



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.06.2004 Bulletin 2004/24

(51) Int Cl.7: **D03D 47/23**

(21) Application number: **03104502.4**

(22) Date of filing: **02.12.2003**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR
 Designated Extension States:
AL LT LV MK

(72) Inventors:
 • **Midali, Roberto**
24123, Bergamo (IT)
 • **CATTANEO, Luigi**
24020, CASNIGO (Bergamo) (IT)

(30) Priority: **04.12.2002 IT MI20022568**

(74) Representative: **Vatti, Paolo, Dr. Ing. et al**
Fumero Studio Consulenza Brevetti Snc
Pettenkoferstrasse 20-22
80336 München (DE)

(71) Applicant: **Promatech S.p.A.**
24020 Colzate (Bergamo) (IT)

(54) **Improved carrying gripper for weaving looms**

(57) Carrying gripper to feed the weft yarn in weaving looms - of the type carried by an alternate-motion strap, which comprises a gripper body (1) and an oscillating lever (2) under the action of spring means (4), so as to grip and hold with one end (5) the weft yarn (T) between the same and a base (6) of said body (1), the opening of said gripper being controlled by a gripper-

opening device engaging the other end, characterised in that the base (6) of the gripper body (1) has a recess (13) above which is mounted a yielding lamina (14) with which engages the end (5) of said lever (2) holding the weft yarn (T). Said yielding lamina comprises a slot (15) with which is meant to cooperate a complementary projection (16) of said end (5) of the lever (2) holding the weft yarn.

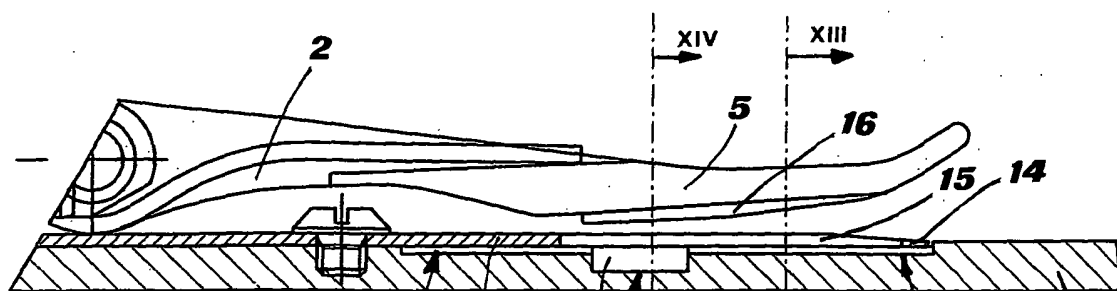


Fig. 12

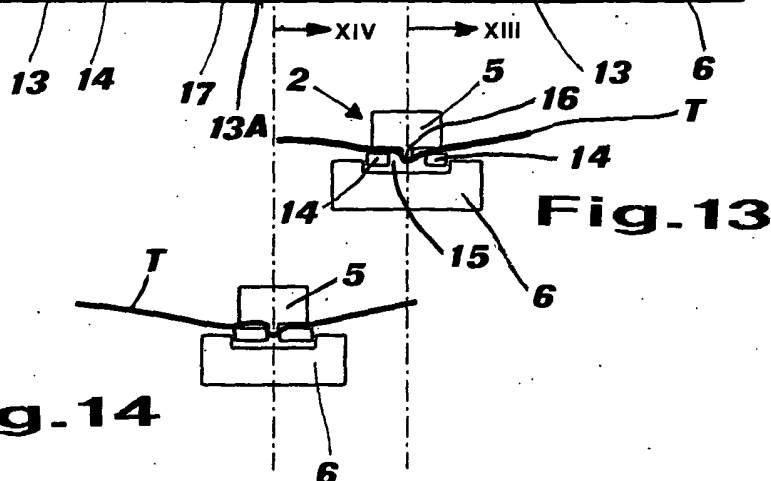


Fig. 13

Fig. 14

Description

[0001] The present invention relates to an improved carrying gripper for weaving looms.

[0002] Among weaving looms with continuous weft feeding, gripper looms are known in which the weft yarn is introduced into the shed by a pair of grippers - a carrying gripper and a drawing gripper - which pass said weft yarn to each other in the middle of the shed, said grippers being fixed at the end of alternate-motion straps which introduce them into and move them within the shed.

[0003] It is the function of the carrying grippers to grip the weft yarn, carried by a presenting device to the entrance of the shed, and to hold it in order to carry it to the middle of the shed, where it will be drawn by the drawing gripper.

