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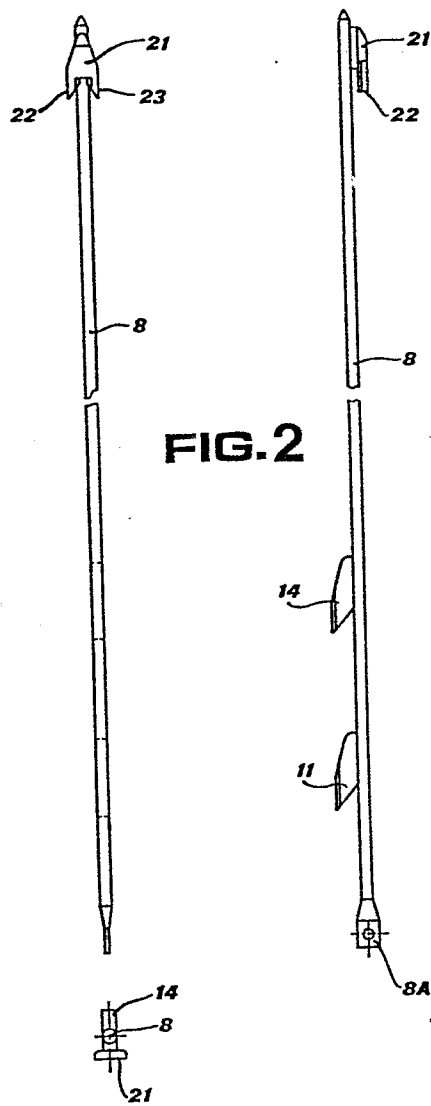
(71) Applicant: **FIMTESSILE FABBRICA ITALIANA**
MACCHINARIO TESSILE S.p.A.
Via Spiazzi, 52
I-24028 Ponte Nossa (Bergamo)(IT)

(72) Inventor: **Epis, Olivo**
Via Monsignor Re, 19
I-24028 Ponte Nossa - Bergamo(IT)

(74) Representative: **Vatti, Paolo, Dr. Ing. et al,**
Fumero - Studio Consulenza Brevetti
Widenmayerstrasse 4/I
D-8000 München 22(DE)

(54) Single rod hook for jacquard weave machines and machine produced therewith.

(57) A single rod hook for a double-lift, open-shed jacquard weave machine of the type comprising mobile grippers which intersect each other, has its upper nibs formed as the two teeth, with their facing surfaces inclined, of a single bifurcated projecting appendix in which they join together at the same height. Said appendix is disposed in a diametrically opposite position to the lower nibs. A jacquard weaving machine using hooks of the aforesaid type has its hooks controlled with a composite movement of rotation and flexure.



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"SINGLE ROD HOOK FOR JACQUARD WEAVE MACHINE AND MACHINE PRODUCED THEREWITH"

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This invention relates to open-shed, double-lift weave machines of the type comprising two grippers of opposing motion and a single rod hook.

Various versions of these machines are already known in the art, they differing mainly by the means used for preventing the hook simultaneously engaging the two mobile grippers.

One of the most known versions uses a cylindrical rod hook with two nibs applied angularly offset by about 90° from each other and at different heights.

This method requires particularly strong hook return members (usually springs), because besides returning the hook they must also cause it to rotate on becoming engaged by the gripper blades, and the greater load applied causes greater wear of all the hooks under movement.

In addition, the two upper nibs applied at different heights require a hook which is longer in the part which projects from the needle guides, resulting in greater flexibility and sensitivity to vibration, thus making it more difficult for the hook to become engaged by the blades.

Another version uses a hook with a rod of rectangular cross-section and nibs applied on two opposing sides. In this method, in order to prevent simultaneous engagement by the two mobile grippers, the hook is made to bend laterally, by the effect of the suitably increased hook return force.

