(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 544 623 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **92810912.3**

(51) Int. Cl.[5] : **D03D 47/34**

(22) Date of filing : **24.11.92**

(30) Priority : **28.11.91 JP 340293/91**

(43) Date of publication of application :
02.06.93 Bulletin 93/22

(84) Designated Contracting States :
BE DE FR IT

(71) Applicant : **Kabushiki Kaisha Toyoda Jidoshokki Seisakusho**
1, Toyoda-cho 2-chome, Kariya-shi
Aichi-ken (JP)

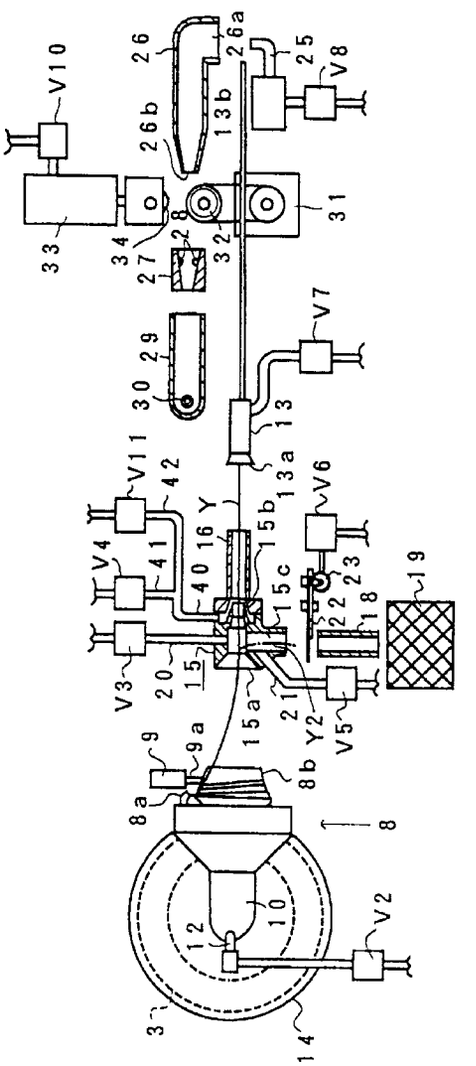
(72) Inventor : **Murata, Masahiko, c/o K.K. Toyoda Jidoshokki,**
Seisakusho, 1, Toyoda-cho 2-chome
Kariya-shi, Aichi-ken (JP)

(74) Representative : **Hammer, Bruno, Dr.**
c/o Gebrüder Sulzer AG, KSR/Patente/0007
CH-8401 Winterthur (CH)

(54) Apparatus and method for feeding a weft yarn.

(57) To draw a cut weft end Y2 into a weft guide nozzle 16 and then to introduce the same weft end Y2 into a weft inserting main nozzle 13 with certainty, thereby stabilizing the operation of feeding the weft properly through the guide nozzle 16 and the main nozzle 13.
[STRUCTURE]
The weft end Y2 formed by cutting a weft with a weft cutter 22 at a predetermined position is drawn into the weft guide nozzle 16 under the influence of suction force created by high-pressure air flow supplied from the valve VII and thereafter the weft end Y2 is introduced into the main nozzle 13 by a low-pressure air flow supplied from the valve V4 whose pressure is set at an optimum level for insertion of the weft end into the main nozzle 13.

Fig. 1



EP 0 544 623 A1

The present invention relates to an apparatus and a method of feeding a weft to introduce its leading end into a weft inserting main nozzle of a jet loom IN the event of occurrence of a weft break between a weft supply cheese and the main nozzle.

[PRIOR ART]

Publication of unexamined Japanese patent application No. 3-180544 (1991) discloses a weft feeding apparatus as shown in FIG. 6. in this apparatus, drawing into a weft guide nozzle in the leading end portion of a wet cut off by a weft cutter and present in a weft ejecting passage EP and the subsequent introducing the weft end into a weft inserting main nozzle MN are both effected by air flows under the same pressure supplied by a solenoid-operated two-way valve V4.

[PROBLEMS THAT THE INVENTION IS TO SOLVE]

If the pressure of air from the valve V4 is set primarily for introducing the weft end into the main nozzle MN in the above apparatus, drawing of the weft end into the guide nozzle IN may not be effected successfully because of too weak suction pressure in the guide nozzle.

on the other hand, if the air pressure is set primarily for drawing the weft end into the guide nozzle IN, the pressure becomes too strong to introduce the weft end properly into the main nozzle. That is, under such air pressure setting, the air flow from the guide nozzle tends to rebound from the inlet of the main nozzle and causes a vortex of air flow adjacent the nozzle inlet, thus making it difficult for the weft end to be inserted into the main nozzle with certainty.

The inventor noted using two different air pressures, i.e. one is suitable for drawing the weft end into the guide nozzle and the other for introducing that end into the main nozzle, and made the present invention to stabilize the weft feeding operation by drawing the weft end into the weft guide nozzle IN by air flow under a pressure and then introducing the end into the main nozzle MN by air flow under a pressure which is lower than that of the air flow for the drawing.

[MEANS SOLVING THE PROBLEMS]

In order to solve the above problems, the weft feeding apparatus according to the present invention (first invention as recited in claim 1) in a jet loom includes means disposed on downstream side of a weft measuring and storage device of winding type with rAgpAct thg direction in which the weft is fed toward a weft inserting main nozzle of the loom and operable pneumatically for retaining the weft in a predetermined position, means for transferring the weft from said weft measuring and storage device to said weft retaining means, means for cutting the weft at a predetermined position while the weft is being retained by said weft retaining means, and a weft guide nozzle for guiding the weft therethrough and allowing the cut end of the weft to be introduced into said weft inserting main nozzle, wherein

said weft guide nozzle being operable to draw thereinto said cut end of the weft by air flow under a pressure supplied by first air supply means and thereafter to introduce said cut end into said weft inserting main nozzle by air flow under a pressure supplied by second air supply means, the pressure of air flow supplied by said second air supply means being lower than that of air flow supplied by said first air supply means.

The weft feeding method in a jet loom (second invention as recited in claim 2) includes steps of:

transferring the weft from a weft measuring and storage device of winding type to weft retaining means by weft transferring means, said weft retaining means being operable pneumatically for retaining the weft in a predetermined position,

retaining the transferred weft in said predetermined position,

cutting the weft at a predetermined position by weft cutting means while said weft is being retained by said weft retaining means,

drawing the leading cut end of the weft into a weft guide nozzle by air flow under a pressure supplied thereto by first air supply means, and

introducing said leading cut end of the weft into a weft inserting main nozzle of the loom by air flow under a pressure supplied to said weft guide nozzle by second air supply means, the pressure of air flow supplied by said second air supply means being lower than that of air flow supplied by said first air supply means.

