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(54) Carrying gripper device for weaving machine

(57) The invention relates to a carrying gripper device for weaving machines, comprising a movable body (2) provided of pick-up means to pick up a weft thread in the carrying gripper device, and clamping means (30, 71) for clamping a thread in the carrying gripper device picked up weft thread, in which the carrying gripper device comprises controlling means to keep the clamping means (30, 71) in a release position during the movement of the movable body (2) so as to withdraw a picked up weft thread out of the pick-up means to a predetermined length, and to subsequently bring the clamping means (30, 71) in a clamping position to clamp the weft thread.

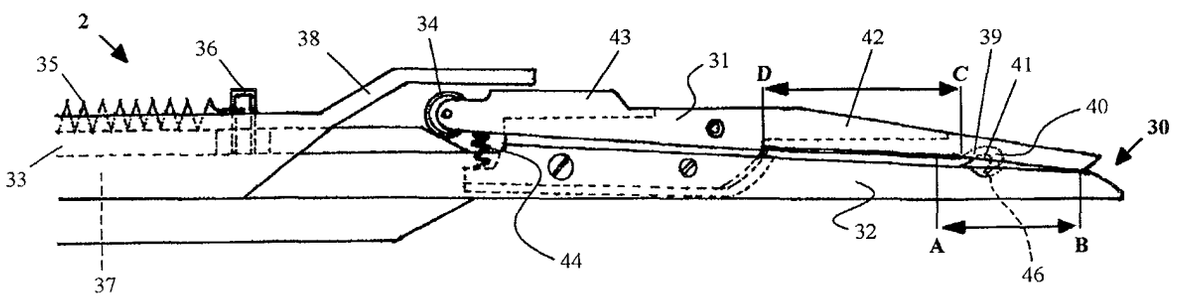

Fig. 1a

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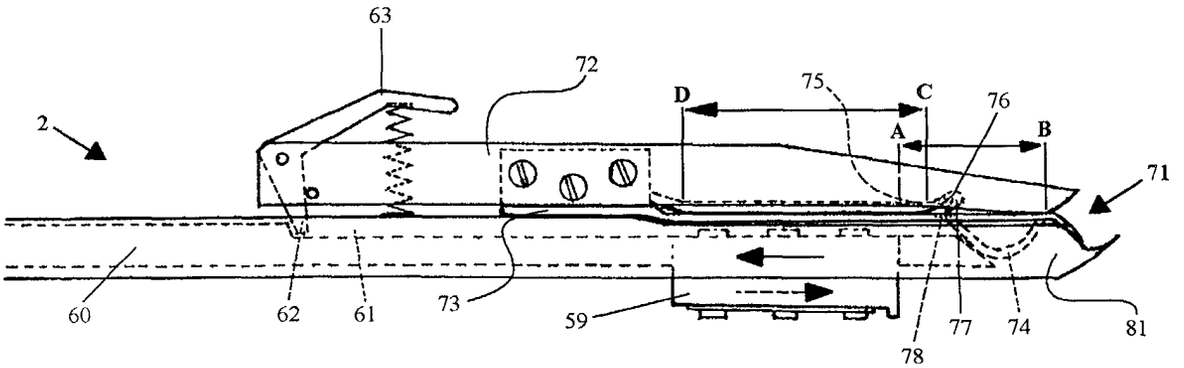

Fig. 3a

Description

[0001] The invention relates to a carrying gripper device for weaving machines, comprising a movable body provided of pick-up means to pick up a weft thread in the carrying gripper device, and clamping means for clamping a picked up weft thread which has been picked up in the carrying gripper device.

[0002] Until now, weaving machines are provided with a feed gripper device which takes the weft thread to the middle of the weaving machine, after which a carrying gripper device picks up and clamps the weft thread and takes this weft thread along to the edge of the woven fabric.

[0003] Accordingly, in EP 0 971 059 a carrying gripper provision for weaving machines is described, with a fixed gripper rapier body provided with a hook and a gripping face on the inside of the hook, and with a hinged clip suspended from the fixed gripper rapier body, which with a gripping face thereon, works together with the gripping face of the hook in order to grip a weft thread taken by the gripper rapier provision, whereby in front of the extremity of the gap which is formed by the gripping face of the hinged clip and the gripping face of the hook a mechanism is provided which prevents the weft thread from sliding to the extremity of aforementioned gap, and that preferably consists of a bar that is provided on the gripping face of the hook of the gripper rapier body and works together with a hole in the hinged clip, or a bar that runs through the extremity of the hook of the gripper rapier body, or a bar that is provided on the hinged clip and works together with a hole in the hook of the gripper rapier body, or a projecting surface that is provided in the extremity of the hook of the gripper rapier body and which works together with a hole in the hinged clip.

[0004] The problem of such a device is that with every weft of the weft thread there is a loss end at the end of the picked up weft thread. Until now this loss end is incorporated in a loss ribbon which serves to bind and to hold the loss ends. In this way, there is an important loss of thread, which first of all creates a waste problem and moreover is an expensive cost factor in case of weaving with expensive threads.

[0005] The purpose of the invention is to provide a carrying gripper device for weaving means, which doesn't show abovementioned disadvantages.