[0004] The present invention relates to carrying grippers of the type comprising a gripper body and an oscillating lever under the action of spring means so as to grip and hold with one end the weft yarn between the same and a base of said body, the opening of said gripper being controlled by a gripper-opening device engaging the other end.

[0005] One of the problems in known carrying grippers of this type is the need to adopt an elastic system characterised by a high degree of rigidity in order to hold the weft while it is transported into the shed. Without adequate rigidity, in fact, the weft slips off the gripper due to the high accelerations at the dead positions at the entrance and in the middle of the shed, with severe negative consequences for the weaving being performed.

[0006] On the other hand, an elastic system with a high degree of rigidity entails, in the activation step of the lever holding the weft, a control characterised by an impulsive collision. For the gripper to withstand such collision, it must be equipped with a base made of a hard material, such as widia, capable of absorbing (without wearing) the impulsive pressure induced by the impact of the lever. The lever clicks when the gripper-opening device - acting on the lever of the gripper at the shed entrance - stops pushing onto one end of the lever itself causing it to oscillate and making the other end collide with said widia base through the action of the spring means controlling it.

[0007] The present invention aims at improving the gripping of the weft by introducing a geometrical asset of the gripping elements which forces the gripped portion of weft to bend at an acute angle. A weft tail at an acute angle actually improves the friction conditions and therefore the weft holding. Friction increase allows to reduce the rigidity of the elastic element, resulting in a diminished collision energy developing in the step during which the lever itself clicks into a closing position following deactivation of the gripper-opening device at the shed entrance.

[0008] The reduction of the existing elastic potential

energy further allows to do without the widia hard base normally provided on the gripper body at the engagement area of the oscillating lever holding the weft with the gripper body itself.

[0009] All this is achieved - according to the invention - by means of a weft-feeding carrying gripper for weaving looms, of the type carried by an alternate-motion strap and comprising a gripper body and an oscillating lever under the action of spring means, to grip and hold with one end the weft yarn between the same and a base of said body, the opening of said gripper being controlled by a gripper-opening device engaging the other end thereof, characterised in that the base of the gripper body has a recess above which there is mounted a yielding lamina with which the end of said lever holding the weft yarn engages.

[0010] In this gripper said yielding lamina preferably comprises a slot with which is meant to cooperate a complementary projection of said end of the lever holding the weft yarn, said slot of the lamina and said projection of the lever extending lengthwise to the gripper and having the shape of much extended isosceles triangles with the base close to the tip of the gripper.

[0011] Furthermore, said recess in the base of the gripper body preferably houses a pad made of soft material.

[0012] Using a gripper according to the invention as defined above allows to replace the system used in the prior art - an elastic lamina with a high degree of rigidity which pushes a lever against a hard plane - with a system consisting of an elastic lamina with a low degree of rigidity which pushes the lever against a yielding lamina, the latter being mounted over a recess, free to deform.

[0013] The invention will now be described in greater detail in the following text, with reference to the accompanying drawings, wherein:

[0014] fig. 1 shows a perspective view of a carrying gripper according to the prior art, whereof

[0015] fig. 2 is a cross-section;

[0016] fig. 3 is a perspective view with the components disassembled of the known gripper illustrated in figg. 1 and 2;

[0017] fig. 4 shows, in an enlarged lateral view, the front part of the carrying gripper illustrated in figg. 1 to 3;

[0018] fig. 5 is a detail further enlarged of the view illustrated in fig. 4 showing the engagement with the weft yarn in two successive gripper stroke moments,

[0019] figg. 6 and 7 being transversal cross-sections drawn according to the lines VI-VI and VII-VII in fig. 5 to illustrate such engagement in said moments;

[0020] fig. 8 shows a global perspective view of the carrying gripper according to the invention, whereof

[0021] fig. 9 is a transversal cross-section;

[0022] fig. 10 is a perspective view with the parts disassembled of the gripper according to the invention illustrated in figg. 8 and 9;

[0023] fig. 11 shows, in an enlarged lateral view, the front part of the carrying gripper illustrated in figg. 8 to

10, in a first embodiment;

[0024] fig. 12 is a detail further enlarged of the view illustrated in fig. 11;

[0025] figg. 13 and 14 are transversal cross-sections drawn according to the lines XIII-XIII and XIV-XIV in fig. 12, to illustrate the engagement with the weft yarn in two successive gripper stroke moments;

[0026] fig. 15 is the further enlarged detail of the front part of a second embodiment of the carrying gripper shown in figg. 8 to 10;

[0027] figg. 16 and 17 are transversal cross-sections drawn according to the lines XVI-XVI and XVII-XVII shown in fig. 15, to illustrate the engagement with the weft yarn in two successive gripper stroke moments; and

[0028] fig. 18 shows, in the same scale as fig. 15, the preferred shape of the slot of the yielding lamina which is a characteristic of the gripper according to the invention.