[OPERATION OF THE INVENTION]

In the apparatus and method of feeding a weft in a jet loom according to the above first and second in-

ventions, a weft leading end formed by cutting a weft with the weft cutting means is drawn into the weft guide nozzle under the influence of suction force which is produced by supplying high-pressure air to the guide nozzle and, thereafter, the same weft end is introduced into the main nozzle with certainty by air flow which is produced by supplying low-pressure air to the guide nozzle whose pressure is set at an optimum level for insertion of the weft end into the main nozzle.

[EFFECT OF THE INVENTION]

With the weft feeding apparatus in a jet loom according to the first invention, the cut weft end can be drawn smoothly into the weft guide nozzle by suction air flow optimum for the drawing which suction air flow is produced by supplying air under a high pressure to the guide nozzle from high-pressure air supply means (or the first air supply means) and, thereafter, the weft end can be introduced with certainty into the weft inserting main nozzle by air flow suitable for that purpose which air flow is produced by supplying air under a low pressure to the guide nozzle from low-pressure air supply means (or the second air supply means).

With the weft feeding method in a jet loom according to the second invention, the cut weft end can be drawn smoothly into the weft guide nozzle by suction air flow optimum for the drawing which suction air flow is produced by supplying air under a high pressure to the guide nozzle and, thereafter, the weft end can be introduced with certainty into the weft inserting main nozzle by air flow suitable for that purpose which air flow is produced by supplying air under a low pressure to the guide nozzle.

[EMBODIMENTS]

The following will describe embodiments of weft feeding apparatus in a jet loom according to the present invention while making reference to the accompanying drawings. (First embodiment)

The first embodiment will be described with reference to FIGS. 1 to 4.

There is provided a rotatably supported bracket 1, which carries at one end thereof a weft cheese 3 and has at the opposite end a weft unwinding motor 2 operatively connected to the bracket 1 through gearing for driving the weft cheese 3 to rotate in its weft unwinding direction.

A motor 4 is disposed adjacent the large end of the weft cheese 3 and operatively connected to an arm 5 supporting thereon a weft releasing blow nozzle 6 and sensor 7 of photoelectric transmission type for detecting the current wound diameter of the cheese 3. The blow nozzle 6 is connected through a solenoid-operated two-way valve V1 to an air supply tank (not shown) from which air under pressure is supplied to the valve V1. The blow nozzle 6 is directed toward the conical periphery of the cheese 3 adjacent its large end at such an angle with respect to the peripheral surface of the cheese 3 so that an air flow injected from the blow nozzle 6 sweeps the conical peripheral surface of the cheese from its large end toward the opposite small end.

A weft measuring and storage device 8 of a known winding type is arranged downstream of the weft cheese 3 with respect of the direction in which the weft is fed in the jet loom. The weft measuring and storage device 8 has a weft winding tube 8a driven to rotate by a motor M (indicated in FIG. 3) for winding a predetermined number of turns, or a predetermined length, of reserve weft Y1 on weft winding surface 8b of the device 8. The motor M is operable independently of a main loom drive motor (not shown). The windings of reserve weft stored on the weft winding surface 8b can be released when a stop pin 9a, whose reciprocating motion is controlled by an electromagnetic solenoid 9, is moved out of engagement with the weft winding surface 8b.

The weft measuring and storage device 8 further includes a weft inlet 8c which is in communication with the weft winding tube 8a, and a weft introducing duct 10 is mounted to the device 8 so as to enclose its inlet 8c. A weft-break sensor 11 of photoelectric transmission type is provided within the weft introducing duct 10 adjacently to its inlet. A blow nozzle 12 is connected to the duct 10 so as to direct an air flow therefrom toward the weft inlet 8c. Supply of air under pressure to the blow nozzle 12 is controlled by a solenoid-operated two-way valve V2. Air from the blow nozzle 12 is blown through the weft inlet 8c and weft winding tube 8a and toward a weft inserting main nozzle 13 which is fixedly mounted on a slay (not shown) of the loom.

A cone-shaped convergent guide conduit 14 is disposed between the weft cheese 3 and the weft measuring and storage device 8 with the larger opening thereof located adjacent the cheese 3 and the smaller opening adjacent the inlet of the duct 10 so that substantially all air flow from the weft releasing blow nozzle 6 collected by this guide conduit 14 can be introduced into the duct 10.

On the downstream side of the weft measuring and storage device 8 are disposed a nozzle block 15 and a weft guide nozzle 16 connected rigidly to the block 15. The nozzle block 15 and the guide nozzle 16 are located so as to receive a weft yarn Y released from the weft winding surface 8b and also to guide the same weft therethrough toward the inlet 13a of the weft inserting main nozzle 13. The guide nozzle 16 is directed toward the inlet 13a of the main nozzle 13 which is then moved to its retracted position as indicated by phantom

line in FIG. 2.

The nozzle block 15 has formed therein a weft ejecting passage 15c directing downward. Below the ejecting passage 15c of the nozzle block 15 are provided a weft ejecting pipe 18 and a trash box 19. There is provided a blow nozzle 20 communicating with the interior of the nozzle block 15 for directing air flow toward the weft ejecting passage 15c. Supply of air under pressure to the blow nozzles 20 is controlled by a solenoidoperated two-way valve V3 which is connected to the above air supply tank (not shown).

The nozzle block 15 has a weft inlet port 15a which is tapered convergently in the weft feeding direction and the end of the weft winding tube 8a of the weft measuring and storage device 8 is bent to direct its air flow toward this convergent inlet port 15a. The nozzle block 15 cooperates with the guide nozzle 16 to form therebetween a convergent space providing a weft exit passage 15b communicating with the interior of the guide nozzle 16, as shown in FIG. 1. A tube 40 is connected to the nozzle block 15 in communication with the exit passage 15b. The tube 40 is bifurcated into two branch tubes 41, 42 connected to solenoid-operated two-way valves V4, V11, respectively, which are in turn connected to the above air supply tank (not shown) and function to control air supply to the guide nozzle 16 through these tubes 41 and 42.

Air supplied to the guide nozzle 16 through the valve V4 and the tube 41 is adjusted to a pressure that is suitable for introducing a weft into the weft inserting main nozzle 13, while air supplied through the valve V11 and the tube 42 to the guide nozzle is adjusted to a pressure that is higher than the above pressure and suitable for generating a suction pressure in the weft ejecting passage 15c strong enough to draw a weft end in that passage 15c toward the guide nozzle 16. Accordingly, the valves V4 and V11 ar@ connected to the air supply tank via separate lines (not shown) for supplying to the respective valves different adjusted air pressures as required.