In this case, the increase in the return force again causes excessive wear of the moving members and an overall worsening of the weaving conditions. The use of this device with particularly delicate fabrics is therefore to be avoided. In both the two versions considered, the movements which the hooks undergo in

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order to avoid the blade which lies opposite the one which engages them are not positively controlled, and they are therefore badly affected by poor lubrication or dust, which is always present in weaving.

The object of the present invention is to provide a jacquard machine with a single rod hook of very compact form which is partly controlled positively in order to avoid the blades lying opposite those which engage it, so as to obviate the drawbacks of the previously known methods.

This object is attained according to the present invention by a hook for a jacquard machine, characterised in that the two upper nibs are in the form of the two teeth, with their facing surfaces inclined, of a single bifurcated projecting appendix in which they join together at the same height. The inclined surface of the teeth can be of variable inclination and/or of curved profile. Moreover, said projecting appendix of which the two teeth form the upper nibs of the hook is disposed on said hook in a diametrically opposite position to the lower nibs.

The invention also relates to a jacquard weaving machine equipped with hooks of the aforesaid type in which said hooks are controlled with a composite movement of rotation and flexure.

The invention is described hereinafter in greater detail by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a complete diagrammatic section through a jacquard weaving machine according to the invention;

Figure 2 shows three views, namely two side views and one plan view, of a hook according to the present invention;

Figure 3 shows two views of the upper end of a hook in its lowest position and about to be engaged by a mobile blade which is rising;

Figure 4 shows two views of the upper end of a hook engaged by a

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mobile blade which is rising;

Figure 5 shows two views of a hook at the open shed and about to be engaged by a mobile blade;

Figure 6 shows two views of a hook which is pressed against and engaged with a mobile blade which is descending.

Figure 1 shows diagrammatically the essential members of a jacquard machine which uses a hook according to the present invention.

The reference numeral 1 indicates the punched tape carrying the hook movement programme corresponding to the pattern to be formed during weaving.

This programme is read by needles 2 arranged to raise pushers 3. When the pushers are raised, they are pressed by blades 4, and in this case cause the main needles 5 to move axially against the action of springs 6.

On the main needles there are provided suitable projections 7 which surround the hooks 8 in order to cause them to undergo the various transverse movements.

The reference numeral 9 indicates the fixed gripper of the base blades 10, on which the hooks 8 rest by way of the nib 11 when they are required to remain inactive.

The reference numeral 12 indicates the fixed gripper of the open-shed blades 13, on which the hook rests the way of the nib 14 when it is required to remain at rest in its upper end-of-stroke position.

The reference numeral 15 indicates the gripper of the lower mobile blades 16, which is driven with vertical reciprocating movement.

On the blades there are suitably disposed plates 17 provided with nibs for engaging the hooks 8.

The reference numeral 19 indicates the gripper of the upper mobile blades 20, which is also driven with vertical reciprocating

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movement as in the case of the lower gripper 15, but with its movement displaced in phase by 180° with respect to this latter.

Figure 2 shows a hook 8 according to the invention. It is constituted by a cylindrical rod with a flattened appendix at its base in which a hole 8 is provided for its connection to the loom healds.

The hook 8 is provided on one and the same side, at a suitable distance apart and parallel to each other, with the two lower nibs 11 and 14 for its support on the base blades 9 and on the open-shed blades 12 respectively.

At the upper end of the hook and in a diametrically opposite position to the nibs 11 and 14 there is a bifurcated projecting appendix 21 in the form of two teeth or beaks 22 and 23, which have their facing surfaces strongly inclined, preferably with a variable inclination and/or curved profile. These teeth constitute the upper nibs of the hook for engagement with the mobile blade nibs.

In a jacquard machine equipped with this type of hook (and which also forms part of the invention), an original method is provided - with considerable advantages for proper machine operation - for controlling said hooks. When a hook 8 has to be moved, for example raised by the plate 17A (Figures 3 onwards) of the mobile blade 16 which is approximately at its lower end-of-stroke position, as shown in Figure 3, the hook does not become displaced by the main needle, and consequently its nib or beak 22 becomes engaged by the nib 24 of the plate 17A (Figures 3 and 4).

