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(54) **Mispicked weft removing device for a jet loom.**

(57) The device for removing mispicked wefts in an air jet loom includes a weft separating unit (29, 29a) for the separation of the mispicked, i.e. broken weft (Y) from the cloth fell (W_2). There is a weft extracting unit (19, 19a, 19b, 20, 21, 22, 23, 24, 25) disposed at the weft arriving side. The free end of the mispicked weft (Y) is blown into a so called gripping area or region where the end of the broken weft (Y) is caught e.g. by rollers (22, 25) of the weft extracting unit (19, 19a, 19b, 20, 21, 22, 23, 24, 25). The gripping region of the extracting unit extends close to the weft arriving side but outside the range of the motion of the reed (4) of the loom.

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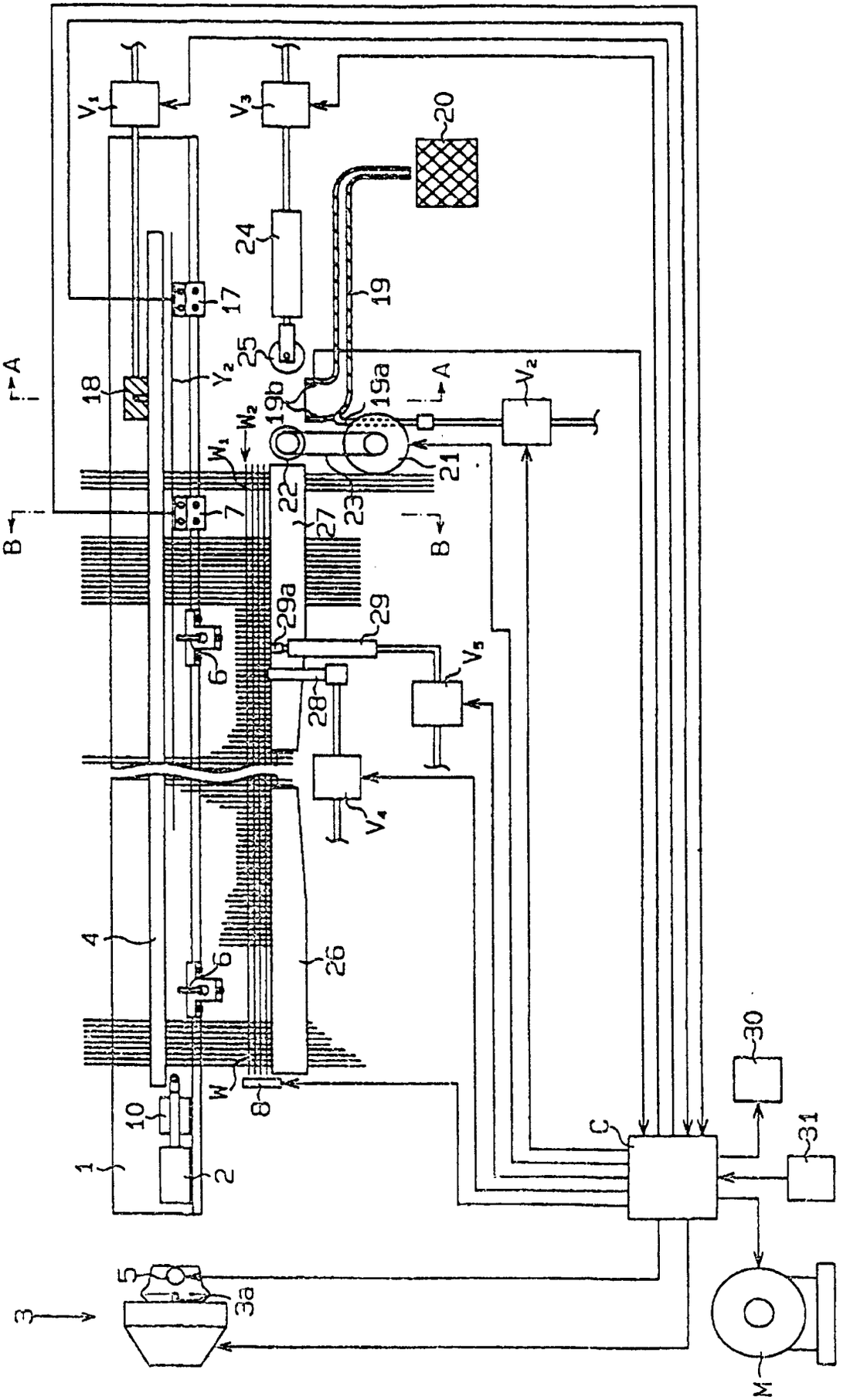
Fig. 1


V1
V3
20
24
19
17
25
18
Y2
19b
19a
A
V2
W1
W2
21
22
7
27
23
B
29a
29
6
V5
28
V4
4
26
W
8
10
1
2
C
30
31
5
3a
3
M

The present device relates to a mispicked weft removing device for a jet loom, for removing a mispicked weft picked by a main picking nozzle.

Mispicked weft removing devices for a jet loom, for removing a mispicked weft from the cloth fell of a fabric being woven on the jet loom are disclosed in the Japanese Patent Publications No. (Sho) 56-27621 and (Sho) 62-62167 and Japanese Patent Laid-open No. (Sho) 62-177257.

The device disclosed in JP No. (Sho) 67-27621 separates a mispicked weft from the cloth fell by the blowing action of a blow nozzle that travels along the cloth fell, and then sucks the floating mispicked weft with a suction pipe capable of entering the shed from the weft picking side to remove the mispicked weft.

The device disclosed in JP No. (Sho) 62-62167 employs a hooked pushing member provided at its extremity with a nozzle and capable of sliding along the fabric toward the cloth fell. The mispicked weft is separated slightly from the cloth fell by the blowing action of the nozzle before the hooked pushing member engages the mispicked weft to facilitate the hooked pushing member engaging the mispicked weft.

The device disclosed in JP No. (Sho) 62-177257 employs weft extracting units disposed respectively on the weft picking side and weft arriving side of the loom to extract a broken weft from the both sides of the fabric.

The device disclosed in JP No. (Sho) 56-27621 that extracts a mispicked weft by suction is not satisfactory in reliability.

The device disclosed in JP No. (Sho) 62-62167 extracts a mispicked weft by pulling the yarn extending from a supply package and hence this device is effective only when the mispicked weft is continuous with the yarn extending from the supply package. Therefore, if the mispicked weft is broken in the shed, the mispicked weft can not perfectly be removed.

The device disclosed in JP No. (Sho) 62-177257 is able to remove a mispicked weft even if the mispicked weft is broken in the shed. However, it is possible that the weft extracting unit disposed on the weft arriving side fails so suck the free end of the mispicked weft on the cloth fell because of the suction nozzle of the weft extracting unit is located above the cloth fell. That is, a shed must be formed to remove the mispicked weft and it is possible that the extremity of the mispicked weft is unable to reach the suction nozzle when a shed is formed because the reed is separated far from the cloth fell when a shed is formed.

Accordingly, it is an object of the present device to provide a mispicked weft removing device capable of surely removing a mispicked weft from a shed and is more reliable even if the mispicked weft is not continuous with the yarn extending from a supply package.

According to the present invention this problem is solved by the teaching contained in claims 1 or 2. The depending claims are related to particular embodiments of the invention.

The present device provides a mispicked weft removing device comprising a mispicked weft separating unit for separating a mispicked weft from the cloth fell of a fabric being woven on a jet loom, a mispicked weft extracting roller unit disposed on the weft arriving side of the jet loom at which a weft picked by a main picking nozzle arrives, and a leading air current generating unit for generating a leading air current for leading the free end of a mispicked weft into a gripping region in which the mispicked weft extracting roller unit is able to catch the free end of the mispicked weft. The gripping region extends near the weft arriving range and outside the range of swing motion of the reed.

If a weft is broken at a position before the main picking nozzle, the leading end of the weft picked by the main picking nozzle reaches a position beyond a weft arriving position in the weft arriving side. The free end of the weft remaining in the cloth fell is led to the gripping region of the mispicked weft extracting roller unit by the leading air current generated by the leading air current generating unit, and then the free portion of the weft is gripped by a pair of roller of the mispicked weft extracting roller unit. Then the mispicked weft is separated from the cloth fell by the mispicked weft separating unit when a shed that releases the mispicked weft from the warps is formed. In this state, the mispicked weft extracting roller unit is actuated to extract the mispicked weft from the shed. Since the gripping region of the mispicked weft extracting unit extends near the cloth fell, the mispicked weft extracting unit is able to grip the leading end of the mispicked weft without fail regardless of the condition of the shed. Thus, the mispicked weft can surely be removed from the fabric.

Example of preferred embodiments of the mispicked weft removing device according to the invention and parts and details thereof are described on behalf of the drawings. The various drawings show the following:

Fig. 1 is a sectional plan view of a picking unit and the associated parts;

Fig. 2 to 10(b) show a mispicked weft removing device in a preferred embodiment according to the present device, in which;

Fig. 2 is an enlarged sectional view taken on line A-A in Fig. 1;

Fig. 3 is an enlarged sectional view taken on line B-B in Fig. 1;

Fig. 4 is a sectional front view of a mispicked weft extracting unit and a threading unit;

Fig. 5 is a sectional plan view of the mispicked weft extracting unit and the threading unit;

Fig. 6 is a sectional plan view showing a mis-

picked weft caught by suction;

Fig. 7 is a sectional plan view of assistance in explaning a manner of extracting a mispicked weft;

Fig. 8 is a sectional front view of assistance in explaning the operation of the threading unit;

Fig. 9 is a sectional front view of assitance in explaining a threading procedure;

Fig. 10(a) and 10(b) are flow charts of a mispicked weft removing procedure;

Fig. 11 is a side elevation of an essential portion of a mispicked weft separating in a modification; and

Fig. 12 and 13 show a mispicked weft removing device in another embodiment according to the present device, in which

Fig. 12 is a sectional plan view of an essential portion of the mispicked weft removing device, in which a pair of rollers are separated from each other, and

Fig. 13 is a sectional plan view of an essential portion of the mispicked weft removing device, in which the pair of rollers are pressed against each other.