A blow nozzle 21 is connected to the nozzle block 15 in communication with the ejecting passage 15c at such an angle with respect thereto that provides an air flow toward the exit passage 15b through a region in the nozzle block 15 between the blow nozzle 20 and the passage 15c. Air supply to the blow nozzle 21 is controlled by a solenoid-operated two-way valve V5 connected to the above air supply tank.

A weft cutter 22, which is operated by an air cylinder 23, is provided between the weft ejecting passage 15c and the pipe 18. The air cylinder 23 is connected to the air supply tank through a solenoid-operated three-way valve V6.

The weft inserting main nozzle 13 has in its inlet 13a a weft-break sensor 24 of photoelectric transmission type and a stationary cutter 13b located on top of the opposite exit end thereof and projecting beyond that exit end.

A blow nozzle 25 and a weft introducing duct 26 are disposed immediately below and above the region where an air jet is just issued from the main nozzle 13, respectively, with outlet of the nozzle 25 and the inlet 26a of the duct in facing relation to each other, as shown in FIG. 1. The duct 26 has an outlet 26b directed oppositely with respect to the direction of air injection from the main nozzle 13.

An air guide 27 is located adjacently to the outlet 26b of the air duct 26 and a weft sensor 28 of photoelectric transmission type is provided within this air guide 27. A suction pine 29 having a bent portion as shown by phantom line in FiG. 2 is provided adjacently to the exit of the air guide 27. A blow nozzle 30 is connected to the bent portion of the suction pipe 29 for producing air jet toward a trash box (not shown).

The main weft inserting nozzle 13, blow nozzle 25, weft introducing duct 26, air guide 27 and suction pipe 29 are all mounted on a slay of the loom for movement therewith. Behind the swinging region of these parts 13, 25, 26, 27, 29 are provided a motor 31 and an air cylinder 33. A drive roller 32 is operatively connected to the motor 31 to be driven thereby, while a follower roller 34 is mounted to the piston rod of the air cylinder 33 so that extending motion of the cylinder causes the follower roller 34 to be brought into contact engagement with its associated drive roller 32 in the region between the weft introducing duct 26 and the air guide 27.

Supply of air under pressure to the weft inserting main nozzle 13 and to the blow nozzle 25, 30 is controlled by solenoid-operated two-way valves V7, V8 and V9, respectively, which are connected to the air supply tank. Supply of air under pressure to the air cylinder 33 is controlled by a solenoidoperated three-way valve V10 which is also connected to the air supply tank. As indicated in FIG. 3, operation of the solenoid-operated valves V1-V11, motors 2, 4, 31, M, and solenoid 9 are all controlled by a computer control C which is provided independently of a main control apparatus for the weaving loom. The control C is adapted to control the operation of the solenoids and motors from signals which are transmitted from the weft-break sensors 11, 24, weft sensor 28, and cheese wound diameter sensor 7.

Diagram in FIG. 4 shows part of a flow chart of control program for feeding a weft into the main nozzle 13 in the event of occurrence of a weft break at any position between the weft supply cheese 3 and the main nozzle 13. The program is stored in the computer control C.

(operation of the first embodiment)

The following will describe the operation of the first embodiment when a break has occurred in the weft Y at a position between the weft measuring and storage device 8 and the main nozzle 13. In the event of such a weft break, the control C responds to a signal from the weft-break sensor 24 and energizes (or turns on) the solenoid for the valve V3 to open the blow nozzle 20 and also the solenoid 9 to move the stop pin away from the weft winding surface 8a. Simultaneously, the solenoids for the valves V1 and V2 are energized for a predetermined period of time to open their blow nozzles 6 and 12 for the same time period. Thus, the leading end portion of the weft resulting from the weft break and extending from the weft measuring and storage device 8 is blown into the weft ejecting passage 15c and further into the weft ejecting pipe 18 and the trash box 19 by air flow from the blow nozzles 20. When the blow nozzles 6 and 12 complete air injection for the above predetermined period of time, the control C deenergizes (or turns off) the solenoid 9 to move the stop pin 9a into engagement with the weft winding surface Bb. Thus, the reserve weft Y1 on the weft winding surface 8b is transferred to the region of the weft ejecting pipe 18 and the weft is retained between the device 8 and the ejecting pipe 18 under the influence of air flow from the blow nozzles 20.

After the stop pin 9a has been engaged with the weft winding surface 8b, the motor 2 is also stopped and the valve V3 is closed to stop air blowing from the blow nozzle 20. Subsequent to the engagement of the stop pin 9a, the computer control C commands the motor M to rotate for a predetermined amount to rotate the weft winding tube 8a to make a predetermined turns of rotation, thereby forming a reserve weft with a predetermined number of windings round the weft winding surface 8b.

After such reserve weft winding, the control C commands energization of the solenoids for the valves V5 and V11 to blow air from the nozzle 21 toward the exit passage 15c and air under such a high pressure through the tube 42 toward the blow nozzle 16 that is suitable to draw a weft end which is to be formed by cutting in the next process.

Subsequently, the control C turns on and then off the solenoid for the valve V6 to activate the cutter 22 to make a complete cutting stroke to cut the weft at a predetermined position between the ejecting passage 15c and the dust pipe 18. As a result of this cutting, the weft can be cut to a predetermined length as measured from the weft measuring and storage device 8. This weft length is of such length that can permit smooth weft insertion into the main nozzle 13.

The cut weft end Y2 is drawn into the guide nozzle 16 under the influence of air blowing from the blow nozzle 21 and air blown from the opened valve V11 into the nozzle 16. Then, tho computer control C energizes the solenoids for the valves V4 and V13 thereby to provide air under such a low pressure through the tube 41 into the guide nozzle 16 that is suitable for introducing the weft end Y2 into the weft inserting main nozzle 13 and also an air jet through the main nozzle 13. In this state of the apparatus, the cut weft end Y2 is located within the guide nozzle 16. The valve V11 is closed to stop its air blowing, so that the low-pressure air flow from the valve V4 prevails within the guide nozzle 16.

Subsequently, the computer control C energizes the solenoid 9 to disengage the stop pin 9a from the weft winding surface 8b and release the reserve weft on the surface. Therefore, the cut weft end Y2 then present in the guide nozzle 16 is blown out by the low-pressure air flow toward the inlet 13a and then inserted into the main nozzle 13. This insertion of the weft into the main nozzle 13 can be accomplished with a high degree of reliability because the weft is previously cut to an optimum length for such insertion.

The windings of reserve weft round the weft winding surface 8b are released successively by air blowing from the blow nozzle 21 and the guide nozzle 16. The weft end Y2 inserted into the main nozzle 13 is injected with the air jet issued therefrom. The air jet from the main nozzle 13 meets with the air flow from the blow nozzle 25 and enters into the weft introducing duct 26, so the weft end Y2 coming out from the main nozzle 13 is deflected toward the duct 26 without being inserted into a shed. The weft end Y2 is moved past the region between the rollers 32 and 34 and reaches the weft sensor 28.

