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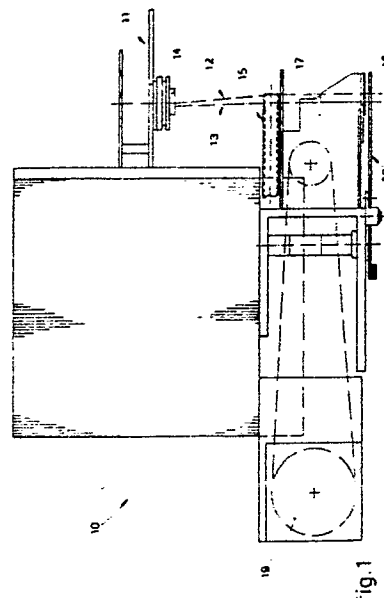
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(54) **Process to splice warp yarns for weaving operations and device to employ the process.**

(57) Process to splice warp yarns for weaving operations, which is suitable to connect together in succession a plurality of yarns (12-13) wound on two different beams, the plurality of yarns on one beam being wound on the other beam after being spliced, the plurality of yarns (12-13) to be spliced being pre-arranged in an ordered manner in the zone of the splice, each yarn (12) of one beam being selected together with the respective yarn (13) of the other beam from the warps to which they belong so as to be pre-arranged for the splice, the yarns (12-13) being connected by means of a splice produced by a splicer-type unit (17).

Splicer device (10) which comprises a unit (17) to splice yarns (12-13) and employs the above process.



PROCESS TO SPLICE WARP YARNS FOR WEAVING OPERATIONS AND DEVICE TO EMPLOY THE PROCESS

This invention concerns a process to splice warp yarns for weaving operations. To be more exact, the invention concerns a process which arranges to connect the warp yarns of two weaving beams by means of splices produced with splicer-type systems.

The invention is employed in the step before the weaving where it is necessary to produce in succession on a loom pieces in which the warp consists of the same number of yarns.

A further object of the invention is a device that employs such a process.

The state of the art comprises processes and devices suitable to connect warp yarns on different beams.

The necessity for such connections arises from the requirement to wind a plurality of warp yarns in succession on one and the same beam.

If such a connection were not made, then it would be necessary to feed the loom from a plurality of beams one after another, thus entailing a burdensome preparation for the weaving, very long times to thread the various yarns in the healds and non-productive stoppages of the looms.

To obviate this, a beam is readied which contains the greatest possible quantity of warps, thus ensuring a continuity of unwinding on the loom by means of the connection of the yarns of one warp to the yarns of the next warp.

Such connection is made on appropriate machines by knotting each single yarn of one warp to the corresponding yarn of the next warp.

The knots thus made involve substantially two drawbacks. The first drawback consists of the fact that the tail ends of the knots thus made are too long and entail problems in the feed of the warp on the loom and in the finished product.

The operator of the knotting machine has to take steps to cut the tail ends by hand in many cases.

The second drawback is that the knots are of a great size and lead to problems in the passage of the yarns in the slashers and in the looms.

At each change of warp in these machines it is necessary to reduce the working speed with obvious effects on the output.

The present applicant has studied, tested and obtained a process and a device able to overcome all the problems of the state of the art.

The invention arranges to carry out the connection between the yarns of successive warps by means of a splice made with a system known as a "splicer" and no longer by means of knotting.

A splice of this type does not contain tail ends,

nor does it increase the diametric dimension of the yarn substantially in the zone where it is produced.

The dynamometric properties of the spliced yarn are such as not to cause any problems in the weaving process.

The splice is made at the ends of the yarns to be connected by means of an air system, which produced the connection of the yarns by interlacing the fibres of one end with the fibres of the other end.

The two yarns to be spliced come from their respective beams and are positioned suitably on support frames cooperating with the splicer device; they are selected beforehand and are then located on a gripper unit, the excess portions of each yarn not involved in the splice being sheared.