[0029] In the art, carrying grippers are known such as that, manufactured and used by the Applicant in their own weaving looms and illustrated in figg. 1 to 9 of the accompanying drawings, comprising a gripper body 1, a lever 2 mounted oscillating onto said body at 3, spring means consisting of an elastic lamina 4 normally acting onto said lever 2 to push its end 5 against the base 6 of the gripper body 1, so that said gripper grips and holds the weft yarn T, and an open protection element 7 provided with slits 8 and 9 guiding the weft yarn. According to the known art, grippers such as the ones illustrated in figg. 1 to 9 feature the end 5 of the lever 2 extended by a forkshaped flexible element 10 applied by means of screws 11 to hold the weft yarn T and house - in the base 6 of the gripper body 1 - a wide pad 12 inserted in the area where the collision of the end 5, 10 of the lever 2 occurs. As shown in figg. 5 to 7, the weft yarn T is first engaged softly by the gripper, approximately at cross-section VI-VI, and successively tightened to obtain a stable engagement at the section VII-VII of fig. 5. In this gripper all the drawbacks are present that have been highlighted in the first part of the description.

[0030] To avoid such drawbacks the invention provides a gripper such as the one illustrated as a whole in figg. 8 to 10 and in two embodiments in figg. 11 to 14, and 15 to 18 respectively.

[0031] This gripper comprises, like the one shown in figg. 1 to 8, a gripper body 1, a lever 2 mounted oscillating onto said body at 3, spring means consisting of an elastic lamina 4, normally acting onto said lever 2 to push its end 5 against the base 6 of the gripper body 1, to grip and hold the weft yarn T, and an open protection element 7, provided with a slit 8 guiding the weft yarn.

[0032] According to the invention, base 6 of the gripper body 1 has, at the engaging area of the weft yarn T, a recess 13, over which a yielding lamina 14 is mounted, with which the end 5 of lever 2 holding the weft yarn T 2 is engaged. The yielding lamina 14 comprises a slot or slit 15 with which, during the functioning of the gripper,

a complementary-shaped rib 16 cooperates, obtained below in the end 5 of the lever 2, slot 15 and rib 16 extending lengthwise to the gripper body 1.

[0033] In the embodiment of figg. 11 to 14, the yielding lamina 14 takes up the whole length of the recess 13 of the gripper body, substantially in the middle of which is located, slightly projecting, a pad 17 made of soft material, whereas in the embodiment of figg. 15 to 17 the yielding lamina 14 projects onto the recess 13, of which it leaves free the final portion.

[0034] In both the invention embodiments it is preferable to give the slot 15 the shape of a much extended isosceles triangle, with the base close to the tip of the gripper, as it is shown by way of example in fig. 18 for the gripper of figg. 15 to 17. In such case, the same shape is taken up by the rib 16 of the end 5 of the lever 2 (which must have, as already explained, a complementary shape to that of the slot 15).

[0035] This shape of the slot 15 and of the rib 16 further aids the horizontal arrangement at an acute angle of the weft tail when it is gripped by a gripper such as those in figg. 8 to 18. This arrangement, which is a characteristic of the invention, noticeably improves the gripping and the holding of the weft yarn. The effect is so much better, the narrower the acute angle at issue is, which advantageously occurs indeed when the slot 15 and the rib 16 are shaped as an isosceles triangle as shown in fig. 18.

[0036] With the gripper according to the invention as described above, the weft can be effectively held while it is transported into the shed (preventing it from slipping off the gripper due to the strong acceleration at the dead centre positions at the entrance and in the middle of the shed, with negative consequences on the weaving being performed) without having to resort to an excessive rigidity of the elastic system employed to hold it (thus avoiding the impulsive collisions which in the known art required to equip the gripper with a base made of a hard material, such as wood).

[0037] This result is due above all to the nature of the gripping elements, which provide, in the base 6 of the gripper body 1, the innovative recess 13 onto which the yielding lamina 14 is arranged to receive the engagement of the rigid end 5 of the retaining lever 2 of the gripper, turning upside down the criteria of the known art, which provided a rigid base for the gripper, with a hard inlay and a rigid retaining lever featuring a yielding end.

[0038] Besides, to the result can actively contribute also the other important innovative characteristic of the invention, namely the provision of a slot such as 15 in the yielding lamina 14 and of a corresponding rib such as 16, projecting from the end 5 of the retaining lever 2.