If the weft feeding is thus accomplished successful, the computer control C responding to a weft-detected signal from the weft sensor 28 deenergizes the solenoids for valves V4, V5, V7, V8 and also the solenoid 9 to close the main weft inserting nozzle 13, guide nozzle 16 and blow nozzles 21, 25 and also to move the stop pin ga into engagement with the weft winding surface 8b. Subsequently, the control C activates the motor M to rotate the weft winding tube 8a for a predetermined number of turns to forming reserve winding of weft on the weft winding surface 8b.

(Effect of the first embodiment)

As it is apparent from the foregoing, in to the apparatus of the above first embodiment, the cut end Y2 of weft is drawn into the guide nozzle 16 under the influence of suction force created by high-pressure air flow

in the guide nozzle 16 and thereafter the weft end Y2 is introduced into the main nozzle 13 with certainty by air flow supplied from the valve V4 whose pressure is set at an optimum level for insertion of the weft end into the main nozzle 13 without being influenced by vortex of air which is produced otherwise adjacent the inlet 13a and affects smooth insertion of the weft end into the main nozzle 13. Thus, this embodiment can provide an advantageous effect in that feeding of a weft to insert its leading end into the main nozzle can be accomplished with a high degree of success.

In the above first embodiment wherein air under high pressure and air under low pressure are supplied separately from thg solenoid-operated valves V11 anG V4 ana the operdtion of the respective valves is computer controlled, merely adding a pneumatic circuit for the valve V11 to the conventional apparatus will serve for the purpose of the invention to make possible reliable insertion of weft end into the main nozzle and the cost therefor is reasonably low.

Furthermore, because the cut weft end Y2 is introduced into the main nozzle 13 by air flow suitable for such purpose only after the weft end Y2 has been drawn into the guide nozzle 16 with certainty by producing a strong suction in the guide nozzle, the time for passing the weft through the main nozzle can be shortened as compared with that which has been spent by the conventional apparatus.

Additionally, the above first embodiment wherein it is so controlled that the cut weft end Y2 is continued to be subjected to air flow during a period after the weft has been cut by the cutter 22 and before the weft end Y2 is introduced into the main nozzle 13, the weft end can be held within the nozzle block 15 without erroneously coming out thereof. (Second embodiment)

The second embodiment differs from the first embodiment in that part of the control program stored in the computer control C is modified. So the following will describe only such modification in the second embodiment.

As shown by partial flow chart in FIG. 5, after air blowing by the blow nozzles 6, 12 is stopped by closing their associated valves V1, V2, the computer control C commands the motor M to rotate to form a reserve weft. Then, the cutter 22 is activated to cut the weft by operating the valve V6. The blow nozzle 21 is opened to blow air under a pressure which is greater than that of the air from the blow nozzle 20, which is followed by closing of the valve 3 to stop air blowing from the blow nozzle 20.

Thereafter, the valve 11 is opened to produce air flow under a high pressure in the guide nozzle 16 for drawing the weft end Y2 into the guide nozzle 16. After the weft end Y2 has been drawn into the guide nozzle 16, the valve 11 is closed, with simultaneous opening of the valve 4 to produce in the guide nozzle 16 an air flow of low pressure for introducing the weft end Y2 into the weft inserting main nozzle 13. With this second embodiment, feeding of a weft to insert its leading end into the main nozzle can be accomplished with a high degree of success as in the first embodiment. (Third embodiment) The third embodiment differs from the first embodiment in that the solenoid-operated two-way valves V4 and V11 are substituted with a solenoid-operated pressure control valve. In drawing the weft end Y2 into the guide nozzle 16, the computer control C transmits a control signal to the pressure control valve to provide an high-pressure air flow in the guide nozzle 16 that is suitable for the drawing, and in introducing the same weft end Y2 into the main nozzle 13, the control C generates a control signal to the pressure control valve to provide a low-pressure flow in the guide nozzle 16. With this second embodiment, the same effect is obtained as in the first embodiment.

It is to be understood that the above embodiments are described only by way of examples for the illustrative purpose and that the invention is not limited to these embodiments, but it can be practiced in other various ways without departing from the scope of the claims.

It is noted that the time at which the solenoid valves V11 and V4 are actuated to open and close relative to each other as described in the above embodiment provides only an example and other ways of controlling is available according to the present invention.

It is noted that the arrangement of the sensors and nozzles in the first embodiment is also an example for the illustrative purpose and that variations thereof can be made as required.

To draw a cut weft end Y2 into a weft guide nozzle 16 and then to introduce the same weft end Y2 into a weft inserting main nozzle 13 with certainty, thereby stabilizing the operation of feeding the weft properly through the guide nozzle 16 and the main nozzle 13.

[STRUCTURE]

The weft end Y2 formed by cutting a weft with a weft cutter 22 at a predetermined position is drawn into the weft guide nozzle 16 under the influence of suction force created by high-pressure air flow supplied from the valve V11 and thereafter the weft end Y2 is introduced into the main nozzle 13 by a low-pressure air flow supplied from the valve V4 whose pressure is set at an optimum level for insertion of the weft end.

[BRIEF EXPLANATION OF THE DRAWINGS]

FIG. 1 is a side schematic view of the first embodiment partially in section, showing a normal state of weft feeding;
FIG. 2 is a top schematic view of the same embodiment partially in section, showing the sailie state of weft feeding;
FIG. 3 is an electrical block diagram showing the computer control and its associated parts;
FIG. 4 is a diagram showing part of flow chart of control program for the first embodiment;
FIG. 5 is a diagram showing that part of the flow chart of control program for the second embodiment which is different from that for the first embodiment; and
FIG. 6 a side schematic view of a conventional weft feeding apparatus, showing a normal state of weft feeding.

[DESIGNATION OF REFERENCE NUMERALS]

3...	Weft cheese,
8...	Weft measuring and storage device,
12...	Blow nozzle,
13...	Weft inserting main nozzle,
15...	Nozzle block comprising part of the weft retaining means,
16...	Weft guide nozzle,
22...	Weft cutter,
V4...	Solenoid-operated valve for supplying air under a low pressure,
V11...	Solenoid-operated valve for supplying air under a high pressure.