The gripper unit then transfers separately the yarns to be spliced in correspondence with means that aspirate the ends of the yarns in the neighbourhood of a splicer unit.

A positioner means arranges to insert the ends of the yarns in the splicer unit in correspondence with a splicing chamber; the splicer unit is actuated by its own motor and performs the splicing cycle.

The segments of yarn in the aspiration means do not form part of the splice and, after being sheared, are removed in appropriate containers.

The splice thus made is withdrawn from the splicer unit by an extractor, which takes it to a waiting position beside the yarns spliced earlier.

When the complete connection of the warps has been made, the latter are wound on the beam which is going to feed the loom.

According to a variant the splice is performed by a splicer unit of a mechanical type which does not employ air but works on the ends of the yarn with mechanical means so as to twist the ends of the yarns about each other.

The resulting splice possesses better dynamometric properties and a better appearance than the splices produced by the use of air.

The invention is therefore obtained with a process according to the characterization of Claim 1 and the dependent claims.

The invention is also embodied with a device that employs the above process according to the characterization of Claim 5.

The attached figures, which are given as a non-restrictive example, show the following:-

Fig. 1 gives a diagrammatic plan view of the first step of the splicing process according to the invention;

Figs. 2, 3, 4 and 5 show diagrammatic side views of the successive steps of the splicing process according to the invention.

The diagram of Fig.1 references with 10 a device to splice warps for weaving operations. The device comprises a selector unit 11 which arranges to select a yarn 12 of the first warp and a yarn 13 of the second warp from the plurality of yarns of the respective warps.

These yarns 12 and 13 which are to be spliced together are clamped in a gripper unit 14 after the excess segments of the same yarns 12-13 in the splicing operation have been removed by being sheared.

The gripper unit 14 positions the yarns 12-13 in correspondence with two aspiration intakes, 15 and 16 respectively, which are positioned one above the other in the neighbourhood of a splicer unit 17 of a splicer type.

In Fig.1 the yarns 12-13 in correspondence with the splicer unit 17 are shown as being on different vertical planes for the sake of clarity of illustration.

The segments of the yarns 12-13 connected to the respective beams are positioned suitably at 18 in relation to the splicer unit 17.

The splicer unit 17 is equipped with its own motor 19 so as to carry out the splicing cycle.

In Fig.2 and the following figures a positioner means 20 consisting of two levers 21 and 22 reciprocally pivoted at 23 cooperates with the splicer unit 17.

These levers 21-22 have their end portions shaped as hooks 121 and 122 respectively so as to cooperate with the yarns 12-13 positioned near a taker-in means 24 of the splicer unit 17.

The positioner means 20 is capable of straight alternating motion in the direction of the axis 25, whereas the levers 21-22 are capable of oscillatory motion about the pivot 23.

In Fig.2 the positioner means 20 is in the position of maximum outward movement of the splicer unit 17, whereas the levers 21-22 are in the position of maximum opening.

In Fig.3 the levers 21-22 are shown in their maximum closure position corresponding to cooperation of the terminal hooks 121-122 respectively with the yarns 12-13.

Fig.3 shows partially also the aspiration intakes 15-16 which retain the yarns 12-13 now released by the gripper unit 14.

In Fig.4 the positioner means 20 retreats so as to bring, in cooperation with the taker-in means 24, the yarns 12-13 to the position corresponding to the actual splicing step.

In Fig.5 the splice has been made; the levers 21-22 open while an extractor 26 to withdraw the

spliced yarn from the splicer unit 17 is brought forward. This extractor 26 in its movement of retreat will position the spliced segment of yarn in a required waiting position.

The segments of the yarns 12-13 positioned between the splicer chamber of the splicer unit 17 and the aspiration intakes 15-16 are discharged by the aspiration intakes 15-16 when the splice has been made.

The cycle is repeated in an analogous manner thereafter for the plurality of yarns 12-13 included in the respective warps to be woven.