A mispicked weft removing device in a preferred embodiment according to the present device will be discribed with reference to Figs. 1 to 10(b).

Referring to Fig. 1, a weft is measured by and stored on a rotary weft measuring and storing unit 3. The weft measuring and storing unit 3 feeds the weft stored thereon to a main picking nozzle 2 attached to one side of a sley 1. The main picking nozzle 2 picks the weft into a shed at a predetermined point in a weaving cycle so that the weft runs along a path defined by the recesses 4a of a modified reed 4. As shown in Fig. 4, a solenoid 5 is controlled so as to bring a weft stopping pin 5a into contact with the yarn storage surface 3a of the weft measuring and storing unit 3 to stop feeding the weft Y or so as to separate the weft stopping pin 5a from the yarn storage surface 3a to allow feeding the weft Y.

The weft Y picked by the main picking nozzle 2 is assisted for running by auxiliary picking nozzles 6 which are actuated sequentially. A first weft detector 7 disposed at a predetermined position, namely, a position between one of the salvages of the fabric W and a trimmed salvage W_1, on the weft arriving side, detects if the picked weft Y has arrived at a position corresponding thereto in a predetermined angular range of the weaving cycle. The first weft detector 7 gives information representing the result of detection to a controller C, and then the controller C determines to continue the operation of a main motor M or to stop the same on the basis of the information given thereto by the first weft detector 7. When the weft Y is inserted normally, the weft Y is beaten with the modified reed 4 into the cloth fell W_2 of the fabric W. Then, the weft Y is cut by an electromagnetic cutter 8 disposed on the side of the main picking nozzle 2 and the weaving operation is continued.

If the picked weft Y is unable to reach the position corresponding to the weft detector 7, the controller C gives a command to stop the main motor M. The loom runs before stopping for about one weaving cycle by inertia after a mispick detection signal has been provided. The mispick detection signal is provided while the sley 1 advances from a position corresponding to the back center toward the fabric W. The sley 1 reciprocates once after driving the mispicked weft Y into the fabric W and stops slightly before the cloth fell. The controller C makes the electromagnetic cutter 8 inoperative immediately after providing the mispick detection signal to keep the mispicked weft continuous with the weft extending between the main picking nozzle 2 and the weft measuring and storing unit 3.

A blowing nozzle 18 and a suction pipe 19 included in an air current generating unit, a driving roller 22 and a driven roller 25 included in a mispicked weft extracting unit, and blowing nozzle 2B and a weft separating hook 29a included in a weft separating unit.

Referring to Figs. 10(a) and 10(b), upon the detection of the mispicked weft by the weft detector 7, the controller C gives a weft removal command signal to a mispicked weft removing unit 9 shown in Figs. 4 and 5. Then, a blowing nozzle 10 blows air to blow the weft Y_1 continuous with the mispicked weft into a guide pipe 11. The weft Y_1 flies through an air guide 12 into a suction pipe 13. After reversing the loom until a full shed is formed by the warps, a pneumatic actuator 14 presses a driven roller 14a held on the driving rod thereof against a driving roller 15a operatively connected to a motor 15 to hold the weft Y_1 between the driven roller 14a and the driving roller 15a. Then, the motor 15 is actuated to pull the weft Y_1 and, consequently, the weft Y_1 is tightened and is cut by a cutter 2a provided on the main picking nozzle 2, and the mispicked weft is extracted from the shed.

Upon the detection of the complete removal of the mispicked weft from the change of the level of the output signal of a yarn detector 16, namely, a detector consisting of a light projector and a light receiver, the controller C initializes the mispicked weft removing unit 9 and actuates the main motor M to restart the loom. If the removal of the mispicked weft is not completed within a predetermined time, the controller C provides a failure signal.

A second weft detector 17 is disposed outside the weft detector 7 disposed on the weft arriving side to detect a weft that runs beyond a weft arriving range near the trimmed salvage W_1. A blowing nozzle 18 is attached to the backside of the modified reed 4 at a position between the weft detectors 7 and 17 so as to blow air toward the cloth fell W_2. The flow nozzle 18 is connected through a solenoid valve V_1 to a compressed air tank, not shown.

A suction pipe 19 is disposed beside the trimmed salvage W_1 and near the cloth fell W_2 with its suction opening on a line aligned with the blowing direction of the blowing nozzle 18. Air is blown by a blowing nozzle 19a connected to the suction pipe 19 to generate suction in the suction pipe 19. The blow nozzle 19a is connected through a solenoid valve V_2 to the compressed air tank. A yarn detector 19b consisting of a light projector and a light receiver is provided in the suction pipe 19 at a position near the suction opening of the suction pipe 19. A waste box 20 is provided opposite to the outlet of the suction pipe 19.

A motor 21 is disposed on one side of the suction pipe 19, on the side near the trimmed salvage W_1, to drive a driving roller 22 through a belt 23. A pneumatic actuator 24 is disposed on the other side of the suction pipe 19 with its longitudinal axis in alignment with the picking direction. A driven roller 25 is supported on the driving rod of the pneumatic actuator 24. The driven roller 25 and the driving roller 22 are disposed respectively on the opposite sides of a gripping region between the blowing nozzle 18 and suction opening of the suction pipe 19 and outside the range of swing motion of the modified reed 4. When the driving rod of the pneumatic actuator 24 is projected, the driven roller 25 is moved across the gripping region between the blowing nozzle 18 and the suction opening of the suction pipe 19 and is pressed against the driving roller 22. The driving roller 22 is disposed near the cloth fell W_2. Thus, the driving roller 22 and the driven roller 25 grip a weft in the gripping region near the cloth fell W_2 and outside the range of swing motion of the modified reed 4. The pneumatic actuator 24 is connected through a solenoid valve V_3 to the compressed air tank.

Temples 26 and 27 are disposed near the cloth fell W_1 to guide the salvanges of the fabric W and the trimmend salvage W_1. A blowing nozzle 28 is disposed directly above the temple 27 so as to blow air toward the cloth fell W_2.

A pneumatic actuator 29 is disposed near the blowing nozzle 28. A weft separating hook 29a is attached to the driving rod of the pneumatic actuator 29. When the driving rod of the pneumatic actuator 29 is projected, the weft separating hook 29a scratches the cloth fell W_2. The blowing nozzle 28 and the pneumatic actuator 29 are connected respectively through solenoid valves V_4 and V_5 to the compressed air tank.

The solenoid valves V_1 to V_5 are controlled by the controller C according to the detection signals of the second weft detector 17 and the yarn detector 19b, and the output signal of a rotary encoder 31 for detecting the angular phase of the loom.

If the weft is broken before the main picking nozzle 1, the broken weft Y_2, i.e., a mispicked weft, is detected by the second weft detector 17 and the mispicked weft Y_2 is driven into the cloth fell W_2, the controller C executes a mispicked weft removing procedure shown in Fig. 10(a) and 10(b). The leading end of the mispicked weft Y_2 driven into the cloth fell W_2 is not arrested by the warps of the trimmed salvage W_1.

Upon the detection of the weft by the second weft detector 17, the controller C stops the main motor M and energizes the solenoid of the solenoid valve V_2 to stop the loom and to make the suction pipe 19 operative. Subsequently, the solenoid of the solenoid valve V_1 is energized for a predetermined time to blow air by the blowing nozzle 18 for the predetermined time, so that a leading air current is generated across the gripping region between the blowing nozzle 18 and the suction opening of the suction pipe 19 to lead the leading end Y_3 of the mispicked weft Y_2 into the suction pipe 19 by the leading air current.

After blowing air for the predetermined time by the blowing nozzle 18, the loom is reversed to form a maximum shed to enable the mispicked weft removing unit 9 to carry out the mispicked weft removing operation. This mispicked weft removing procedure is carried out in case a picked weft is broken within the shed, namely, in case one end of the picked weft is continuous with the weft extending within the main picking nozzle 2.

After the completion of the mispicked weft removing procedure by the mispicked weft removing unit 9, the controller C energizes the solenoid of the solenoid valve V_5 upon the reception of a yarn detection signal provided by the yarn detector 19b to project the driving rod of the pneumatic actuator 29 so that the free end Y_3 of the mispicked weft Y_2 is held between the driving roller 22 and the driven roller 25 as shown in Fig. 7.

If the weft detector 19b does not provide any yarn detection signal within a predetermined time, the controller C provides a command to make a threading unit 32 shown in Figs. 4 and 5 including the mispicked weft removing unit 9 carry out a threading operation.

If the weft is not fed properly and the weft is broken before the main picking nozzle 2, a blowing nozzle 34 blows air to pull out the weft from a yarn package 33. Then, the weft is delivered to the weft measuring and storing unit 3 by the converging action of a converging funnel 35. The weft delivered to the weft measuring and storing unit 3 is blown from a weft winding tube 3b by the blowing action of a blowing nozzle 36, and then the weft is guided into an air path between a blowing nozzle 39 and a suction pipe 40 by the cooperative action of blowing nozzles 37 and a funnel 38. As shown in Fig. 8, the weft Y_4 thus unwound from the yarn package 33 is transported by an air current flowing from the blowing nozzle 39 toward the suction pipe 40 and is sucked into the suction pipe 40. An excessive portion of the weft Y_4 held by the suction pipe 40 by suction is cutt off with a cutter 41. A catching lever 42a which is driven by a motor

42 for swing motion between a position indicated by continuous lines and a position indicated by alternate long and two short dashed lines in Fig. 8 hooks the weft Y_4 and takes the same to a position near the inlet of the main picking nozzle 2. Then, the main picking nozzle 2 sucks and picks the weft Y_4 by its blowing action, and the weft Y_4 is blown into the guide pipe 11 by air blown by the blowing nozzle 10. Subsequently, the mispicked weft removing unit 9 carries out the mispicked weft removing procedure and the cutter 2a cuts the weft Y_4 to complete the threading operation of the threading unit 32.

