axis X. This evens out the surface pressure distribution between the rope 2 and the traction sheave 1.

[0047] As illustrated in Figures 1-4, the cavity 6 is preferably shaped such that it comprises a neck 6c extending between the ledges 7,8, and an extension compartment

(6a+6b) on the inner radial side of the neck 6c, and the width (as measured in direction of the rotational axis X) of the extension compartment is substantially greater than the width of the neck 6c, preferably at least 1 mm wider, more preferably at least 2 mm wider, more preferably at least 4 mm wider.

[0048] In general, it is preferred that the cavity 6 comprises a neck between the ledges 7,8, and the width (as measured in direction in direction of the rotational axis X) of the neck is at least 20 %, preferably at most 60 %, most preferably 30-50 %, of the diameter d of the rope 2.

[0049] In general, it is preferred that the cavity 6 extends behind each of the side walls 4,5 to a depth measured in axial direction from the level (line drawn in radial direction at the point of the edge) of the edge in question which depth is at least 15 %, preferably at least 20% of the diameter d of the rope 2.

[0050] In general, it is preferred that the cavity 6 extends behind each of the side walls 4,5 to a depth measured in axial direction from the level (line drawn in radial direction at the point of the edge) of the edge in question, which depth is at least 1 mm, preferably at least 2 mm.

[0051] Preferably, the side walls 4,5 are made of a first material, said first material preferably being metal or composite material (such as fiber reinforced plastic).

[0052] In the preferred embodiments, the cavity 6 comprises a cavity portion 6a,6b behind each of the side walls 4,5 which is not filled with material as hard as the wall material (said first material). For example the cavity portion 6a,6b can be empty or contain material (second material), which is softer than the material (said first material) of the side walls 4,5.

[0053] The first and second embodiment differ in what is inside their cavities 6. In the embodiment of Figures 1 and 2, the cavity 6 is empty. In the embodiment of Figures 3 and 4, the cavity 6 contains a filler element 9 made of a second material softer than the material of the side walls 4,5 (said first material), said second material preferably being non-metallic, such as polymer material, such as elastomer, such as polyurethane.

[0054] The filler element 9 is advantageous since it can be used to fine-tune radial stiffness of the ledges 7 and 8. The filler element 9 is also advantageous since it can be used to increase frictional engagement between the rope and the traction sheave. The first mentioned advantage is best facilitated when the filler element 9 extends behind the side walls 4,5. Thereby, it can provide support for the ledges 7,8. This has also the advantage that the filler element 9 becomes shape locked in its place and cannot easily detach from the cavity 6 in use. The frictional engagement is best facilitated when the filler element 9 extends in radial direction of the traction sheave 1 radially farther from the axis X than the edges 4a,5a.

[0055] The side walls 4,5 are preferably slanted in an arched manner, such that their steepness is reduced towards the bottom of the groove 3, an example of which shape is visible in Figures 1-4. However, the side walls 4,5 could alternatively be slanted differently. For example, they could be straight, or have differently changing steepness.

[0056] Figure 5 illustrates an elevator comprising a drive machinery M for an elevator, the drive machinery M comprising a rotatable traction sheave 1 for driving one or more ropes 2 of the elevator, and a motor 30 for rotating the traction sheave 1, the traction sheave 1 being as illustrated and described referring to Figures 1-2 or 3-4. Preferable further details have been described illustrated and described referring to Figures 6 and 7.

[0057] The elevator moreover comprises one or more ropes 2, wherein the one or more ropes 2 are placed in the one or more rope grooves 3 of traction sheave 1, only one rope per groove 3 such that each rope 2 rests against two side walls 4,5 of the rope groove 3. Each rope 2 rests against a side wall 4,5 of the rope groove 3 such that the radially innermost point (i.e. innermost point in radial direction of the traction sheave 1) of the rope 2 is out of contact with the side walls 4,5. Each said rope 2 rests supported in radial direction of the traction sheave 1 by the ledges 7,8 thereof.