[0006] This purpose is achieved by providing a carrying gripper device for weaving machines, comprising a movable body provided of pick-up means to pick up a weft thread in the carrying gripper device, and clamping means for clamping a weft thread which has been picked up in the carrying gripper device, in which the carrying gripper device comprises controlling means to keep the clamping means in a release position during the movement of the movable body so as to withdraw a picked up weft thread out of the pick-up means to a predetermined length, and to subsequently bring the clamping means in a clamping position to clamp the weft thread.

[0007] In a preferred embodiment of a carrying gripper device according to the invention, the pick-up means comprise a groove, which is bounded with two guiding wedges, i.e. a first guiding wedge which is predominantly closed and a second guiding wedge which narrows to the front of the movable body, and in the groove a hook is provided which is placed in such a way that the first guiding wedge reaches further to the back of the movable body than the eye of the hook.

[0008] In a more specific preferred embodiment of a carrying gripper device according to the invention, the hook is put up movable.

[0009] In another specific preferred embodiment of a carrying gripper device according to the invention, the side of the hook which is situated at the side of the first guiding wedge is placed predominantly in the middle of the groove formed between the two guiding wedges.

[0010] In a preferred embodiment of a carrying gripper device according the invention, the clamping means comprise a controllable clamping part, and during the bringing of the clamping means to the clamping position the controlling means attend to the performing of a movement of said controllable clamping part through which the picked-up weft thread is clamped into the clamping means.

[0011] In a first specific preferred embodiment of a carrying gripper device according to the invention, the controlling means comprise a cable which is connected with a control which is in contact with said controllable clamping part so that a back and forth movement of the cable attends to the performing of an up and down movement of at least a part of the controllable clamping part between a release and a clamping position of the picked up weft thread.

[0012] In a second specific preferred embodiment of a carrying gripper device according to the invention, the controlling means comprise a push contact which is in contact with said controllable clamping part so that a back and forth movement of the push contact attends to the performing of an up and down movement of at least a part of the controllable clamping device between a release and a clamping position of the picked up weft thread.

[0013] Preferably, the carrying gripper device according the invention is provided to cooperate with a feed gripper device by which the picked up thread can be withdrawn out of the carrying gripper device to a predetermined length.

[0014] Thereby, said push contact of the controlling means is provided to cooperate with a slider on the feed gripper device.

[0015] In a preferred carrying gripper device according the invention, the feed gripper device is provided of means to release the weft thread at the same time or shortly before the clamping of the weft thread in the carrying gripper device.

[0016] This invention will be further explained in the following non-restricting description of two preferred embodiments of a carrying gripper device for weaving machines according to the invention.

[0017] In this description, reference is made to the attached figure by means of reference numbers, in which:

- ***figure 1a*** is a side view of a first embodiment of a carrying gripper device according to the invention;
- ***figure 1b*** is a side view of the controllable clamping part of the carrying gripper device as shown in figure 1a;
- ***figure 1c*** is a perspective detailed view of the front part of the controllable clamping part of the carrying gripper device as shown at figure 1a;
- ***figure 1d*** is a detailed view from above of the hook and the lower clamping part of the carrying gripper device as shown in figure 1a;
- ***figure 2a*** is a side view of a feed gripper device which cooperates with a first embodiment of a carrying gripper device according to the invention;
- ***figure 2b*** is a view from above of the feed gripper device as shown in figure 2a;
- ***figure 3a*** is a side view of a second embodiment of a carrying gripper device according to the invention;
- ***figure 3b*** is a side view of the fixed clamping part of the carrying gripper device as shown in figure 3a;
- ***figure 3c*** is a side view of the controllable clamping part and the hook of the pick-up gripper device as shown in figure 3a;
- ***figure 3d*** is a detailed bottom view of the front part of the controllable clamping part of the carrying gripper device as shown in figure 3a;
- ***figure 3e*** is a detailed view from above of the hook and the lower clamping part of the carrying gripper device as shown in figure 3a;
- ***figure 4a*** is a side view of a feed gripper device which cooperates with a second embodiment of a carrying gripper device according to the invention;
- ***figure 4b*** is a view from above of the feed gripper device as shown in figure 4a.

[0018] The carrying gripper device for weaving devices according to the invention, and beside it also the feed gripper device, as these are shown in figures 1a, 2a, 2b, 3a, 4a and 4b, exist of a movable body (1 or 2) which is moved in the weaving machine by means of a driven guide (not shown on the figure). With the front of the movable body (1 or 2) is meant the side where the weft thread is picked up, the back of the movable body (1 or 2) is then the other side.

