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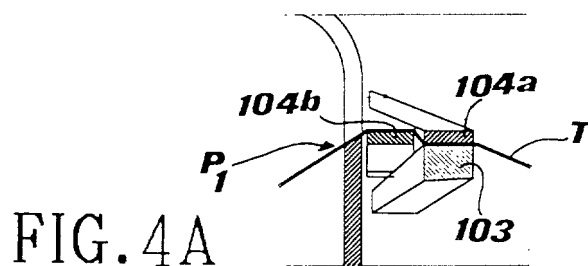
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(54) **Weft carrying gripper for weaving looms with progressive weft clamping**

(57) A gripper for weaving looms comprising a gripper body (101) provided with a gripping device is described, the latter having at least one contact shoe (103) and one co-operating pressure plate (104) which diverge along the front part and between which a weft yarn is intended to engage; according to the invention the

pressure plate (104) consists of two flexible half-plates (104a,104b) which are located alongside each other and joined at the same plate base, a first (104a) of said half-plates co-operating with said contact shoe (103) and a second (104b) of said half-plates being able to support the weft yarn (T) and carrier the pressure load of said yarn to the first half-plate (104a).



Description

[0001] The present invention relates to an improved carrier gripper for weaving looms. In particular it relates to a carrier gripper with plates for gripping the weft yarn.

[0002] As is known, a carrier gripper in a weaving loom has the function of transferring a weft yarn from the point of insertion in the shed to the central zone of the loom where the exchange occurs with the drawing gripper which in the meantime has arrived on the opposite side. During the gripping phase, the gripper must be able to grip firmly the weft yarn which lays in front of it between the fabric being formed and the weft feeding device, so as to convey it at high speed towards the centre of the loom; at the same time, however, the weft yarn must not remain trapped in the carrier gripper since the exchange with the drawing gripper must occur smoothly, otherwise there would be the risk of breakage of the weft yarn or the formation of an irregular weave.

[0003] These two opposing requirements mean that the gripping device is a very delicate and critical component for correct operation of the loom and that many major efforts and investments have been made in this area.

[0004] A carrier gripper designed in accordance with the latest technology consists of an elongated box-shaped body which is fixed onto a gripper support belt to which the weft-gripping device is fixed. The latter typically consists of a pair of shoes which are pressed against each other in a substantially horizontal plane and between which the weft yarn is intended to be engaged.

[0005] Such a device according to the prior art is shown schematically in Figs. 1 and 2 which are a schematic side elevation view (Fig. 1), with an enlarged detail (Fig. 1A), and a cross-sectional view (Fig. 2), with an enlarged detail (Fig. 2A), of a carrier gripper.

[0006] According to the prior art shown, a carrier gripper has a box-shaped body 1 which is fixed to the end of a gripper support belt 2 and to which a bottom contact shoe 3 and a pressure plate 4 are attached. A weft yarn T is gripped between these two latter parts.

[0007] The pressure plate 4 is flexible while the contact shoe 3, which is usually arranged underneath, may also be substantially rigid. The pressure plate 4 is kept pressed against the shoe 3 by a cam member 5, by means of which it is possible to adjust the rigidity thereof and hence the gripping action exerted on the weft yarn in co-operation with the bottom shoe.

[0008] The possibility of adjustment is envisaged in a very large number of grippers according to the prior art since it is desirable to be able to vary manually the pressing force depending on the characteristics of the yarn forming the weft, in particular depending on the yarn count and the material from which it is made.

[0009] It should be noted that the adjustment, which is performed manually by means of the cam 5, must be carried out so that gripping of the weft between the bot-

tom shoe and the resilient pressure plate is sufficient not to allow separation of the yarn during insertion into the shed, but, at the same time, is not excessive such as to cause possible breakages during the exchange operation.

[0010] It must also be pointed out, with the gradual increase in tension of the weft yarn, there is a tendency for the latter to be inserted further down inside the interstice between the shoe and the plate, thereby modifying the point of contact of the yarn on the gripper.

[0011] Obviously, achieving in each case the correct compromise and degree of adjustment, depending on operation of the loom and the thickness of the yarn, is certainly not an easy affair.

[0012] The object of the present invention is therefore to provide a carrier gripper which also allows a certain tolerance with regard to the adjustment precision, as well as a gripper which automatically maintains suitable gripping of the weft for each operating step, at the same time ensuring that the weft remains gripped at a predefined point along the resilient plate, for example at a point where the acceleration produced by the movement of the grippers does not cause breakage thereof.

