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(54) **Method and device for introducing of yarn end into a spinning nozzle of a jet spinning machine**

(57) The invention relates to the method for introducing of yarn end (A) into a spinning nozzle (1) of the jet spinning machine, during which the yarn (A) is handed over to the introducing head (2) of an attending device, which is movably mounted along at least one row of operating units, and which is capable to stop in front of the specified operating unit requiring attendance, while the introducing head (2) transports the yarn end (A) for introducing to an outlet opening (11) of the spinning nozzle (1). At handing over the yarn (A) into the introducing head (2) the yarn (A) on the introducing head (2) is guided into a defined position, it is caught in the introducing head (2) and there is created an end of yarn (A) for introducing, which in the defined position is held at the introducing head (2), which after then shifts to an outlet opening (11) of the spinning nozzle (1) into its introducing position, consequently the yarn end (A) releases from holding at the introducing head (2) and it is exposed to suction from outlet opening (11) of the spinning nozzle (1), through which the yarn end (A) straightens towards an outlet opening (11) of the spinning nozzle (1) and it is sucked into an outlet opening (11) of the spinning nozzle (1), through which it is repeatedly achieved that the yarn end (A) is reliably introduced for introducing into the spinning nozzle (1) for spinning renewal.

The invention also relates to attending device of the jet spinning machine, which is movable along a row of operating units, while it comprises the introducing head (2) adjustable during attendance of an operating unit into a position for take-over of the yarn (A) after spinning interruption, and further adjustable into a introducing position of a yarn end (A) for introducing into the spinning nozzle (1). The introducing head (2) is provided with the means for catching the yarn (A) in a defined position and further it is provided with the means for forming a yarn

end (A) for introducing and the means for holding a yarn end (A) for introducing in defined position at the introducing head (2).

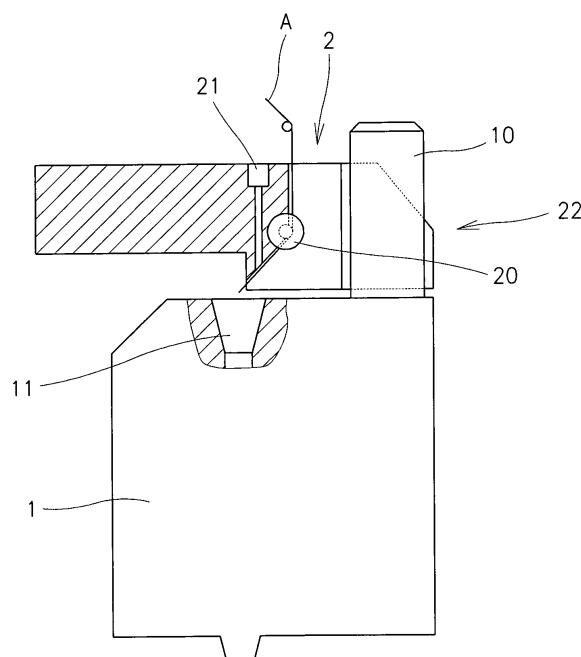


Fig. 2

Description

Technical field

[0001] The invention relates to the method for introducing of yarn end into a spinning nozzle of the jet spinning machine, during which the yarn is handed over to the introducing head of an attending device which is movably mounted along at least one row of operating units, and which is capable to stop at in front of the specified operating unit requiring attendance, while the introducing head transports a yarn end for introducing to an outlet opening of the spinning nozzle.

[0002] The invention also relates to the attending device of the jet spinning machine, which is movable along a row of operating units, while it comprises the introducing head adjustable during attendance of an operating unit into a position for take-over of the yarn after spinning interruption, and further adjustable into a introducing position of the yarn end for introducing into the spinning nozzle.

Background art

[0003] During introducing of the yarn end into the spinning nozzle of the jet spinning machine after spinning interruption, e.g. after breakage, the difficulties are caused by a small diameter of an outlet opening of the spinning nozzle into which the free end of the yarn for spinning renewal is introduced. Further difficulties are caused also by relatively great length of outlet section of the spinning nozzle. The difficulties even at slightly varying parameters of the yarn being introduced, external conditions and even at minor deviations in mutual position of the spinning nozzle and introducing device do not allow a repeated reliable introducing of an yarn end into the spinning nozzle.