[0019] In a first embodiment according to the invention, a first feed gripper device cooperates with a first carrying gripper device. The movable body (1) of the first feed gripper device, as is shown in figures 2a and 2b, comprises two gripping clasps, i.e. a first, passive gripping clasp (10) and a second, controllable gripping clasp (11), between which the weft thread is clamped. The weft thread is clamped in the first gripping clasp (10) because of the fact that the upper clamping part (12) is a first resilient elongated sheet, so that the weft thread can slide into this first gripping clasp (10) and remains clamped between the upper (12) and the lower clamping part (13) of the first gripping clasp (10). The second gripping clasp (11) consists of a controllable upper hinged clamping part (14) and a lower clamping part (15). The end of the upper hinged clamping part (14) comprises a pressing element (16), f.i. a circular element (as shown in the figure) or a first slanting inclined plane against which an other slanting inclined plane fits, which is in contact with a movable bar (17). This movable bar (17) is controlled by a cable (not shown in the figure), which is connected with the movable bar (17), and at which the control device in the weaving machine can pull. A spring (18) which is connected at one side (19) to the lower part (20) of the first feed gripper device, and which is connected at the other side (21) to the controllable bar (17), attends to the returning of the controllable bar (17) to its original position after there has be pulled at the controllable bar (17) by means of the cable. Furthermore, above the end of the pressing element (16) a second resilient element (22) is provided which attends to the placing of the controllable gripping clasp (11) in an opened release position when the pressing element (16) has no more contact with the controllable bar (17).

[0020] The control of the second gripping clasp (11) of the first feed gripper device from a clamping position to a release position comprises the following steps: in the clamping position in which the first part (23) of the upper hinged clamping part (14) and the lower clamping part (15) are in contact, there isn't pulled at the cable, through which the controllable bar (17) is in contact with the pressing element (16), and the pressing element (16) is brought in a position through which the first clamping hinged part (23) is pushed against the lower clamping part (15). When the weft thread has to be brought in the gripping clasp (11), the second gripping clasp (11) has to be brought to a release position. Therefore, the control device has to pull at the cable, through which the controllable bar (17) moves backwards, and the pressing element (16) is released and pushes up the back hinged part (24) under the influence of the operation of the second resilient sheet (22), through which the first clamping hinged part (23) moves up and the weft thread can be brought between the lower clamping part (15) and the upper hinged clamping part (14). On the moment that the weft thread has to be clamped into the gripping clasp (11), the control device releases the cable, through which the controllable bar returns to its original position by the returning of the spring (18), and makes contact again with the pressing element (16), through which the back hinged part (24) is again pushed up and in that way also the second resilient sheet (22) is pushed up, through which the first clamping hinged part (23) is brought down, and in that way the upper hinged clamping part (14) and the lower clamping part

(15) are brought in contact through which the weft thread is clamped.

[0021] The first feed gripper device in which the weft thread is now clamped, is brought into the space according to the width of the fabric by means of a driven guide. There, the weft thread has to be picked up by a first carrying gripper device, as is shown in figure 1a. Thereby, the movable body (2) of the first carrying gripper device comprises clamping means in the form of a gripping clasp (30) intended for clamping of the weft thread. This gripping clasp (30) comprises a controllable upper hinged clamping part (31) and a lower clamping part (32). The upper hinged clamping part (31) is controlled in a similar manner as the upper hinged clamping part (14) of the corresponding first feed gripper device. The end of the upper hinged clamping part (31) comprises a pressing element (34) which is in contact with a controllable bar (33). This controllable bar (33) is controlled by an attached cable (not shown on the figure) and at which the control device of the weaving machine can pull. A spring (35) which is connected at one side (36) to the lower part (37) of the first carrying griper device, and at the other side is connected with the controllable bar (33) (which is not shown in the figure), attends to the returning of the controllable bar (33) in its original position after that the controllable bar (33) has pulled at the cable. Furthermore, a protecting sheet (38) is provided on top of the end of the pressing element (34).

[0022] As shown in figures 1c and 1d, in the upper hinged clamping part (31) a groove (45) is provided which is bounded with two guiding wedges, i.e. a first guiding wedge (47) which is predominantly closed and a second guiding wedge (48) which narrows to the lower clamping part (32) and to the front of the movable body (2). In this groove (45), a hook (39) is provided in which the weft thread is picked up. The side of the hook (39) which is situated at the side of the first guiding wedge (47) has to be placed predominantly in the middle between the first (47) and the second guiding wedge (48). This hook (39) is placed under light suspension. The end (40) of the hook (39) is situated in a notch (46) in the lower clamping part (32). Between the end (40) of the hook (39) and the notch (46) a small air crack is provided. On the one hand, this air crack attends to the non-wearing of the end (40) of the hook (39) caused by the constant bumping against the lower clamping part (32), and on the other hand attends to the non-clamping of the weft thread between two metal surfaces, but the adjourning of the weft thread in a small air crack and in that way the sliding in the eye (41) of the hook (39).

[0023] The control of the gripping clasp (30) of the first carrying gripper device from a clamping to a release position comprises the following steps: in the clamping position of the gripping clasp (30) there isn't pulled at the cable, through which the controllable bar (33) is in contact with the pushing element (34), through which the first clamping hinged part (42) is pushed with high pressure against the lower clamping part (32). When the weft thread has to be adjourned in this gripping clasp (30), this gripping clasp (30) has to be brought into a release position. Therefore, the control device pulls at the cable through which the controllable bar (33) moves backwards and has no more contact with the pressing element (34). A spring is connected to the back hinged part (43) which is attended to the pushing of the first clamping hinged part (42) against the lower clamping part (42) with a slight pressure. The high pressure between the first clamping hinged part (42) and the lower clamping part (32) then disappears, but the two parts (32, 42) are still pushed against each other with a slight pressure under the influence of a spring (44). After the picking up of the weft thread by the gripping clasp (30) out of the first feed gripper device, the spring (44) attends for the sliding of the loss end of the thread between two clamping parts (32, 42) which are placed under a slight pressure when the first feed gripper device pulls at the weft thread until the weft thread is clamped again in the gripping clasp (30) by bringing of the gripping clasp (30) in its clamping position. Therefore, the cable is released by the control device through which the controllable bar (33) is brought again in contact with the pressing element (34) through which for its part the back hinged part (43) is placed under high pressure and the first clamping hinged part (42) is pushed with a high pressure against the lower clamping part (32) and clamps the weft thread.