After holding the free end Y_3 of the mispicked weft Y_2 has been held between the driving roller 22 and the driven roller 25, the solenoid of the solenoid valve V_4 is energized for a predetermined time to separate the mispicked weft Y_2 slightly from the cloth fell W_2 by blowing air through the blowing nozzle 28 for the predetermined time.

After the air blowing operation of the blowing nozzle 28 has been stopped, the solenoid of the solenoid valve V_5 is energized to project the driving rod of the pneumatic actuator 29 and, conseuqently, the weft separating hook 29a scratches the cloth fell W_2 to separate further the mispicked weft Y_2 slightly separated from the cloth fell W_2 by tje blowing action of the blowing nozzle 28 from the cloth fell W_2. Since the mispicked weft Y_2 is separated beforehand by the blowing action of the blowing nozzle 28, the weft separating hook 29a is mispicked weft Y_2 without fail.

After separating the mispicked weft Y_2 from the cloth fell W_2 by the weft separating hook 29a, the motor 21 is actuated to extract the mispicked weft Y_2 from the fabric and to deliver the mispicked weft Y_2 toward the suction pipe 19 by rotating the driving roller 22 and the driven roller 25. Thus, the mispicked weft Y_2 is sucked into the suction pipe 19 and is discharged into the waste box 20.

After the entire length of the mispicked weft Y_2 has passend the driving roller 22 and the driven roller 25, the yarn detector 29b gives a signal indicating the absence of yarn to the controller C, and then the controller C stops the motor 21 and provides a signal to de-energize the solenoids of the solenoid valves V_2, V_3 and V_5. Consequently, the weft separating hook 29a is retracted to its standby position, the driven roller 25 is separated from the driving roller 22, and the suction of the suction pipe 19 is stopped.

Subsequently, the threading unit 32 carries out the foregoing threading operation. The results of the threading operation of the threading unit 32 is evaluated from the output signal of the yarn detector to see if the threading operation has been successful. If the threading operation and the mispicked weft removing procedure have successfully been achieved, the loom is restarted. If either the threading operation or the mispicked weft removing procedure has not successfully been achieved, an alarm is provided.

Since the gripping region in which the driving roller 22 and the driven roller 25 grip the free end Y_3 of the mispicked weft Y_2 is near to the cloth fell W_2, the free end Y_3 of the mispicked weft Y_2 is very short. Accordingly, a region for the removal of a weft mispicked due to faulty yarn feed or the breakage of the weft in the shed can be expanded by disposing the second weft detector 17 close to the first weft detector 7 to increase remarkably the success probability of the weft removing operation.

The present device is not limited in its practical application to the foregoing embodiment. For example, the weft separating hook 29a may be disposed under the fabric W as shown in Fig. 11.

As shown in Figs. 12 and 13, in a mispicked weft removing device in another embodiment according to the present device, a suction nozzle 43a is fitted slidably on a suction pipe 43, a lever 44 having one end interlocked with the driving rod of a pneumatic actuator 24 and the other end interlocked with the suction nozzle 43a is supported for swing motion on a support shaft 45, a driving roller 22 to be driven by a motor 21 is disposed near the trimmed salvage, and a driven roller 25 is supported on the extremity of the driving rod of the pneumatic actuator 24. When the driven roller 25 is advanced toward the driving roller 22, the suction nozzle 43a is moved away from a gripping region in which the rollers 22 and 25 grip the free end of a mispicked weft by the lever 44, and the suction nozzle 43a is advanced into the gripping region by the lever 44 when the driven roller 25 is moved away from the driving roller by the pneumatic actuator 24. When the driven roller 25 is retracted from the gripping region as shown in Fig. 12, the suction nozzle 43a is loacted within the gripping region. When the driven roller 25 is pressed against the driving roller 22 as shown in Fig. 13, the suction nozzle 43a is moved away from the gripping region. Accordingly, the suction nozzle 43a can be advanced as near to the cloth fell W_2 as possible in sucking the free end Y_3 of a mispicked weft Y_2 by the suction pipe 43 to ensure further the suction and mechanical gripping of the free end Y_3.

The device for removing mispicked wefts in an air jet loom includes a weft separating unit 29, 29a for the separation of the mispicked, i.e. broken weft Y from the cloth fell W_2. There is a weft extracting unit 19 19a, 19b, 20, 21, 22, 23, 24, 25 disposed at the weft arriving side. The free end of the mispicked weft Y is blown into a so called gripping area or region where the end of the broken weft Y is caught e.g. by rollers 22, 25 of the weft extracting unit 19, 19a, 19b, 20, 21, 22, 23, 24, 25. The gripping region of of the extracting unit extends close to the weft arriving side but outside the range of the motion of the reed 4 of the loom.

As is apparent from the foregoing description, according to the present device, the free end of a mis-

picked weft is led into the gripping region of the mispicked weft extracting unit by an air current, the mispicked weft driven into the cloth fell is separated from the cloth fell by the mispicked weft separating unit, and the mispicked weft extracting unit operates in the gripping region near the cloth fell on the weft arriving side. Therefore, the short free end of a mispicked weft can be led into the gripping region of the mispicked weft extracting unit and, consequently, a mispicked weft arresting region in which a mispicked weft mispicked due to faulty yarn feed or breakage of the picked weft in the shed and running past the weft arriving range can surely be removed can be expanded.

Claims

1. A mispicked weft removing device for a jet loom, said device comprising:
   a mispicked weft separating unit (29, 29a) for separating a mispicked weft (Y) from the cloth fell (W_2);
   a mispicked weft extracting roller unit (19, 19a, 19b, 20, 21, 22, 23, 24, 25) disposed on the weft arriving side of the jet loom at which a weft picked by a main picking nozzle (2) disposed on the weft picking side of the loom arrives; and
   a leading air current generating unit (28) for generating a leading air current for leading the free end of a mispicked weft into a gripping region in which the mispicked weft extracting roller unit is(19, 19a, 19b, 20, 21, 22, 23, 24, 25) able to catch the free end of the mispicked weft (Y), the gripping region extending near the weft arriving side and outside the range of swing motion of the reed (4).

2. A mispicked weft removing device for a jet loom, said device comprising:
   a mispicked weft separating unit (29, 29a) for separating a mispicked weft (Y) from the cloth fell (W_2),
   a mispicked weft extracting unit (19, 19a, 19b, 20, 21, 22, 23, 24, 25) disposed on the weft arriving side of the jet loom at which a weft picked by a main picking nozzle (2) disposed on the weft picking side of the loom arrives, and
   a leading air current generating unit (28) for generating a leading air current for leading the free end of a mispicked weft (Y) into a gripping region in which the mispicked weft extracting unit (19, 19a, 19b, 20, 21, 22, 23, 24, 25) is able to catch the free end of the mispicked weft,
   and the gripping region extending near the weft arriving side and outside the range of the swing motion of the reed (4).

3. A mispicked weft removing device as claimed in claim 1 or 2 comprising means (C) for inactivating a weft yarn cutter (8), placed on the side of the main picking nozzle (2), upon detection of weft mispicking by a weft detector (7).

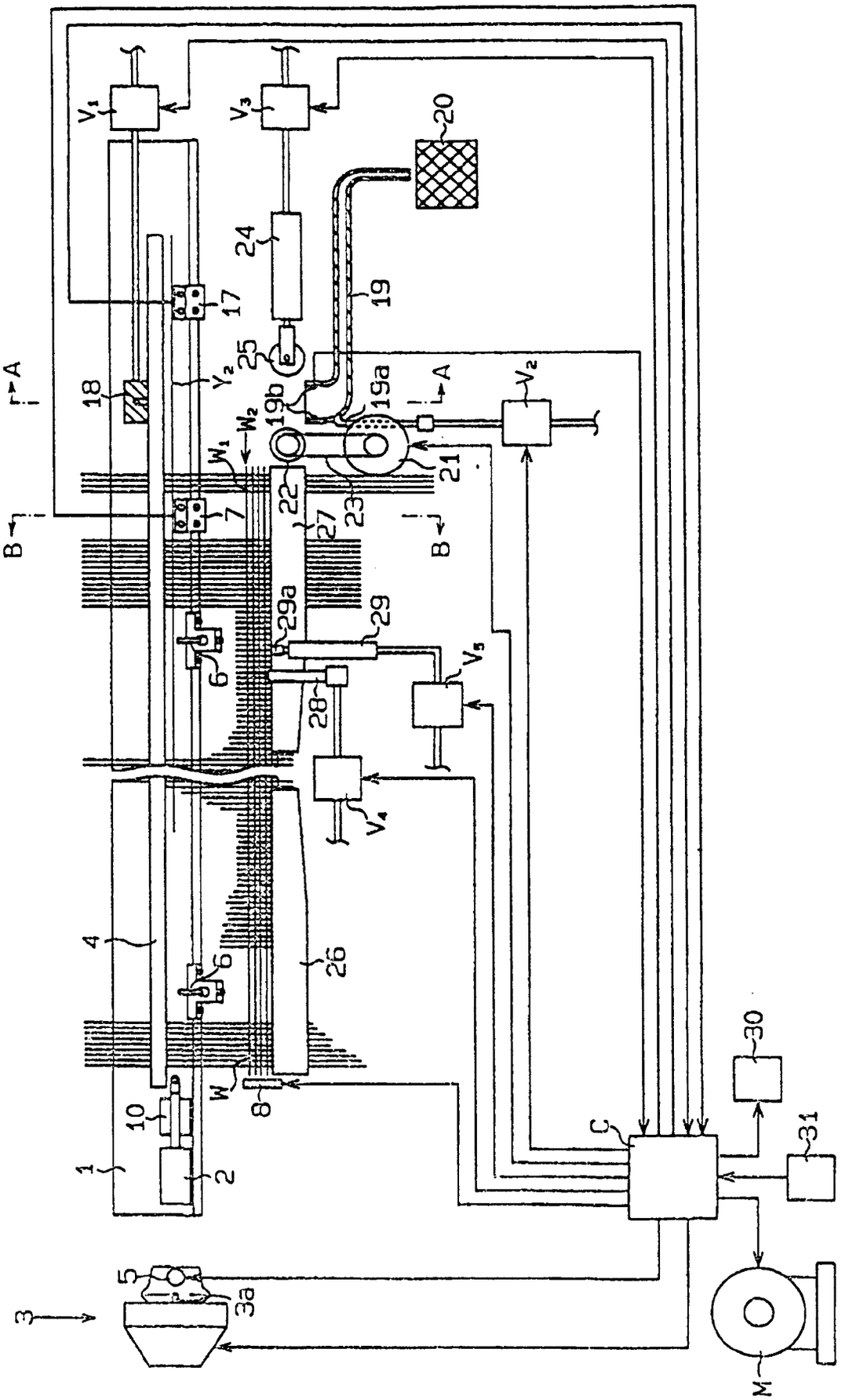
4. A mispicked weft removing device as claimed in one of claims 1 to 3, comprising a further mispicked weft extracting unit (9), placed near the weft entering/main nozzle (2) side.