[0039] In the gripper according to the invention, the synergy developing between the nature and the geometrical asset of the tightening elements determines an acute-angle bending of the weft tail portion gripped and held by the gripper, which noticeably improves the fric-

tion conditions and therefore the holding of the weft itself. Since this occurs so much more effectively, the narrower the acute angle is according to which the tail arranges itself, it is convenient to give the slot 15 of the yielding lamina 14 the shape of the isosceles triangle shown (fig. 18) for the preferred embodiment of the invention, shape which indeed aids the tail bending at a very narrow acute angle.

[0040] Thanks to its improved holding of the weft, the arrangement according to the invention allows, on the other hand, to reduce the rigidity of the elastic gripping system, with a resulting reduction of the collision energy developing in the step in which the retaining lever clicks into a closing position, at the deactivation of the gripper-opening device at the shed entrance, which brings advantages in terms of durability and gripper costs (besides, the expensive widia inlays are superfluous), as well as in terms of noise reduction during weaving.

[0041] The choice between the embodiment shown in figg. 11 to 14 (in which the end 5 of the lever 2 engages, in addition to the yielding lamina 14, also - with its rib 16 - the pad made of soft material 17) and that shown in figg. 15 to 18 (in which the lever 2 engages only the yielding lamina 14 mounted projecting) must be made bearing in mind the yarns used, the types of weaving and especially one's experience.

[0042] It is understood that the embodiments of the carrying gripper according to the invention illustrated above are purely by way of example and that changes may be made without going beyond the scope of the invention.

Claims

1. Carrying gripper to feed the weft yarn in weaving looms - of the type carried by an alternate-motion strap and comprising a gripper body (1) and an oscillating lever (2) under the action of spring means (4) so as to grip and hold with one end (5) the weft yarn (T) between the same and a base (6) of said body, the opening of said gripper being controlled by a gripper-opening device engaging the other end thereof, **characterised in that** the base (6) of the gripper body (1) has a recess (13) above which there is mounted a yielding lamina (14) with which the end (5) of said lever (2) holding the weft yarn engages.
2. Carrying gripper as claimed in claim 1) in which said yielding lamina (14) comprises a slot (15) with which is meant to cooperate a complementary projection (16) of said end (5) of the lever (2) holding the weft yarn.
3. Gripper as claimed in claims 1) and 2) in which said slot (15) of the yielding lamina (14) and said projection (16) of the lever (2) extend lengthwise to the

gripper.

4. Gripper as claimed in claims 1) to 3) in which said recess (13) houses a pad (17) made of soft material.
5. Gripper as claimed in claims 1) to 4) in which said slot (14) is formed like a slit and said projection (16) is formed like a rib, both being substantially rectilinear.
6. Gripper as claimed in claims 1) to 4) in which said slot (14) and said rib (16) have the shape of much extended isosceles triangles with the base close to the tip of the gripper.