[0024] As shown in figure 1a, it is important that the weft thread always is slightly clamped between point A to point D as soon as the weft thread enters the first carrying gripper device between the lower clamping part (32) and the upper hinged clamping part (31), this with the insertion of the weft thread as well as with the pulling out of the loss end, independent from the movement of the controllable bar (33). Between point A and point B the weft thread is always slightly clasped between the lower clamping part (32) and the upper hinged clamping part (31) by the slight pressure of the spring (44). Between point C and point D the weft thread is always slightly clasped by the slight pressure of the hook (39) against the lower clamping part (32).

[0025] The picking up of the weft thread in the first carrying gripper device and the taking over of the weft thread from the first feed gripper device to the first carrying gripper device comprises the following steps: the first feed and carrying gripper device move towards each other and the weft thread which is clamped in the two gripping clasps (10, 11) of the first feed gripper device is slided into the gripping clasp (30) of the first carrying gripper device, which at that moment is in the release position. The weft thread slides under the hook (39). The first feed gripper device is moved in a direction away form the first carrying gripper device and therefore pulls at the loss end of the weft thread through which the loss end shortens. In that, only the first feed gripper device pulls at the weft thread the speed of sliding of the weft thread in the eye (41) of the hook (39) decelerates. If this loss end has a minimal length, f.e. about 0,8 cm

(predominantly determined), the control device will control the gripping clasp (30) from the first carrying gripper device by bringing the gripping clasp (30) to the clamping position and in that way the weft thread will be clamped in this gripping clasp (30). The control device brings as much as possible at the same time the second gripping clasp (11) from the first feed gripper device to the release position through which this second gripping clasp (11) releases the weft thread. With the taking over of the weft thread the first carrying gripper device stands still during some degrees. The first feed and carrying gripper device are subsequently moved away from each other whereby the first carrying gripper device takes along the weft thread to the edge of the fabric.

[0026] The carrying gripper device is subsequently brought next to the reed, after which the weft thread is picked up with suitable means along the reed and is released very quickly thereafter or simultaneously by the gripper clasp (30) because of the fact that the controlling means bring it as much as at the same time in a release position. The weft thread is taken to the beating up of the fabric(up to the woven fabric). In that way a nice selvedge is kept.

[0027] In a second embodiment according to the invention, a second feed gripper device cooperates with a second carrying gripper device. The movable body (1) of the second feed gripper device, as is shown in figures 4a and 4b, comprises three gripping clasps, i.e. a first gripping clasp (50) and a second gripping clasp (50b), and a third controllable gripping clasp (51), between which the weft thread can be clamped. The second and third gripping clasp (50b, 51) are put up next to each other. The weft thread is being clasped in the first gripping clasp (50) because of the fact that the upper clamping part (52) is a resilient elongated sheet through which the weft thread can slide into the first gripping clasp (50) and is clasped between the upper (52) and the lower clamping part (53) of the first gripping clasp (50). The second gripping clasp (50) operates according an analogous principle of the first gripping clasp (50), but is constructed in such a way that the weft thread is being clasped in a direction away from the middle of the fabric. The third gripping clasp (51) consists of a controllable upper hinged clamping part (54) and a lower clamping part (55). The upper hinged clamping part (54) is a hook shaped element, as shown in figure 4a. The lower end (56) of the upper hinged clamping part (54) is situated in a corresponding aperture (57) in a slider (58). This slider (58) cooperates with a push contact (59) which is situated on the second carrying gripper device, as is shown in figure 3a. This push contact (59) is connected with a controllable bar (60) in which a groove (61) is provided to engage the lower end (62) of a hinged hook shaped element (63), which is provided to bring the second carrying gripper device in a release position when it's brought next to the reed and the weft thread is taken over by suitable means and is taken to the beating up of the fabric (up to the woven fabric).

[0028] The control of the third gripping clasp (51) of the second feed gripper device from a clamping to a release position comprises the following steps: in the release position of the gripping clasp (51) the upper hinged clamping part (54) can freely move in the corresponding aperture (57), through which the weft thread freely can be brought between the upper hinged clamping part (54) and the lower clamping part (55) and at the same time is clamped in the passive second gripping clasp (50b) next to the controllable gripping clasp (51). When the feed and carrying gripper device move towards each other and come in contact with each other, the push contact (59) of the carrying gripper device is pushed against the slider (58) of the second feed gripper device, through which this slider (58) moves backwards (in the direction of the arrow), through which the lower end (56) of the upper hinged clamping part (54) is pushed against the edge (65) of the hole (57), through which the upper hinged clamping part (54) is pushed against the lower clamping part (55), through which the third gripping clasp (51) is brought into the clamping position and the weft thread is clamped. When the weft thread is taken over by the second carrying gripper device, the third gripping clasp (51) has to be brought to the release position. Thereby, the second feed and carrying gripper device are moved away from each other, through which the push contact (59) of the carrying gripper device come off the slider (58), through which it can move freely again and in that way also the end (56) of the upper hinged clamping part (54) can move freely in the corresponding aperture (56) in the slider (58).