When the hook 8 becomes engaged, the effect of the inclination of the tooth 22 and of the return members acting on its base at 8A causes it to rotate and move laterally until it rests against the nib 24, as shown in Figure 4.

This movement is possible partly because of the play between the guide rods 25 and the hook itself and partly by virtue of a

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slight flexure of the hook rod

The result of these movements is that the nib 23 moves away from the nib 26 of the opposing plate 17B.

The rotation in this stage is limited because the shape of the nibs 22 to 26 is such that even if the descending plate 17B should touch the nib 23 of the hook 8 at the gripper cross-over, it would cause no damage. In this respect, the contact in question would act in the sense of causing the hook to approach the plate 17A and thus improve its engagement therewith.

In contrast, when a hook at the open shed (Fig. 5) is pressed laterally at P (Fig. 6) in order to be returned to its bottom dead centre after being engaged by a plate (17A on the drawing), the same pressure P used for separating the nib 14 from the blade 13 (Fig. 1) acts in order to cause it to rotate and thus guarantee the already existing engagement with the plate 17A and provide an adequate protection for said hook against engagement with the plate 17B during its descending movement.

The aforesaid is also obviously valid for the hook nib 23 and the plate 17B during alternate movements.

If the hook has not been selected and is at rest in its inactive position, the nibs (24, 26) of the plates 17A and 17B move freely during their vertical movements, remaining separated from the rod of the hook 8 by a space equal to about one half the distance by which the hook nibs 22, 23 project from said rod of the hook 8.

This composition of movements (rotation + flexure) for preventing engagement of the hook by the opposing blade considerably limits the force required for returning said hook, thus reducing wear of all the moving parts.

The fact that the rotation is positively controlled limits the wear of the beaks or nibs 22, 23, because these rotate completely only when they are controlled. Moreover, and in

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particular, the hook rotates on command, thus ensuring operational precision.

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CLAIMS

1) A single rod hook for a double-lift, open-shed jacquard weaving machine of the type comprising mobile grippers which intersect each other, characterised in that the upper nibs are in the form of the two teeth, with their facing surfaces inclined, of a single bifurcated projecting appendix in which they join together at the same height.

2) A hook as claimed in claim 1), wherein said appendix, of which the two teeth form the upper nibs of the hook, is disposed on said hook in a diametrically opposite position to the lower nibs.