5. A mispicked weft removing device as claimed in one of claims 1 to 4, comprising a threding unit (32) for threading up the thread (Y) from a weft yarn package (33) to a weft storing unit (3).

6. A mispicked weft removing device as claimed in one of claims 1 to 5, comprising a threding unit (37, 38, 39, 40, 41, 42, 42a) for threading up the thread (Y) from a weft storing unit (3) to a main picking nozzle (2).

7. Air jet loom comrising a mispicked weft removing device as claimed in one of the claims 1 to 6.

Fig. 1


V1
V3
20
24
19
17
25
18
Y2
19b
19a
A
V2
W2
W1
21
22
23
27
B
7
29a
29
6
V5
28
V4
4
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W
8
10
1
2
C
30
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3a
3
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Fig. 2

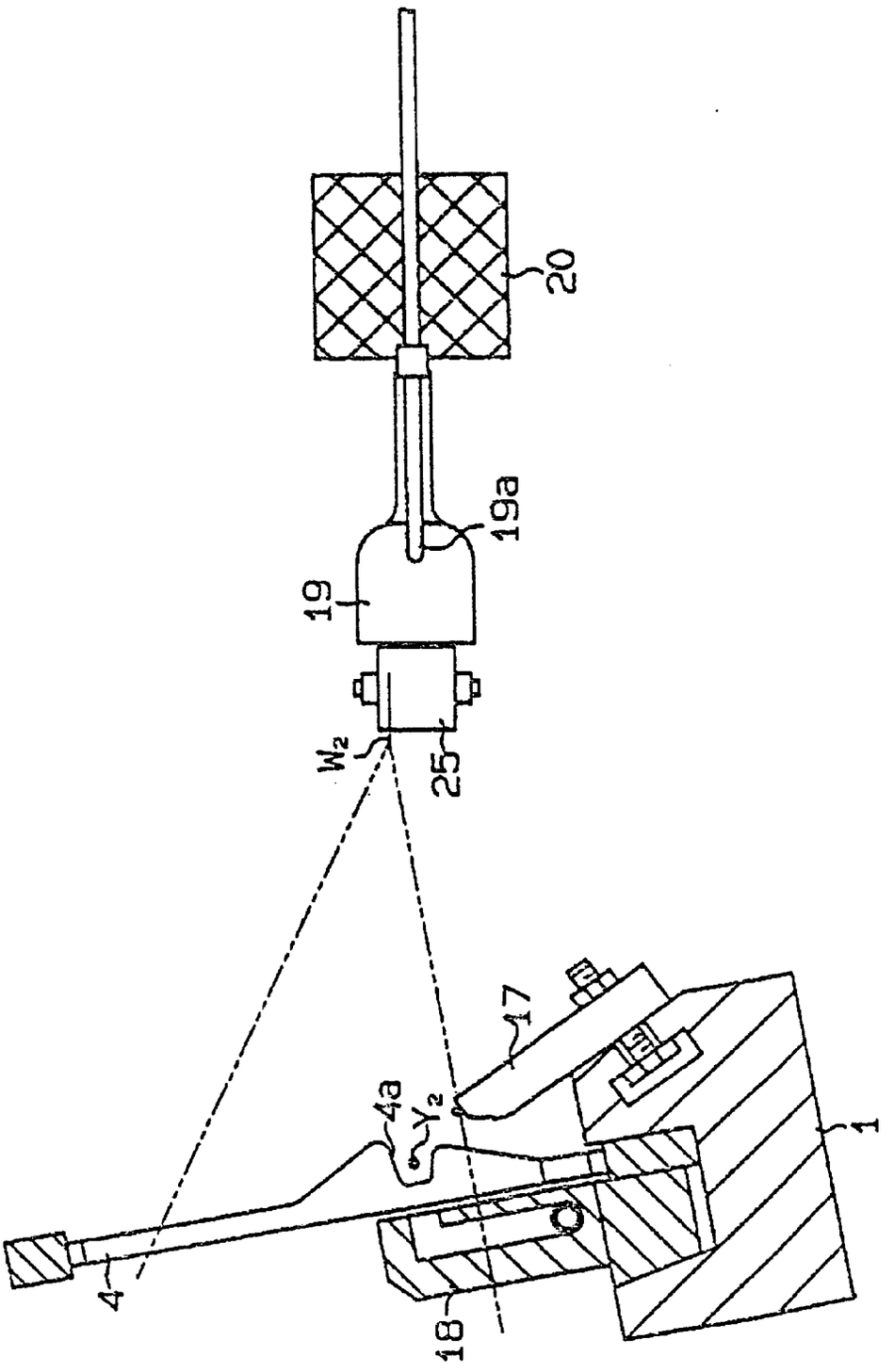


Fig. 3

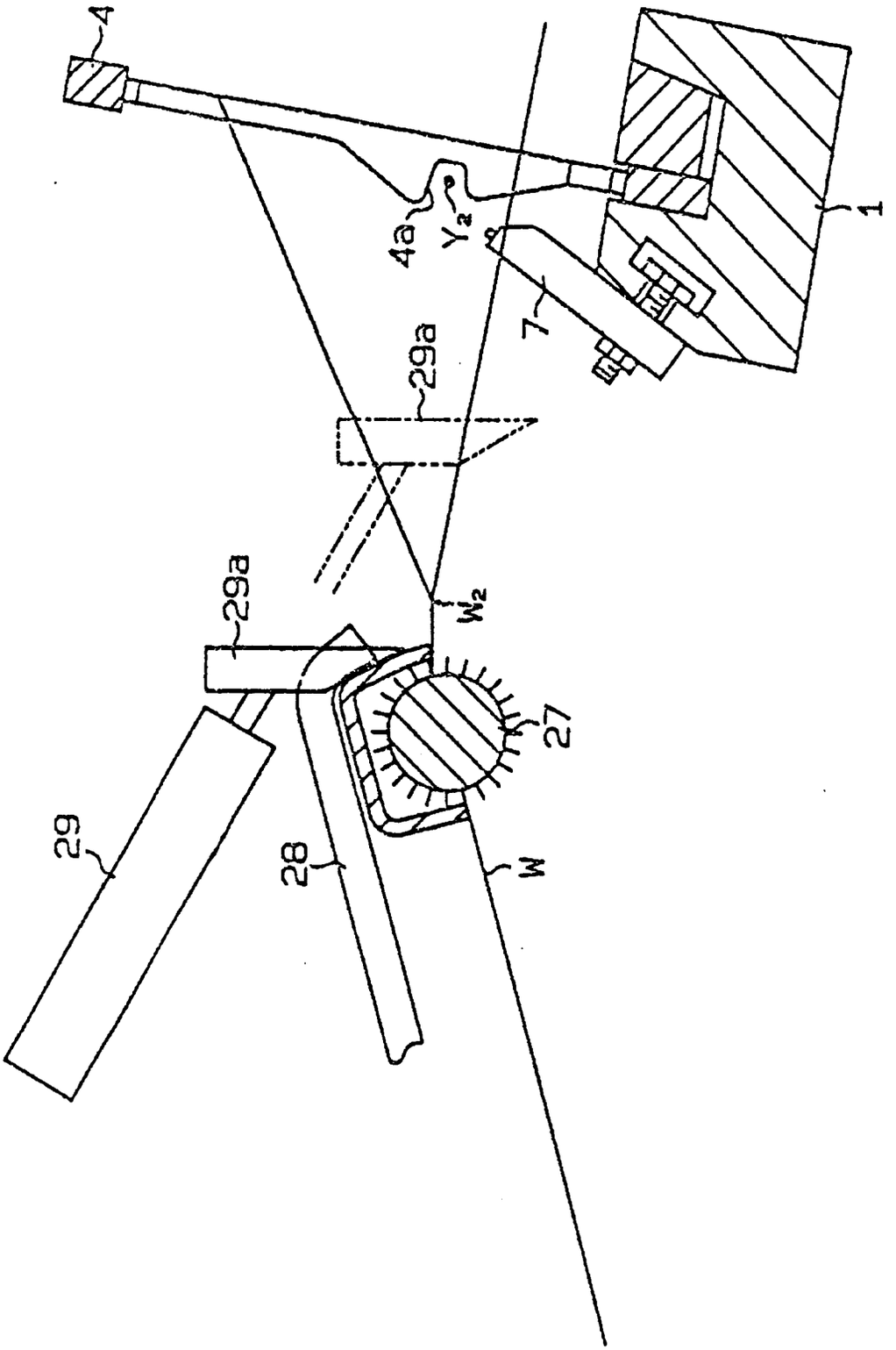
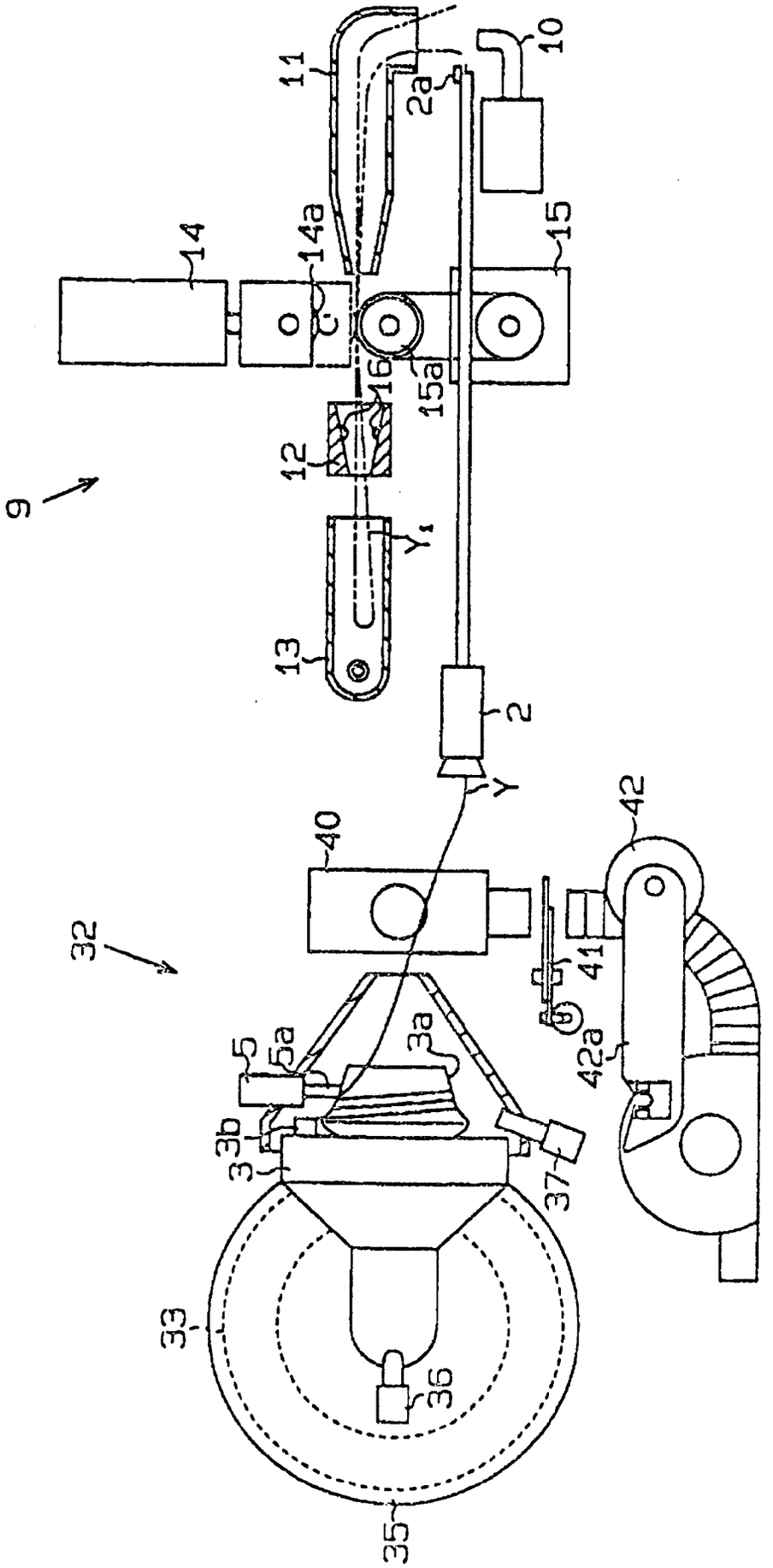