[0029] When the second feed gripper device has clamped the weft thread, it is brought in the space according to the width of the fabric by means of a driven guide. There, the weft thread has to be taken over by a second carrying gripper device, as is shown in figure 3a. The movable body (2) of the second carrying gripper device is provided with a gripping clasp (71), consisting of an upper clamping part (72) and a lower controllable clamping part (73), as also is shown in figure 3c, in which the lower controllable clamping part (73) is attached to a lower part (81) of the movable body (2). The lower controllable clamping part (73) is constructed out of a resilient material and is provided with a projection (74) which is in contact with the controllable bar (60).

[0030] As is shown in figures 3d and 3e, in the upper clamping part (72) a groove (64) is provided which is bounded with two guiding wedges, i.e. a first guiding wedge (79) which is predominantly closed to the lower controllable clamping part (73) and a second guiding wedge (80) which narrows to the lower clamping part (73) and to the front of the movable body (2). In this groove (64) a hook (75) is situated in which the weft thread is picked up. The side of the hook (75) which is situated at the side of the first guiding wedge (79) has to be place in the middle between the first (79) and the second guiding wedge (80). This hook (75) is placed under slight suspension. The end (77) of the hook (75) is

situated in a notch (78) in the lower controllable clamping part (73). Between the end (77) of the hook (75) and the notch (78) a small air crack is provided. On the one hand, the air crack attends to the non wearing of the end (77) of the hook (75) caused by the constant bumping of against the lower controllable clamping part (73), and on the other hand attends to the non clamping of the weft thread between two metal surfaces, but the adjourning of the weft thread in a small air crack and in that way the sliding in the eye (76) of the hook (75).

[0031] The control of the gripping clasp (71) of the second carrying gripper device from a clamping to a release position comprises the following steps: in the clamping position the controllable bar (60) is in contact with the protrusion (74) of the lower controllable clamping part (73). This bar (60) is pushed with force against the protrusion (74) by a spring mechanism (not shown in the figures) through which the lower controllable clamping part (73) is pushed with high pressure against the upper clamping part (72). When the second carrying and feed gripper device make contact during the movement towards each other, the push contact (59) of the carrying gripper device makes contact with the slider (58) of the feed gripper device through which the push contact (59) is pushed backwards (in the direction of the arrow). The controllable bar (60) consequently moves along backwards where through the controllable bar (60) has no further contact with the protrusion (74) and the lower controllable clamping part (73) is brought to the release position. However, in this release position the upper clamping part (72) is still pushed with a slight pressure against the lower controllable clamping part (73) because of the fact that the lower controllable clamping part (73) is a resilient sheet. With the picking up of the weft thread in the gripping clasp (71) of the second carrying gripper device, the lower controllable clamping part (73) is slightly pushed downwards by the picking up of the weft thread. When the second feed gripper device pulls at the weft thread, this lower controllable clamping part (73) attends to the sliding of the loss end between two slightly pressed clamping parts (72, 73) until the moment that the weft thread again is clamped in the gripping clasp (71) by the bringing of the gripping clasp (71) in its clamping position. If the weft thread is situated between the lower controllable clamping part (73) and the upper clamping part (72), the second carrying and feed gripper device move away from each other through which the push contact (59) again moves to the front (in the direction of the dotted arrow) under the influence of a spring (not shown in the figure) which is attached to the back of the controllable bar (60). Because of that the controllable bar (60) is again in contact with the protrusion (74) on the lower controllable clamping part (73) through which the lower controllable clamping part (73) is pushed with a high pressure against the upper clamping part (72) and the weft thread is clamped in the gripping clasp (71).

[0032] Also here it is important that, as is shown in figure 3a, as soon as the weft thread enters the second carrying gripper device between the lower controllable clamping part (73) and the upper clamping part (72), the weft thread is constantly clasped between point A and point D this with the entering of the weft thread as well as with the pulling of the loss end independent of the movement of the controllable bar (60). Between point A and point B, the weft thread is constantly clasped between the lower controllable clamping part (73) and the upper clamping part (72) because of the fact that the lower controllable clamping part (73) is a resilient sheet. Between point C and point D the weft thread is constantly slightly clasped by the slight pressure of the hook (75) against the lower controllable clamping part (73).