[0004] According to the EP 0807699 A2 (US 5 813 209) this problem is solved so that the spinning nozzle is made of two parts, one is the nozzle block and the second is the spindle carrying member. At introducing the yarn end both parts draw away and a suction member is inserted between them, by means of which the yarn is sucked via the spindle carrying member, while the yarn is returned by means of rollers of the introducing device. Once the yarn is sucked into a suction member, the yarn is passing through an opening in the spindle carrying member. Consequently the spindle carrying member returns back to the nozzle block and they link together. At the same time the pressure nozzle in the spindle carrying member is activated, out of which an air stream comes out towards the nozzle block, and an underpressure/suction nozzle positioned in the direction of yarn introduction behind the block of spinning nozzle, into which the yarn through the spinning nozzle is sucked.

[0005] The disadvantage of this solution is its high complexity and also the fact that yarn introducing according to it is slow.

[0006] The goal of the invention is to simplify and speed up yarn introducing and to develop a suitable device for yarn introducing, this at a repeatedly reliable introducing of the yarn end into the spinning unit.

The principle of invention

[0007] The goal of the invention has been achieved through a method for introducing of yarn end into a spinning nozzle of the jet spinning machine, whose principle consists in that, at handing over the yarn into the introducing head the yarn on the introducing head is guided into a defined position, it is caught in the introducing head and there is created an end of yarn for introducing, which in the defined position is held at the introducing head, which after then shifts to an outlet opening of the spinning nozzle into its introducing position, consequently the yarn end releases from holding at the introducing head and it is exposed to suction from outlet opening of the spinning nozzle, through which the yarn end straightens towards an outlet opening of the spinning nozzle and it is sucked into an outlet opening of the spinning nozzle, through which it is repeatedly achieved that the yarn end is introduced for introducing into the spinning nozzle for spinning renewal.

[0008] Another advantage of this method is that at introducing the prepared yarn end into the spinning nozzle, it is not necessary to open the spinning nozzle, or to divide its body into several parts, by which this part of the jet spinning machine is simplified and much more cheaper than when compared with the background art.

[0009] According to advantageous embodiments the yarn end from holding status at the introducing head releases either in the introducing position of introducing head or it releases during the reverse motion of introducing head from introducing position into an initial position of the introducing head.

[0010] To improve accuracy of introducing the yarn end for introducing into an output opening of the spinning nozzle, the introducing head in its introducing position is centered towards an outlet opening of the spinning nozzle.

[0011] To improve a process of spinning renewal in an operating unit of the jet spinning machine, the yarn at introducing of yarn end into the spinning nozzle of the jet spinning machine is guided into its working track on the operating unit.

[0012] For further improvement of the process of spinning renewal the yarn, before introduction the end for introducing into an outlet opening of the spinning nozzle, is held in a working track in an operating unit.

[0013] Principle of an attending device of the jet spinning machine, which is movable along a row of operating units, while it comprises an introducing head adjustable at attendance of the operating unit into a position for take-over of yarn after spinning interruption and further adjustable into an introducing position of yarn end for introducing into the spinning nozzle consists in that, the in-

roducing head is provided with the means for catching the yarn in a defined position and further it is provided with the means for forming a yarn end for introducing and the means for holding a yarn end for introducing in defined position at the introducing head.

[0014] According to an advantageous embodiment the means for catching the yarn in defined position on the introducing head are formed by a clamp.

[0015] According to advantageous embodiments the means for holding the yarn end for introducing in defined position at the introducing head are formed by an auxiliary suction nozzle optionally connectable to an underpressure source or they are formed by a clamp or clip.

[0016] To increase accuracy in guiding of the introducing head towards the spinning nozzle, it is advantageous if the introducing head is provided with at least one centring means, which at least in the introducing position of the introducing head co-operates with the centring means on an operating unit being attended.

[0017] According to one advantageous embodiment the centring means on the introducing head is formed by a prismatic enlargement, while the centring means on an operating unit is formed by a centring element positioned on each operating unit.

[0018] According to another advantageous embodiment the centring means on the introducing head is formed by a centring element, while the centring means on the operating unit is formed by a prismatic enlargement on each operating unit.

[0019] To improve the process of spinning renewal on an operating unit of the jet spinning machine, to the introducing head on an attending device there is assigned an auxiliary yarn guide into a working track between the introducing head and yarn winding mechanism, while the auxiliary guide comprises guiding means reversibly adjustable to the operating unit and backwards.