Claims

1 - Process to splice warp yarns for weaving operations, which is suitable to connect together in succession a plurality of yarns (12-13) would on two different beams, the plurality of yarns on one beam being wound on the other beam after being spliced, the plurality of yarns (12-13) to be spliced being pre-arranged in an ordered manner in the zone of the splice, each yarn (12) of one beam being selected together with the respective yarn (13) of the other beam from the warps to which they belong so as to be pre-arranged for the splice, the process being characterized in that the yarns (12-13) are connected by means of a splice produced by a splicer-type unit (17).

2 - Process as claimed in Claim 1, in which the splicer employed to obtain the splice of the yarns (12-13) is a splicer operating by means of air.

3 - Process as claimed in Claim 1, in which the splicer employed to obtain the splice of the yarns (12-13) is a splicer of a mechanical type.

4 - Process as claimed in any claim hereinbefore, in which the splice of the yarns (12-13) is achieved according to the sequence of the following working steps:

- gripping (14) of the yarns (12-13) after selection of the same (12-13),
- positioning of the yarns (12-13) in correspondence with the splicer unit (17),
- separate aspiration (15-16) of the yarns (12-13),
- engagement and positioning (20) of the yarns (12-13) in the splicer unit (17),
- performance of the splice,
- withdrawal (26) of the spliced yarns (12-13) from the splicer unit (17), and
- transfer of the spliced yarns to a waiting position.

5 - Splicer device (10) which comprises a unit (17) to splice yarns (12-13) and is characterized in that it employs the process according to the claims hereinbefore.