[0033] The picking up of the weft thread in the second carrying gripper device according to the invention and the taking over of the weft thread of the second feed gripper device to the second carrying gripper device comprises the following steps: the second feed and carrying gripper device move towards each other and make contact with each other. The push contact (59) of the second carrying gripper device pushes with it against the slider (58) of the second feed gripper device. At the bottom of the second feed gripper device a space (66) is provided between which the push contact (59) of the second feed gripper device can slide. The weft thread which is clamped between the two gripping clasps (50, 51) of the second feed gripper device slides into the gripping clasp (71) of the second carrying gripper device which is placed in the release position and slides under the hook (75). The push contact (59) of the second carrying gripper device is moved in a direction away from the second feed gripper device through which the second feed gripper device pulls at the loss end of the weft thread through which the loss end shortens. The push contact (59) of the second carrying gripper device again moves forward (in the direction of the dotted arrow). The carrying and feed gripper device can also move away from each other at the same time. When the push contact (59) has returned to its original position, thus when the controllable bar (60) is again in contact with the protrusion (74) of the lower controllable clamping part (73), the gripping clasp (71) attains the clamping position and the loss end has a minimal length, f.i. about 0,8 cm. The distance over which the push contact (59) of the second carrying gripper device can move can be predominantly determined and is determining for the distance over which the loss end of the weft thread is shortened. Depending on which kind of application this can be tested and adjusted. If the push contact (59) of the second carrying gripper device is placed back in its original position, there is no more contact with the slider (58) of the second feed gripper device through which the third gripping clasp (51) of the second feed gripper device attains the release position through which the third gripping clasp (51) releases the weft thread. The second carrying and feed gripper device are moved further away from each other in which the second carrying gripper device

takes the weft thread along to the edge of the fabric.

[0034] Also here the second carrying gripper device is brought next to the reed after which the weft thread is clasped with suitable means next to the reed and is released by the carrying gripper because of the fact that the control means as much as possible at the same time bring the gripping clasp (71) in a release position. The weft thread is taken along to the beating up of the fabric (up to the woven fabric).

[0035] Such a system attends to an important saving of the weft thread at the side of the carrying gripper. This saving varies between 1 to 3 %.

[0036] There is no more loss ribbon at the side of the carrying gripper which consequently attends to the falling away of the necessary warp threads and bobbins and the necessary technical assembly.

For thin or thick weft threads a supplementary regulation of the grippers neither of the weaving device concerning the weft thread is not necessary anymore.

The necessary weft thread tension can be kept extremely small and is restricted to a smaller part of the thread and in this way also weaker weft thread can be woven at high speed.

Because of the fact that the weft thread is constantly clamped in the carrying gripper device at the side of the reed up to the beating up of the fabric, the weft thread impossibly can jump back (when the carrying gripper is released) in the shed of the fabric neither can slide through (when the carrying gripper stops at the side of the reed) which consequently causes a weft fault in the first case and/or weft burls in the second case.

Claims

1. Carrying gripper device for weaving machines, comprising a movable body (2) provided of pick-up means to pick up a weft thread in the carrying gripper device, and clamping means (30, 71) for clamping a weft thread which has been picked up in the carrying gripper device, **characterised in that** the carrying gripper device comprises controlling means to

   keep the clamping means (30, 71) in a release position during the movement of the movable body (2) so as to withdraw a picked up weft thread out of the pick-up means to a predetermined length,

   and to

   subsequently bring the clamping means (30, 71) in a clamping position to clamp the weft thread.

2. Carrying gripper device according to claim 1, **characterised in that** the pick-up means comprise a groove, which is bounded with two guiding wedges, i.e. a first guiding wedge which is predominantly closed and a second guiding wedge which narrows to the front of the movable body, and that in the groove a hook (39, 75) is provided which is placed in such a way that the first guiding wedge reaches further to the back of the movable body (2) than the eye (41, 76) of the hook (39, 75).

3. Carrying gripper device according to claim 2, **characterised in that** the hook (39, 75) is put up movable.

4. Carrying gripper device according to any one of claims 2 and 3, **characterised in that** the side of the hook (39, 75) which is situated at the side of the first guiding wedge is placed predominantly in the middle of the groove formed between the two guiding wedges.

5. Carrying gripper device according to any one of claims 1 up to and including 4, **characterised in that** the clamping means (30, 71) comprise a controllable clamping part (31, 73) **and that** during the bringing of the clamping means (30, 71) to the clamping position the controlling means attend to the performing of a movement of said controllable clamping part (31, 73) through which the picked-up weft thread is clamped into the clamping means (30, 71).

6. Carrying gripper device according to claim 5, **characterised in that** the controlling means comprise a cable which is connected with a control (33) which is in contact with said controllable clamping part (31) so that a back and forth movement of the cable attends to the performing of an up and down movement of at least a part (42) of the controllable clamping part (31) between a release and a clamping position of the picked up weft thread.

7. Carrying gripper device according to claim 6, **characterised in that** the controlling means comprise a push contact (59) which is in contact with said controllable clamping part (73) so that a back and forth movement of the push contact (59) attends to the performing of an up and down movement of at least a part of the controllable clamping device (73) between a release and a clamping position of the picked up weft thread.

8. Carrying gripper device according to any one of the preceding claims, **characterised in that** it is provided to cooperate with a feed gripper device by which the picked up thread can be withdrawn out of the carrying gripper device to a predetermined length.

9. Carrying gripper device according to one of claims 6 and 7, **characterised in that** said push contact (59) of the controlling means is provided to cooperate with a slider (58) on the feed gripping device.