Claims

1. Apparatus for feeding a weft yarn in a jet loom including means disposed on downstream side of a weft measuring and storage device of winding type with respect the direction in which the weft is fed toward a weft inserting main nozzle of the loom and operable pneumatically for retaining the weft in a predetermined position, means for transferring the weft from said weft measuring and storage device to said weft retaining means, means for cutting the weft at a predetermined position while the weft is being retained by said weft retaining means, and a weft guide nozzle for guiding the weft therethrough and allowing the cut end of the weft to be introduced into said weft inserting main nozzle, wherein said weft guide nozzle being operable to draw thereinto said cut end of the weft by air flow under a pressure supplied by first air supply means and thereafter to introduce said cut end into said weft inserting main nozzle by air flow under a pressure supplied by second air supply means, the pressure of air flow supplied by said second air supply means being lower than that of air flow supplied by said first air supply means.

2. Method of feeding a weft yarn in a jet loom, said method including steps of:
transferring the weft from a weft measuring and storage device of winding type to weft retaining means by weft transferring means, said weft retaining means being operable pneumatically for retaining the weft in a predetermined position, retaining the transferred weft in said predetermined position, cutting the weft at a predetermined position by weft cutting means while said weft is being retained by said weft retaining means, drawing the leading cut end of the weft into a weft guide nozzle by air flow under a pressure supplied thereto by first air supply means, and introducing said leading cut end of the weft into a weft inserting main nozzle of the loom by air flow under a pressure supplied to said weft guide nozzle by second air supply means, the pressure of air flow supplied by said second air supply means being lower than that of air flow supplied by said first air supply means.

Fig. 1

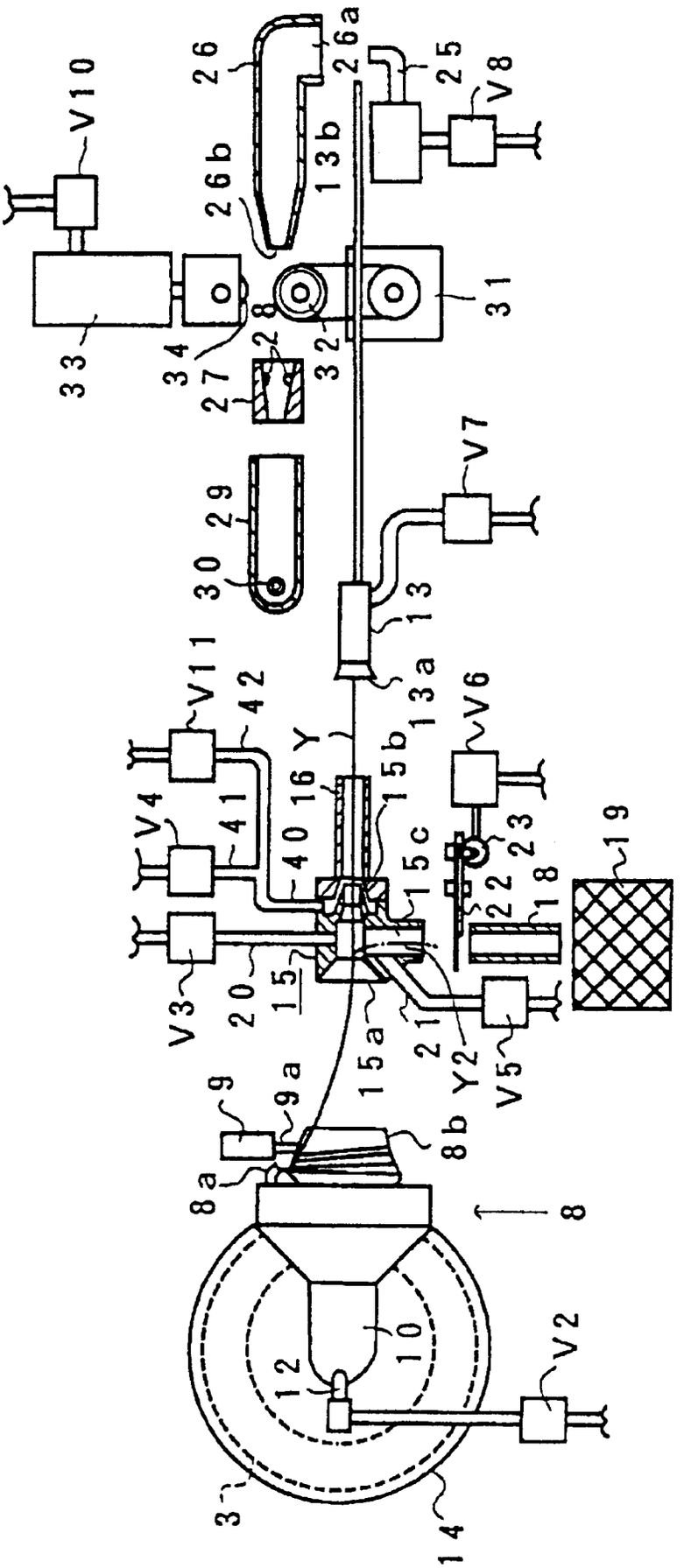

V10
26
26a
25
V8
26b
13b
31
33
34
28
32
27
29
30
V7
13
V11
42
13a
V6
V4
41
40
16
Y
15b
15c
23
19
22
18
V3
20
15
21
Y2
V5
15a
9
9a
8b
8a
8
12
10
V2
3
14

