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(54) Device and method for weaving pile fabrics with improved yarn feed

(57) This invention relates to a weaving device for weaving pile fabrics comprising a weaving machine with at least two yarn separating rollers (3), the weaving device having at least two warp beams (1a;1b) lying alongside one another in weft direction, each of which is provided to guide ground warp yarns (5a;5b) via a yarn separating roller (3) to shed formation means (11,12) of the weaving machine, said yarn separating rollers (3) extending over the whole width of the weaving machine and being connected at their respective ends to the weaving machine, and whereby at least two yarn separating rollers (3) between their ends comprise several supporting devices (9) that link these yarn separating rollers (3) together, and each of these yarn separating rollers (3) has at least one zone between two consecutive supporting devices (9) that is designed for the passage of ground warp yarns (5a;5b) coming from both a first (1a) and a second warp beam (1b).

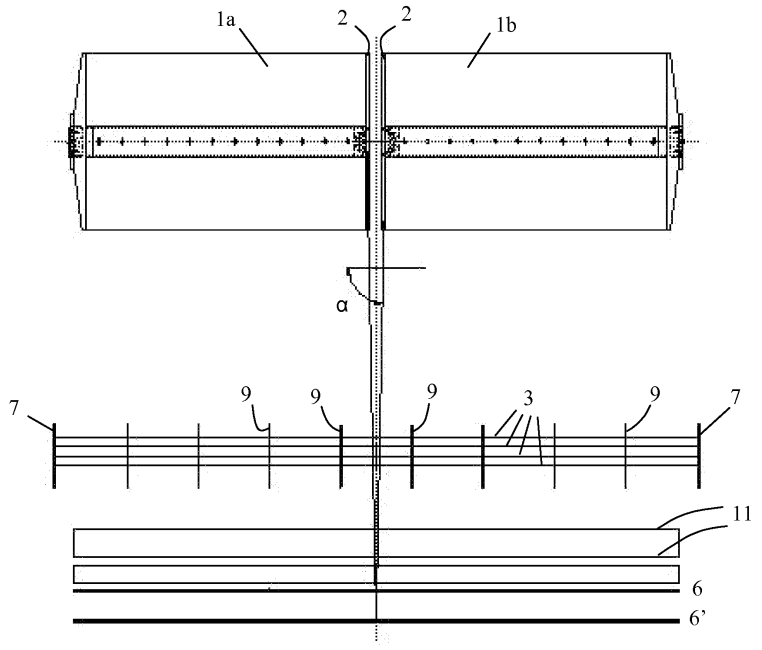

Fig. 3

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Description

[0001] This invention relates on the one hand to a weaving device for weaving pile fabrics comprising a weaving machine with at least two yam separating rollers, said weaving device having at least two warp beams lying alongside one another in weft direction, each of which is provided to guide ground warp yarns via a yam separating roller to shed formation means of the weaving machine, said yam separating rollers extending over the whole width of the weaving machine and being connected at their respective ends to the weaving machine. On the other hand this invention relates to a method for weaving pile fabrics performed on such a weaving device.

[0002] Pile fabrics, in particular carpets, are currently woven to weaving widths of more than 3 metres, in particular 4 metres and sometimes even wider. During both single-face weaving (e.g. wire loom weaving or weaving of looped pile using falsewefts over spacers) and during double-face weaving of pile fabrics, significant tensions have to be applied to the warp yarns in order to obtain a good shed formation, to produce stable and dense ground fabrics and to ensure the pile height of the fabric.

[0003] For pile-warp yarns that are generally delivered from a weaving creel with individual bobbins to the fabric forming zone, these tensions vary between 1 and 3 N per yarn, this tension being provided by the weight of bended rods that are hung in the weaving creel over the yarns in addition to the frictional resistance over the path of the pile-warp yam between the weaving creel and the fabric forming zone.

[0004] The ground warp yarns, tight-warp yarns and binding warp yarns, are generally each delivered in a package from warp beams under relatively high tensions:

- for ground warp yarns this tension varies between 3 and 10 N/yarn, depending on the yarns, the density and the fabric structure;
- for tight-warp yarns this tension varies between 10 and 25 N/yarn, also depending on the yarns, the density and fabric structure.

[0005] This tension on the ground warp yarns exerts a significant load on the ground warp beam that is more or less uniformly distributed over the width of the warp beam. This load is dependent on:

- the tension per ground warp yam;
- the number of ground warp yarns, the number of ground warp yarns being dependent in turn on:
  - the density of the fabric (number of reed dents per metre or number of warp systems per metre) (as several warp systems can occur in one reed dent);
  - the number of ground warp yarns (tight warp or binding warp) per reed dent or warp system.

[0006] High loads on the warp beam lead to a significant deformation of the warp beam, resulting in the tension on the individual warp yarns var ying over the width of the warp beam and causing irregularities to occur in the fabric or leading to an increased risk of warp yam breakage.

For this reason with high loads, the warp beams for both the tight warp and the binding warp are split into two (or more) warp beams ("twin beams") lying alongside one another in weft direction, or warp beams are split into warp beams arranged above one another or a combination of both (for example, two warp beams lying alongside one another and another two warp beams lying alongside one another and arranged above these warp beams).

[0007] In practice during the weaving of pile fabrics above a weaving width of 3 metres, the warp yarns are generally always split over warp beams lying alongside one another. As a result there are also few machines available on the market for the warping of warp beams with a width of more than 3 metres.

[0008] In addition to this split over warp beams lying alongside one another, the warp beams lying alongside one another can each be split again into two warp beams lying above one another. This latter method is generally employed when the load on the warp beam in radial direction exceeds a value of between 10 kN and 15 kN (preferably when 12 kN is exceeded).

[0009] As discussed above, the installation of warp beams lying alongside one another in a weaving machine is known from the prior art and is discussed further below by reference to Figures 1 and 2. The installation of such warp beams lying alongside one another (1a-1b) has the consequence that there is a distance A between the two ground warp yam packages of these two warp beams in the area of these warp beams. This distance A is roughly 100 to 150 mm, this being the distance necessary to install side flanges (2) and an intermediate frame with bearing for the two warp beams.

[0010] In the further passage of this package of ground warp yarns to the weaving machine, the distance A decreases. But in order to prevent the ground warp yarns from losing their correct position relative to one another during the shed formation and consequently moving over one another, yam separating rollers (3a - 3b) are also installed between the warp beams and the weaving machine. These yam separating rollers (3a - 3b) ensure that the ground warp yarns do not move over one another during the weaving process, when the warp yarns move in warp direction. The separating rollers consist of free-floatingly journalled shafts or tubes with the ground warp yarns being in contact with these rollers over a part of the circumference of these rollers. The outside diameter of such freely rotating yam separating rollers is at least 65 mm, but dimensions in the order of 85 mm are generally assumed.