[0058] When the elevator is in accordance to the first embodiment, the radially innermost point (i.e. in radial direction of the traction sheave innermost) of the rope 2 is out of contact with any part of the traction sheave 1, and when the elevator is in accordance to the second embodiment the radially innermost point (i.e. in radial direction of the traction sheave 1 innermost) of the rope 2 is in contact with the filler element 9 contained in the cavity 6.

[0059] The elevator moreover comprises an elevator car 20, the ropes 2 being connected with the elevator car 20. The elevator car 20 is movable in a hoistway 70. In the embodiment illustrated in Figure 5, the elevator moreover comprises a counterweight 80 the ropes 2 being connected also with said counterweight 80 thereby interconnecting the car 20 and counterweight 80 to each other.

[0060] In the embodiment illustrated in Figure 5, the drive machinery M comprises a motor 30 for rotating the traction sheave 1 and the elevator moreover comprises an electronic control system 60 for automatically controlling rotation of the motor 30 for thereby controlling rotation of the traction sheave 1. The electronic control system 60 is preferably configured to control rotation of the traction sheave 1 in response to passenger input received via one or more user interfaces (not showed). Said control system preferably comprises one or more electrically powered microprocessors, for example.

[0061] Preferable further details of the traction sheave 1 of Figures 1-2 or Figures 3-4 have been illustrated in Figures 6 and 7. No filling element 9 has been illustrated but the traction sheave 1 of Figures 6 and 7 could contain a filling element 9, in which case the cross sections of the traction sheave 1 would be in line with Figures 3 and 4 (Figure 3 showing structure when there is no rope in the groove, and Figure 4 showing structure when there is a rope in the groove).

[0062] In the embodiment of Figure 6, the first wall 4 and the second wall 5 are integral parts of the same piece. The first wall 4 and the second wall 5 delimiting plurality of rope grooves 3 are moreover integral parts of the same piece. That is plurality of rope grooves 3 are delimited by the same piece.

[0063] In the embodiment of Figure 7, the first wall 4 is comprised in a first wall element 40, and the second wall 5 is comprised in a second wall element 50, said wall elements 40,50 being discrete (i.e. not integral) pieces. This structure is advantageous since this makes fabrication of the cavity simple, e.g. the shape of the cavity can be machined very simply. Said wall elements 40,50 delimit the cavity 6, in particular said first wall element 40 delimiting the cavity portion 6a behind the first side wall 4, and said second wall element 50 delimiting the cavity portion 6b behind the second side wall 5.

[0064] Said first wall element 40 defines one or more faces of the cavity portion 6a behind the first side wall 4. Said second wall element 50 defines one or more faces of the cavity portion 6b behind the second side wall 5.

[0065] The traction sheave 1 comprises a frame 10 on which the wall elements 40,50 have been mounted. The frame forms here a central shaft of the traction sheave. It may be cylindrical as illustrated. Wall elements 40,50 of each rope groove 3 have been mounted on this same frame 10. The frame 10 is preferably connected or connectable to a rotor of a motor directly or by transmission.

[0066] The wall elements 40 and 50 are ring-shaped. The illustrated structure can be achieved for instance such that the faces of the wall elements 40 and 50 delimiting the groove 3 and/or the cavity 6 are machined before or after the rings have been mounted on the frame 10. These methods may result in different dimensional accuracies.

[0067] In the embodiments presented, the groove 3 is suitable for receiving a rope 2, which is round in cross section. The rope 2 may be for instance a twisted metal rope, such as one twisted from plurality of metal cords made of metal wires. The rope surface material can be metal, but it could alternatively be some other material, such as polymer material, e.g. if the rope is a coated rope. Generally, advantages of the invention can be obtained irrespective of rope surface material.

[0068] In the embodiments presented, each filling element 9 can be manufactured e.g. with injection molding after the cavity 6 has been fabricated.

[0069] In the embodiments presented, it is generally preferred that each grooves 3 is rotationally symmetrical around the axis X.

