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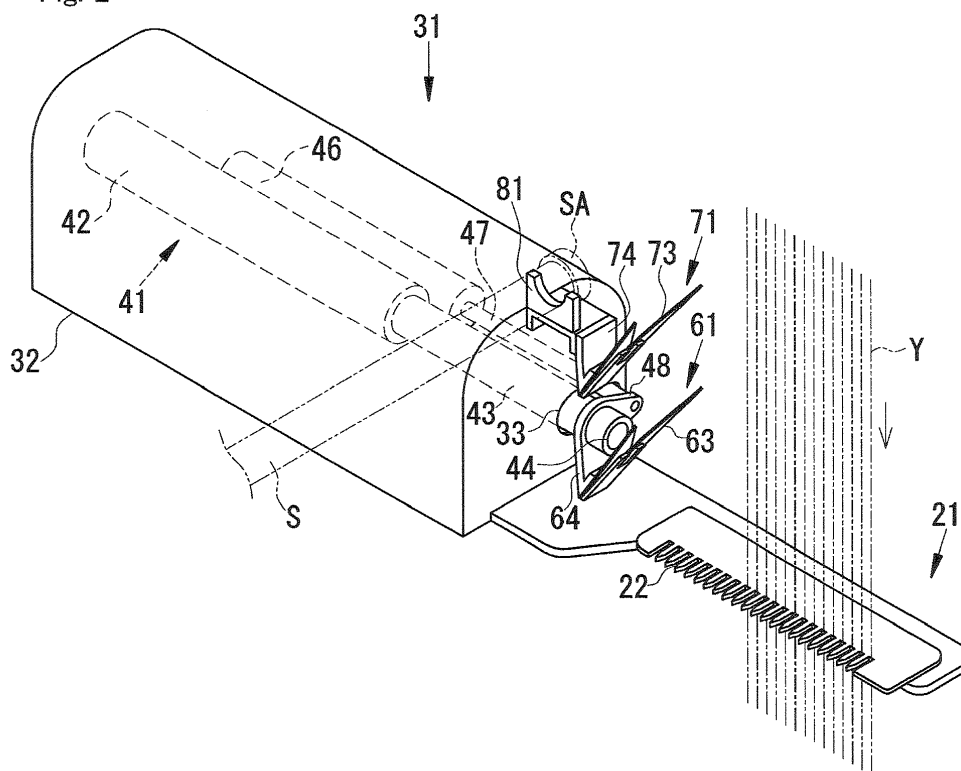
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(54) **Yarn cutting-sucking device and spinning winder**

(57) An object is to provide a yarn cutting-sucking device which enables anyone unskilled easily transfer work which is very difficult and requires a skilled operator. A yarn cutting-sucking device 10 cutting and sucking a plurality of yarns Y running along one direction, includes

a first cutter 61 cutting the yarns Y, a suction part 44 sucking the yarns Y cut by the first cutter 61, and a second cutter 71 arranged at an upstream side of the suction part 44 and cutting the yarns Y sucked by the suction part 44.

Fig. 2



Description

Field of the Invention

[0001] The present invention relates to an art of a yarn cutting-sucking device and a spinning windier.

Background of the Invention

[0002] Conventionally, a spinning windier is known in which a plurality of fibers are bundled so as to form a plurality of yarns and treatment such as drawing is applied on the yarns and then the yarns are wound so as to form a plurality of packages. A yarn cutting-sucking device is also known which is arranged at a downstream side of a yarn spinning device (for example, see the Japanese Examined Patent Publication No. 7-26247).

[0003] When any trouble occurs or abnormality such as yarn severance occurs in the spinning windier, the yarn cutting-sucking device cuts all the yarns and sucks and holds the yarns continuously spun from the spinning device. Accordingly, the yarns continuously spun are prevented from being wound round a body of revolution at the downstream side and the package is prevented from having lost its shape.

[0004] Now, when the trouble of the spinning windier is solved by an operator and the production and winding of the plurality of the yarns are restarted, the operator must perform threading operation. In the threading operation, the yarns continuously spun from the spinning device are sucked and held by a suction gun, and the yarns are threaded on a roller or a guide by operating the suction gun. Previous to the threading, the operator must perform transfer work in which the yarns held by the yarn cutting-sucking device are transferred to the suction gun.

[0005] The transfer work is explained in detail. Firstly, the operator holds the suction gun with one of hands and holds a cutter with the other hand. The suction gun is held while the suction port thereof is close to the yarn cutting-sucking device. The operator cuts the plurality of the yarns sucked by the yarn cutting-sucking device with the cutter, and sucks and holds the cut yarns with the suction gun. When all the yarns sucked by the yarn cutting-sucking device is cut, and sucked and held with the suction gun, the transfer work is finished.