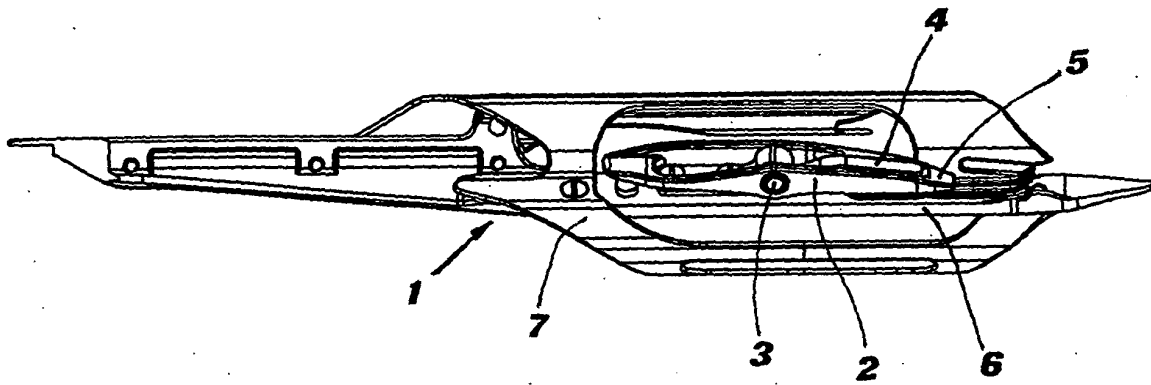


Fig.1

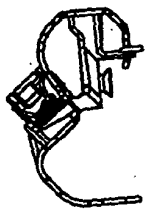


Fig.2

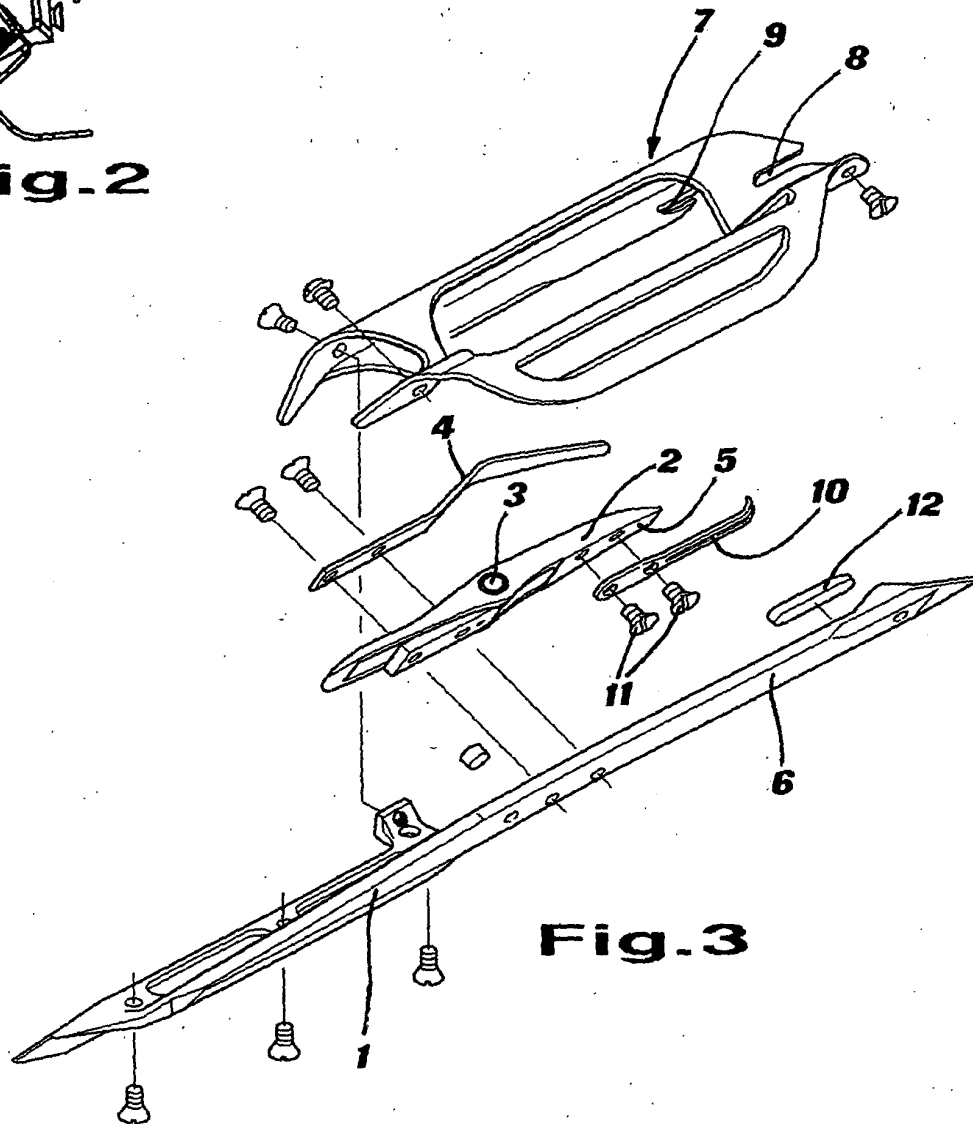
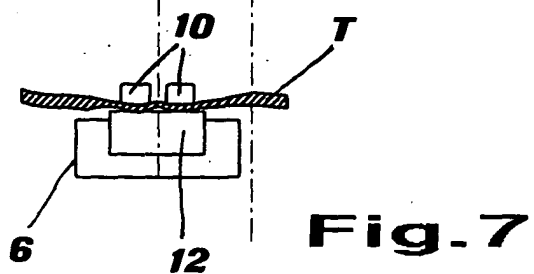
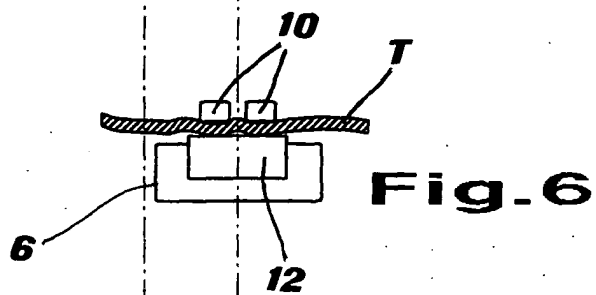
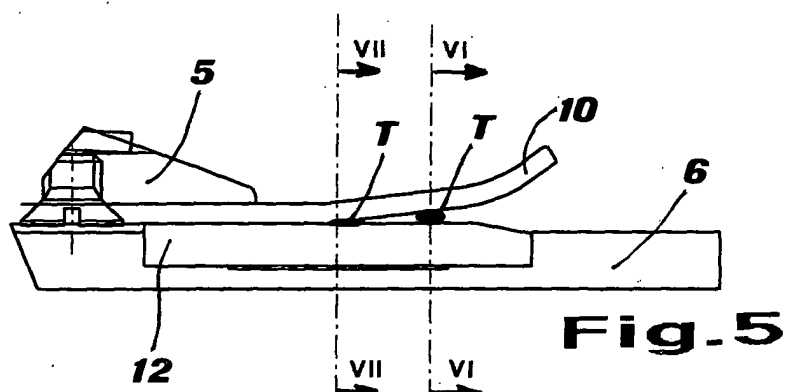
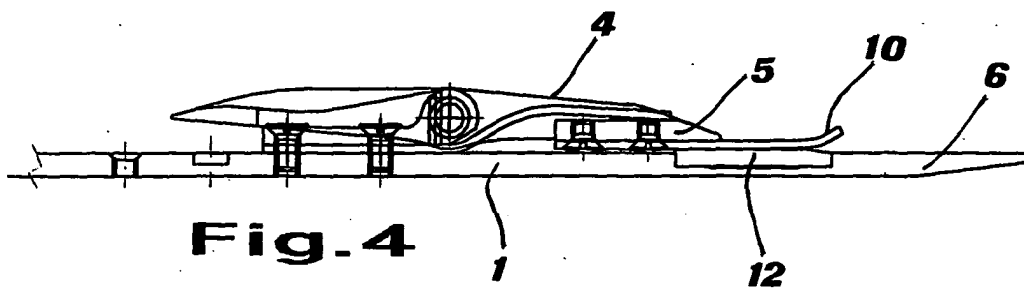