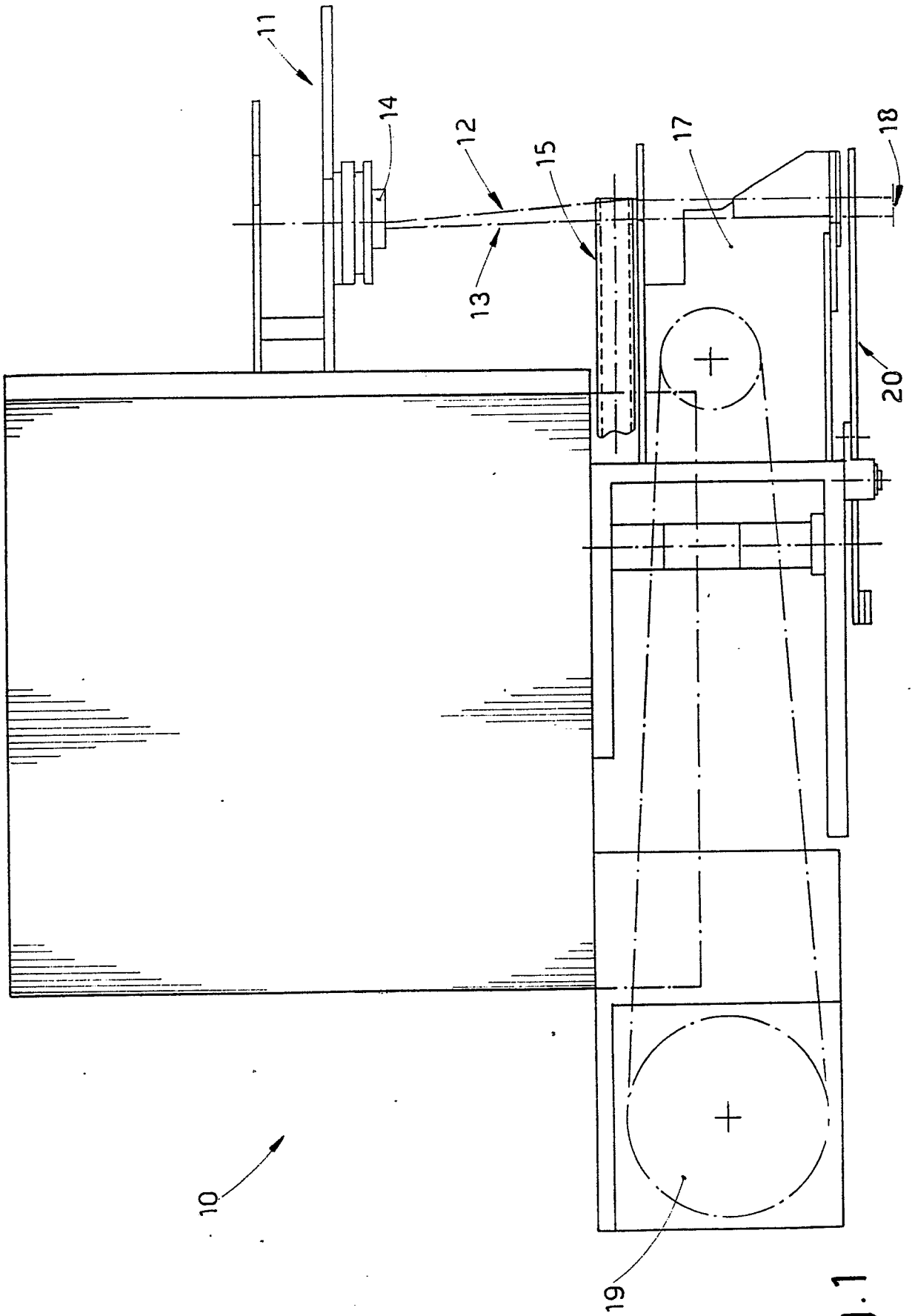


fig. 1