Fig. 4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Y_1
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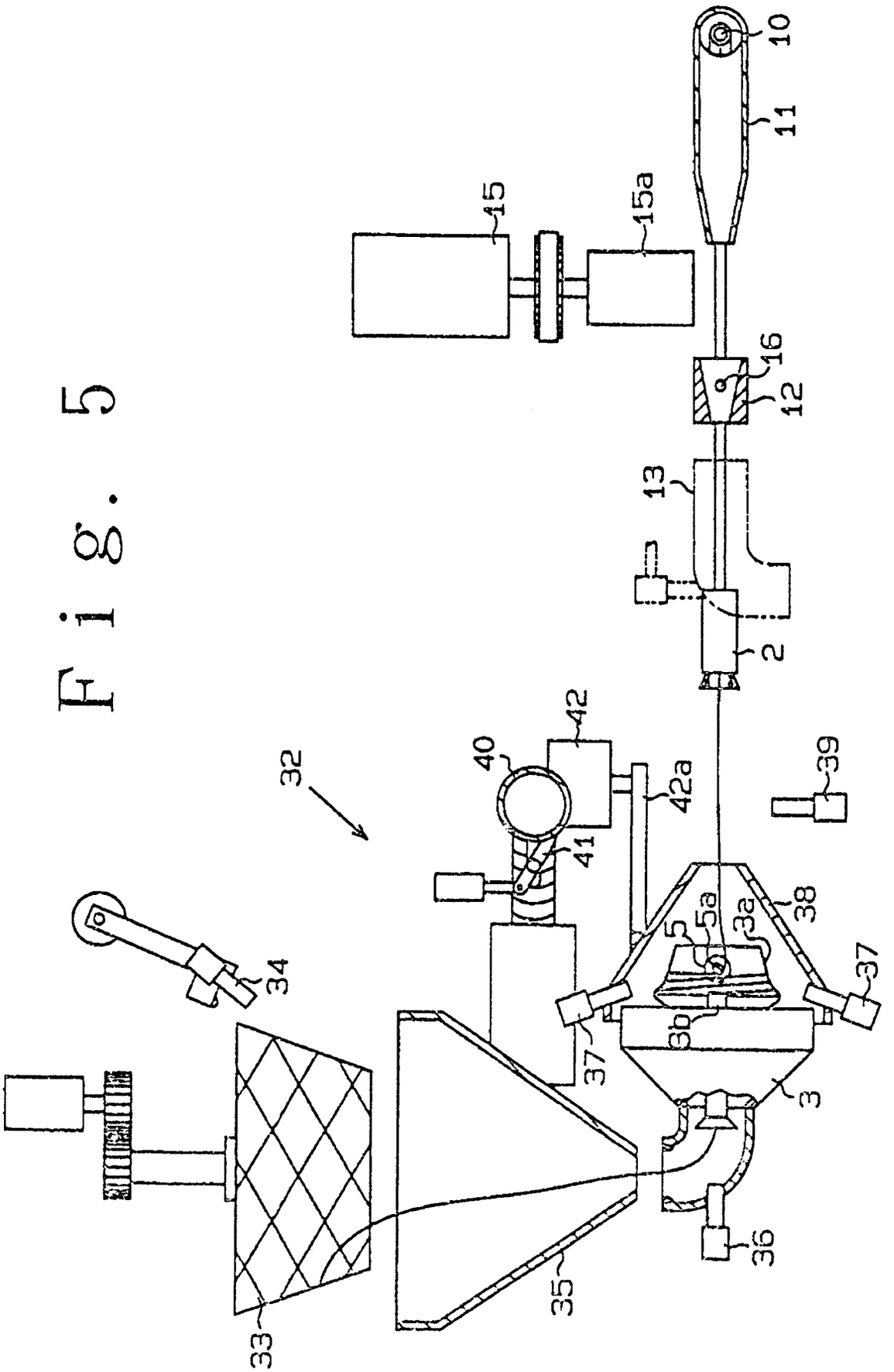
Fig. 5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3b
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35
33

Fig. 6

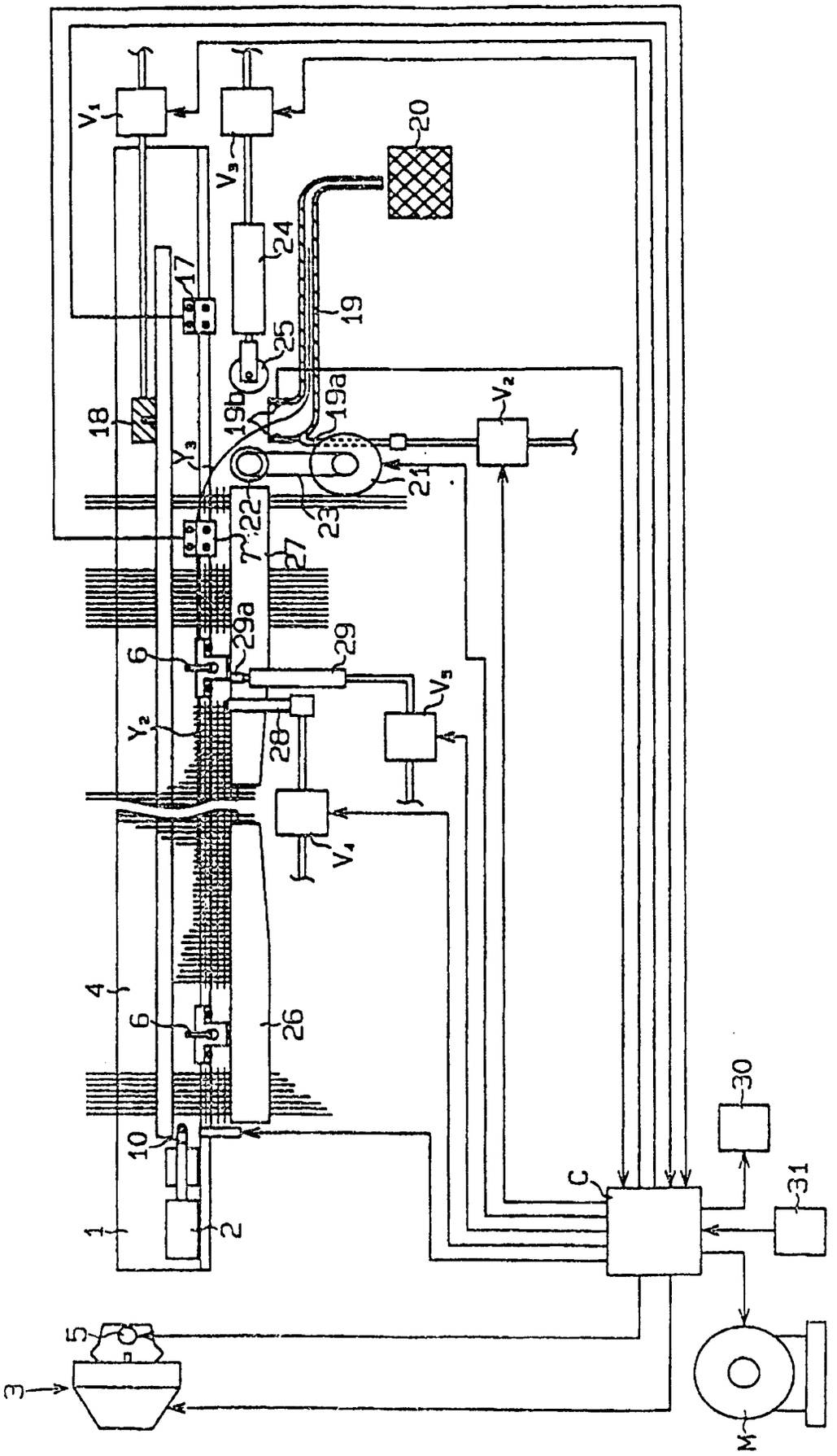

V1
V3
20
24
17
19
25
18
19b
19a
V2
Y3
21
22
23
7
27
29a
29
6
V5
Y2
28
V4
4
26
10
1
2
C
30
31
5
3
M