Fig.3



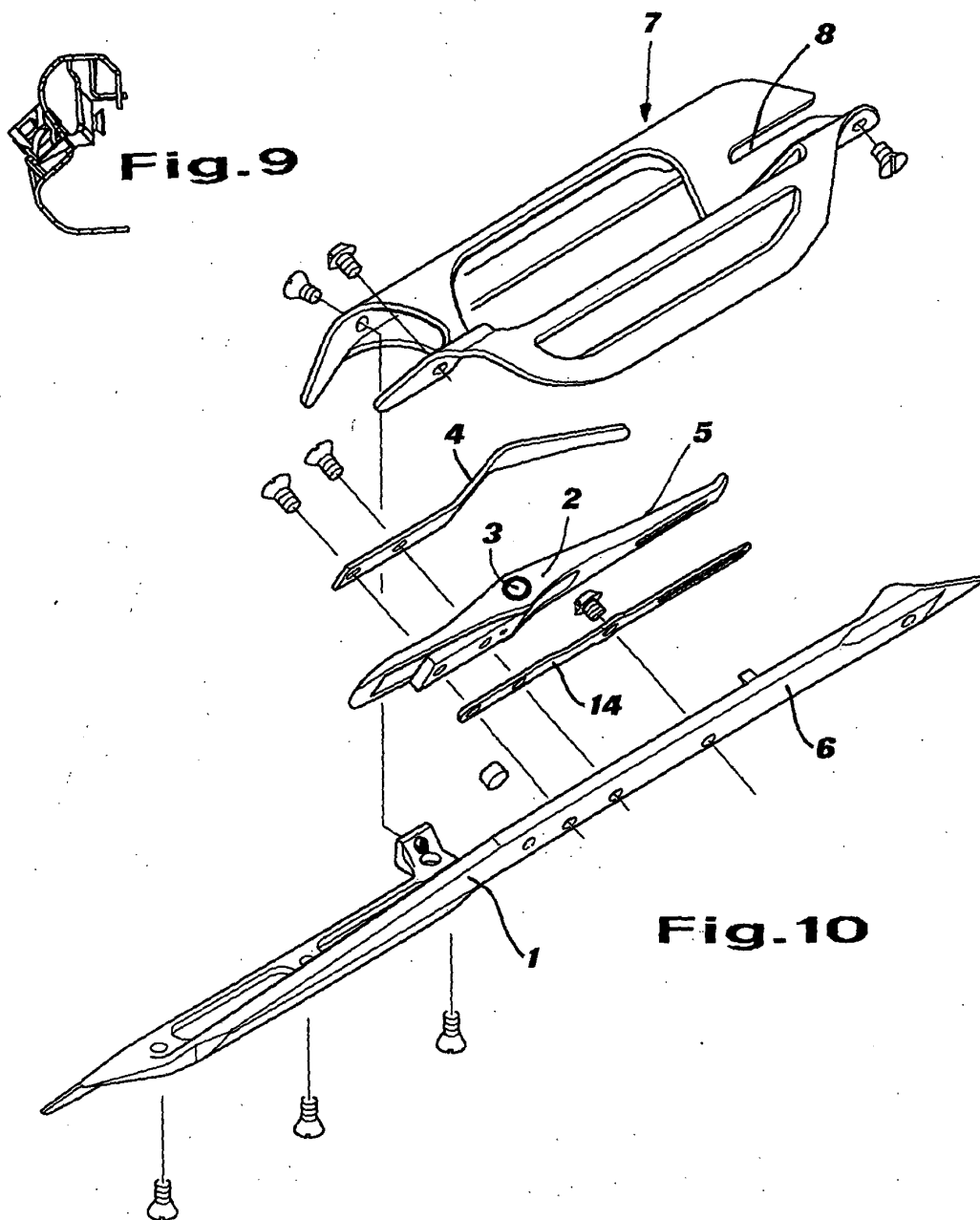
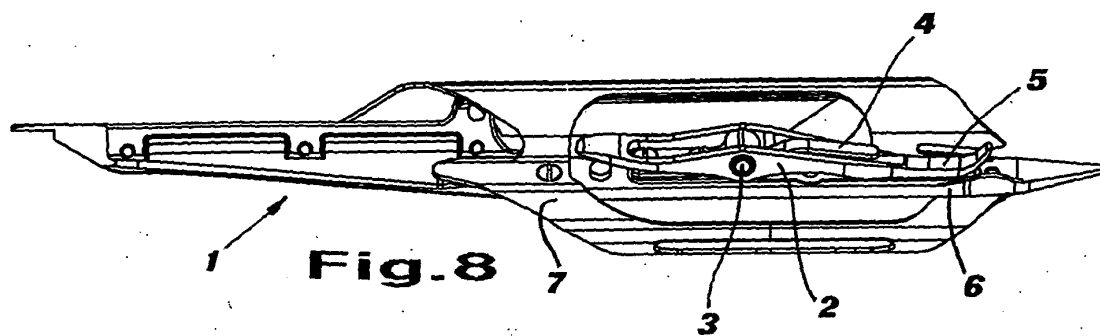