[0006] However, when the transfer work is performed, the operator must operate the suction gun and the cutter with both hands separately. The plurality of the yarns sucked by the yarn cutting-sucking device do not stop and are running at high speed because they are continuously spun from the spinning device, whereby it is difficult to cut the yarns with the cutter. When the cutting of the yarns is failed, or when the yarns are cut and the suction of the yarns with the suction gun is failed, troubles such as winding of the yarns round the body of revolution at the downstream side occur again. As mentioned above, in the transfer work, the cutting of the yarns run-

ning at high speed with the cutter and the suction and holding of the cut yarns with the suction gun must be performed certainly, whereby the transfer work is very difficult and requires a skilled operator.

Summary of the Invention

[0007] The present invention is provided in consideration of the above-mentioned problem, and the purpose of the present invention is to provide a yarn cutting-sucking device which enables anyone unskilled easily transfer work which is very difficult and requires a skilled operator.

[0008] The above-mentioned problems are solved by the following means.

[0009] According to the first invention, a yarn cutting-sucking device cutting and sucking a plurality of yarns running abreast of each other along one direction, includes a first cutter cutting the yarns, a suction part sucking the yarns cut by the first cutter, and a second cutter arranged at an upstream side of the suction part and cutting the yarns sucked by the suction part.

[0010] According to the second invention, in the first invention, a positioning part is provided which positions a suction port of a suction gun at a position at which the plurality of the yarns are sucked by the suction gun when the yarns are cut by the second cutter.

[0011] According to the third invention, in the second invention, cutting of the plurality of the yarns by the second cutter is triggered by positioning of the suction gun on the positioning part.

[0012] According to the fourth invention, in spinning windier in which a plurality of yarns melted and spun by a yarn spinning device is sent via a godet roller and wound by a winding device, the yarn cutting-sucking device according to one of the first to third invention is provided between the yarn spinning device and the godet roller.

[0013] The present invention constructed as the above brings the following effects.

[0014] According to the first invention, the second cutter cutting the plurality of the yarns sucked by the suction part is arranged at the upstream side of the suction part. When the second cutter cuts the yarns while the suction port of the suction gun is close to the yarn cutting-sucking device, the yarns are sucked and held by the suction gun. Accordingly, at the transfer work in which the yarns are transferred from the yarn cutting-sucking device to the suction gun, an operator does not need to cut the yarns manually with a cutter. Therefore, the transfer work of the yarns from the yarn cutting-sucking device to the suction gun can be performed easily by anyone unskilled.

[0015] According to the second invention, the positioning part is provided which positions the suction port of the suction gun so that the suction gun sucks the plurality of the yarns when the second cutter cuts the yarns. When the positioning part positions the suction port of the suction gun and the second cutter cuts the yarns, the yarns are sucked and held certainly by the suction gun. Accordingly, an operator can position the suction port of

the suction gun and hold the suction gun easily. Therefore, the transfer work of the yarns from the yarn cutting-sucking device to the suction gun can be performed more easily.

[0016] According to the third invention, the cutting of the plurality of the yarns by the second cutter is triggered by the positioning of the suction gun with the positioning part. The cutting of the plurality of the yarns by the second cutter is performed interlockingly with the positioning of the suction gun by an operator, whereby the operator does not need to command the operation of the second cutter and load on the operator is reduced. Since the transfer work of the yarns from the yarn cutting-sucking device to the suction gun is performed quickly, the operator can sift to the threading operation quickly, whereby the productivity of the spinning windier can be improved.

[0017] According to the fourth invention, the yarn cutting-sucking device is provided between the spinning device and the godet roller. Accordingly, the plurality of the yarns are cut and sucked at the upstream side of the godet roller in the running direction of the yarns, whereby the subsequent threading operation to the godet roller and the winding device can be performed easily.

Brief Description of Drawings

[0018]

Fig. 1 is a schematic drawing of a spinning windier 10 according to an embodiment 1 of the present invention.

Fig. 2 is a perspective view of a yarn path restriction guide 21 and a yarn cutting-sucking device 31.

Fig. 3 is a sectional view of the yarn cutting-sucking device 31 and the yarn path restriction guide 21.

Fig. 4 is a block drawing of the yarn cutting-sucking device 31.

Fig. 5 illustrates the operation to cut and suck yarns by the yarn cutting-sucking device 31.