[0013] This object is achieved by means of a carrier gripper as described in the accompanying main claim.

[0014] Further characteristic features and advantages of the device according to the invention will however emerge more clearly from the detailed description which follows of a preferred embodiment thereof, provided by way of example and illustrated in the accompanying drawings, in which:

Fig. 1 is a schematic side elevation view of a gripper according to the prior art;

Fig. 1A is an enlarged view of the detail shown encircled in Fig. 1;

Fig. 2 is a cross-sectional view along the line II-II in Fig. 1;

Fig. 2A is an enlarged view of the detail shown encircled in Fig. 2;

Fig. 3 is a view, similar to that of Fig. 1, of a gripper according to the invention;

Fig. 3A is an enlarged view of the detail shown encircled in Fig. 3;

Fig. 4 is a cross-sectional view along the line IV-IV of Fig. 3 in a condition where the weft yarn is loosely tensioned;

Fig. 4A is an enlarged view of the detail shown enclosed in a square in Fig. 4;

Fig. 5 is a cross-sectional view along the line IV-IV of Fig. 3 in a condition where the weft yarn is tightly tensioned;

Fig. 5A is an enlarged view of the detail shown enclosed in a square in Fig. 5;

Fig. 6A is a plan view of the bottom shoe according to the invention;

Fig. 6B is a side elevation view of the bottom shoe according to Fig. 6A;

Fig. 7A is a top plan view of a resilient plate according to the invention;

Fig. 7B is a side elevation view of the plate according to Fig. 7A;

Fig. 8 is a side elevation view of a gripper according to the invention; and

Fig. 8A is an enlarged, perspective, partial view of Fig. 8 which shows the gripping device according to the invention.

[0015] A carrier gripper comprises, in a manner known per se, a box-shaped body 101, which is fastened to a gripper support belt 102, on which a bottom contact shoe 103 is fixed. Moreover a flexible plate 104 co-operating with the bottom shoe 103 is provided.

[0016] The box-shaped body 101 is configured in such a way as to offer, in working conditions, two support points P_1 and P_2 for a weft yarn T which also passes through the gripping device (Figs. 4 and 5).

[0017] The bottom shoe has a front end curved downwards (Fig. 6B). It may be made of a rigid or resilient material. Preferably the front end is curved towards the box-shaped body of the gripper: this prevents any interference with the warp yarns at the moment of closing of the shed when the gripper is retracted.

[0018] The plate 104 rests on top of the bottom shoe and is pressed against it by cam means 105 (shown only schematically).

[0019] According to the invention, the resilient plate 104 is divided, in its front portion, into two half-plates 104a and 104b which are joined together integrally at the working zone (namely where the weft yarn is gripped).

[0020] As can be seen in Fig. 7B, the two half-plates 104a and 104b are curved, respectively upwards and downwards (with reference to the working condition). Moreover, the half-plate 104a is longer than the half-plate 104b and is also bent towards the box-shaped body along its end section.

[0021] The resilient plate 104, moreover, has a portion 104c with a knee bend which is able to engage with the drawing gripper, during the exchange operation, in order to slacken gripping of the weft yarn.

[0022] The basic adjustment of the gripping device is performed in a manner similar to that of the prior art, namely by adjusting the static engagement between the upper half-plate 104a and the bottom shoe 103. However, according to the invention the weft T is intended not only to be wedged between the half-plate 104a and the fixed shoe 103, but also to rest on the half-plate 104a, as clearly illustrated in Figs. 4A and 5A.

[0023] In this way, the tension present in the weft yarn T is transmitted partly onto the half-blade 104b which is thus loaded and pushed so that it flexes downwards. Since the half-blade 104a is joined integrally, at its base, with the half-blade 104b, the load applied onto the latter by the tension in the yarn T is distributed also partly onto the half-blade 104a which therefore acts with a greater

pressure on the bottom shoe 103, clamping the weft yarn T more firmly and counteracting its tendency to be wedged more deeply inside the gripping device.

[0024] The cam system 105 may therefore be adjusted manually with a smaller degree of precision and so as to exert less pressure such that the weft yarn is retained "gently" in static conditions - preventing breakage at the moment of gripping or at the moment of exchange between the two grippers - whereas it is held firmly, in dynamic conditions, by the increased gripping pressure due to the greater tension in the yarn itself - typically preventing it from being extracted from the carrier gripper during insertion in the weft shed, or its point of contact on the gripping device from being displaced excessively.