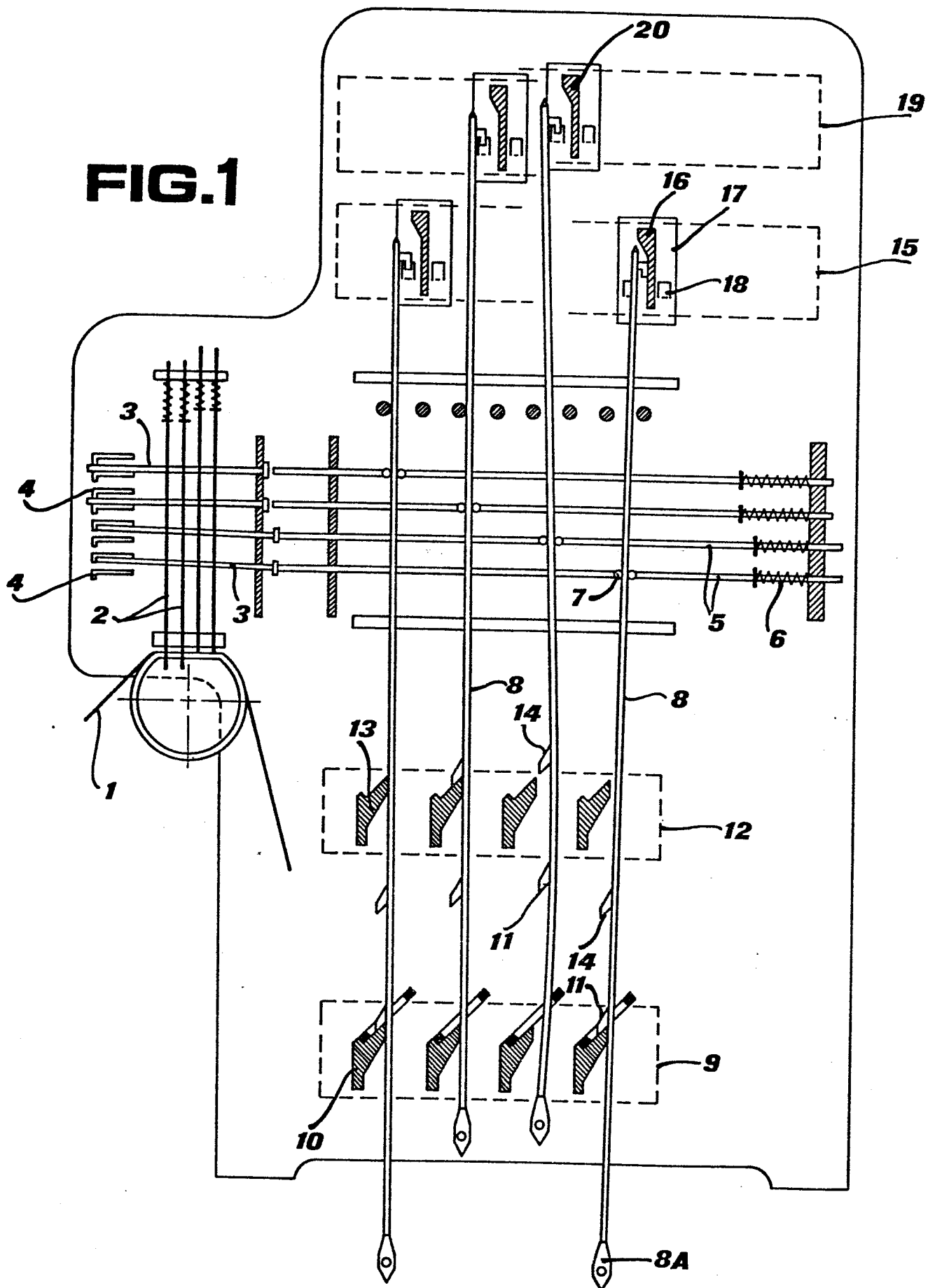
3) A jacquard weaving machine, characterised by being equipped with hooks as claimed in claims 1) and 2), and in that said hooks are controlled therein with a composite movement of rotation and flexure.