Fig. 7

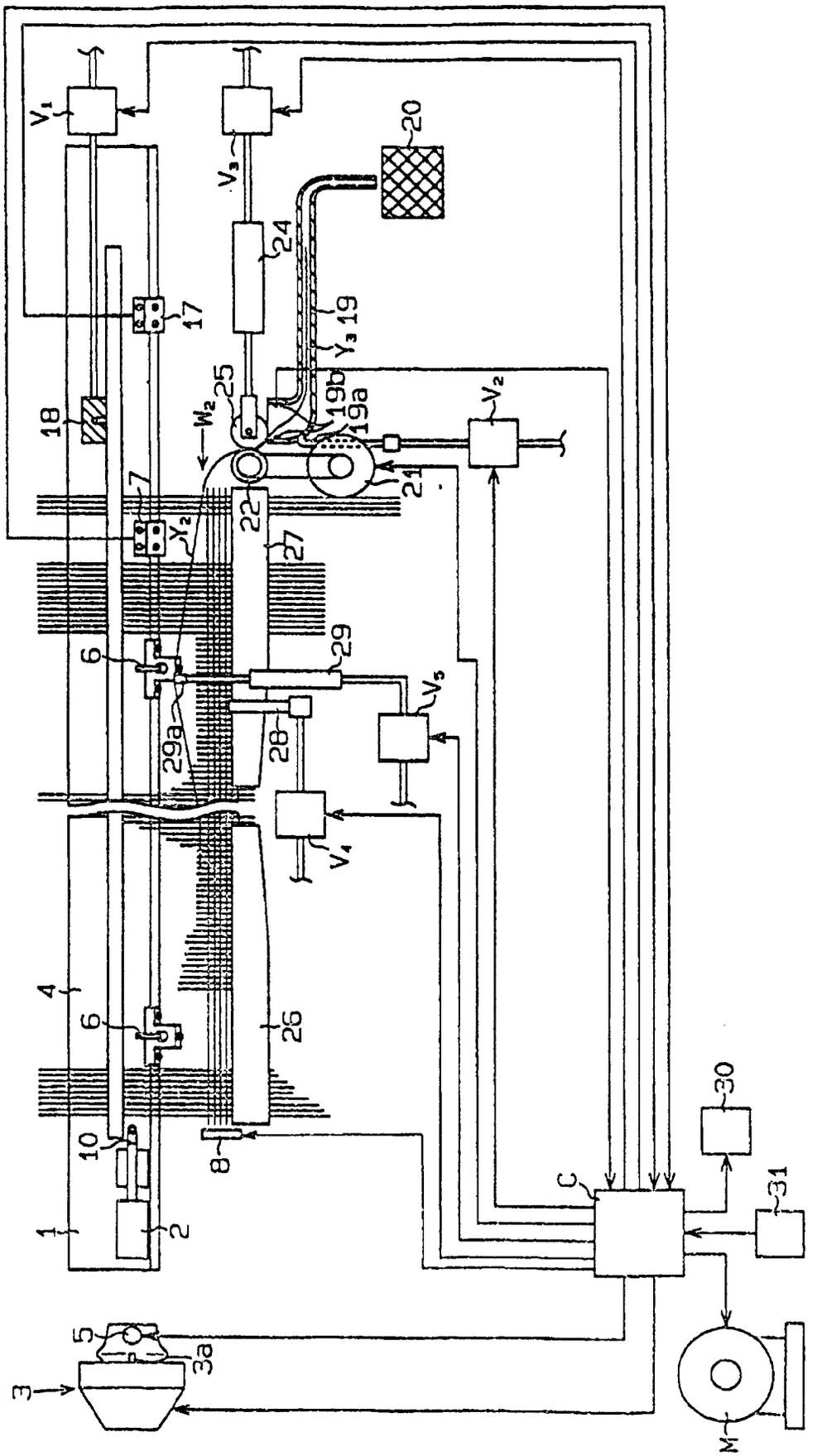

V1
V3
20
24
17
Y3 19
18
W2 25
19b
19a
V2
21
7
Y2
22
27
6
29
V5
29a
28
V4
4
6
26
10
8
C
30
31
1
2
5
3a
3
M