[0025] The view shown in Fig. 5A illustrates lowering of the half-plate 104b which results in an increase in the pressure on the weft yarn retained between the half-plate 104a and the fixed shoe 103.

[0026] From a functional point of view, the following should be considered.

[0027] At the start of the working cycle, a weft yarn extends between the fabric and the associated weft feeding device. The carrier gripper according to the invention approaches the zone of interaction with the weft yarn and the latter is captured between the two points P_1 and P_2 of the box-shaped body, being inserted between the plate 104a and the fixed shoe 103 and remaining gripped there. At this point the weft yarn is cut on the fabric side (on the right-hand side in Figs. 4 and 5A) and drawn inside the shed.

[0028] As the tension in the weft yarn gradually increases, a greater pressure is exerted on the half-plate 104b, thus also producing a greater gripping action of the half-plate 104a.

[0029] At the moment of exchange with the drawing gripper, the practically static conditions are restored such that the enhanced pressure is no longer exerted on the half-plate 104a and therefore the weft yarn may be easily extracted from the carrier gripper.

[0030] As can be deduced also from the functional description given above, with the gripper according to the invention the object mentioned in the introductory part has been perfectly achieved. Namely, a carrier gripper equipped with a device having a gradual gripping action has been provided, where the degree of clamping of the weft may be adjusted with a certain tolerance depending on the specific working conditions and the type of weft yarn.

[0031] The gradual increase in pressure of the half-plate on the bottom shoe also prevents the weft yarn from becoming excessively wedged inside the gripping device, thus preventing its point of contact from being displaced into an undesirable position.

[0032] It is understood, however, that the invention is not limited to the particular configuration illustrated above, said configuration being only a non-limiting example of the scope of the invention, but that numerous

variations are possible, all within the reach of a person skilled in the art, without thereby departing from the scope of the invention itself.

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Claims

1. Gripper for weaving looms of the type comprising a gripper body able to travel within the shed and provided with a gripping device, the latter having at least one contact shoe and one co-operating pressure plate which diverge each other at their front part and between which a weft yarn is intended to engage, **characterized in that** the pressure plate consists of two flexible half-plates which are located alongside each other and joined at the same plate base, a first one of said half-plates co-operating with said contact shoe and a second one of said half-plates being able to support the weft yarn and carrier the pressure load of said yarn to the first half-plate.
2. Gripper according to Claim 1, in which said pressure plate is arranged on top of said contact shoe.
3. Gripper according to Claim 1 or 2, in which said second half-plate is arranged between the first half-plate and said gripper body.
4. Gripper according to Claim 2 or 3, in which said first half-plate is curved upwards along its front portion, while said second half-plate is curved downwards along its front portion.
5. Gripper according to Claim 4, in which said second half-plate is shorter than said first half-plate and the latter is also curved towards the gripper body along its front end section.
6. Gripper according to any one of the preceding claims, in which said shoe and plate are pressed together by means of an adjustable pressure mechanism.