[0011] The force exerted on the yam separating rollers is also considerable, and for this reason the yam separating rollers for weaving widths above 3 metres are split

into two yam separating rollers (3a - 3b) lying alongside one another that are mounted in an intermediate frame (4). In the event that the weaving machine comprises warp beams lying above one another, also yam separating rollers installed above one another are provided. In addition, separate yam separating rollers are provided for tight-warp yarns and binding warp yarns.

[0012] This construction of yam separating rollers is located behind the shed formation means and preferably as close as possible to these. This construction always creates a distance B of between 35 and 50 mm between the two ground warp yam packages lying alongside one another at this point in the ground warp yam feed; the distance B is generally roughly 45 mm.

[0013] This means that with a splitting of the ground warp yarns over warp beams lying alongside one another (1a - 2a) as described above, the ground warp yam packages only come together in the area of the weaving reed (6 - 6'). Furthermore, at the transition between the two ground warp yam packages lying alongside one another (5a-5b) in reed dents lying alongside one another, the outermost ground warp yarns of the first ground warp yam package (5a) arrive in the weaving reed at an angle in relation to the warp direction and the outermost ground warp yarns of the next ground warp yam package (5b) also arrive in the weaving reed at an angle in relation to the warp direction, but at an opposed angle. This angle is determined by the width B that is related to the intermediate frame (4) between the yam separating rollers (3a - 3b) and the distance from this fr ame (4) to the weaving reed (6 - 6'). From the warp beam (1a - 1b) up to this frame (4), the ground warp yarns (5a - 5b) assume a smaller angle in relation to the warp direction than if they would extend directly to the dents of the weaving reed. The presence of the intermediate frame (4) thus results in the angle at which the ground warp yarns (5a - 5b) of the said transition between two warp beams lying alongside one another towards the weaving reed increasing compared to if they would extend in a straight line to the weaving reed (6 - 6'). This is particularly disadvantageous for the weaving of the pile-warp yarns.

For illustration: reference number 6 indicates the weaving reed in its rearmost position during the weaving cycle, while reference number 6' indicates the weaving reed in its front-most position (in contact with the fabric already formed).

When we look in the warp direction, in other words the direction in which the warp yarns move, the ground warp yarns (5b) coming from the left-hand warp beam (1b) clamp the pile-warp yarns to the left of them between the reed dent and these ground warp yarns (5b) and the pile-warp yarns to the right of these ground warp yarns have more space within the reed dent so that they are less firmly woven into the fabric. A similar phenomenon occurs with the right-hand warp beam, whereby in this case the pile-warp yarns to the right of the ground warp yarns (5a) are clamped more tightly and the pile-warp yarns to the left of the ground warp yarns are less firmly woven in.

[0014] In a common drawing in of ground warp yarns in which all the pile-warp yarns lie alongside one another in each pile-warp system or reed dent, and all the ground warp yarns lie on one side alongside the pile-warp yarns, this means that the pile legs on the left-hand side of the fabric tend to have a different angle in their upright position from the pile legs on the right-hand side of the fabric. This results in a visual effect that is generally both undesirable and disturbing. This effect , also known as "shading", is equally applicable for effects that occur when the pile-warp yarns within a warp system are distributed on both sides of the ground warp yarns.

[0015] Apart from the visual effect, the yarns (both the pile-warp and the ground warp yarns) are subject to a higher load due to the additional friction with this reed dent resulting from the reciprocating reed (6 - 6') arriving in the reed dent at an angle. This effect occurs more strongly with higher densities, as here the clamping of the pile-warp yarns predominates more significantly.

[0016] The occurrence of visually disturbing effects such as those described above is particularly disadvantageous when weaving wall-to-wall carpet , as this effect is present over a longer distance in longitudinal direction with such carpets. This effect is also present in width direction in stripes lying alongside one another and can also be seen at the transitions of these stripes.

[0017] The object of the invention is to provide a device that no longer exhibits the above-mentioned disadvantages, or exhibits these disadvantages significantly less, by creating a warp yam passage coming from warp beams lying alongside one another, whereby the warp yarns from the warp yarn packages lying alongside one another join one another better in the area of the fabric forming zone, and in particular in the area of the weaving reed.

[0018] The object of the invention is achieved by providing a weaving device for the weaving of pile fabrics having the features mentioned in the first paragraph of this description, and of which at least two yam separating rollers have several supporting devices between their ends that link these yam separating rollers together; each of these yam separating rollers has at least one zone between two consecutive supporting devices that is designed for the passage of ground warp yarns coming from both a first and a second warp beam.

[0019] By replacing the intermediate frame between the yam separating rollers as known from the prior art with several supporting devices, whereby at least one zone between two consecutive supporting devices is available for the passage of ground warp yarns coming from both a first and a second warp beam, the ground warp yarns coming from both a first and a second warp beam and which are preferably located in the middle of the weaving device in the area of the zone where the warp beams lying alongside one another in weft direction are joined together are no longer hindered by the intermediate frame between the yam separating rollers as known from the prior art. These ground warp yarns lo-

cated at the transition between the warp beams no longer come into contact with elements of an intermediate frame between the separating rollers and are not deflected there in their further movement towards the fabric forming zone so that they already come much closer together a short distance ahead of the weaving reed than is the case at the same distance ahead of the weaving reed then this is the case on prior-art weaving devices. This means that the tensile force of the warp yarns on the reed dents in weft direction is more limited, leading to less warp yam breakage and less wear on the reed dents.

[0020] The inventive provision of several supporting devices between the ends of the yam separating rollers has the added advantage that the diameter of the yam separating rollers can be reduced in relation to the prior-art yam separating rollers. This makes the weaving device li ghter and less expensive, and also reduces the contact area between separating roller and ground warp yarns so that the ground warp yarns are subject to less frictional force.

[0021] In a preferred embodiment of the weaving device, the supporting devices comprise a plate-shaped element, said element having a maximum thickness of 15 mm. The plate-shaped element preferably has a maximum thickness of 10 mm. In a more preferred embodiment the plate-shaped element has a maximum thickness of 5 mm, in particular a maximum thickness of 3 mm.