Fig. 6 illustrates the operation to cut and suck yarns by the yarn cutting-sucking device 31.

Fig. 7 is a perspective view of the yarn path restriction guide 21 and the yarn cutting-sucking device 31 according to an embodiment 2.

Fig. 8 is a sectional view of the yarn cutting-sucking device 31 and the yarn path restriction guide 21.

Fig. 9 is a block drawing of the yarn cutting-sucking device 31.

Fig. 10 illustrates the operation to cut and suck yarns by the yarn cutting-sucking device 31.

Fig. 11 illustrates the operation to cut and suck yarns by the yarn cutting-sucking device 31.

Detailed Description of the Preferred Embodiments

[0019] The embodiment for carrying out the invention is explained on the basis of attached drawings.

[Embodiment 0]

[0020] An explanation will be given on a spinning windier 10 according to an embodiment 1 of the present invention referring to Figs. 1 to 6. As shown in Fig. 1, the spinning windier 10 mainly includes a spinning device 11, an oiling nozzle 13, a yarn path restriction guide 21, a cutting-suction device 31, godet rollers 14A and 14B, a yarn winding device 16 and a control part 18. Fibers spun by the spinning device 11 run toward the yarn winding device 16 and receive various process on the way, whereby a yarn Y is formed and wound as a package. In below explanation, the fibers and the yarn are not distinguished from each other and simply referred to as the yarn Y. The upstream side and the downstream side relative to the direction of running of the fibers (yarn Y) from the spinning device 11 toward the yarn winding device 16 are regarded as the upstream side and the downstream side of the running direction of the yarn Y.

[0021] The spinning device 11 spins the plurality of the yarns Y and is arranged in the upper portion of the spinning windier 10. The spinning device 11 has a plurality of spinnerets 12, and a plurality of fibers are spun from each of the spinnerets 12. One yarn Y is formed from the plurality of the fibers spun from each of the spinnerets 12, whereby the plurality of the yarns Y are formed in the whole spinning device 11. The plurality of the yarns Y run along the direction perpendicular to the surface of Fig. 1 (hereinafter, referred to as alignment direction).

[0022] The oiling nozzle 13 is arranged below the spinning device 11. The oiling nozzle 13 sprays oil onto the plurality of the yarns Y spun from the spinning device 11 and makes the oil adhere to the yarns Y.

[0023] As shown in Figs. 1 and 2, the yarn path restriction guide 21 guides the plurality of the running yarns Y. The yarn path restriction guide 21 is arranged between the oiling nozzle 13 and the godet roller 14A in a yarn path in which the yarns Y run. The yarn path restriction guide 21 is comb teeth-like shaped by a plurality of grooves 22 arranged along the alignment direction corresponding to the plurality of the yarns Y. By the grooves 22, the distance between the yarns Y wound round the godet rollers 14A and 14B is determined, and the movement of the yarns Y aligned along the alignment direction is restricted.

[0024] When any trouble occurs or abnormality such as yarn severance occurs in the spinning windier 10, the yarn cutting-sucking device 31 cuts all the plurality of the yarns Y and sucks and holds the yarns Y continuously spun from the spinning device 11. The yarn cutting-sucking device 31 is provided at one of sides in the alignment direction (the left sides in Figs. 1 and 2) of the yarn path restriction guide 21 and cuts and sucks the yarns Y just above the yarn path restriction guide 21. The yarn cutting-sucking device 31 will be explained in detail later.

[0025] The godet rollers 14A and 14B draws the plurality of the yarns Y spun from the spinning device 11. The godet roller 14A is coupled with a separate roller 15A

arranged above it. The godet roller 14B is coupled with a separate roller 15B arranged below it. Each of the godet rollers 14A and 14B is a drive roller driven by a driving motor (not shown). Each of the separate rollers 15A and 15B is a driven roller rotated following the running of the yarn Y.

[0026] The yarn Y sent from the spinning device 11 via the oiling nozzle 13 is wound several times round the godet roller 14A and separate roller 15A at the upstream side and subsequently wound several times round the godet roller 14B and separate roller 15B at the downstream side, and then conveyed to the yarn winding device 16.

[0027] The downstream godet roller 14B is rotated at higher speed than the upstream godet roller 14A. The godet roller 14A is heated to temperature at which the yarn Y can be drawn (for example, 90°C), and the godet roller 14B is heated to temperature higher than that of the godet roller 14A (for example, 120°C). The yarn Y sent from the spinning device 11 is heated by the godet roller 14A to the temperature at which the yarn Y can be drawn, and then conveyed to the yarn winding device 16 while being drawn by the godet roller 14B.