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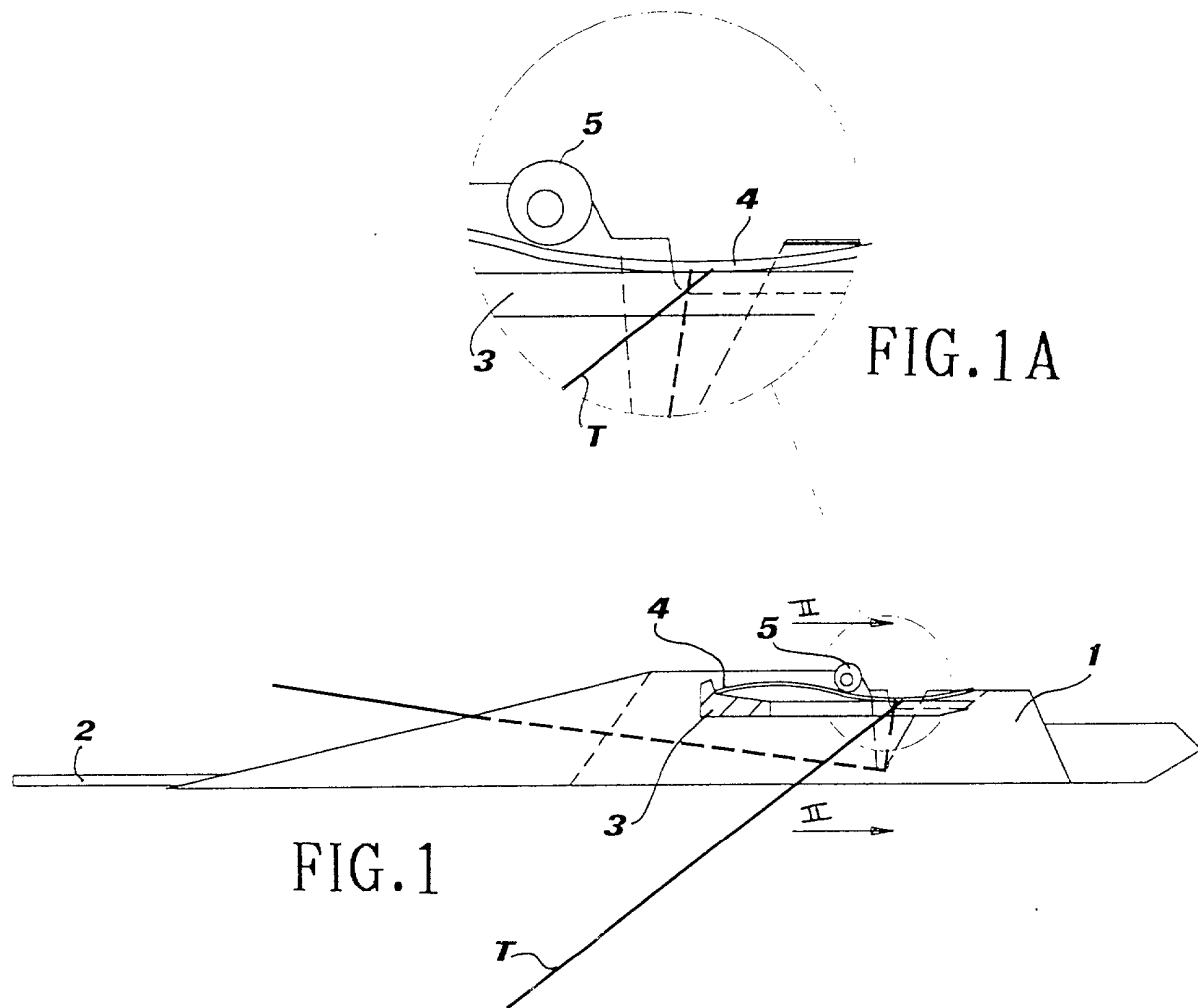


FIG. 2A

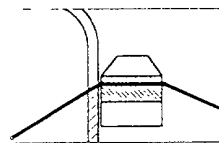
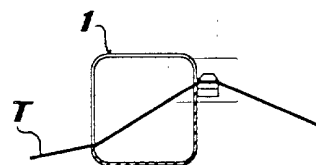