[0022] In a particular embodiment, one or more supporting devices are connected to the frame of the weaving machine and/or to the foundation on which the weaving machine is installed in order to support the assembly of separating rollers and supporting devices. This enables the bending of the separating rollers to be further limited or the diameter of the yam separating rollers to be reduced further still.

[0023] In a more particular embodiment, the yam separating rollers extend through openings provided in the plate-shaped element, said openings being located such that at least two yam separating rollers are positioned at different heights.

[0024] According to an advantageous embodiment of the inventive device, the weaving machine comprises a reciprocating weaving reed provided with a number of dents between which the ground warp yarns extend during operation of the weaving device and the weaving machine comprises a comb provided with a number of teeth between which at least a part of the ground warp yarns extend during operation of the weaving machine, said comb being attached to the supporting devices. This type of fixed comb has the advantage that the passage of a warp yam is no longer dependent on the positions of the weaving reed, but runs on a fixed path between the warp beam and the teeth of the comb, and that from the comb the ground warp yarns move more or less in warp direction towards the weaving reed and the fabric forming zone. This also relieves the weaving reed of a load in weft direction, contributing to less wear on the weaving reed and less warp yam breakage.

[0025] The teeth of the comb preferably exhibit a pitch corresponding to the pitch of the dents in the weaving reed. The term "pitch" should be considered within the context of this description as the distance from the side of one tooth or dent to the same side of a following tooth or dent.

[0026] In view of the fact that in a large number of weaving applications the ground warp yarns extend in the zone between two reed dents on the one side and the pile-warp yarns extend on the other side, then in a preferred embodiment of the invention a comb for ground warp yarns with the same pitch as the weaving reed can be offset in relation to this weaving reed by a distance smaller than the pitch in order to guide the ground warp yarns in weft direction more closely together in relation to their final position in the weaving reed. This further limits the tension exerted by the ground warp yarns on the pile-warp yarns.

[0027] In a first particular embodiment, the comb is installed in the zone between the yam separating rollers and the warp beams. The comb is preferably installed such that it extends over the transitional zone where the ground warp yarns from both the first and the second warp beam join; this transitional zone is generally located in the middle of the weaving machine. The width of the comb in weft direction is hereby limited to a distance smaller than the distance between the two supporting devices located closest to this transitional zone. In this transitional zone, the position of the yam separating rollers ensures that the movement of the ground warp yarns resulting from the shed formation is limited by guiding the ground warp yarns around the yam separating roller. This limited lifting movement of the ground warp yarns also allows the height of the teeth in the comb to be kept very small as long as this height does not exceed the height of movement of the ground warp yarns in the area of the comb.

[0028] According to a second particular embodiment, the comb is installed in the zone between the yam separating rollers and the shed formation means. The shed formation means comprise, inter alia, weaving frames and the Jacquard harness. In this zone the ground warp yarns are more directly subject to the movements in vertical direction due to the shed formation. But since the ground warp yarns have already passed the supporting devices of limited thickness, the comb can extend in this situation over the full length of the weaving reed and all the ground warp yarns arrive more of less parallel to the warp direction at the weaving reed.

[0029] The weaving machine is preferably a double-face weaving machine. In this case separate combs are provided for upper and lower fabric.

[0030] The inventive construction of fixed yam separating rollers connected by one or more supporting devices forms a structu re that permits - in a particularly advantageous embodiment of the device - the supporting devices to support a number of chore separating bars for pile-warp yarns. Chore separating bars serve to hold the

different chores of pile-warp yarns apart in order to prevent crossing of pile-warp yarns over as large a length of the pile-warp yam run as possible. The attachment of the chore separating bars to the supporting devices allows them to be brought closer to the shed formation device for the pile-warp yarns and reduces the zone in which these risk to cross. Close to the shed formation means, the pile-warp yarns already form a compact package and the chore separating bars can be connected to one another in a compact space. By also installing the chore separating bars through the supporting devices, in particular the plate-shaped element s, the diameter of the row separating bars can be limited so that they can be installed practically vertically above one another in a compact ma nner so that they create little hindrance for the weaver during the repair of warp yam breaks in the fabric.

[0031] Another subject of this invention relates to a method for the weaving of pile fabrics consisting of weft yarns, ground warp yarns and pile-warp yarns, whereby the method is performed on a weaving device such as that described above, whereby the ground warp yarns extend practically parallel to one another in the zone between two consecutive supporting devices that is designed for the passage of ground warp yarns coming from both the first and the second warp beam. This is in contrast to the known methods in which the ground warp yarns coming from ground warp beams lying alongside one another are deflected due to the presence of the intermediate frame.

[0032] According to a particular method, the ground warp yarns coming from both the first and the second warp beam remain extended practically parallel to one another up to the fabric forming zone, more particularly up to the weaving reed.

[0033] The characteristics, advantages and special features of this invention are further illustrated in the following more detailed description of a possible embodiment. This description is intended only to illustrate the invention by reference to an example and can therefore in no way be considered as a limitation of the scope of this patent application.

In this description, reference is made by means of reference numbers to the attached figures, in which:

- *Figure 1: shows a top view of a prior-art device;*
- *Figure 2: is a perspective view of a prior-art device;*
- *Figure 3: is a top view of a first embodiment of the invention;*
- *Figure 4: is a top view of a second embodiment of the invention;*
- *Figure 5: is a perspective view of the second embodiment;*
- *Figure 6: is a side view of the first embodiment.*

[0034] On a double-face weaving machine, a stock of tight warp yarns and a stock of binding warp yarns are provided on respective warp yarn beams. These ground warp yarns are guided in two layers above one another to the weaving machine. In the uppermost layer are the tight warp and binding warp yarns for weaving of an uppermost ground fabric. In the lowermost layer are the tight warp and binding warp yarns for weaving of a lowermost ground fabric. Shed formation means (11,12) are used to form an uppermost shed between the warp yarns of the uppermost layer, and to form a lowermost shed between the warp yarns of the lowermost layer. Weft threads are inserted into these sheds so that they form a respective ground fabric together with the warp yarns of each layer.

[0035] In view of the fact that the ground warp yarns are fed in under high tensions, these warp yarns exert a significant load on the ground warp beam. In order to now limit this load above a weaving width of 3 metres in practice, the warp beams for both the tight warp and the binding warp are split into two (1a and 1b) warp beams lying alongside one another, or warp beams are split into warp beams arranged above one another, or a combination of the two is employed (two warp beams lying alongside one another and another two warp beams lying alongside one another and arranged above these warp beams).