[0028] The yarn winding device 16 winds up the plurality of the yarns Y drawn by the godet rollers 14A and 14B so as to form a plurality of packages. The yarn winding device 16 is arranged in the lower portion of the spinning windier 10.

[0029] The control part 18 is a well-known micro computer and has a CPU as an arithmetic unit and a storage means such as a ROM, a RAM or an external storage device. The control part 18 controls driving of various driving devices based on signals generated by various sensors.

[0030] An explanation will be given on the yarn cutting-sucking device 31 in detail. As shown in Figs. 2, 3 and 4, the yarn cutting-sucking device 31 mainly includes a holder 32, a suction device 41, a first cutter 61, a second cutter 71 and a positioning part 81. The holder 32 is a substrate of the yarn cutting-sucking device 31 and is provided in a frame (not shown) of the spinning windier 10.

[0031] The suction device 41 sucks the plurality of the yarns Y cut by the first cutter 61. The suction device 41 has a holding barrel 42, a suction barrel 43 and a cylinder 46.

[0032] The holding barrel 42 and the suction barrel 43 are cylindrical members. The suction barrel 43 is movably reciprocally held by the holding barrel 42, and the inside of the holding barrel 42 is communicated with the inside of the suction barrel 43. The space between the outer side of the suction barrel 43 and the inner side of the holding barrel 42 is airtight so that air does not leak. At the tip of the suction barrel 43, a suction part 44 is formed which is a suction port sucking the plurality of the cut yarns Y. The holding barrel 42 is fixed to the holder 32 so that the reciprocal moving direction of the suction barrel 43 is in parallel to the alignment direction of the yarns

Y. The suction barrel 43 penetrates the holder 32, and the suction part 44 at the tip is projected from an opening 33 of the holder 32.

[0033] As shown in Fig. 4, a suction source 51 is connected to the suction device 41. The suction source 51 generates a suction air flow. By the suction source 51, suction force sucking the plurality of the cut yarns Y is generated in the suction part 44. The suction source 51 and the suction device 41 are connected via an electromagnetic valve 52 by an air pipe. The electromagnetic valve 52 is electrically connected to the control part 18, and is opened and closed by the control part 18.

[0034] The cylinder 46 is fixed to the holder 32. A tip of a cylinder rod 47 of the cylinder 46 is connected to a connection member 48 fixed to the suction barrel 43. As shown in Fig. 4, the cylinder 46 is driven by a driving device 49 so as to make the cylinder rod 47 move reciprocally, whereby the suction part 44 at the tip of the suction barrel 43 moves reciprocally relative to the holder 32 in parallel to the alignment direction of the yarns Y. The driving device 49 is electrically connected to the control part 18.

[0035] As shown in Figs. 2, 3 and 5, the first cutter 61 moves reciprocally with the suction part 44 of the suction device 41, and cuts the plurality of the yarns Y at the upstream side of the yarn path restriction guide 21 when the suction part 44 moves toward the yarn path restriction guide 21. The first cutter 61 has a cutting edge 62, a guide member 63 and a cutting edge holding member 64.

[0036] The cutting edge 62 touches the plurality of the yarns Y so as to cut the yarns Y. The guide member 63 is laid on the cutting edge 62 and guides the yarns Y to the cutting edge 62. The guide member 63 is substantially V-like shaped so as to guide the yarns Y to the cutting edge 62. By guiding the yarns Y to the cutting edge 62 by the guide member 63, the cutting edge 62 can cut the yarns Y easily.

[0037] The cutting edge holding member 64 fixes the cutting edge 62 and the guide member 63 to the suction barrel 43. The cutting edge 62 and the guide member 63 are fixed so that the guide member 63 is directed toward the yarn path restriction guide 21 near the suction part 44 and the tips of the cutting edge 62 and the guide member 63 are slanted toward the upstream side in the running direction of the yarns Y. The cutting edge 62 is positioned so that the plurality of the yarns Y is sucked by the suction part 44 when the cutting edge 62 cuts the yarns Y.

[0038] At the upstream side of the suction part 44, the second cutter 71 cuts the plurality of the yarns Y sucked by the suction part 44 when the suction part 44 moves toward the holder 32. The second cutter 71 has a cutting edge 72, a guide member 73 and a cutting edge holding member 74. The cutting edge 72 and the guide member 73 are substantially similar to the cutting edge 62 and the guide member 63 respectively, and the detailed explanation thereof is omitted.