[0070] In the embodiments presented, it is generally preferred that the cavity 6 is rotationally symmetrical around the axis X.

[0071] In the application the edges 4a,5a is also referred to as a radially inner edges. The edge being a radially inner edge means that the edge is in radial direction of the traction sheave 1 the inner edge of the side wall in question (and thereby not the outer edge).

[0072] It is to be understood that the above description and the accompanying Figures are only intended to teach the best way known to the inventors to make and use the invention. It will be apparent to a person skilled in the art that the inventive concept can be implemented in various ways. The above-described embodiments of the invention may thus be modified or varied, without departing from the invention, as appreciated by those skilled in the art in light of the above teachings. It is therefore to be understood that the invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

Claims

1. A rotatable traction sheave (1) of an elevator for driving one or more ropes (2) of an elevator, the traction sheave (1) comprising one or more rope grooves (3) for receiving a rope (2), wherein each said rope groove (3) is delimited on one side thereof by a first side wall (4), and on the other side thereof by a second side wall (5), the rope groove (3) narrowing towards the rotational axis (X) of the traction sheave (1); each side wall (4,5) being slanted and having an edge (4a,5a), the groove (3) being an undercut groove, a cavity (6) being provided between the aforementioned edges (4a,5a) of the side walls (4,5), which cavity (6) extends radially towards the rotational axis (X) of the traction sheave (1), **characterized in that** the cavity (6) extends behind the side walls (4,5) as seen in radial direction of the traction sheave (1).

2. A traction sheave (1) according to claim 1, wherein the cavity (6) extends behind the face portions (4b,5b) of said side walls (4,5) as seen in radial direction of the traction sheave (1), which face portions (4b,5b) delimit the groove (3) and are beside said edges (4a,5a).

3. A traction sheave (1) according to any of the preceding claims, wherein the side walls (4,5) form two ledges (7,8) protruding towards each other.

4. A traction sheave (1) according to any of the preceding claims, wherein the ledges (7,8) are arranged to bend towards the rotational axis (X) by force of the rope (2) directed on them.

5. A traction sheave (1) according to any of the preceding claims, wherein the cavity (6) comprises a neck (6c) between the ledges (7,8), and the width of the neck (6c) is at least 20 %, preferably at most 60 %, most preferably 30-50 %, of the diameter (d) of the rope (2).

6. A traction sheave (1) according to any of the preced-

ing claims, wherein the side walls (4,5) are made of a first material, said first material preferably being metal or composite material, such as fiber reinforced plastic.

7. A traction sheave (1) according to claim 6, wherein the cavity (6) comprises a cavity portion (6a,6b) behind the side walls (4,5) which is not filled with material as hard as the first material.

8. A traction sheave (1) according to any of the preceding claims, wherein the cavity (6) is completely or at least partially empty.

9. A traction sheave (1) according to any of the preceding claims 6-8, wherein the cavity (6) contains a filler element (9) made of a second material softer than the first material of the side walls (4,5), said softer material preferably being non-metallic material, such as polymer material, such as elastomer, such as polyurethane.

10. A traction sheave (1) according to claim 9, wherein the filler element (9) is for increasing frictional engagement between the rope (2) and the traction sheave (1).

11. A traction sheave (1) according to any of the preceding claims 9-10, wherein the filler element (9) extends behind the side walls (4,5) as seen in radial direction of the traction sheave (1).

12. A traction sheave (1) according to any of the preceding claims, wherein the side walls (4,5) are slanted in an arched manner, such that their steepness is reduced towards the bottom of the groove (3).

13. A traction sheave (1) according to any of the preceding claims, wherein the first wall (4) is comprised in a first wall element (40), and the second wall (5) is comprised in a second wall element (50).

14. A drive machinery (M) for an elevator, the drive machinery (M) comprising a rotatable traction sheave (1) for driving one or more ropes (2) of the elevator, and a motor (30) for rotating the traction sheave (1), the traction sheave (1) being as defined in any of the preceding claims 1-13.