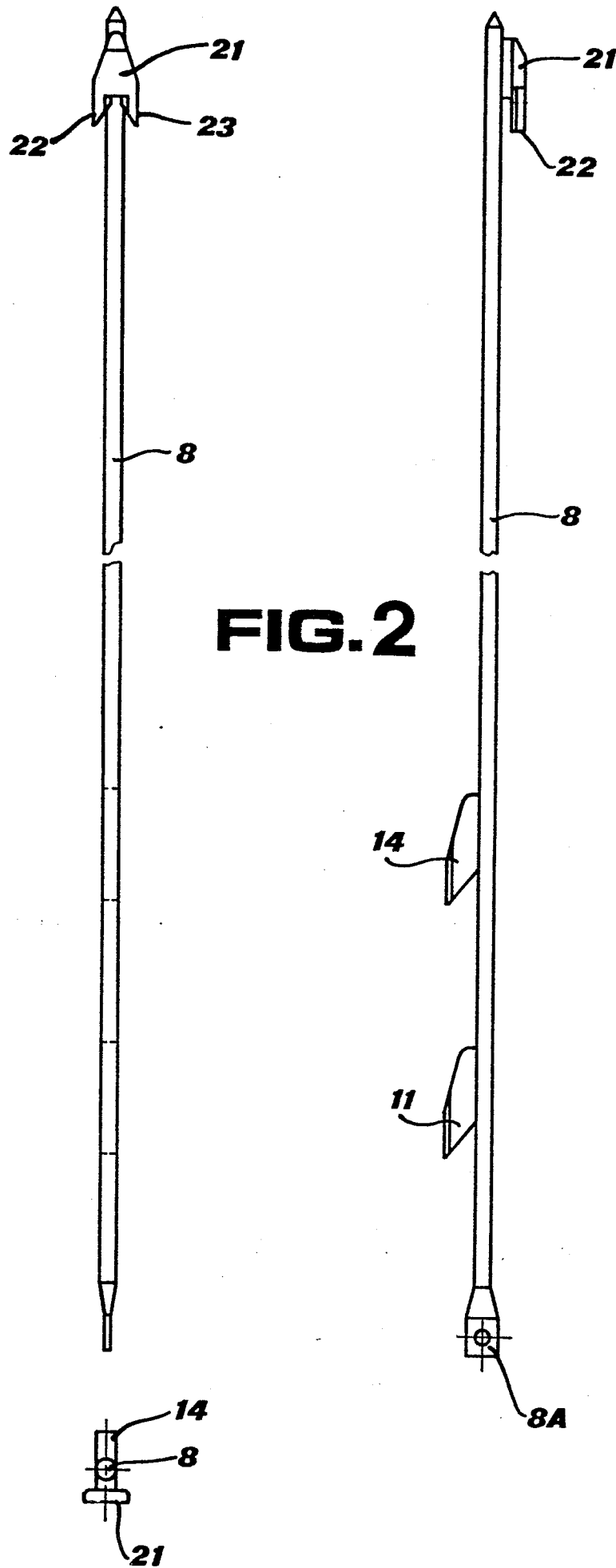
4) A jacquard weaving machine as claimed in claim 3), wherein said rotation is initiated by the engagement of the upper hook nibs with the nibs of the gripper plates, and is completed by virtue of the same engagement aided by the pressure exerted laterally on the rod of the hook for the purpose of disengaging the lower nibs of this latter from the open-shed blades.