[0039] The cutting edge holding member 74 fixes the

cutting edge 72 and the guide member 73 to the holder 32. The cutting edge 72 and the guide member 73 are fixed so that the guide member 73 is directed toward the yarn path restriction guide 21 at the upstream side of the suction part 44 and the tips of the cutting edge 72 and the guide member 73 are slanted toward the upstream side in the running direction of the yarns Y. The cutting edge 72 is positioned so as to cut the plurality of the yarns Y sucked by the suction part 44 at the upstream side of the suction part 44 when the suction part 44 moves toward the holder 32.

[0040] The positioning part 81 positions a suction port SA of a suction gun S so that the suction gun S sucks the plurality of the yarns Y when the second cutter 71 cuts the yarns Y. Concretely, the positioning part 81 is arranged near the second cutter 71 and more closely to the holder 32 than the second cutter 71. For example, the section of the positioning part 81 is shaped to be a recessed semicircle so that the suction port SA of the suction gun S can be mounted easily and the position thereof cannot shift easily.

[0041] As shown in Fig. 3, in the positioning part 81, a detection part 82 which detects the positioning of the suction gun S is provided so that the positioning of the suction gun S triggers the cutting of the plurality of the yarns Y by the second cutter 71. As shown in Fig. 4, the detection part 82 is electrically connected to the control part 18. When the detection part 82 detects the positioning of the suction gun S by the positioning part 81, the control part 18 operates the driving device 49 just after the positioning or after predetermined time (for example, after 1 to 3 seconds) from the positioning so as to drive the cylinder rod 47 of the cylinder 46, whereby the suction part 44 moves toward the holder 32.

[0042] Subsequently, an explanation will be given on cutting and suction operation of the yarn Y by the yarn cutting-sucking device 31 referring to Figs. 4, 5 and 6. While the yarn winding device 16 winds the yarn Y, the connection between the suction device 41 and the suction source 51 is cut off by the electromagnetic valve 52 and the suction device 41 is not driven. The position of the cylinder rod 47 of the yarn cutting-sucking device 31 is backward side of the holder 32. The suction part 44 of the suction barrel 43 and the first cutter 61 are evacuated more closely to the holder 32 than the plurality of the yarns Y.

[0043] As shown in Fig. 5A, when the cutting of the yarn Y which is being wound is detected, the yarn cutting-sucking device 31 is operated. Concretely, the electromagnetic valve 52 is opened and the suction device 41 is connected to the suction source 51, whereby the suction of the suction part 44 is started. When the cylinder 46 is driven, the driving device 49 is also driven, whereby the cylinder rod 47 is extended toward the yarn path restriction guide 21, and the suction part 44 and the first cutter 61 move toward the yarn path restriction guide 21. Accordingly, the suction part 44 of the suction barrel 43 and the cutting edge 62 of the first cutter 61 moves toward

the plurality of the yarns Y along the alignment direction.

[0044] As shown in Fig. 5B, when the suction part 44 of the suction barrel 43 and the first cutter 61 are moved along the alignment direction across the plurality of the yarns Y, the yarns Y are cut one by one by the first cutter 61 and sucked via the suction part 44. When at least one of the yarns Y is sucked via the suction part 44, an accompanying flow is generated along a direction A from the upstream side of the running direction of the yarns Y toward the inside of the suction part 44. Subsequently, the yarn Y cut by the first cutter 61 can be sucked easily by the accompanying flow generated by the running of the yarn Y which has been sucked already by the suction part 44.

[0045] As shown in Fig. 5C, when the suction part 44 of the suction barrel 43 and the first cutter 61 are moved toward the other end of the alignment direction from the plurality of the yarns Y, all the yarns Y are cut and sucked by the suction part 44. At this state, the driving of the cylinder 46 is stopped so as to stop the movement of the suction barrel 43.

[0046] At this state, an operator solves trouble of the spinning windier 10 and the like. When the trouble is solved, for restarting the production and winding of the yarns Y, in advance of threading operation, the operator perform transfer work in which the plurality of the yarns Y held by the yarn cutting-sucking device 31 are transferred to the suction gun S.

[0047] As shown in Fig. 6A, in the transfer work, firstly, the operator mounts the suction port SA of the suction gun S on the positioning part 81 and positions the suction port SA. Then, the detection part 82 provided in the positioning part 81 (see Fig. 3) detects the positioning of the suction gun S by the positioning part 81, and a detection signal is transmitted to the control part 18. Based on the detection signal of the detection part 82, the control part 18 operates the driving device 49 just after the positioning or after predetermined time (for example, after 1 to 3 seconds) from the positioning so as to drive the cylinder rod 47 of the cylinder 46, whereby the suction part 44 moves toward the holder 32.