15. An elevator comprising a drive machinery (M) as defined in claim 14, and one or more ropes (2), wherein the one or more ropes (2) are placed in the one or more rope grooves (3) of traction sheave (1).

Fig. 1

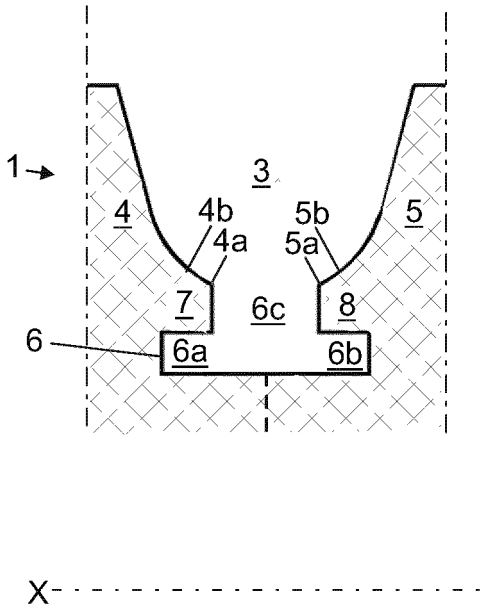


Fig. 2

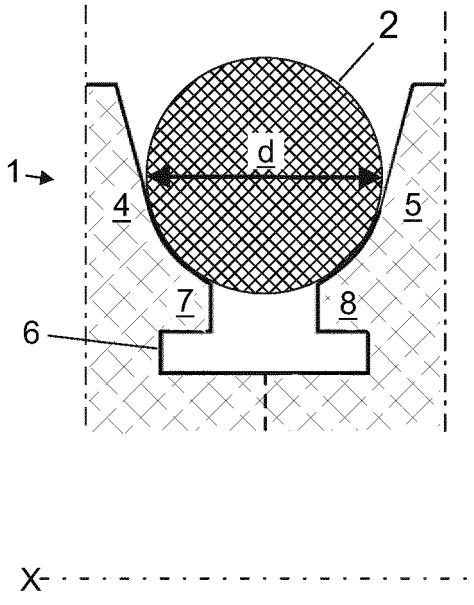


Fig. 3

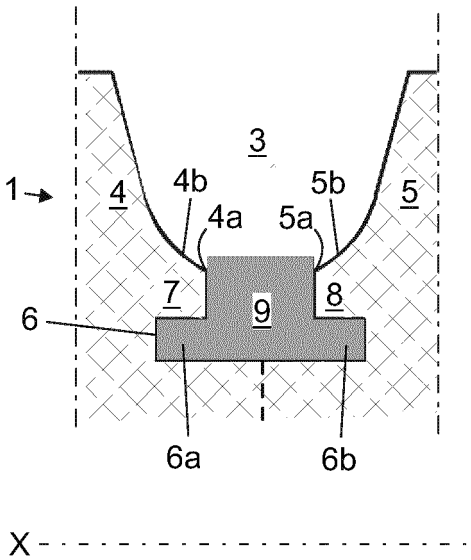


Fig. 4