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FIG.1





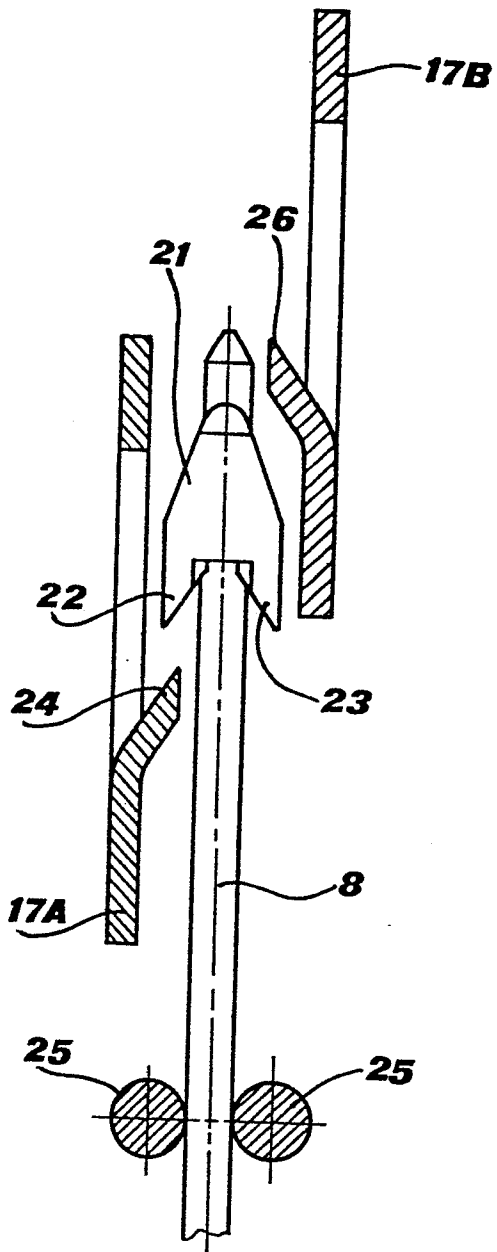


FIG. 3

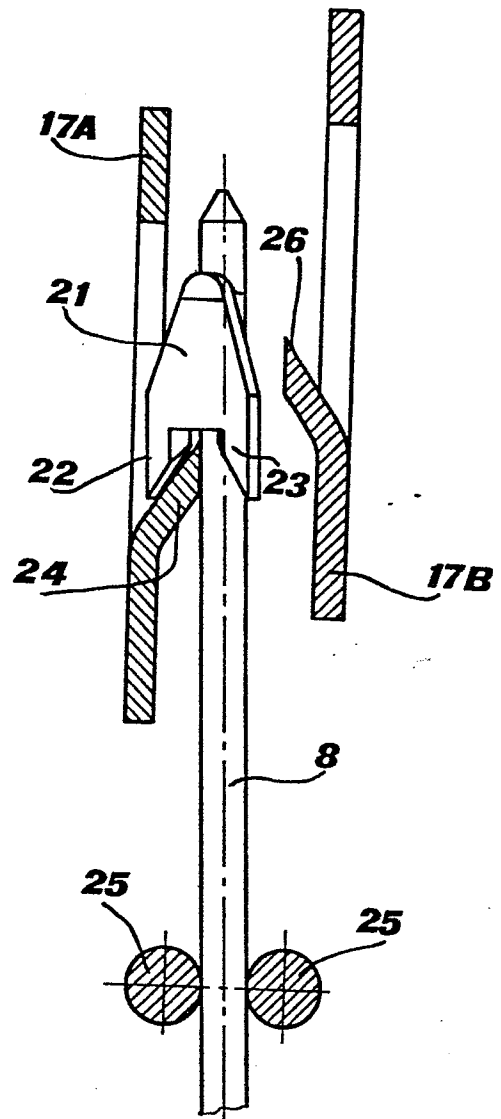
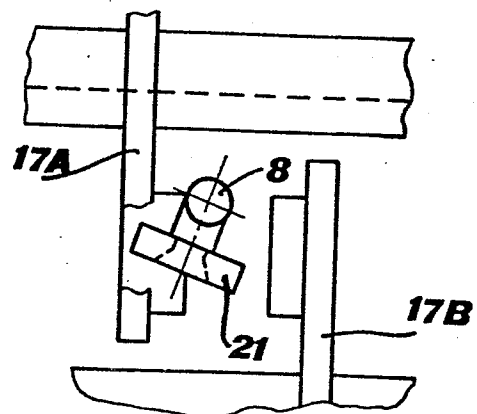
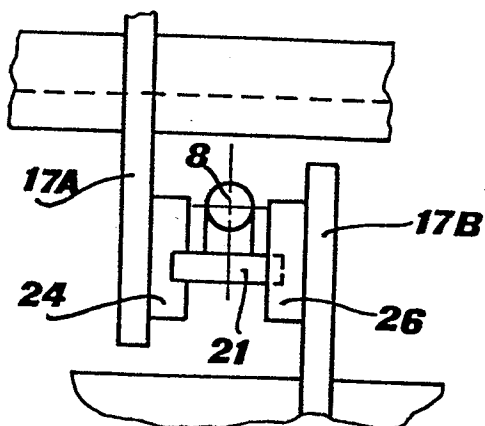