[0048] As shown in Fig. 6B, when the suction part 44 moves toward the holder 32, the yarns Y sucked by the suction part 44 also move toward the holder 32. In this case, the second cutter 71 cuts the plurality of the yarns Y sucked by the suction part 44 at the upstream side of the suction part 44. The yarns Y cut by the second cutter 71 are sucked by the suction gun S mounted on the positioning part 81.

[0049] As shown in Fig. 6C, when all the plurality of the yarns Y are cut by the second cutter 71, all the yarns Y are sucked by the suction gun S mounted on the positioning part 81, whereby the transfer work is finished. Subsequently, the operator performs the threading operation in which the yarns Y are set on the roller or the guide by operating the suction gun S, and then restarts the production and winding of the yarns Y.

[Embodiment 1]

[0050] Subsequently, an explanation will be given on the spinning windier 10 according to an embodiment 2 of the present invention referring to Figs. 7 to 11. The yarn cutting-sucking device 31 of the embodiment 2 differs greatly from the yarn cutting-sucking device 31 of the embodiment 1 at the point in which the suction part 44 of the yarn cutting-sucking device 31 and the first cutter 61 are fixed and the point in which the plurality of the yarns Y are moved toward the first cutter 61 by a yarn shifting guide 60. Since the construction except for the yarn cutting-sucking device 31 is the same as that of the embodiment 1, the yarn cutting-sucking device 31 will be explained mainly.

[0051] As shown in Figs. 7, 8 and 9, the yarn cutting-sucking device 31 mainly includes the suction device 41, a yarn shifting guide 91, the first cutter 61, the second cutter 71 and the positioning part 81.

[0052] The suction device 41 sucks the plurality of the yarns Y cut by the first cutter 61. The suction barrel 43 of the suction device 41 penetrates the holder 32, and the suction part 44 at the tip is projected from the holder 32. The suction source 51 is connected to the suction device 41 via the electromagnetic valve 52.

[0053] The yarn shifting guide 91 pulls the plurality of the yarns Y guided by the yarn path restriction guide 21 toward the holder 32. The yarn shifting guide 91 has a cylinder 93 and a hook part 92. A cylinder rod 94 of the cylinder 93 is projected from the opening 33 of the holder 32. The hook part 92 is provided at the tip of the cylinder rod 94 of the cylinder 93. The hook part 92 hooks the yarns Y hung on the yarn path restriction guide 21. By reciprocal movement of the hook part 92 along the alignment direction of the yarns Y, the yarns Y is hooked and pulled by the hook part 92. The yarn shifting guide 91 is provided at the upstream side of the yarn path restriction guide 21 and at the downstream side of the suction part 44.

[0054] As shown in Figs. 7 and 8, the first cutter 61 is fixed to the holder 32 and cuts the plurality of the yarns Y pulled by the yarn shifting guide 91. The first cutter 61 has the cutting edge 62 and the guide member 63. The first cutter 61 is arranged at the upstream side of the yarn shifting guide 91 and at the downstream side of the suction part 44. Accordingly, when the first cutter 61 cuts the yarns Y pulled by the yarn shifting guide 91, the yarns Y are sucked by the suction part 44.

[0055] The second cutter 71 cuts the plurality of the yarns Y sucked by the suction part 44 at the upstream side of the suction part 44. The second cutter 71 has the cutting edge 72 and the guide member 73. At the second cutter 71, the yarns Y are not cut only by guided to the cutting edge 72 and are cut by driving the cutting edge 72 reciprocally by a driving device (not shown). The cutting edge 72 of the second cutter 71 is not limited to cutting the yarns Y by reciprocal drive and two cutting edges 72 may alternatively cut the yarns Y by shearing force.

[0056] The positioning part 81 positions a suction port SA of a suction gun S so that the suction gun S sucks the plurality of the yarns Y when the second cutter 71 cuts the yarns Y.

[0057] As shown in Fig. 8, in the positioning part 81, a detection part 82 which detects the positioning of the suction gun S is provided so that the positioning of the suction gun S triggers the cutting of the plurality of the yarns Y by the second cutter 71. As shown in Fig. 9, the detection part 82 is electrically connected to the control part 18. When the detection part 82 detects the positioning of the suction gun S by the positioning part 81, the control part 18 drives the second cutter 71 just after the positioning or after predetermined time (for example, after 1 to 3 seconds) from the positioning so as to make the second cutter 71 cut the guided yarns Y.