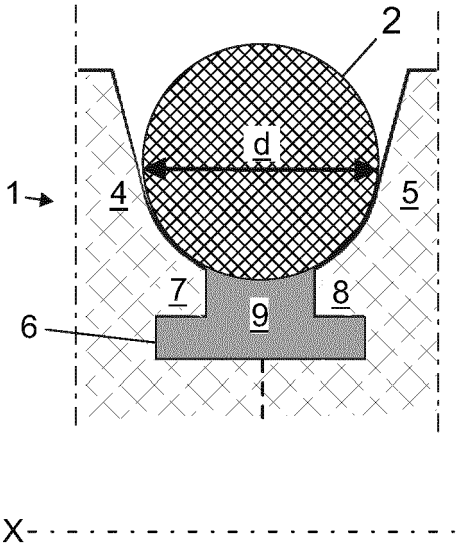


Fig. 5

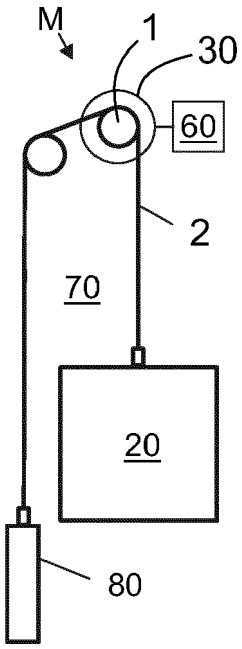


Fig. 6

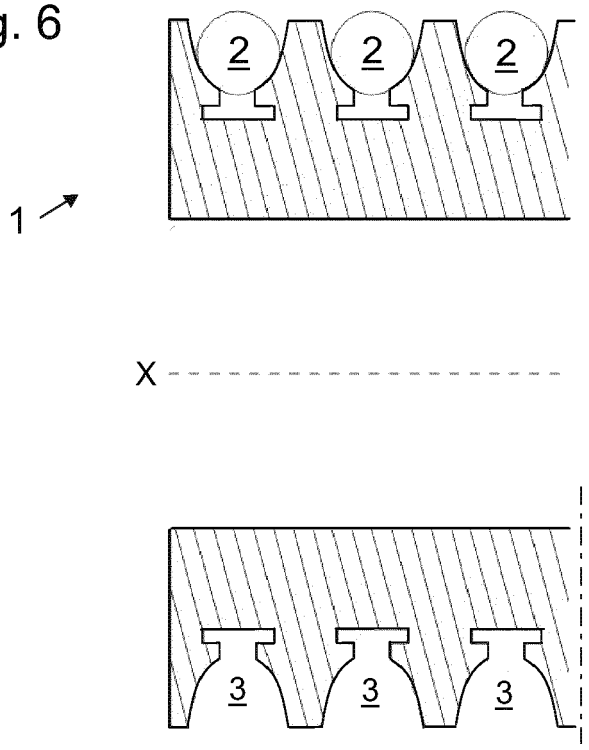
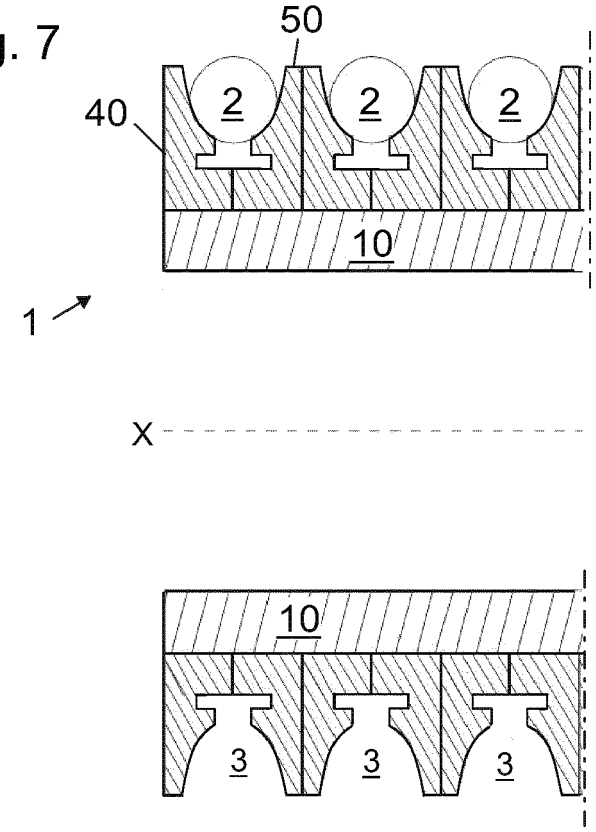


Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 18 20 1509

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 April 2019	Lohse, Georg

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