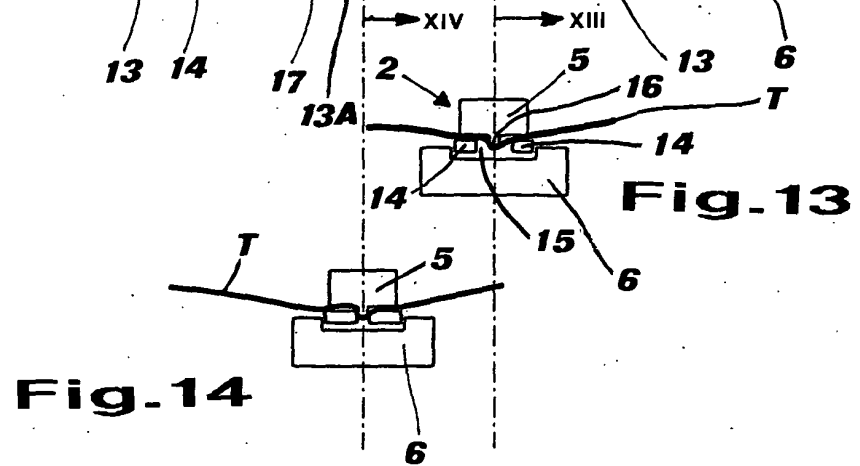
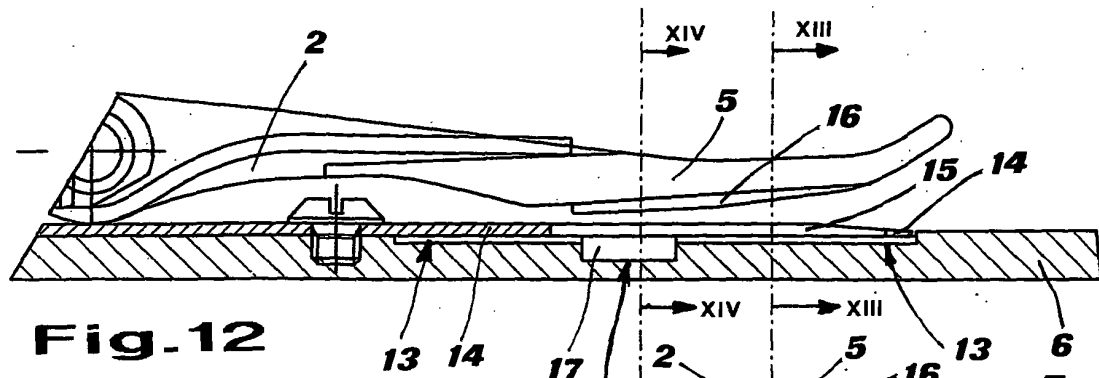
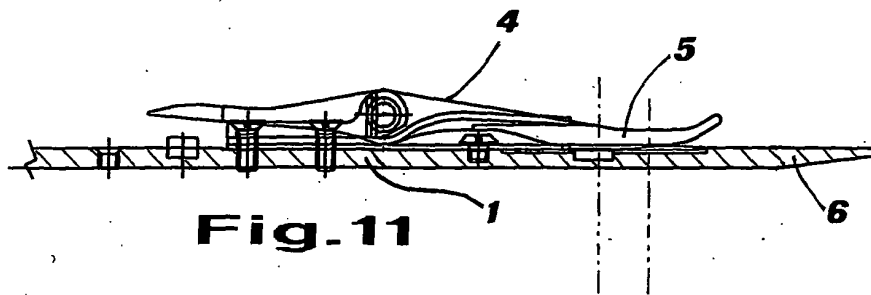