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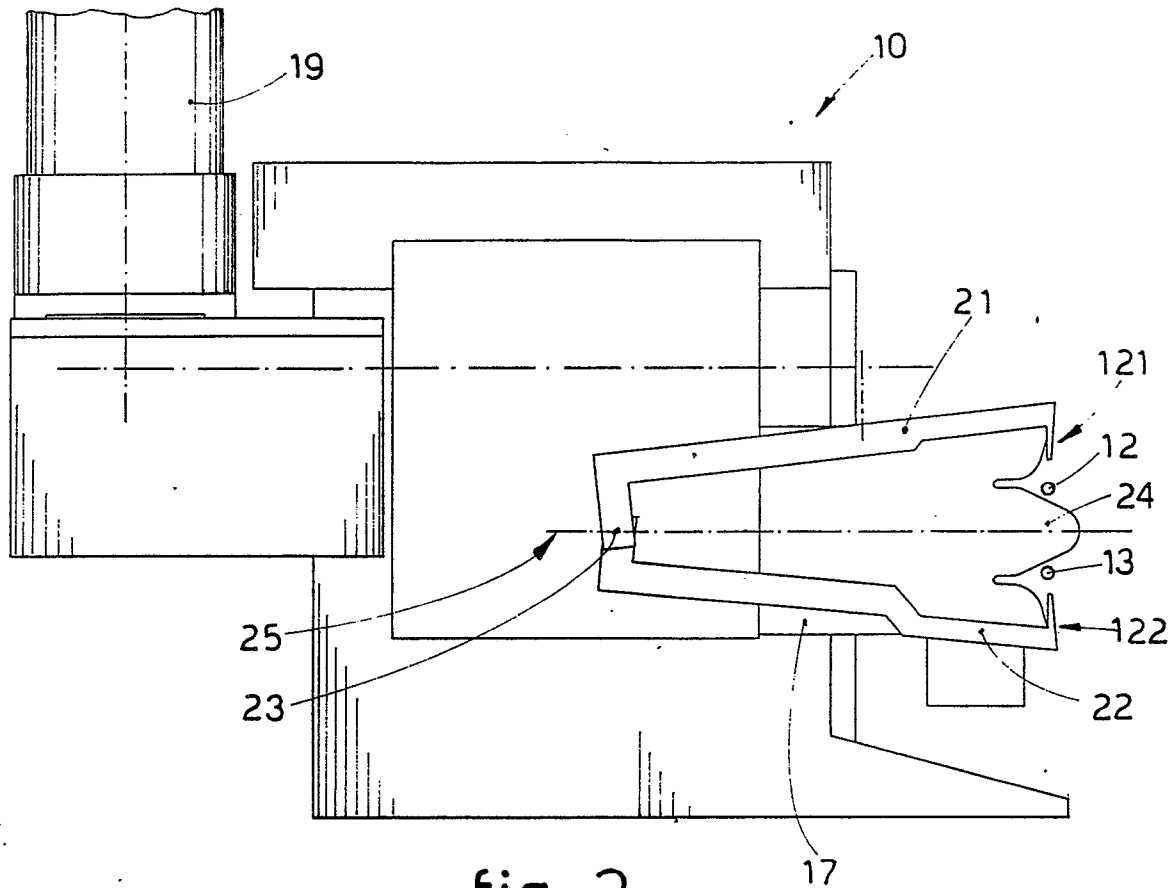