Description of the drawing

[0020] The invention is schematically represented on the drawing, where the Fig. 1 shows a view to the introducing head, the Fig. 2 a side view on the introducing head in introducing position at the spinning nozzle.

Example of embodiment

[0021] Method for introducing the yarn A end into the spinning nozzle 1 of the jet spinning machine is being performed after spinning interruption, e.g. due to breakage of yarn A on an operating unit or after a complete winding of a bobbin and after replacement of the wound bobbin for an empty tube. For spinning renewal either end of yarn A found out on a bobbin (at spinning renewal after breakage) is utilised or the end of auxiliary yarn on an auxiliary bobbin on the attending device (at spinning renewal after a total winding of a bobbin and after bobbin replacement) is utilised.

[0022] Introducing of yarn A end is performed so that

after spinning interruption in front of the operating unit there arrives the attending device, which first finds out the yarn A end wound on the bobbin or it prepares an auxiliary yarn. Such prepared or found out yarn A in the section between the bobbin (an auxiliary one or that one on which the formed yarn A is being wound or the bobbin being wound) and by its end is guided into the defined position on the introducing head 2, which catches the yarn A in a position Y and, in a defined place X between the yarn A end and the position Y of yarn A catching interrupts the yarn A and so forms the end of yarn A for introducing. At breakage of yarn A for forming of yarn end A for introducing in the section Z between the position Y of yarn catching A and the position X of yarn A breakage to form the end of yarn A for introducing, the yarn A is caught on the introducing head 2 in the position Y1, e.g. by means of underpressure from underpressure channel 21, through which the yarn A end is formed for introducing having an exactly defined length, which is situated on the introducing head 2 in exactly defined position.

[0023] After such preparation of yarn A end for introducing, the introducing head 2 shifts to outlet opening 11 of the spinning nozzle 1 into its introducing position, where it stops at outlet opening 11 of the spinning nozzle 1. Now, into the spinning nozzle 1 there is introduced a compressed air for creation of underpressure at outlet opening 11 of the spinning nozzle 1.

[0024] After then the introducing of yarn A end into an outlet opening 11 of the spinning nozzle 1 follows, during which the yarn A is released from the introducing head 2.

[0025] According to one advantageous embodiment the introducing of yarn A end into an outlet opening 11 of the spinning nozzle 1 is performed so that in the introducing position of the introducing head 2 the yarn A is released at first from holding in position Y1, and consequently the yarn A is released from holding in the position Y.

[0026] According to another advantageous embodiment the introducing of yarn A end into outlet opening 11 of the spinning nozzle 1 is performed so that in introducing position of the introducing head 2 the yarn A is at first released from holding in position Y and consequently from holding in position Y1.

[0027] According to another advantageous embodiment the introducing of yarn A end into outlet opening 11 of the spinning nozzle 1 is performed so that in introducing position of the introducing head 2 the yarn A is released simultaneously both from holding in position Y and in position Y1.

[0028] According to another advantageous embodiment the introducing of yarn A end into outlet opening 11 of the spinning nozzle 1 is performed at a reverse motion of the introducing head 2 from its introducing position into its initial position before transfer into the introducing position, while during this reverse motion of the introducing head 2 the yarn A releases either at first from holding in position Y1 and consequently it releases from holding in position Y, or the yarn A releases at first from

holding in position Y and consequently from holding in position Y1, or the yarn A releases simultaneously both from holding in position Y and in position Y1.

[0029] According to another advantageous embodiment the introducing of yarn A into outlet opening 11 of the spinning nozzle 1 is performed so that in introducing position of the introducing head 2 the yarn A is released from holding in position Y1 and consequently at reverse motion of the introducing head 2 from its introducing position into its initial position before transfer into the introducing position, while during this reverse motion of the introducing head 2 the yarn A releases from holding in position Y.

[0030] To improve the following renewal of spinning after yarn introducing into the spinning nozzle 2 the yarn A during introducing of its end into the spinning nozzle 1 is guided into a working track, which it takes on the operating unit during normal spinning, so that after spinning renewal the individual joints of the operating unit of the jet spinning machine are immediately functional.