Fig. 2

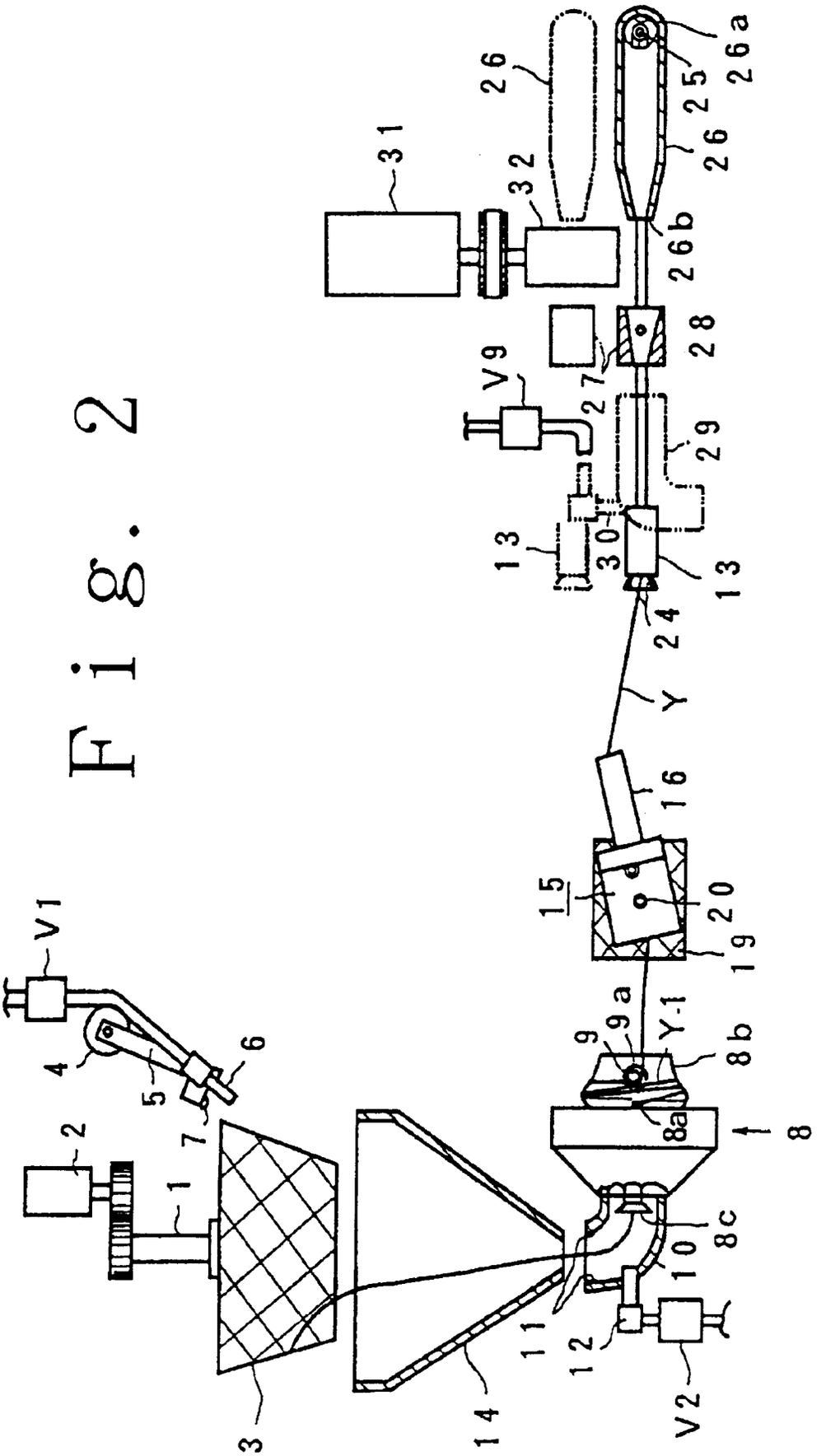

V1
4
5
6
7
2
1
3
14
11
12
V2
10
8c
8a
8b
9
9a
Y-1
8
15
16
19
20
Y
24
13
30
V9
27
28
29
31
32
26
26a
25
26b

Fig. 3

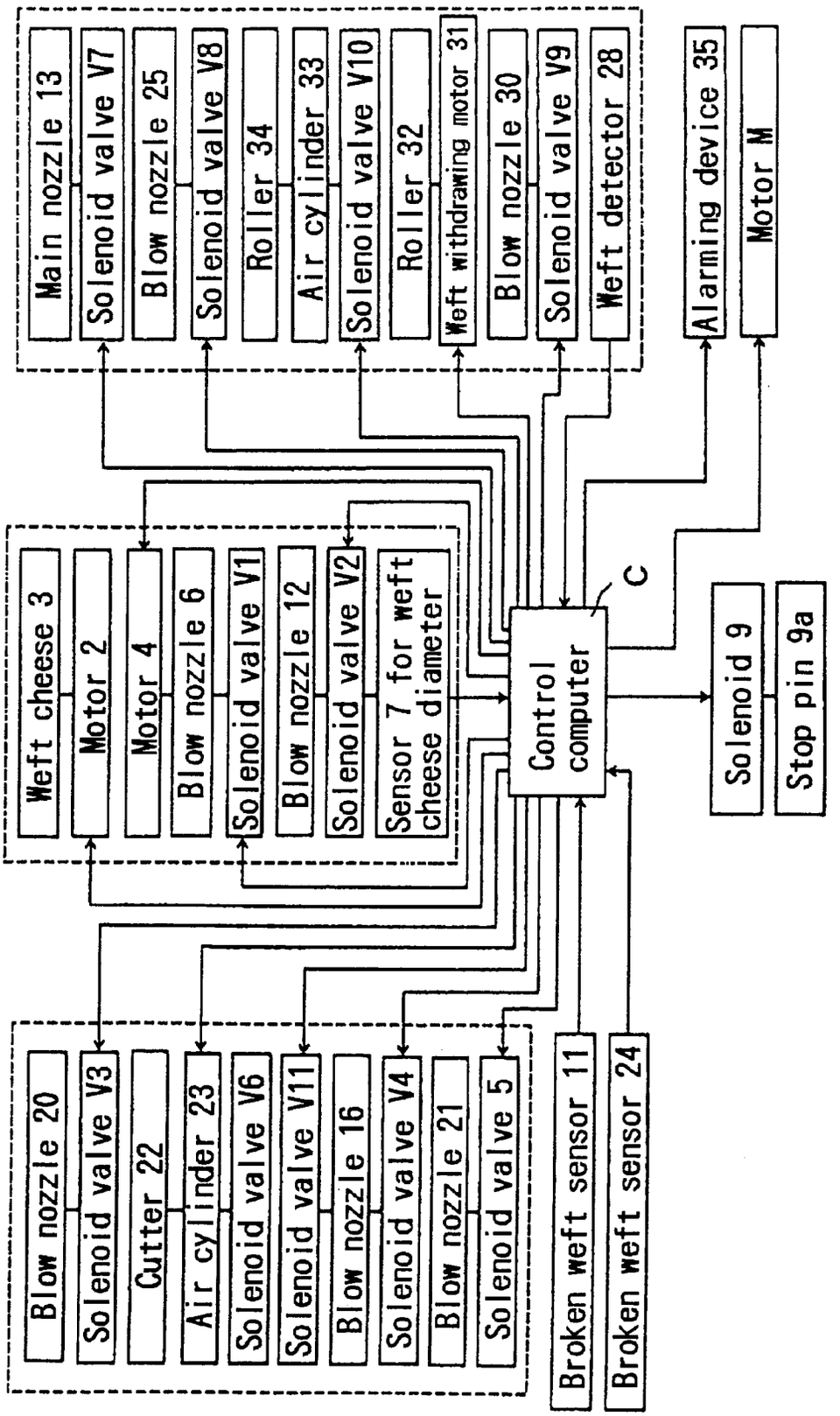

Main nozzle 13
Solenoid valve V7
Blow nozzle 25
Solenoid valve V8
Roller 34
Air cylinder 33
Solenoid valve V10
Roller 32
Weft withdrawing motor 31
Blow nozzle 30
Solenoid valve V9
Weft detector 28
Alarming device 35
Motor M
Weft cheese 3
Motor 2
Motor 4
Blow nozzle 6
Solenoid valve V1
Blow nozzle 12
Solenoid valve V2
Sensor 7 for weft cheese diameter
C
Control computer
Solenoid 9
Stop pin 9a
Blow nozzle 20
Solenoid valve V3
Cutter 22
Air cylinder 23
Solenoid valve V6
Solenoid valve V11
Blow nozzle 16
Solenoid valve V4
Blow nozzle 21
Solenoid valve 5
Broken weft sensor 11
Broken weft sensor 24