FIG. 2



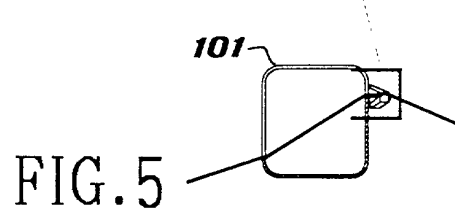
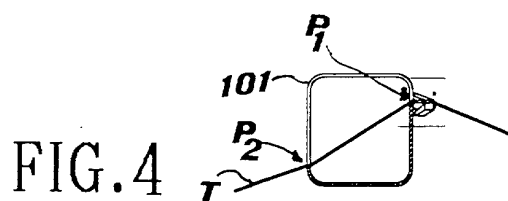
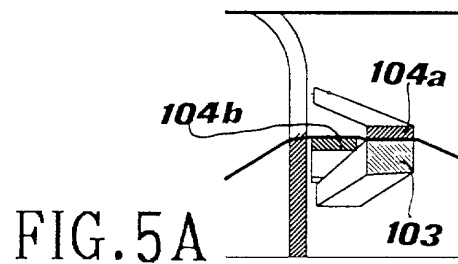
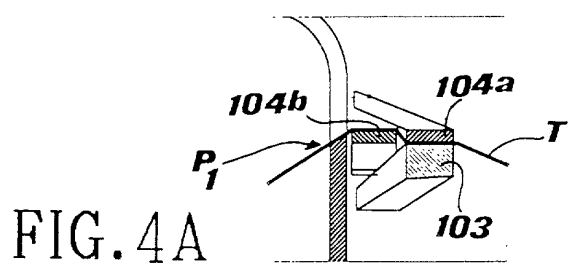
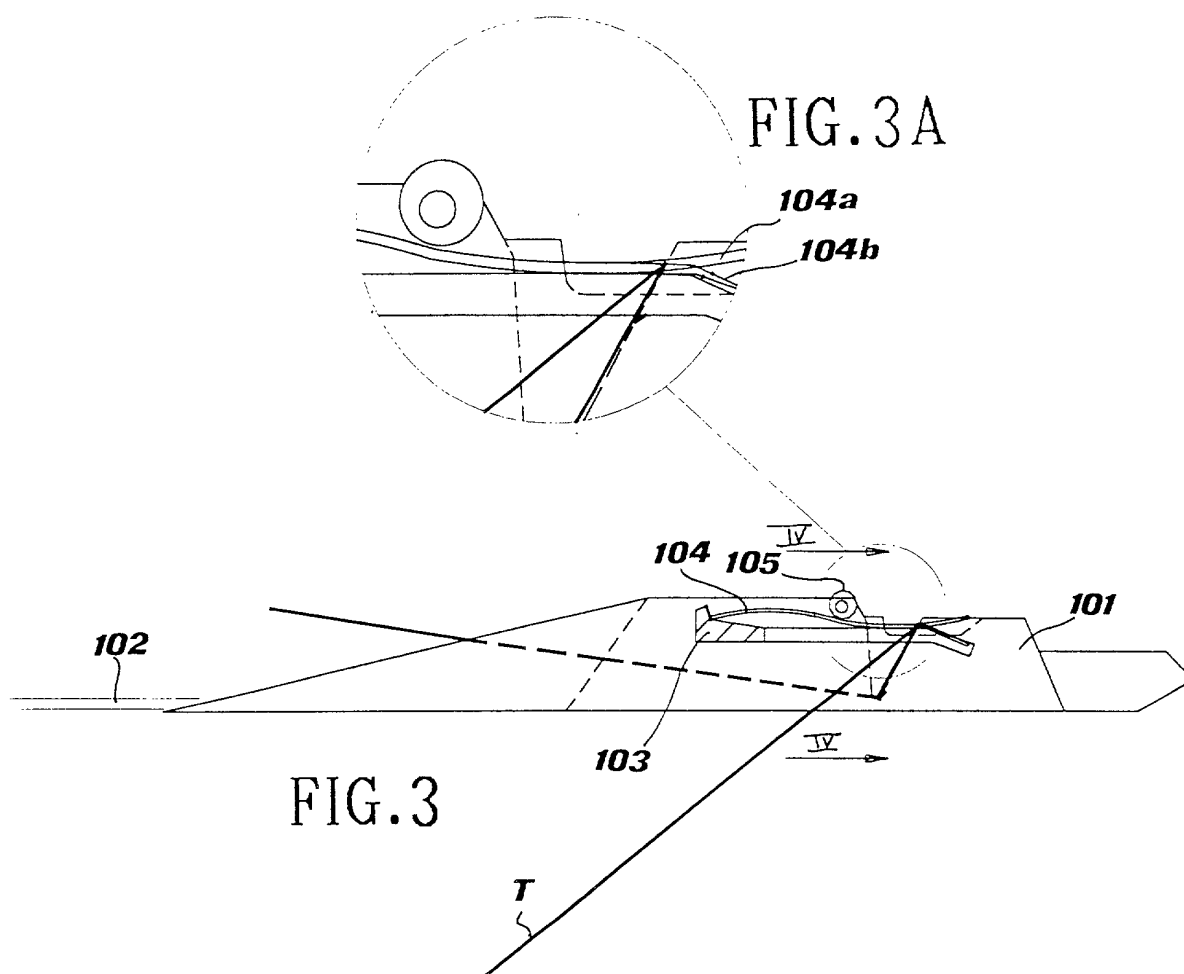