fig. 2

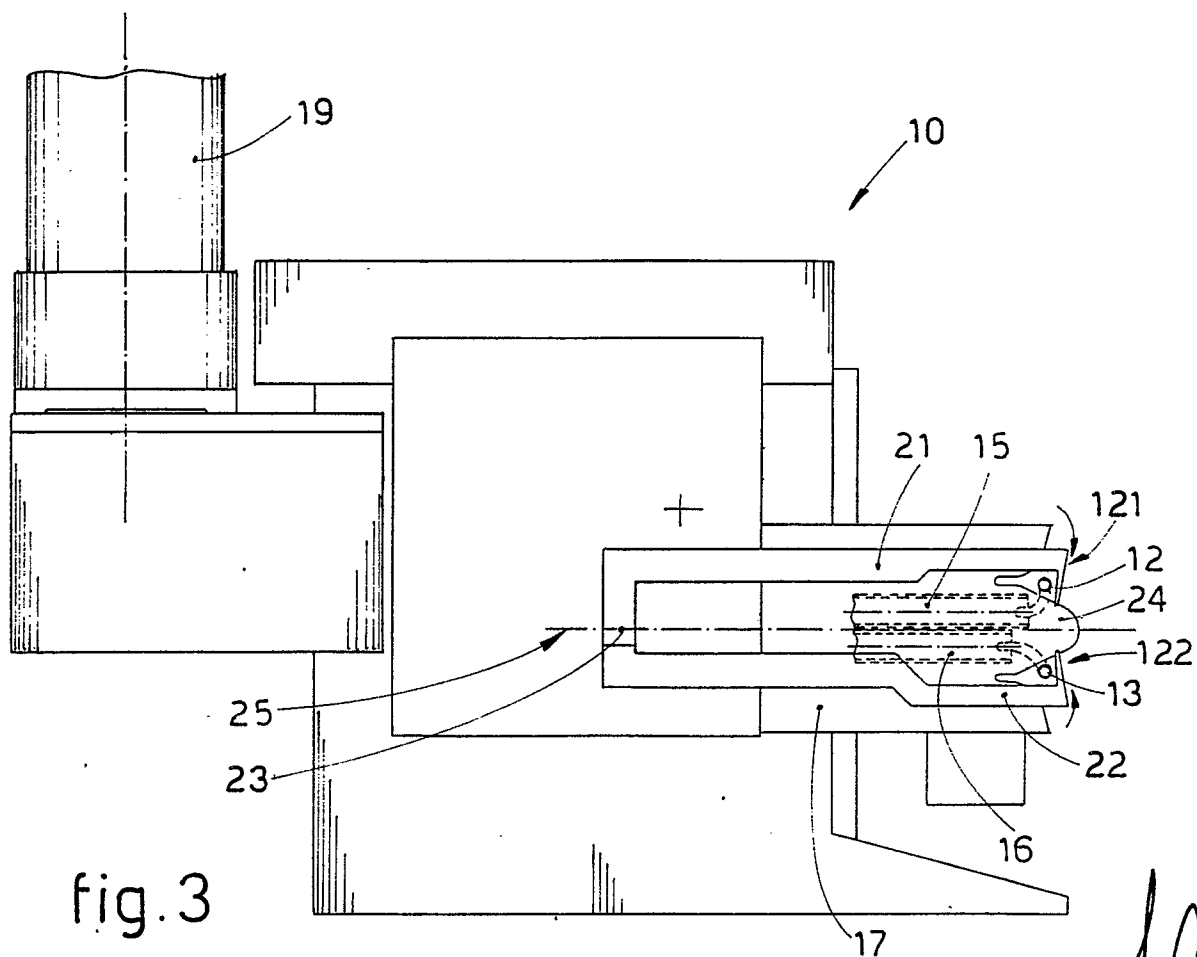
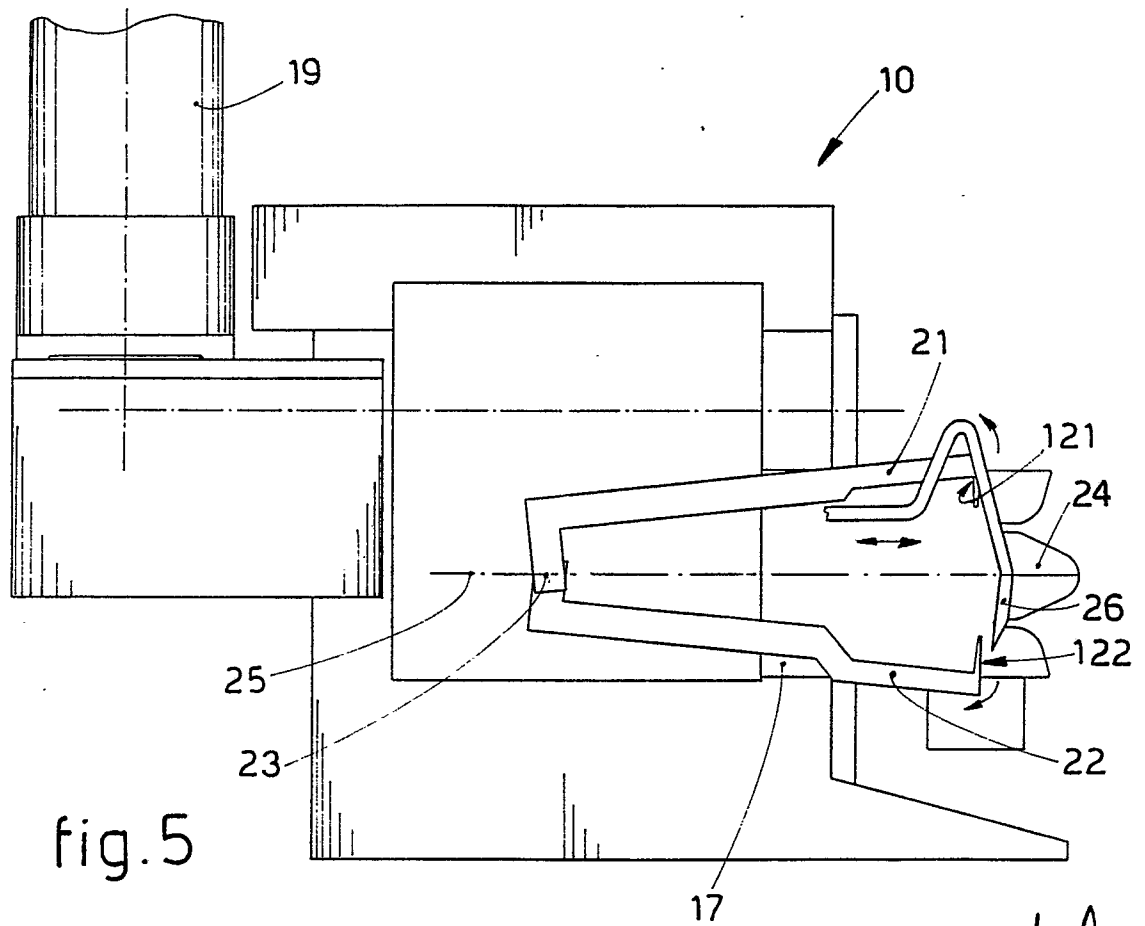