Fig. 4

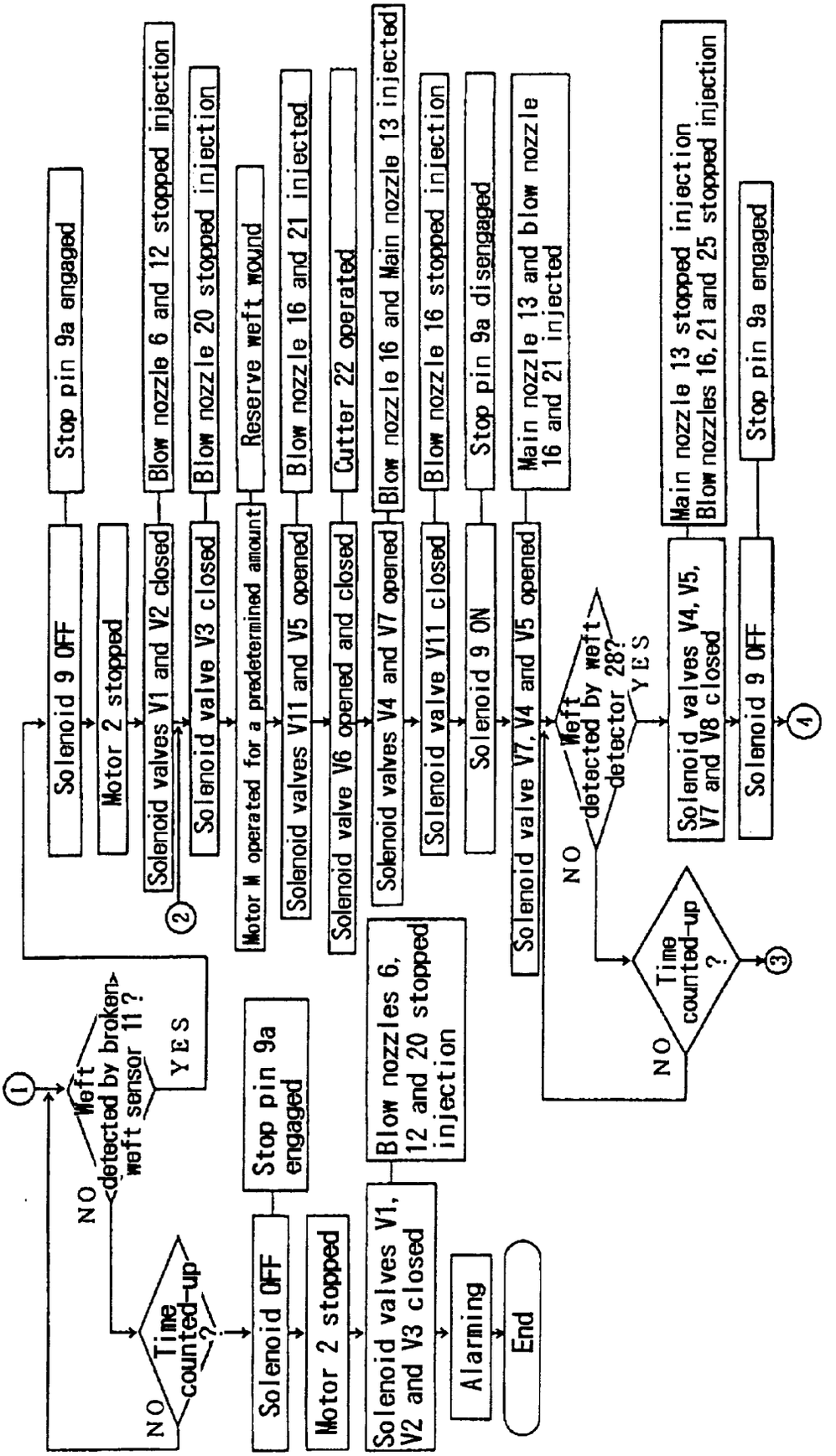

Solenoid 9 OFF
Stop pin 9a engaged
Motor 2 stopped
Solenoid valves V1 and V2 closed
Blow nozzle 6 and 12 stopped injection
Solenoid valve V3 closed
Blow nozzle 20 stopped injection
Motor M operated for a predetermined amount
Reserve weft wound
Solenoid valves V11 and V5 opened
Blow nozzle 16 and 21 injected
Solenoid valve V6 opened and closed
Cutter 22 operated
Solenoid valves V4 and V7 opened
Blow nozzle 16 and Main nozzle 13 injected
Solenoid valve V11 closed
Blow nozzle 16 stopped injection
Solenoid 9 ON
Stop pin 9a disengaged
Solenoid valve V7, V4 and V5 opened
Main nozzle 13 and blow nozzle 16 and 21 injected
Weft detected by weft detector 28?
YES
NO
Time counted-up ?
NO
Solenoid valves V4, V5, V7 and V8 closed
Main nozzle 13 stopped injection
Blow nozzles 16, 21 and 25 stopped injection
Solenoid 9 OFF
Stop pin 9a engaged
Weft detected by broken-weft sensor 11?
YES
NO
Time counted-up ?
NO
Solenoid OFF
Stop pin 9a engaged
Motor 2 stopped
Solenoid valves V1, V2 and V3 closed
Blow nozzles 6, 12 and 20 stopped injection
Alarming
End
1
2
3