[0031] The device for introducing the yarn A end into the spinning nozzle 1 of the jet spinning machine is arranged on the attending device, which is adjustable along at least one row of operating units, that the machine contains. Except for further joints and means the device comprises also the introducing head 2, which is adjustable at least towards the operating unit and backwards respectively towards the outlet opening 11 of the spinning nozzle 1 and backwards. The introducing head 2 on the operating unit is able to take the position for takeover of yarn A, in which the yarn A is handed over to the introducing head for introducing of yarn A end into the spinning nozzle 1, and further the introducing head 2 on the operating unit is able to take the introducing position at outlet opening of the spinning nozzle 1, in which the yarn A end for introducing is introduced into an outlet opening of the spinning nozzle 1.

[0032] The introducing head 2 comprises means for catching the yarn A in position Y e.g. it comprises the clamp 20. The introducing head 2 further comprises means for breakage of yarn A in position X between the position Y and a free end of yarn A found out on the not represented bobbin or prepared from auxiliary yarn on the attending device (at spinning renewal after replacement of fully wound bobbin for an empty tube). The means for breakage of yarn A in position X are formed by a suitable cutting device, or by a rotation milling machine coupled with a drive, or by a scissors or a simple knife-edge or they are formed by other suitable means. The means for breakage of yarn A in position X may be arranged also on another working joint of attending device than the introducing head 2. By breakage of yarn A in position X the end of yarn A for introducing is formed in position Y.

[0033] The introducing head 2 further comprises means for holding the yarn A end for introducing at the introducing head 2 in position Y1 laying in section Z between position Y of catching the yarn A and position X

of breakage the yarn A for creating the end of yarn A for introducing. These means are in the represented example of embodiment formed by an auxiliary suction nozzle 21 optionally connectable to the source of underpressure. In the not represented example of embodiment the means for holding the end of yarn A for introducing at introducing head 2 are formed by mechanical means, e.g. by a clip, clamp etc.

[0034] On its face sides the couple of the introducing head 2 - spinning nozzle 1 is provided with the centring means, e. g. with a prismatic enlargement 22 on a face side of the introducing head 2 and with the centring element 10 mounted on operating unit being attended, e.g. mounted on a body of the spinning nozzle 1. In the not represented example of embodiment the prismatic enlargement is formed on the operating unit being attended, e.g. on a body of the spinning nozzle 1, while the centring element 10 is mounted on a face side of the introducing head 2. With advantage the centring element 10 is formed by a pin or peg. In the not represented example of embodiment the centring means of the couple of the introducing head 2 - spinning nozzle 1 are formed by other suitable elements.

[0035] The spinning nozzle 1 for sucking of an introducing end of the yarn A at its introducing into the spinning nozzle 1 is provided with at least one inlet of compressed air for creating of underpressure in outlet opening 11 for suction of introducing end of yarn A into the spinning nozzle 1.

[0036] To improve the spinning renewal on an operating unit by guiding the yarn into a working track still before spinning renewal, the attending device is provided with a not represented auxiliary yarn guide into a working track between the introducing head 2 and yarn winding device, while working activity of an auxiliary guide is co-ordinated with working activity of the introducing head 2. The auxiliary guide comprises guidance means reversibly adjustable towards the operating unit and backwards, while for further improvement of introducing of yarn end A for introducing into outlet opening 11 of the spinning nozzle 1 the auxiliary guide may hold the yarn in the working track even also during introducing the yarn end A for introducing into outlet opening 11 of the spinning nozzle 1.

List of referential markings

[0037]

1	spinning nozzle
10	centring element
11	outlet opening of the spinning nozzle
2	introducing head
20	clamp
21	auxiliary suction nozzle
22	prismatic enlargement
23	nozzle
A	yarn
Y	place of catching the yarn by the introducing head

- Y1 place of catching the yarn by the introducing head
 Z section between the position Y of yarn catching and the position X of yarn breakage for forming the yarn end for introducing of yarn
 X position of yarn breakage for forming the yarn end for introducing of yarn