FIG. 6B

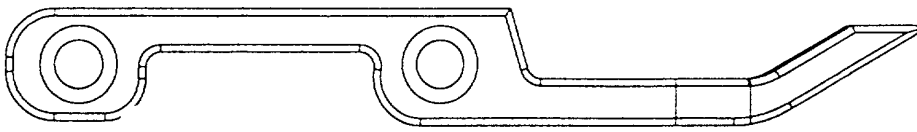


FIG. 6A



FIG. 7C

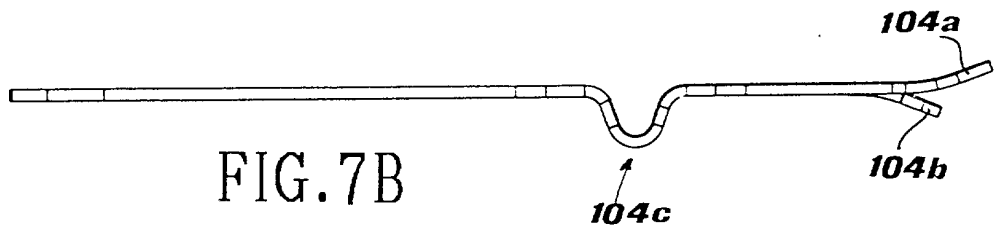


FIG. 7B

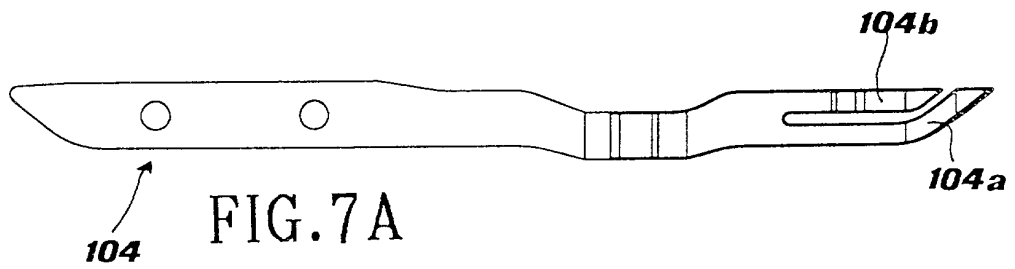
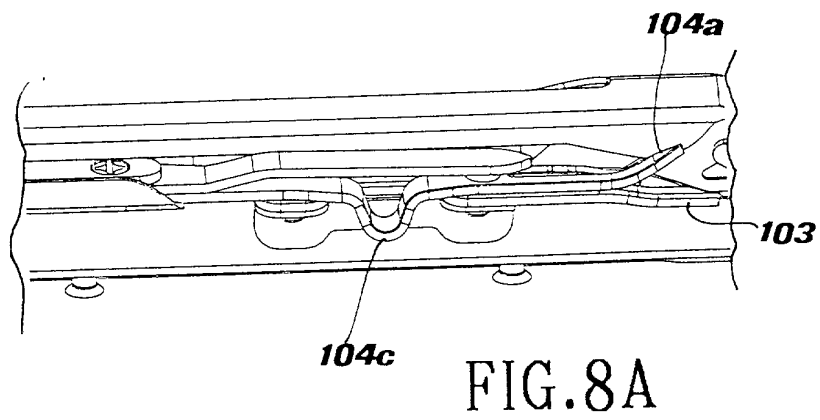
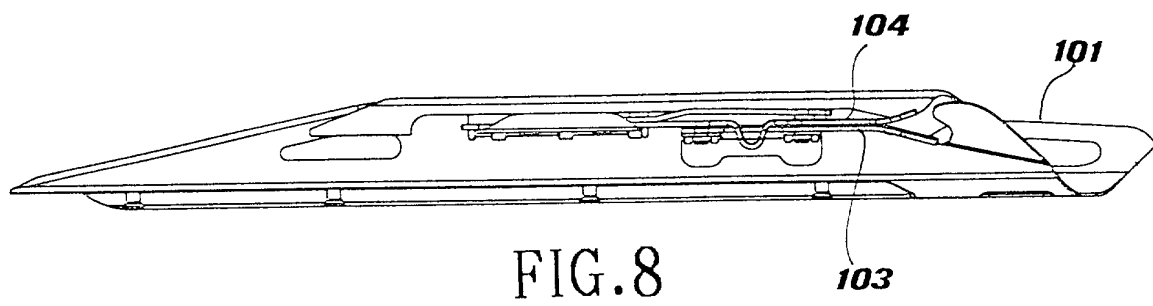


FIG. 7A





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EUROPEAN SEARCH REPORT

Application Number
EP 01 83 0245

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Place of search	Date of completion of the search	Examiner	
THE HAGUE	3 October 2001	Rebiere, J-L	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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