Fig. 8

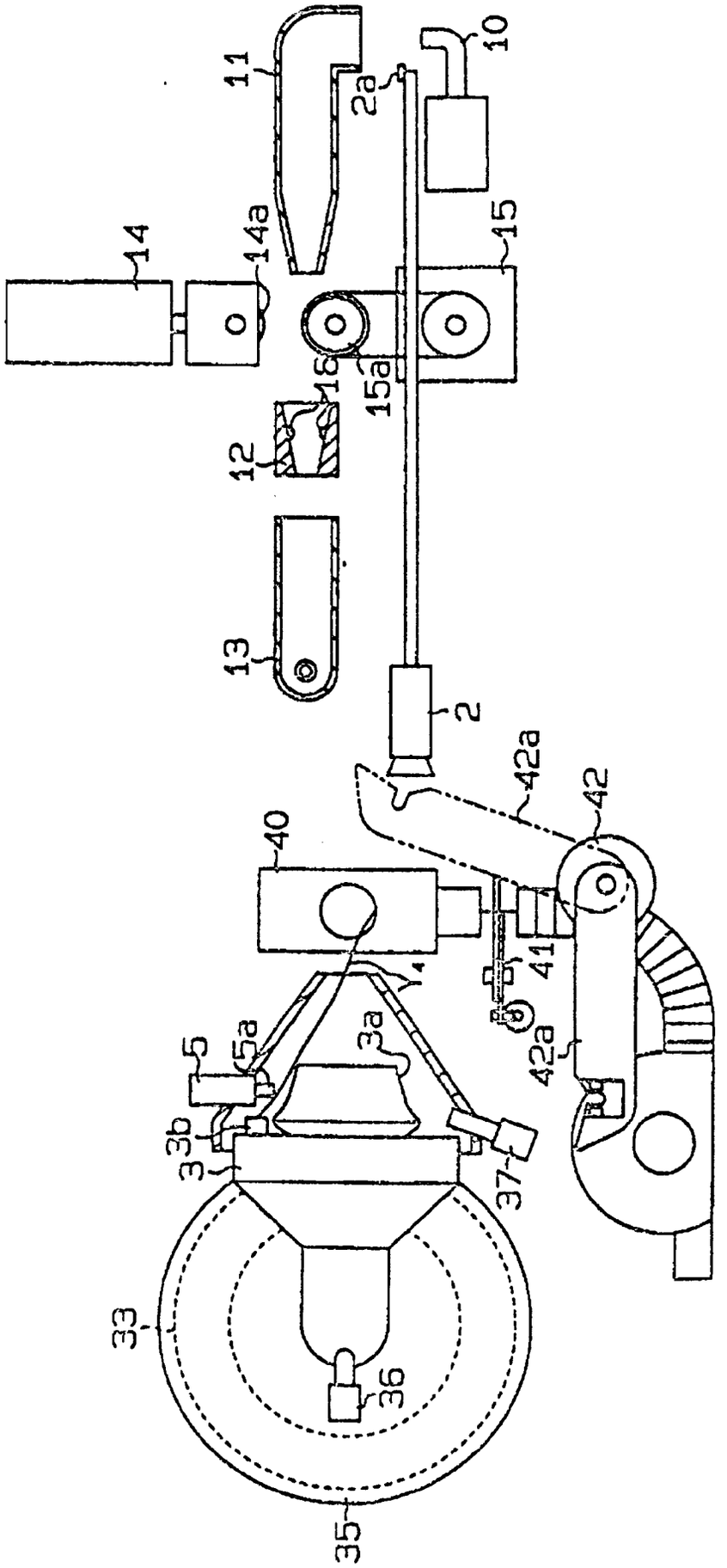


Fig. 9

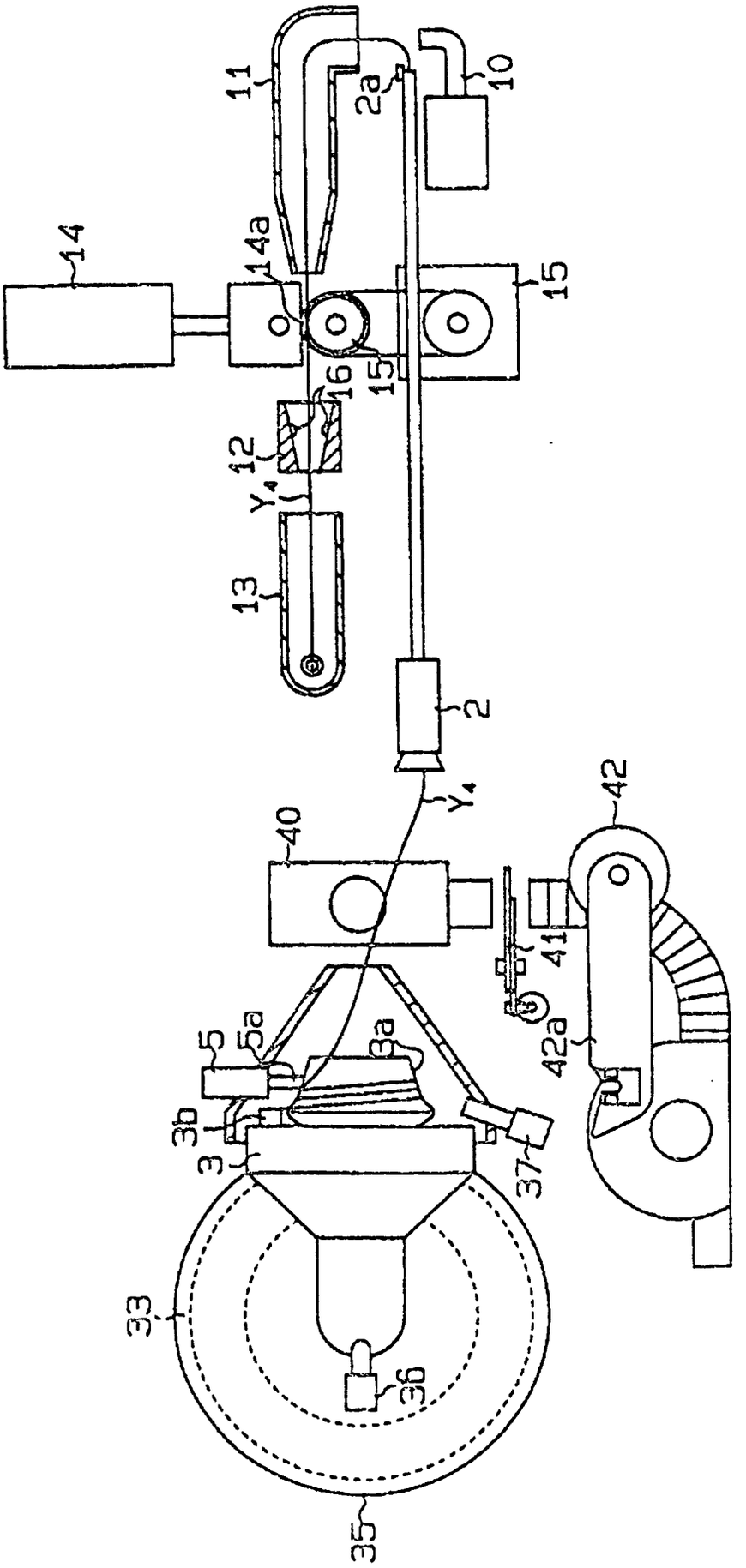

11
2a
10
14
14a
15
16
15
12
Y4
13
2
Y4
40
42
41
42a
5
5a
3a
3b
3
37
33
36
35

Fig. 10(a)

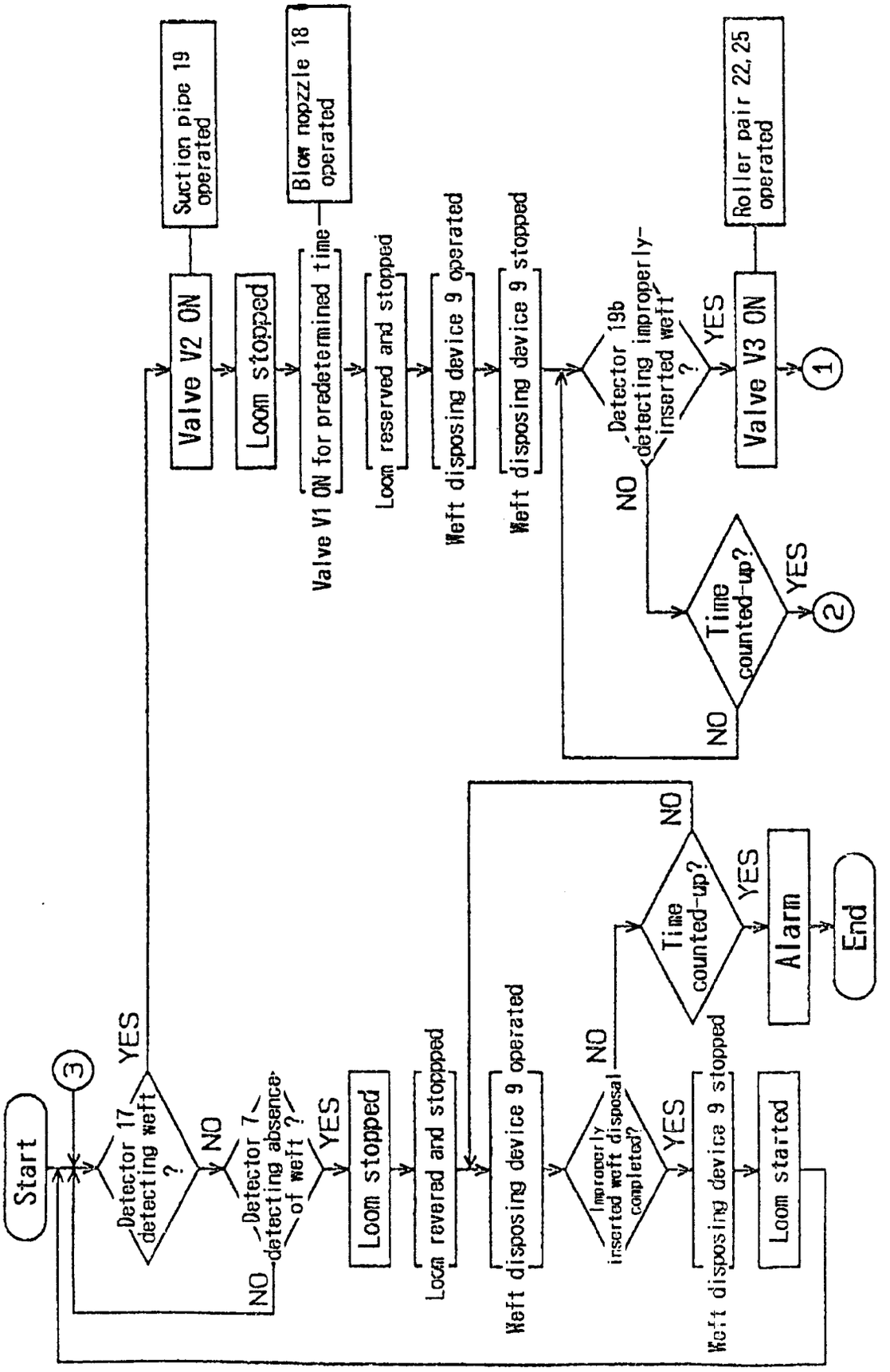

Start
3
Detector 17 detecting weft ?
YES
NO
Detector 7 detecting absence of weft ?
YES
NO
Loom stopped
Loom revered and stopped
Weft disposing device 9 operated
Improperly inserted weft disposal completed?
NO
YES
Weft disposing device 9 stopped
Loom started
Time counted-up?
NO
YES
Alarm
End
Valve V2 ON
Suction pipe 19 operated
Loom stopped
Valve V1 ON for predetermined time
Blow nozzle 18 operated
Loom reserved and stopped
Weft disposing device 9 operated
Weft disposing device 9 stopped
Detector 19b detecting improperly-inserted weft ?
NO
YES
Time counted-up?
NO
YES
Valve V3 ON
Roller pair 22, 25 operated
1
2

Fig. 10 (b)