Claims

1. Method for introducing of yarn end into a spinning nozzle of the jet spinning machine, during which the yarn is handed over to the introducing head of an attending device, which is movably mounted along at least one row of operating units, and which is capable to stop in front of the specified operating unit requiring attendance, while the introducing head transports the yarn end for introducing to an outlet opening of the spinning nozzle, **characterised by that** at handing over the yarn (A) into the introducing head (2) the yarn (A) on the introducing head (2) is guided into a defined position, it is caught in the introducing head (2) and there is created an end of yarn (A) for introducing, which in the defined position is held at the introducing head (2), which after then shifts to an outlet opening (11) of the spinning nozzle (1) into its introducing position, consequently the yarn end (A) releases from holding at the introducing head (2) and it is exposed to suction from outlet opening (11) of the spinning nozzle (1), through which the yarn end (A) straightens towards an outlet opening (11) of the spinning nozzle (1) and it is sucked into an outlet opening (11) of the spinning nozzle (1), through which it is repeatedly achieved that the yarn end (A) is introduced for introducing into the spinning nozzle (1) for spinning renewal.
2. Method according to the claim 1, **characterised by that the** end of yarn (A) from holding at the introducing head (2) releases in introducing position of the introducing head (2).
3. Method according to the claim 1, **characterised by that the** end of yarn (A) from holding at the introducing head (2) releases during the reverse motion of introducing head (2) from introducing position into an initial position of the introducing head (2).
4. Method according to the claims 1 to 3, **characterised by that the** introducing head (2) in its introducing position is centred towards an outlet opening (11) of the spinning nozzle (1).
5. Method according to any of the claims 1 to 4, **characterised by that** at introducing a yarn end (A) into the spinning nozzle (1) of the jet spinning machine the yarn (A) is guided into its working track on the operating unit.
6. Method according to the claim 5, **characterised by that the** yarn (A) before introduction the end for introducing into an outlet opening (11) of the spinning nozzle (1), is held in a working track in an operating unit.
7. Attending device of the jet spinning machine, which is movable along a row of operating units, while it comprises the introducing head adjustable during attendance of an operating unit into a position for take-over of the yarn after spinning interruption, and further adjustable into a introducing position of a yarn end for introducing into the spinning nozzle, **characterised by that the** introducing head (2) is provided with the means for catching the yarn (A) in a defined position and further it is provided with the means for forming a yarn end (A) for introducing and the means for holding a yarn end (A) for introducing in defined position at the introducing head (2).
8. Attending device according to the claim 7, **characterised by that the** means for catching the yarn (A) in defined position on the introducing head (2) are formed by a clamp (20).
9. Attending device according to any of the claims 7 or 8, **characterised by that the** means for holding the end of yarn (A) for introducing in defined position at the introducing head (2) are formed by an auxiliary suction nozzle (21) optionally connectable to an underpressure source.
10. Attending device according to any of the claims 7 or 8, **characterised by that the** means for holding the end of yarn (A) for introducing in defined position at the introducing head (2) are formed by a clamp.
11. Attending device according to any of the claims 7 or 8, **characterised by that the** means for holding the end of yarn (A) for introducing in defined position at the introducing head (2) are formed by a clip.
12. Attending device according to any of the claims 7 or 11, **characterised by that the** introducing head (2) is provided with at least one centring means, which at least in the introducing position of the introducing head co-operates with the centring means on an operating unit being attended.
13. Attending device according to the claim 12, **characterised by that the** centring means on the introducing head (2) is formed by a prismatic enlargement, while the centring means on an operating unit is formed by a centring element positioned on each operating unit.
14. Attending device according to the claim 12, **characterised by that the** centring means on the introduc-

ing head (2) is formed by a centring element, while the centring means on an operating unit is formed by a prismatic enlargement positioned on each operating unit.

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- 15.** Attending device according to any of the claims 7 to 14, **characterised by that** to the introducing head (2) on an attending device there is assigned an auxiliary yarn guide into a working track between the introducing head (2) and yarn winding mechanism, while the auxiliary guide comprises guiding means reversibly adjustable to the operating unit and backwards.