[0058] Subsequently, an explanation will be given on cutting and suction of the yarn Y by the yarn cutting-sucking device 31 referring to Figs. 9, 10 and 11. While the yarn winding device 16 winds the yarn Y, the connection between the suction device 41 and the suction source 51 is cut off by the electromagnetic valve 52 and the suction device 41 is not driven. The position of the hook part 92 of the yarn shifting guide 91 is backward position at the side of the holder 32.

[0059] As shown in Fig. 10A, when the severing of the yarns Y which is being wound is detected, the yarn cutting-sucking device 31 is operated and the suction of the suction part 44 is started. A driving device 95 driving the cylinder 93 of the yarn shifting guide 91 is also driven, whereby the cylinder rod 94 is extended toward the yarn path restriction guide 21, and the hook part 92 moves toward the yarn path restriction guide 21. In this case, the hook part 92 moves forward while displacing the plurality of the yarns Y guided by the yarn path restriction guide 21.

[0060] Subsequently, as shown in Fig. 10B, the driving device 95 retracts the cylinder rod 94 of the cylinder 93 toward the holder 32 so as to move the hook part 92 toward the holder 32. In this case, the hook part 92 moves rearward while hooking the plurality of the yarns Y guided by the yarn path restriction guide 21.

[0061] As shown in Fig. 10C, when the hook part 92 of the yarn shifting guide 91 pulls the plurality of the yarns Y to the first cutter 61, the yarns Y are cut by the cutting edge 62 of the first cutter 61, and the cut yarns Y are sucked via the suction part 44.

[0062] As shown in Fig. 11A, when the hook part 92 of the yarn shifting guide 91 moves to the side of the holder 32, all the plurality of the yarns Y are cut, and sucked by the suction part 44.

[0063] At this state, an operator solves trouble of the spinning windier 10 and the like. When the trouble is solved, for restarting the production and winding of the yarns Y, in advance of threading operation, the operator perform transfer work in which the plurality of the yarns Y held by the yarn cutting-sucking device 31 are transferred to the suction gun S.

[0064] As shown in Fig. 11B, in the transfer work, firstly, the operator mounts the suction port SA of the suction gun S on the positioning part 81 and positions the suction port SA. Then, the detection part 82 provided in the positioning part 81 detects the positioning of the suction gun S by the positioning part 81, and a detection signal is transmitted to the control part 18. Based on the detection signal of the detection part 82, the control part 18 drives the second cutter 71 just after the positioning or after predetermined time (for example, after 1 to 3 seconds) from the positioning so as to cut the plurality of the yarns Y guided to the second cutter 71. The second cutter 71 cuts the yarns Y sucked by the suction part 44 at the upstream side of the suction part 44.

[0065] As shown in Fig. 11C, when all the plurality of the yarns Y are cut by the second cutter 71, all the yarns Y are sucked by the suction port SA of the suction gun S mounted on the positioning part 81, whereby the transfer work is finished. Subsequently, the operator performs the transfer work in which the yarns Y are set on the roller or the guide by operating the suction gun S, and then restarts the production and winding of the yarns Y.

[0066] The above-mentioned spinning windier 10 according to the embodiment brings the following effects.

[0067] The second cutter 71 cutting the plurality of the yarns Y sucked by the suction part 44 is arranged at the upstream side of the suction part 44. When the second cutter 71 cuts the yarns Y while the suction port SA of the suction gun S is close to the yarn cutting-sucking device 31, the yarns Y are sucked and held by the suction gun S. Accordingly, at the transfer work in which the yarns Y are transferred from the yarn cutting-sucking device 31 to the suction gun S, an operator does not need to cut the yarns Y manually with a cutter. Therefore, the transfer work of the yarns Y from the yarn cutting-sucking device 31 to the suction gun S can be performed easily by anyone unskilled.

[0068] The positioning part 81 is provided which positions the suction port SA of the suction gun S so that the suction gun S sucks the plurality of the yarns Y when the second cutter 71 cuts the yarns Y. When the positioning part 81 positions the suction port SA of the suction gun S and the second cutter 71 cuts the yarns Y, the yarns Y are sucked and held certainly by the suction gun S. Accordingly, an operator can position the suction port SA of the suction gun S and hold the suction gun S easily. Therefore, the transfer work of the yarns Y from the yarn cutting-sucking device 31 to the suction gun S can be performed more easily.

[0069] The cutting of the plurality of the yarns Y by the second cutter 71 is triggered by the positioning of the suction gun S with the positioning part 81. The cutting of the plurality of the yarns Y by the second cutter 71 is performed interlockingly with the positioning of the suction gun S by an operator, whereby the operator does not need to command the operation of the second cutter 71 and load on the operator is reduced. Since the transfer work of the yarns Y from the yarn cutting-sucking device

31 to the suction gun S is performed quickly, the operator can shift to the threading operation quickly, whereby the productivity of the spinning windier 10 can be improved.