10. Carrying gripper device according to any one of claims 8 and 9, **characterised in that** the feed gripper device is provided with means to release the weft thread at the same time or shortly before the clamping of the weft thread in the carrying gripper device.

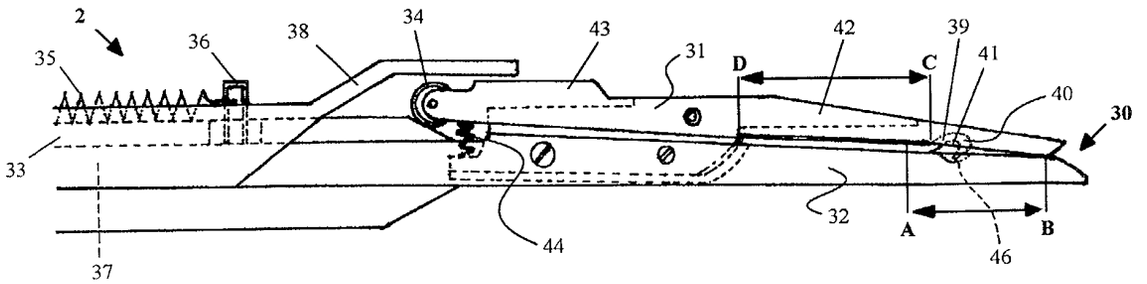

Fig. 1a

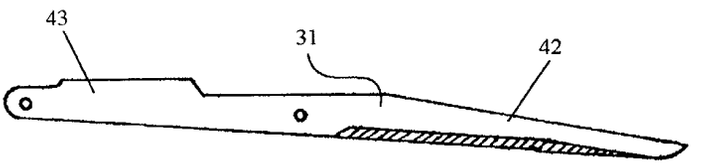

Fig. 1b

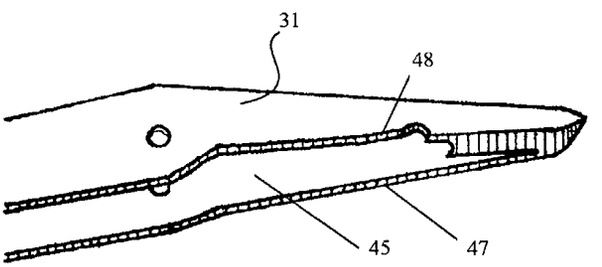

Fig. 1c

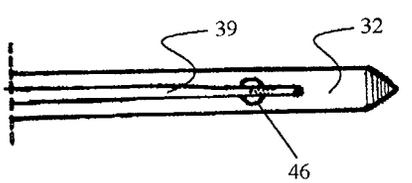

Fig. 1d

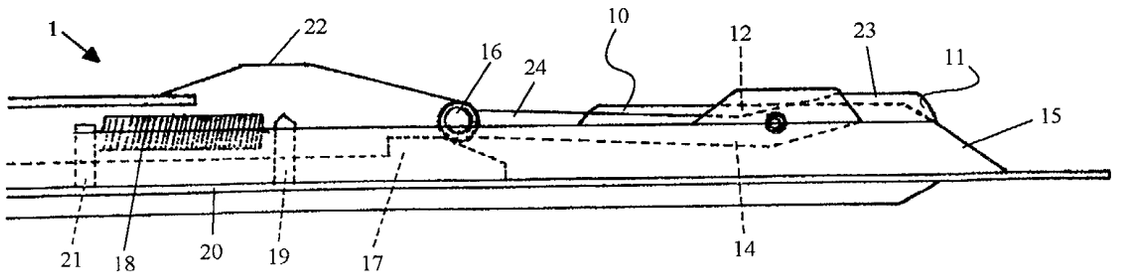

Fig. 2a

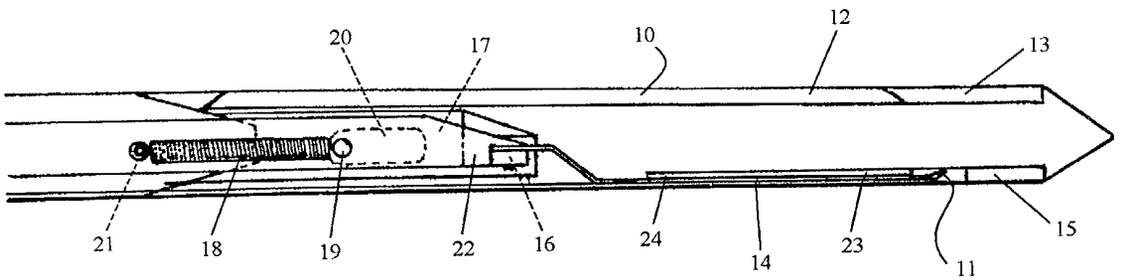

Fig. 2b

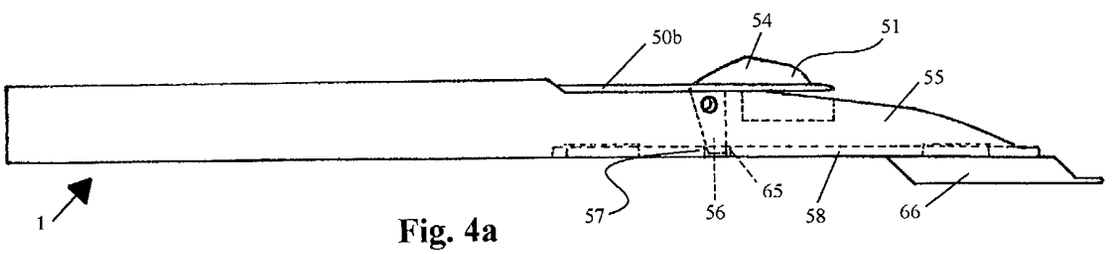

Fig. 4a

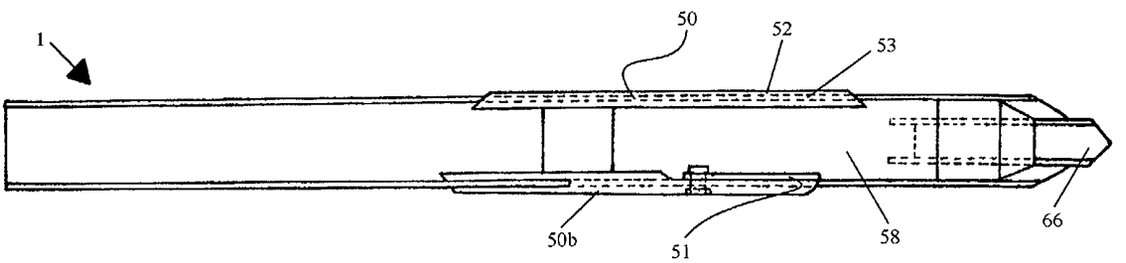

Fig. 4b

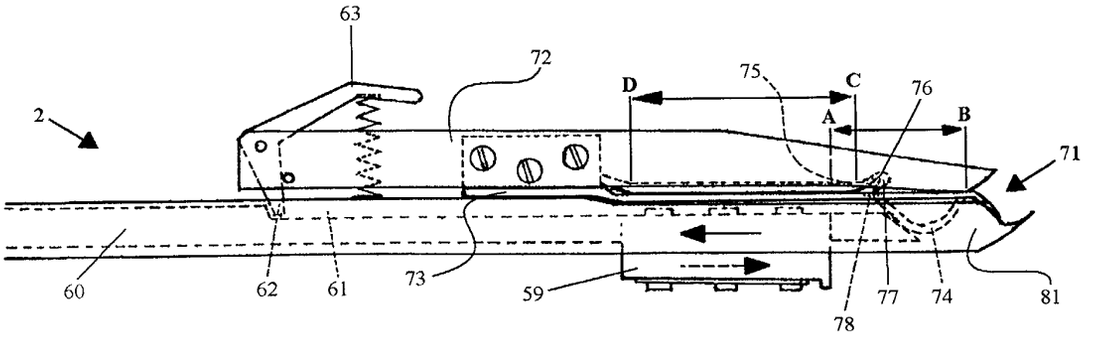

Fig. 3a