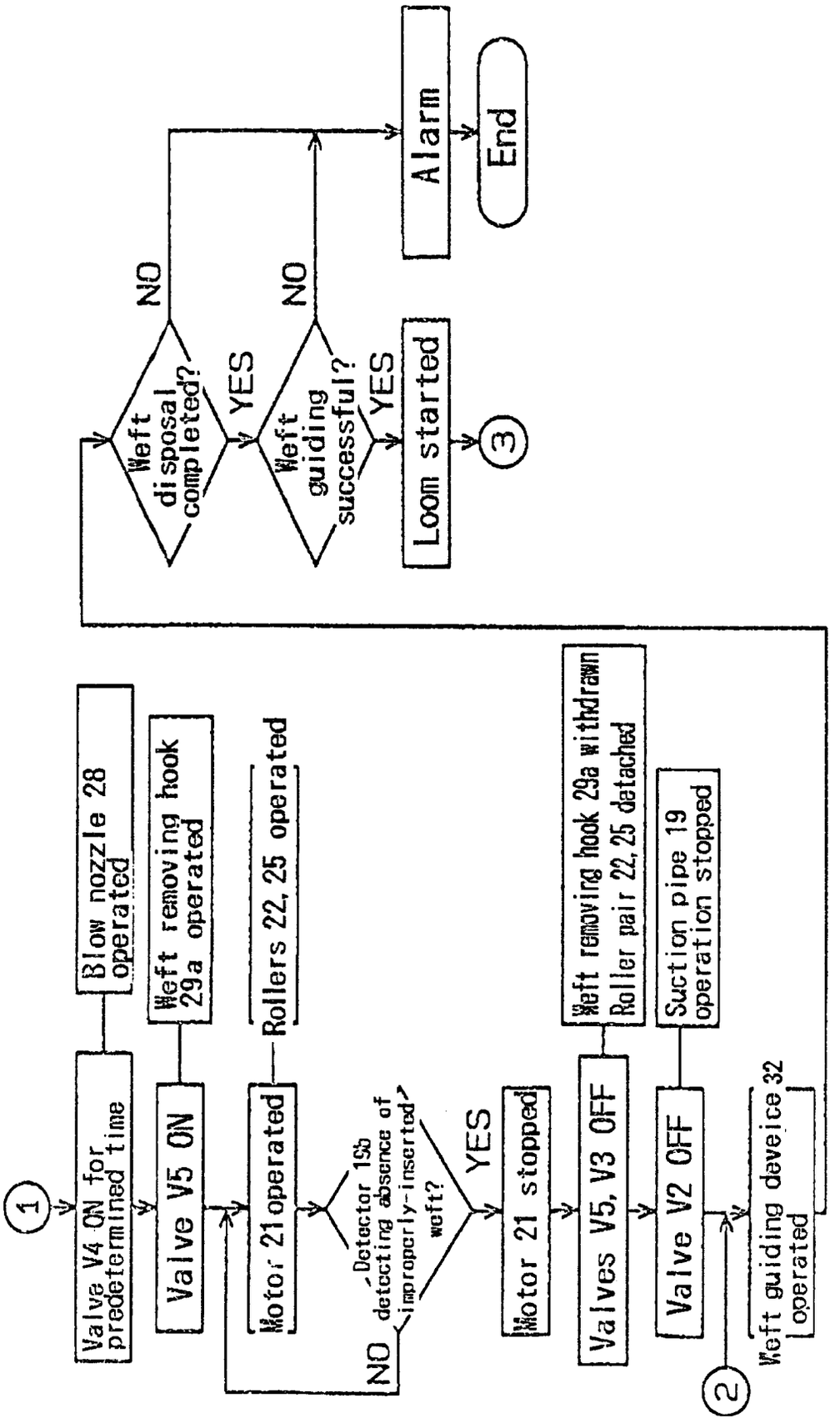

1
Valve V4 ON for predetermined time
Blow nozzle 28 operated
Valve V5 ON
Weft removing hook 29a operated
Motor 21 operated
Rollers 22, 25 operated
NO
Detector 15b detecting absence of improperly-inserted weft?
YES
Motor 21 stopped
Valves V5, V3 OFF
Weft removing hook 29a withdrawn
Roller pair 22, 25 detached
Valve V2 OFF
Suction pipe 19 operation stopped
2
Weft guiding device 32 operated
3
Loom started
Weft guiding successful?
NO
YES
Weft disposal completed?
NO
YES
Alarm
End

Fig. 11

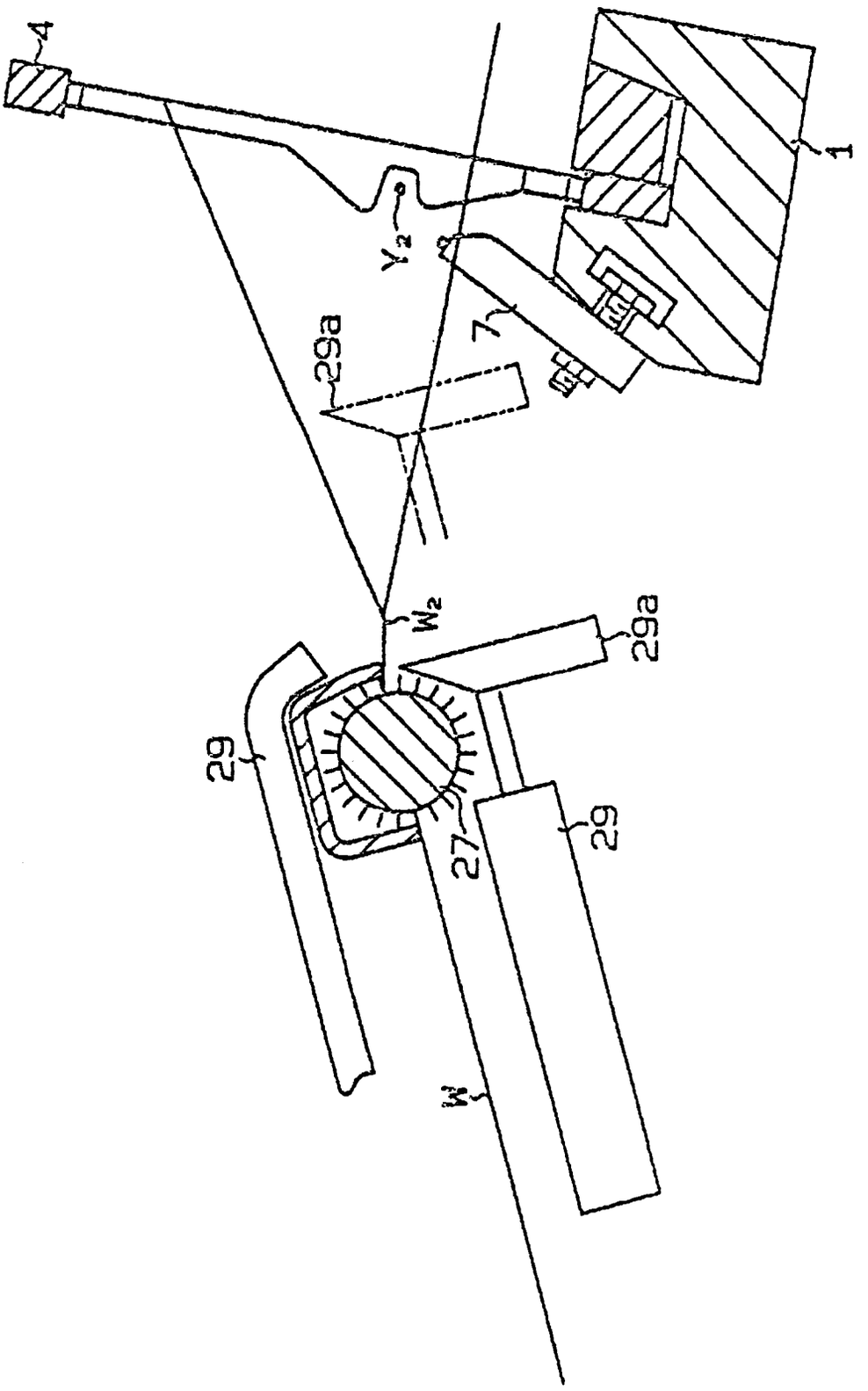


Fig. 13

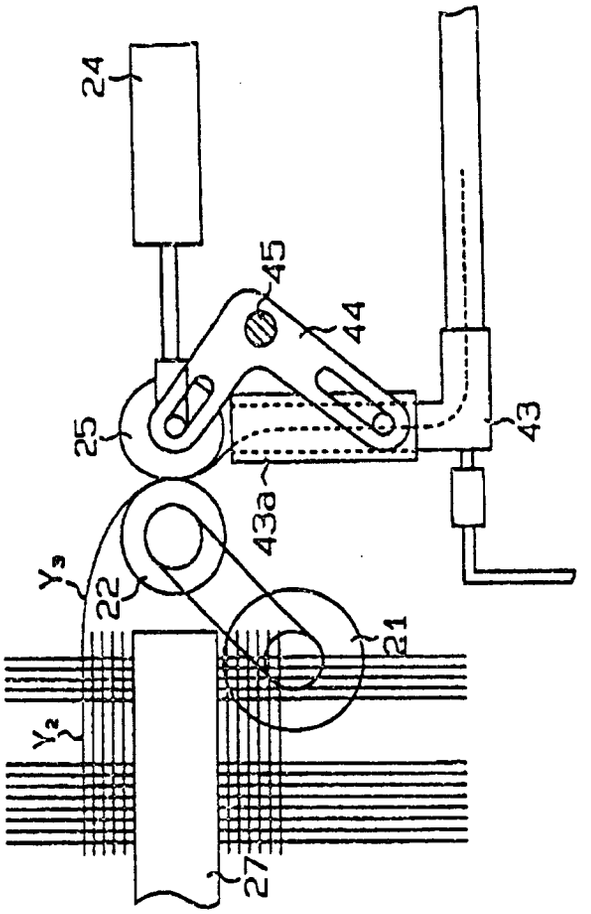
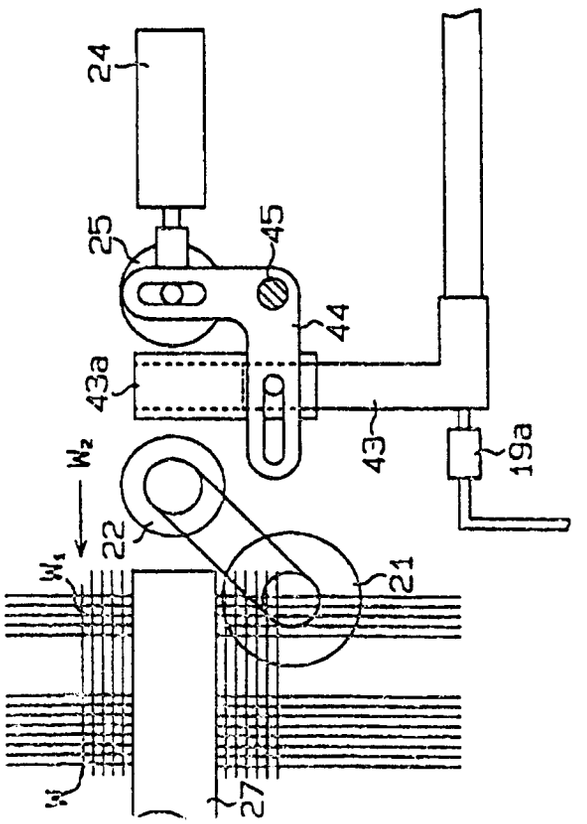

24
45
44
25
43
43a
Y_3
22
21
Y_2
27

Fig. 12


24
25
45
44
43a
43
19a
W_2
22
W_1
21
W
27

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 81 0485

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)
Y	EP-A-0 100 939 (TOYODA JIDOSHOKKI) * page 10, line 33 - page 11, line 5 * * page 14, line 12 - page 15, line 29 * * page 23, line 16 - page 24, line 15; figures 3,4,6,16,17 *	1,2,3,4	D03D47/30
Y	EP-A-0 236 597 (TSUDAKOMA CORP.) * page 4, line 11 - line 26; figures 1,7 *	1,2,3	
Y	US-A-4 890 650 (KINPEI MITSUYA) * column 14, line 41 - column 15, line 31; figures 9-11 *	4	
A	US-A-4 858 656 (MITSURU SUWA) * column 4, line 31 - line 61; figures 1-5 *	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	18 SEPTEMBER 1991	HENNINGSEN O.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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