FIG. 4



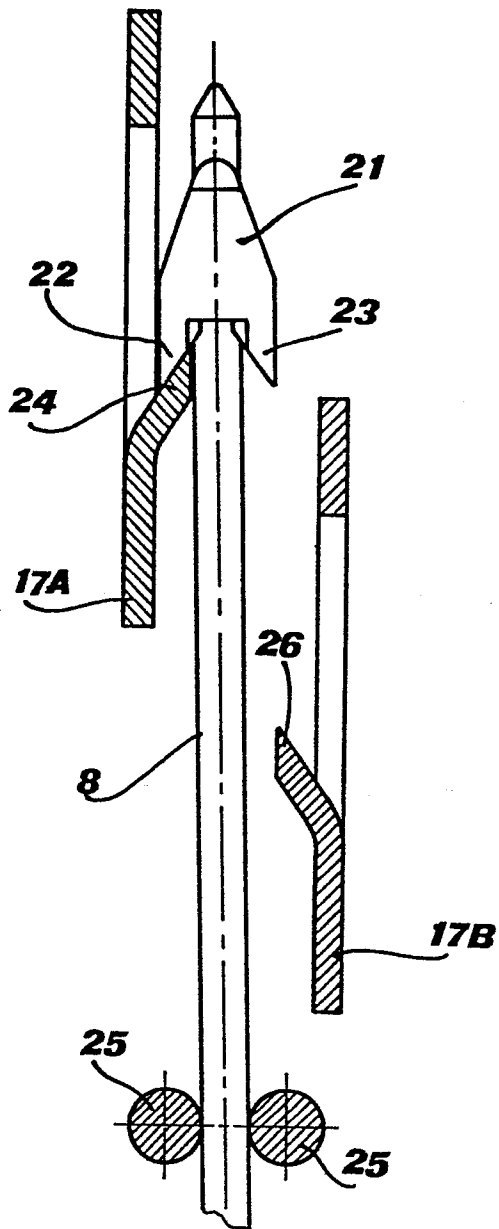


FIG. 5

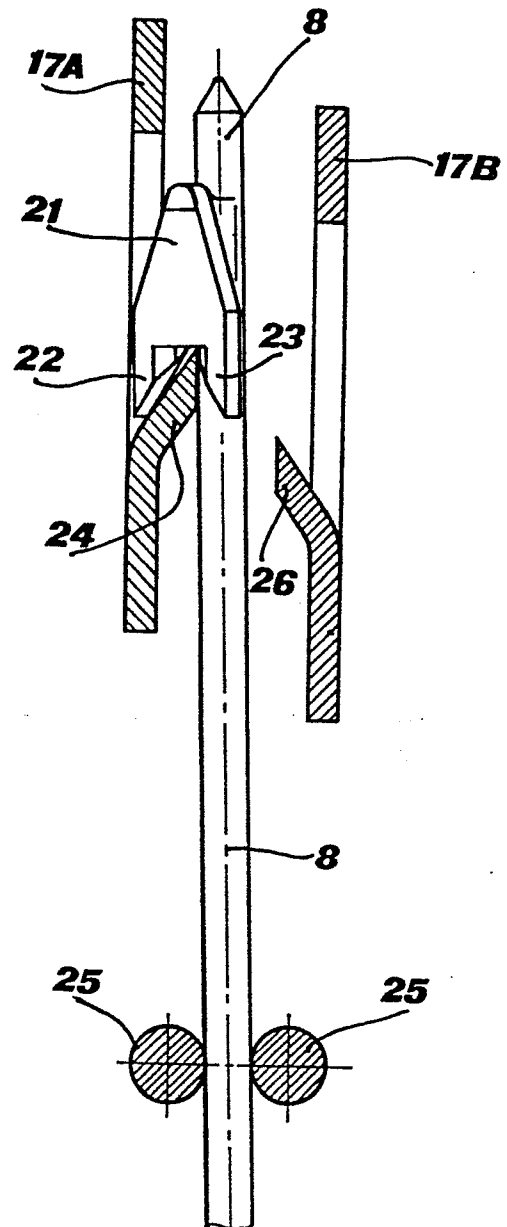


FIG. 6