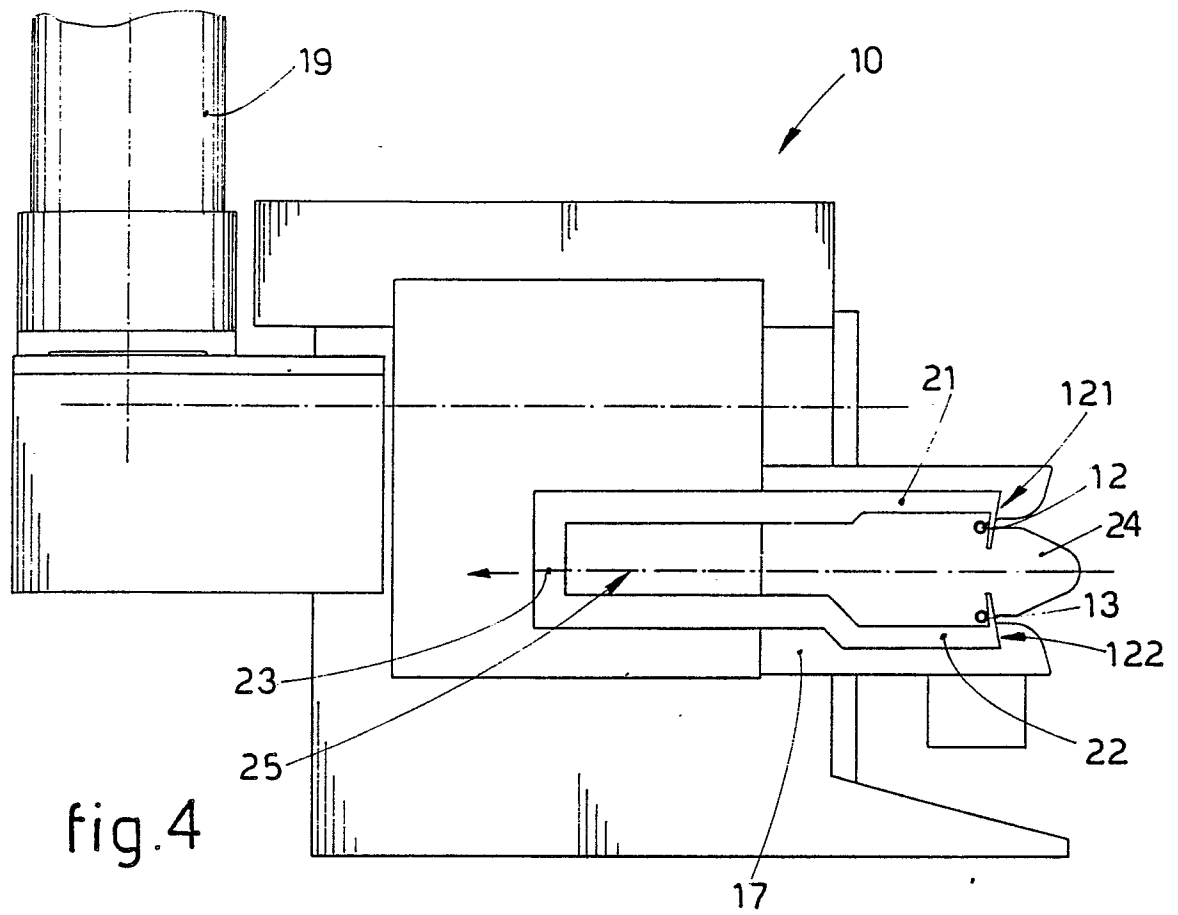


fig. 3

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