[0036] On the double-face weaving machine there are also at least two yam separating rollers (3) arranged above one another to separate the warp yarns of the uppermost layer from the warp yarns of the lowermost layer before these yarns reach the shed formation means (11,12). The yam separating rollers (3) also prevent the ground warp yarns from losing their correct position relative to one another during the shed formation. The force exerted here is also considerable and for this reason the yam separating rollers for weaving widths of 3 metres or higher are also split over two separating rollers lying alongside one another which, according to the prior art (see Figures 1 and 2), are supported and journalled in an intermediate frame (4).

[0037] The splitting of the warp beam (1a; 1b) on the one hand and of the yam separating rollers (3) on the other hand means that the ground warp yarns located in the middle of the weaving machine, in particular in the area of the zone where the two warp beams (1a and 1b) lie alongside one another with their flanges (2) and there practically 100 to 150 mm apart, cannot extend in a straight line (seen in warp direction) in their further movement towards the fabric forming zone. As already described earlier, this leads to various disadvantages such as, inter alia, the occurrence of visually disturbing effects and extra loads on both pile warp and ground warp yarns, etc. In order to avoid this and to ensure that the ground warp yarns concerned come together better, the yam separating rollers (3) of the weaving machine have several supporting devices (9) between their ends that link these yam separating rollers (3) together; each of these yam separating rollers (3) has at least one zone between two consecutive supporting devices (9) that is designed for the passage of ground warp yarns (5a;5b) coming

from both a first (1a) and a second warp beam (1b). The yam separating rollers (3) are fixed and extend over the whole width of the weaving machine. They are connected on both sides of the weaving machine to a flange (7) that forms part of or is fastened to a side frame of the weaving machine. The supporting devices are designed as plate-shaped elements with a limited thickness of max. 15 mm.

[0038] By now replacing the split separating rollers with intermediate frame known from the prior art with full-width separating rollers with several supporting devices, none of which (see in warp direction) lies in the warpwise projection of the transitional zone between the two warp beams (1a and 1b), the ground warp yarns in the area of this transition no longer come into contact with the elements of the intermediate frame and therefore are no longer deflected here (this by contrast with the prior art). As a result, these ground warp yarns come much closer together a short distance ahead of the weaving reed than is the case at the same distance ahead of the weaving reed with the prior art. This means that the tensile force of the warp yarns on the reed dents in weft direction is more limited, leading to less warp yam breakage and less wear on the reed dents.

[0039] The supporting devices (9) can be equipped with one or more permanently installed combs (10) provided with teeth between which ground warp yarns extend, the teeth of such combs (10) having a pitch corresponding to the pitch of the dents in the weaving reed (6 - 6'). The teeth of such a comb (10) can be open at the top or bottom, or can be closed on all sides. In the case of a comb with open teeth, the comb should preferably be installed at such a height and should have such a tooth height that the ground warp yarns are located in the gap between these teeth in each of their positions. This type of fixed comb (10) has the advantage that the passage of a warp yam is no longer dependent on the positions of the weaving reed (6,6'), but runs on a fixed path between the warp beam (1a;1b) and the teeth of the comb (10), and that from the comb (10) the ground warp yarns move more or less in the warp direction towards the weaving reed (6,6') and the fabric forming zone. This also relieves the weaving reed of a load in weft direction, contributing to less wear on the weaving reed and less warp yam breakage.

It goes without saying that with the decrease in the diameter of the warp beam (1a;1b), the passage of the ground warp yarns still varies in vertical direction, but this is fairly limited and has no noticeable disadvantageous effect in the context of this invention.

[0040] The comb (10) can be installed both in the zone between the separating rollers (3) and the warp beams (1a,1b), and in the zone between the separating rollers (3) and the shed formation means (11: weaving frames; 12: Jacquard harness). In the latter case the comb (10) can extend over the full width of the weaving device in one or more parts since the ground warp yarns have already passed the supporting devices of limited thickness. If the comb (10) is installed in the zone between the separating rollers (3) and the warp beams (1a,1b) as shown in Figures 4 and 5, the comb (10) is installed such that it extends over the transitional zone where the ground warp yarns from both the first (1a) and the second warp beam (1b) meet, this transitional zone generally being located in the middle of the weaving machine. The comb is hereby limited in weft direction to a distance smaller than the distance between the two supporting devices located closest to this transitional zone. In this transitional zone, the position of the yam separating rollers ensures that the movement of the ground warp yarns resulting from the shed formation is limited and the height of the teeth can be kept very small.

[0041] With the elimination of the intermediate frame of the yam separating rollers (3), a subsequent obstacle to the ground warp yarns on their route to the weaving reed (6,6') and the fabric forming zone on wide (wider than 3 metres weaving width) weaving machines is the middle support in the weaving frames (11). This middle support (width 10-15 mm) can also be replaced by several thinner supports between the uppermost and lowermost transverse member of a weaving frame spread over the width direction of the weaving machine, with more limited thickness and with the absesence of a support in the middle of the weaving frame.

[0042] We hereby wish to point out that the pile-warp yarns are also obstructed in their passage to the fabric forming zone by the intermediate frame between the yam separating rollers in the prior-art embodiments, and that these yarns also have a more favourable passage on their path to the fabric forming zone with the inventive weaving device. These can also now extend from the feed frame in front of the weaving creel in more or less a straight line until they extend in warp direction in their further movement to the fabric forming zone.

[0043] The inventive construction of fixed yam separating rollers (3) connected by one or more supporting devices (9) forms a structu re that permits a number of chore separating bars (13) for pile-warp yarns to be supported. Chore separating bars (13) serve to hold the different chores of pile-warp yarns apart in order to prevent crossing of pile -warp yarns over as large a length of the pile-warp yam run as possible. The attachment of the chore separating bars (13) to the supporting devices (9) allows them to be brought closer to the shed formation device (11,12) for the pile-warp yarns and reduces the zone in which the pile-warp yarns risk to cross. Close to the shed formation means (11,12), the pile-warp yarns already form a compact package and the chore separating bars (13) can be connected to one another in a compact space. By also installing the chore separating bars (13) in the supporting devices (9), in particular the plate-shaped element s, the diameter of the chore separating bars (13) can be limited so that they can be installed practically vertically above one another in a compact manner so that they create little hindrance for the weaver during the repair of the warp yarns in the event of warp yam breaks.

[0044] It goes without saying that ground warp beams lying alongside one another can also have a different width and that weaving devices with this configuration can also form part of the invention; when speaking of the middle, the transition between the ground warp beams is meant. In the same way, devices with more than two warp beams alongside one another also form part of the invention.