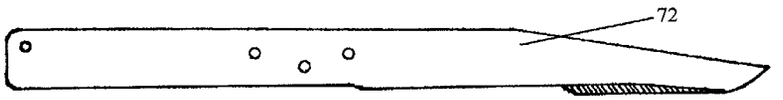

Fig. 3b

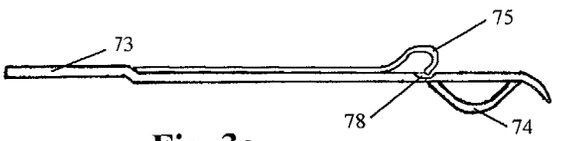

Fig. 3c

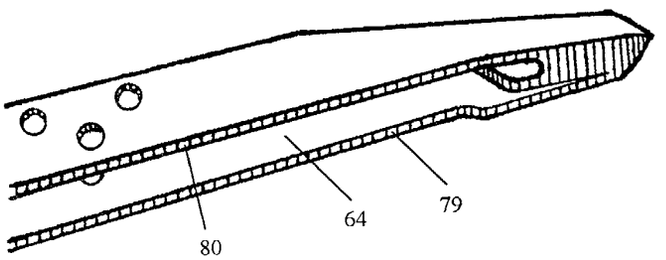

Fig. 3d

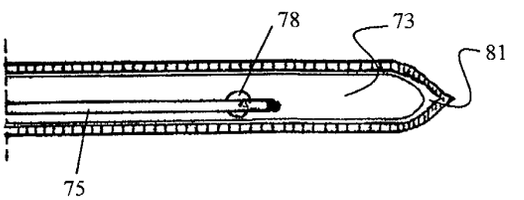

Fig. 3e

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 5655

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 695 820 A (NUOVO PIGNONE SPA) 7 February 1996 (1996-02-07) * abstract * * column 3, line 51 - column 4, line 33; figures 1-6 *	1	D03D47/23
A	US 3 854 505 A (DUPLESSY J) 17 December 1974 (1974-12-17) * abstract; figures 13-15 *	1	
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D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	3 July 2002	Louter, P

CATEGORY OF CITED DOCUMENTS

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