Fig. 10



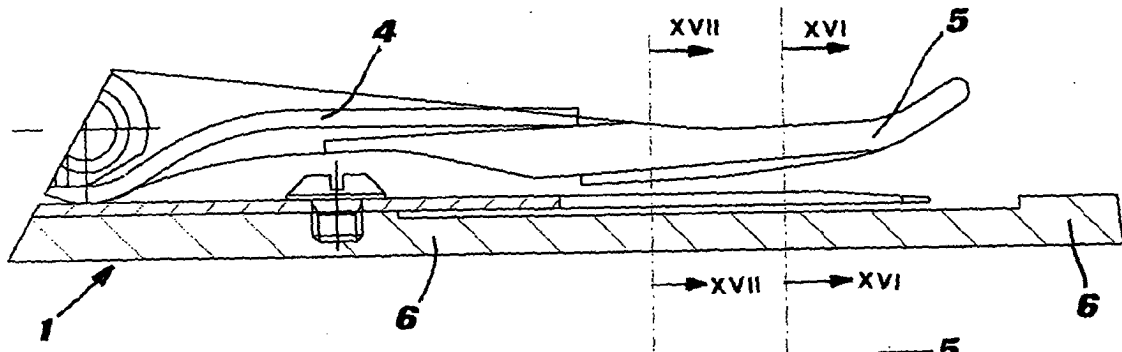


Fig.15



Fig.16

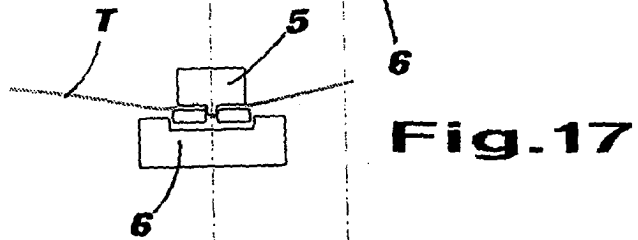


Fig.17

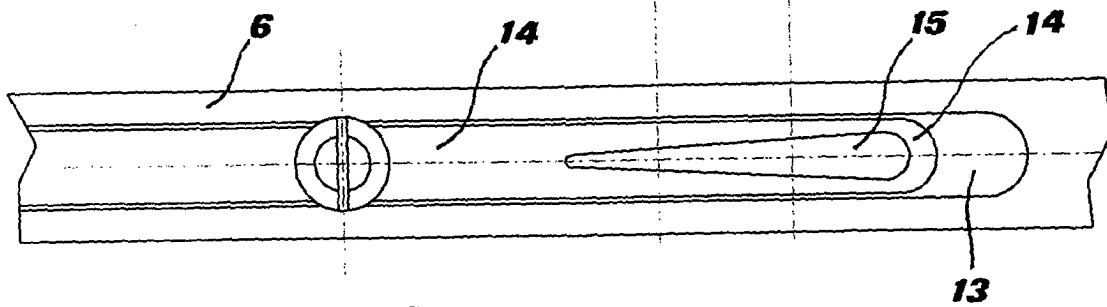


Fig.18