Claims

1. Weaving device for weaving pile fabrics comprising a weaving machine with at least two yam separating rollers (3), the weaving device having at least two warp beams (1a;1b) lying alongside one another in weft direction, each of which is provided to guide ground warp yarns (5a;5b) via a yam separating roller (3) to shed formation means (11,12) of the weaving machine, said yam separating rollers (3) extending over the whole width of the weaving machine and being connected at their respective ends to the weaving machine, **characterised in that** at least two yam separating rollers (3) between their ends comprise several supporting devices (9) that link these yam separating rollers (3) together, and that each of these yam separating rollers (3) has at least one zone between two consecutive supporting devices (9) that is designed for the passage of ground warp yarns (5a;5b) coming from both a first warp beam (1a) and a second warp beam (1b).

2. Weaving device according to Claim 1, **characterised in that** the supporting devices (9) comprise a plate-shaped element, said element having a maximum thickness of 15 mm.

3. Weaving device according to Claim 2, **characterised in that** the plate-shaped element has a maximum thickness of 10 mm.

4. Weaving device according to one of the preceding claims, **characterised in that** one or more supporting devices (9) are connected to the frame of the weaving machine and/or to the foundation on which the weaving machine is installed.

5. Weaving device according to one of Claims 2 to 4, **characterised in that** the yam separating rollers (3) extend through openings provided in the plate-shaped element, said openings being located such that at least two yam separating rollers are positioned at different heights.

6. Weaving device according to one of the preceding claims, **characterised in that** the weaving machine comprises a reciprocating weaving reed (6,6') provided with a number of dents between which the ground warp yarns (5a;5b) extend during operation of the weaving device, and that the weaving machine also comprises a comb (10) provided with a number of teeth between which at least a part of the ground warp yarns (5a;5b) extend during operation of the weaving machine, said comb (10) being attached to the supporting devices (9).

7. Weaving device according to Claim 6, **characterised in that** the teeth of the comb (10) exhibit a pitch corresponding to the pitch of the dents in the weaving reed (6,6').

8. Weaving device according to Claim 7, **characterised in that** the comb (10) is offset in relation to the weaving reed (6,6') by a distance smaller than the pitch.

9. Weaving device according to one of Claims 6 to 8, **characterised in that** the comb (10) is installed in the zone between the yam separating rollers (3) and the warp beams (1a;1b).

10. Weaving device according to one of Claims 6 to 8, **characterised in that** the comb (10) is installed in the zone between the yam separating rollers (3) and the shed formation means (11,12).

11. Weaving device according to one of Claims 1 to 10, **characterised in that** the supporting devices (9) support a number of chore separating bars (13) for pile-warp yarns.

12. Weaving device according to one of the preceding claims, **characterised in that** the weaving machine is a double-face weaving machine.

13. Method for the weaving of pile fabrics consisting of weft yarns, ground warp yarns and pile-warp yarns, **characterised in that** the method is performed on a weaving device according to one of the preceding claims, whereby the ground warp yarns (5a;5b) extend practically parallel to one another in the zone between two consecutive supporting devices (9) that is designed for the passage of ground warp yarns (5a;5b) coming from both the first (1a) and the second warp beam (1b).