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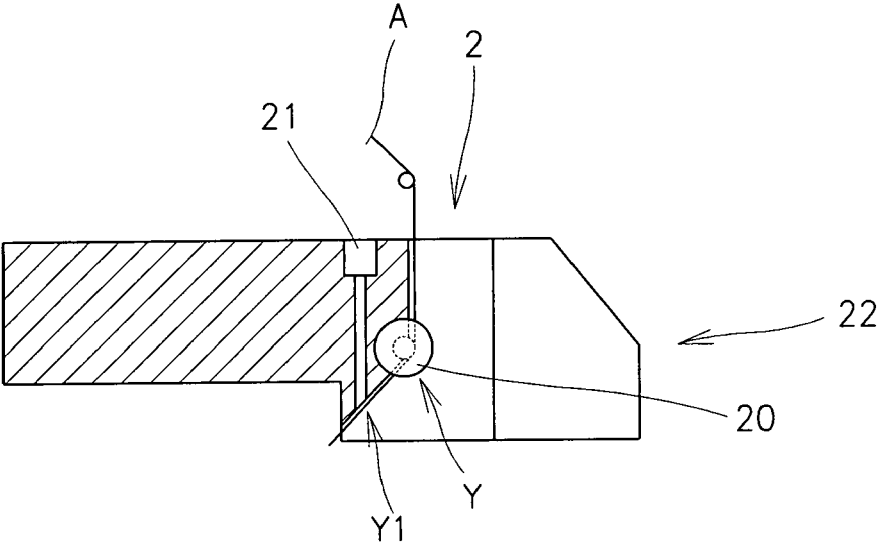


Fig. 1

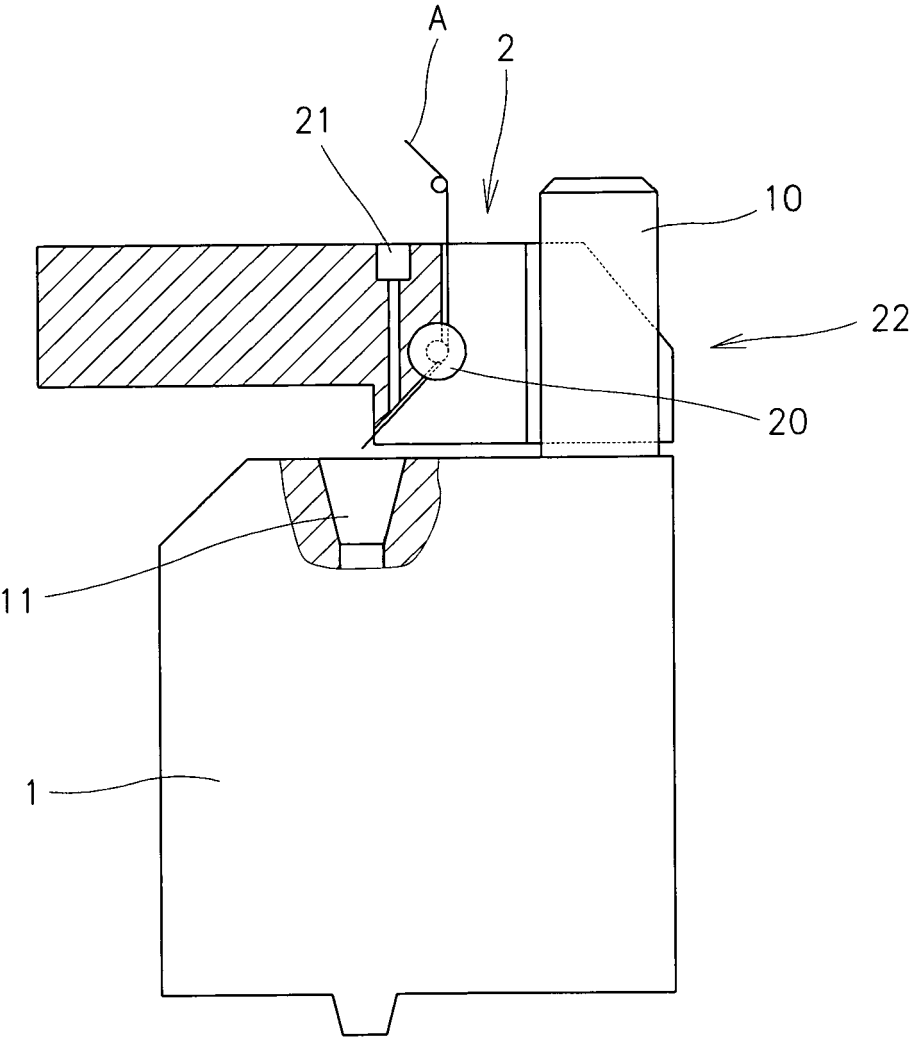


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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