Fig. 5

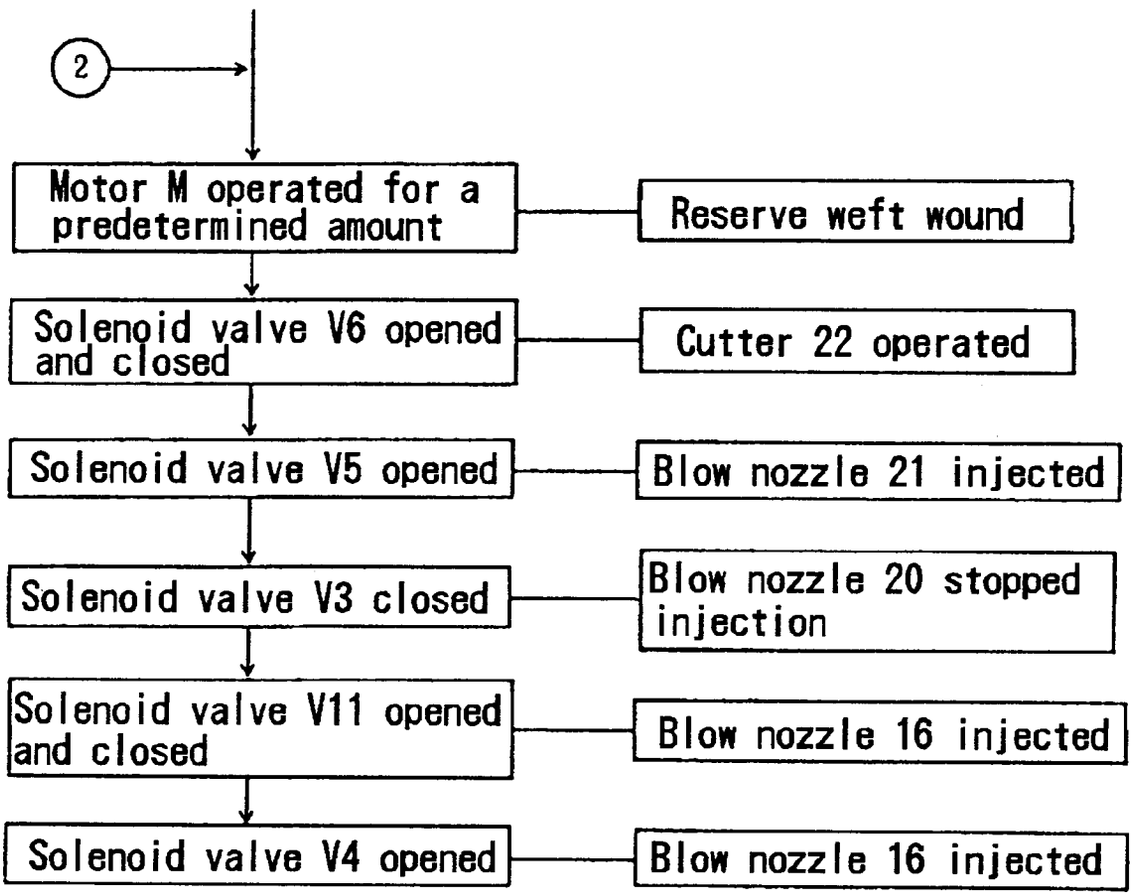
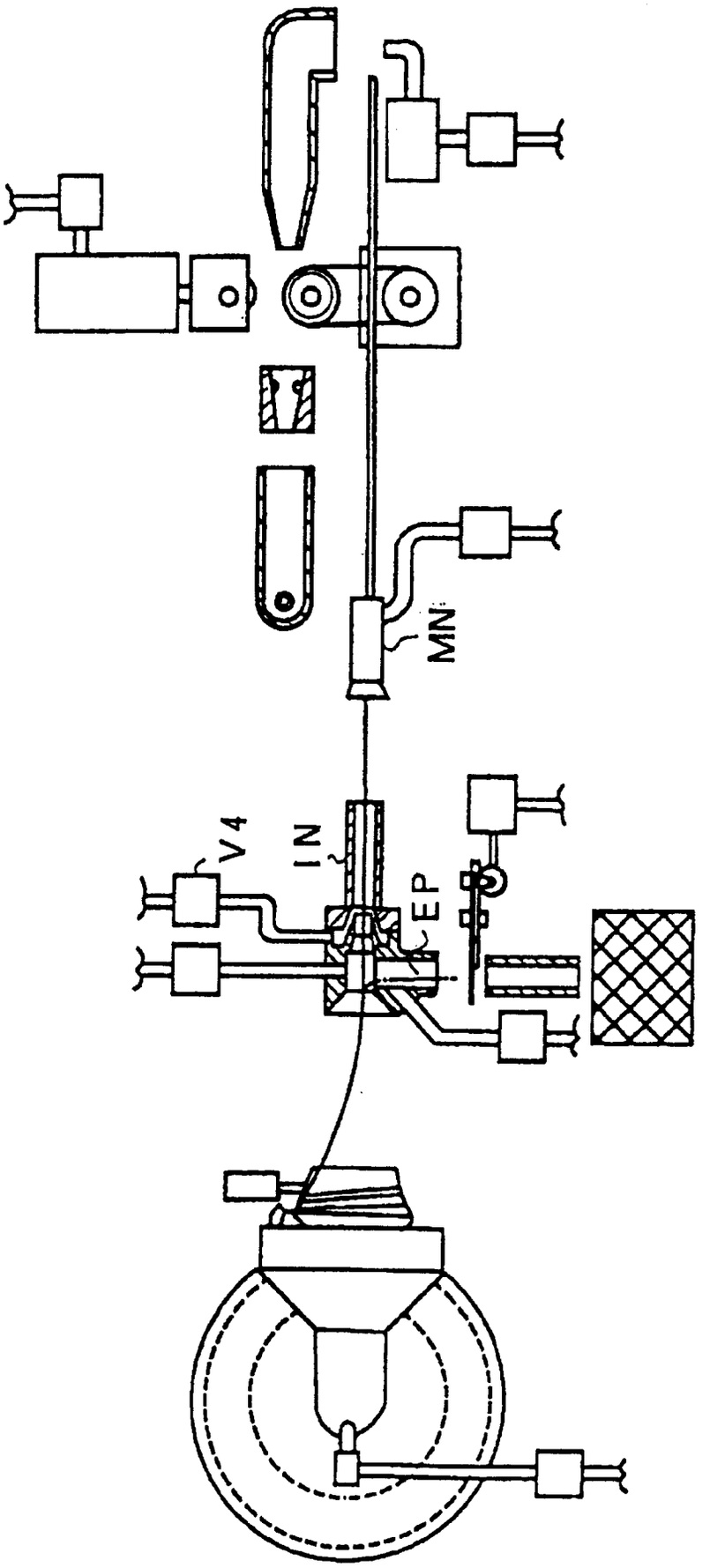

2
Motor M operated for a predetermined amount
Reserve weft wound
Solenoid valve V6 opened and closed
Cutter 22 operated
Solenoid valve V5 opened
Blow nozzle 21 injected
Solenoid valve V3 closed
Blow nozzle 20 stopped injection
Solenoid valve V11 opened and closed
Blow nozzle 16 injected
Solenoid valve V4 opened
Blow nozzle 16 injected

Fig. 6



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 81 0912

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 418 948 (PICANOL N.V.) * the whole document *	1,2	D03D47/34
X	EP-A-0 355 281 (NISSAN MOTOR CO. LTD.) * page 18, line 27 - page 19, line 54; figures 23-26 *	1,2	
P,A	EP-A-0 488 954 (TOYODA JIDOSHOKKI) * the whole document *	1,2	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08 MARCH 1993	HENNINGSEN O.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)