Prior art

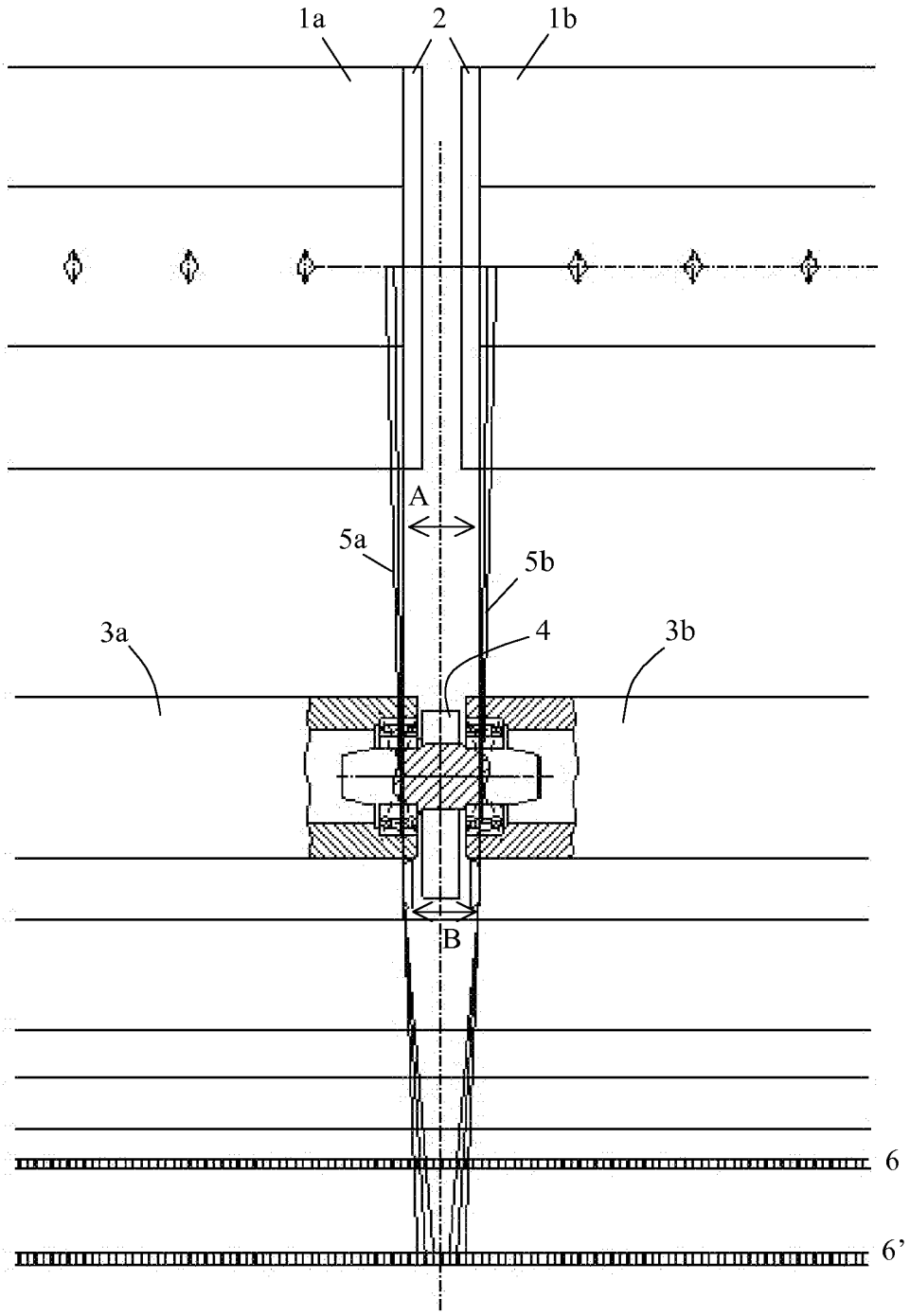

Fig. 1

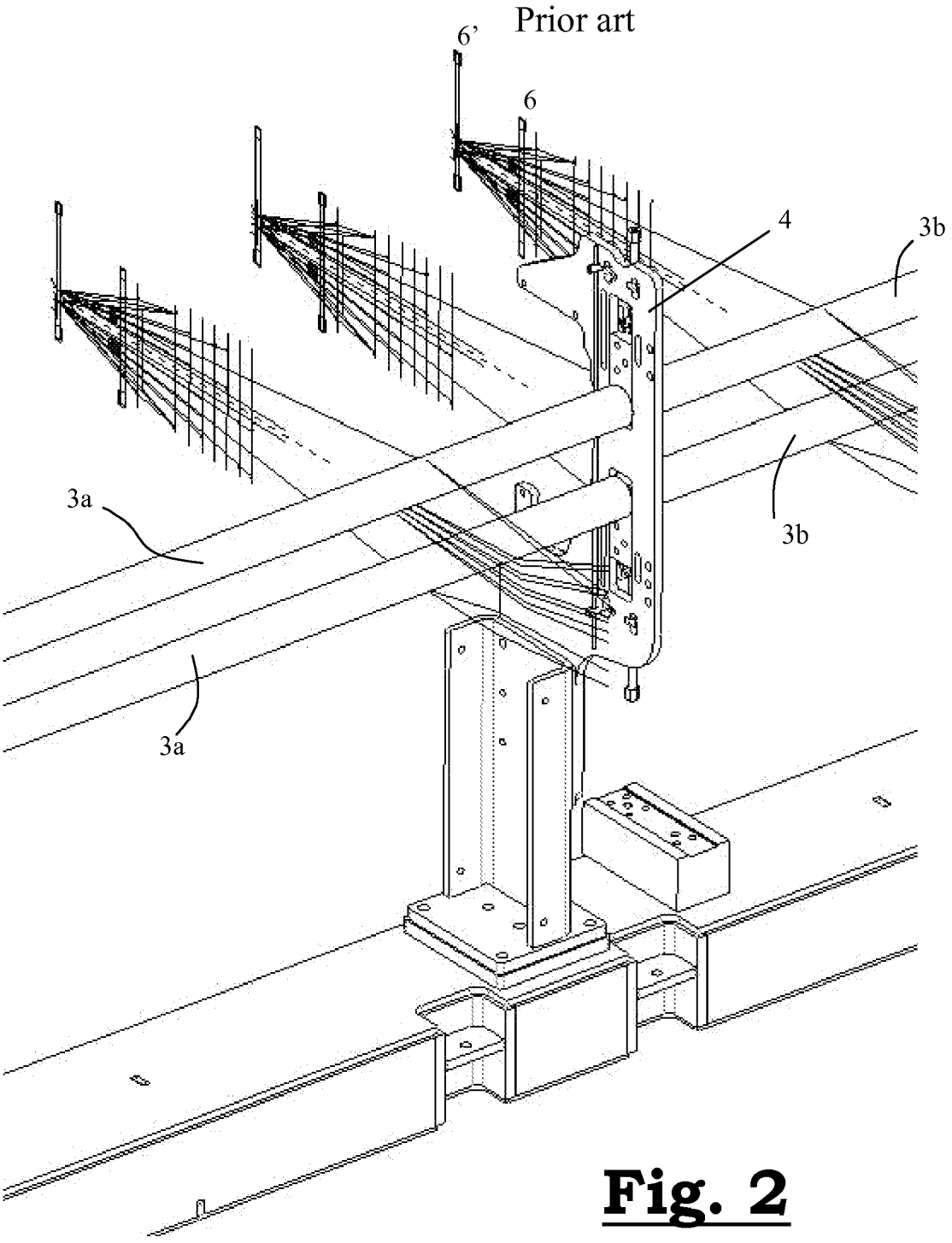

Fig. 2

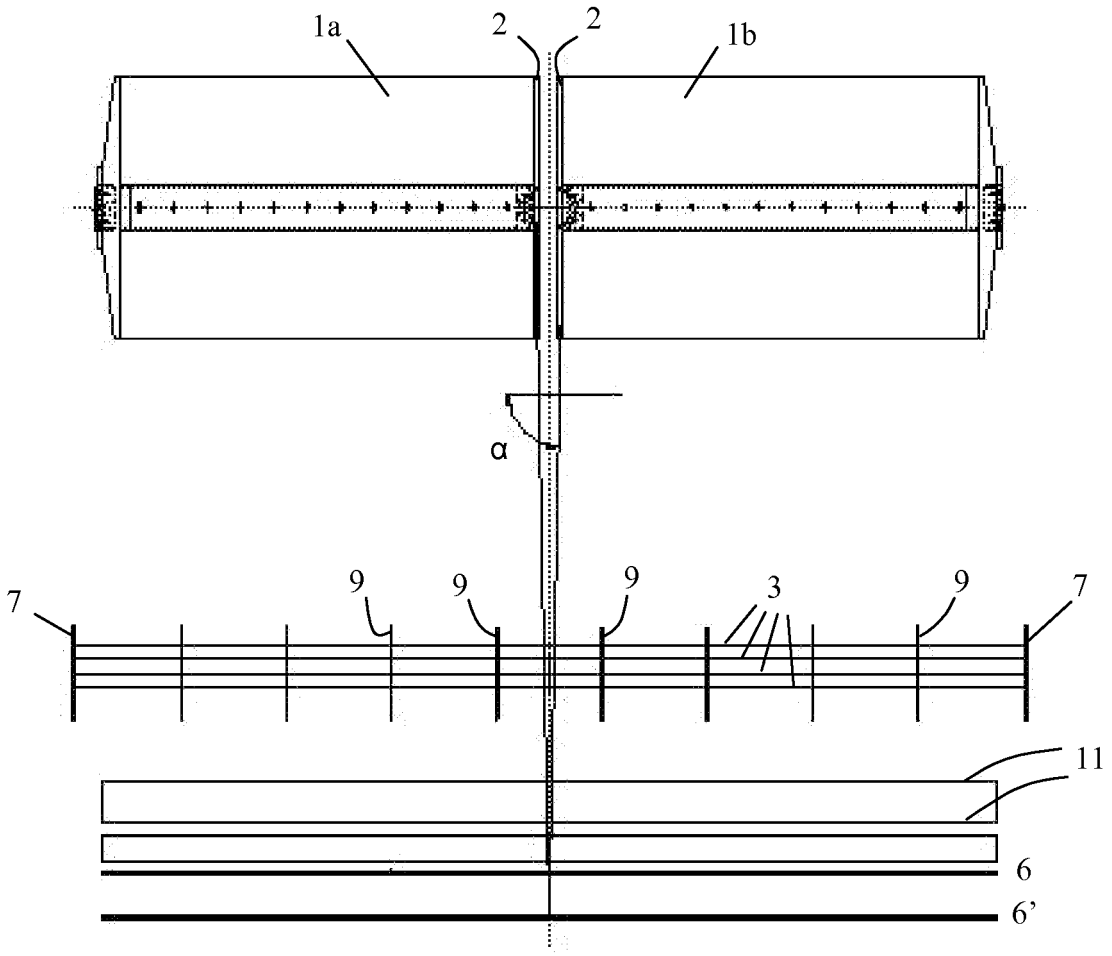

Fig. 3

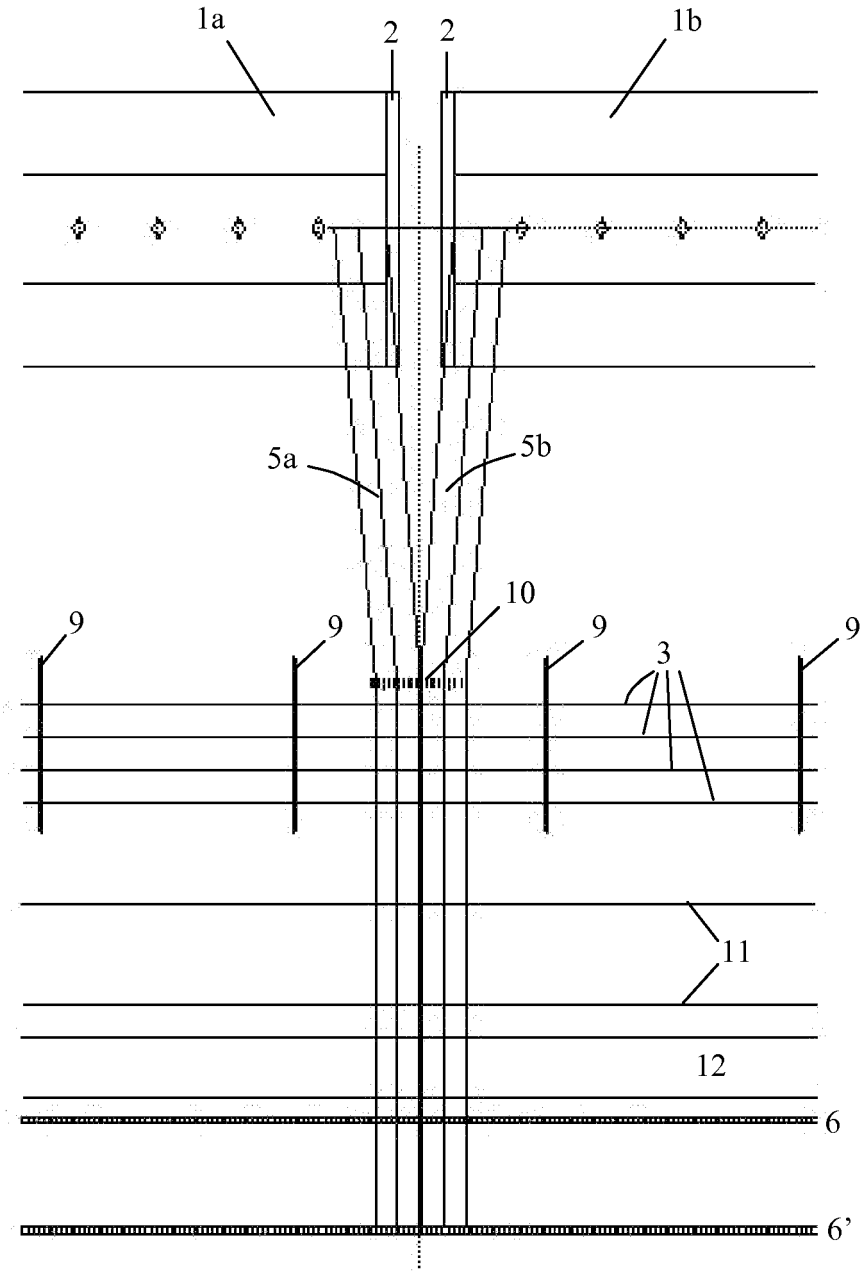

Fig. 4

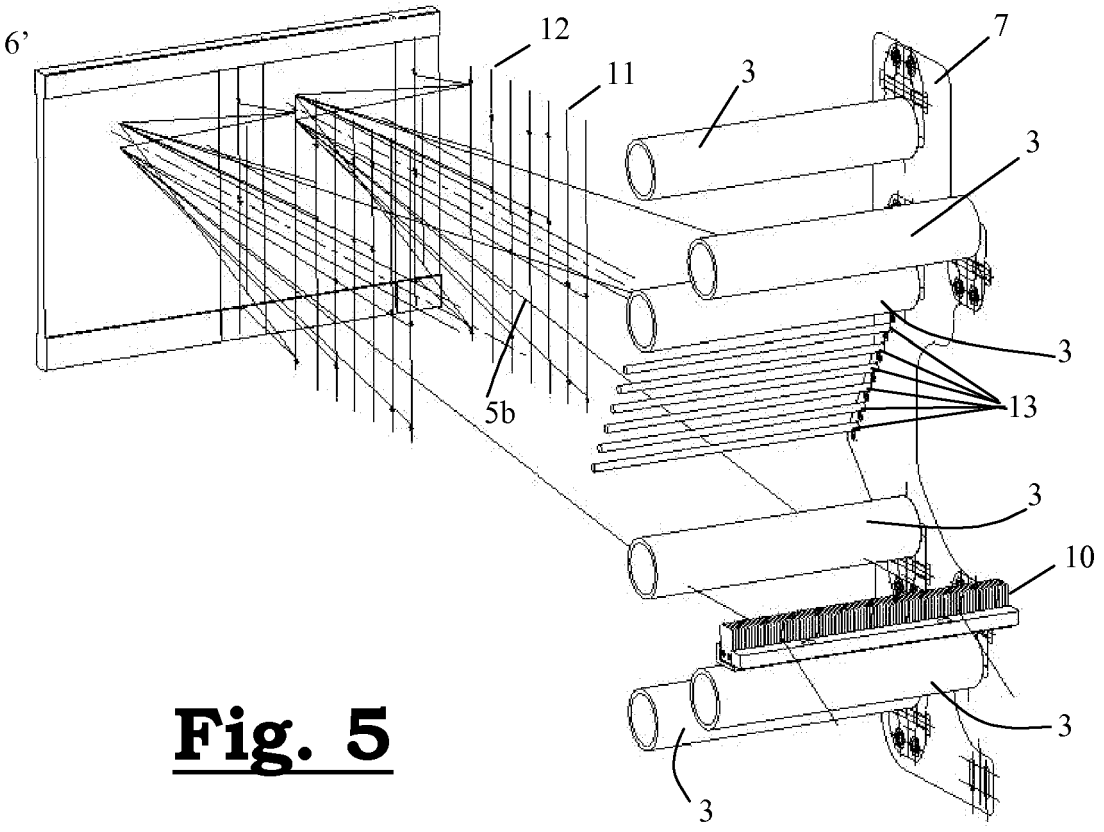

Fig. 5

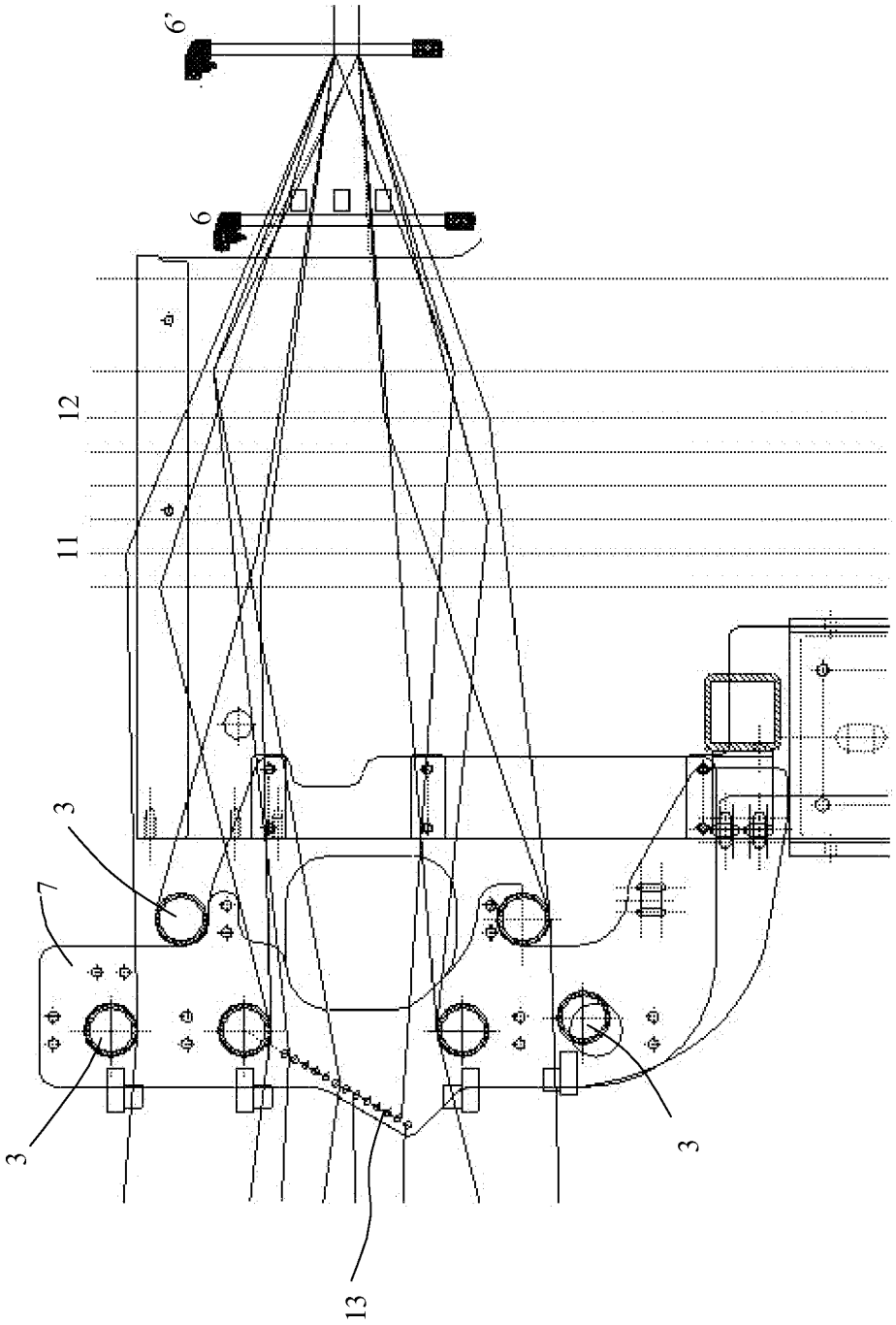

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 08 16 7295

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 671 494 A (WIELE MICHEL VAN DE NV [BE]) 13 September 1995 (1995-09-13) * abstract * * column 3, lines 19-56; figures 1-5 * -----	1-13	INV. D03D39/00 D03D39/16 D03D49/22
A	DE 10 2005 028127 A1 (PICANOL NV [BE]) 14 December 2006 (2006-12-14) * paragraphs [0021], [0022]; figures 1-5 * -----	1-13	

TECHNICAL FIELDS SEARCHED (IPC)

D03D
D02H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 April 2009	Louter, Petrus

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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01-04-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0671494 A	13-09-1995	BE 1008130 A4	23-01-1996
		DE 59501113 D1	29-01-1998
		US 5615712 A	01-04-1997
DE 102005028127 A1	14-12-2006	CN 101194057 A	04-06-2008
		EP 1888826 A2	20-02-2008
		WO 2006131325 A2	14-12-2006

EPO FORM P0459

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