[0070] The yarn cutting-sucking device 31 is provided between the spinning device 11 and the godet rollers 14A and 14B. Accordingly, the plurality of the yarns Y are cut and sucked at the upstream side of the godet rollers 14A and 14B in the running direction of the yarns Y, whereby the subsequent threading operation to the godet rollers 14A and 14B and the winding device 16 can be performed easily.

[0071] The modes for carrying out the invention have been explained above. However, the present invention is not limited to the modes and may be changed. For example, though the cutting of the plurality of the yarns Y by the second cutter 71 is triggered by the positioning of the suction gun S on the positioning part 81, a switch starting the cutting of the yarns Y by the second cutter 71 may alternatively be provided separately in the spinning windier 10. In this case, an operator mounts the suction port SA of the suction gun S on the positioning part 81 at the transfer work and then operates the starting switch. By operating the starting switch, the second cutter 71 cuts the yarns Y and the yarns Y are sucked by the suction port SA of the suction gun S mounted on the positioning part 81.

Claims

1. A yarn cutting-sucking device cutting and sucking a plurality of yarns running abreast of each other along one direction, comprising:
 - a first cutter cutting the yarns;
 - a suction part sucking the yarns cut by the first cutter; and
 - a second cutter arranged at an upstream side of the suction part and cutting the yarns sucked by the suction part.
2. The yarn cutting-sucking device according to claim 1, wherein a positioning part is provided which positions a suction port of a suction gun at a position at which the plurality of the yarns are sucked by the suction gun when the yarns are cut by the second cutter.
3. The yarn cutting-sucking device according to claim 2, wherein cutting of the plurality of the yarns by the second cutter is triggered by positioning of the suction gun on the positioning part.
4. A spinning windier in which a plurality of yarns melted and spun by a yarn spinning device is sent via a godet roller and wound by a winding device, **characterized in that** the yarn cutting-sucking device according to one of

claims 1 to 3 is provided between the yarn spinning device and the godet roller.

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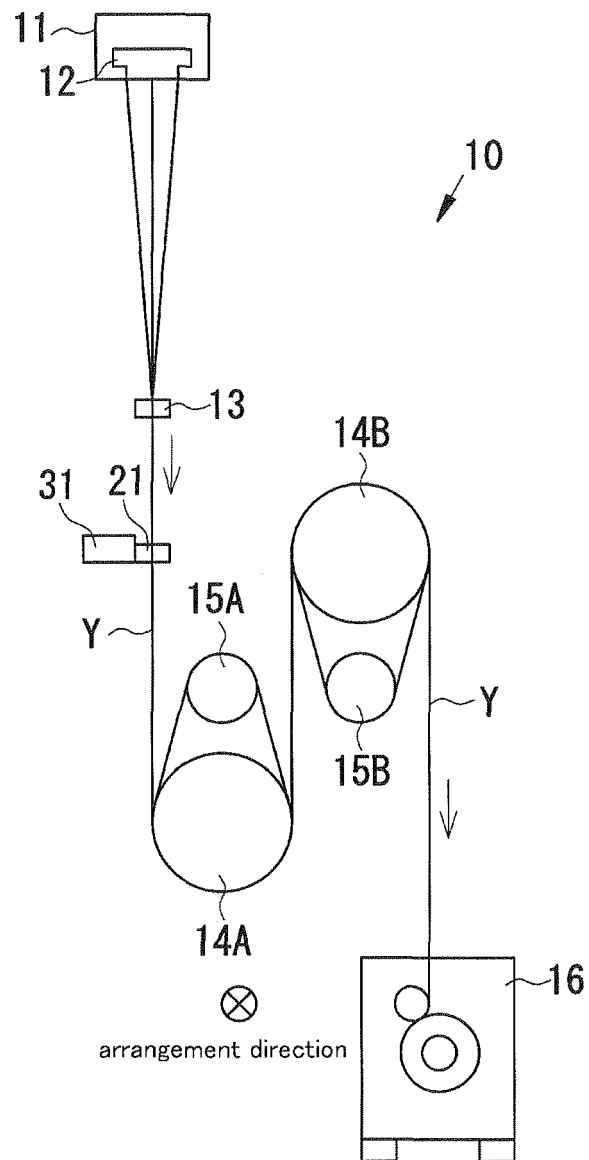
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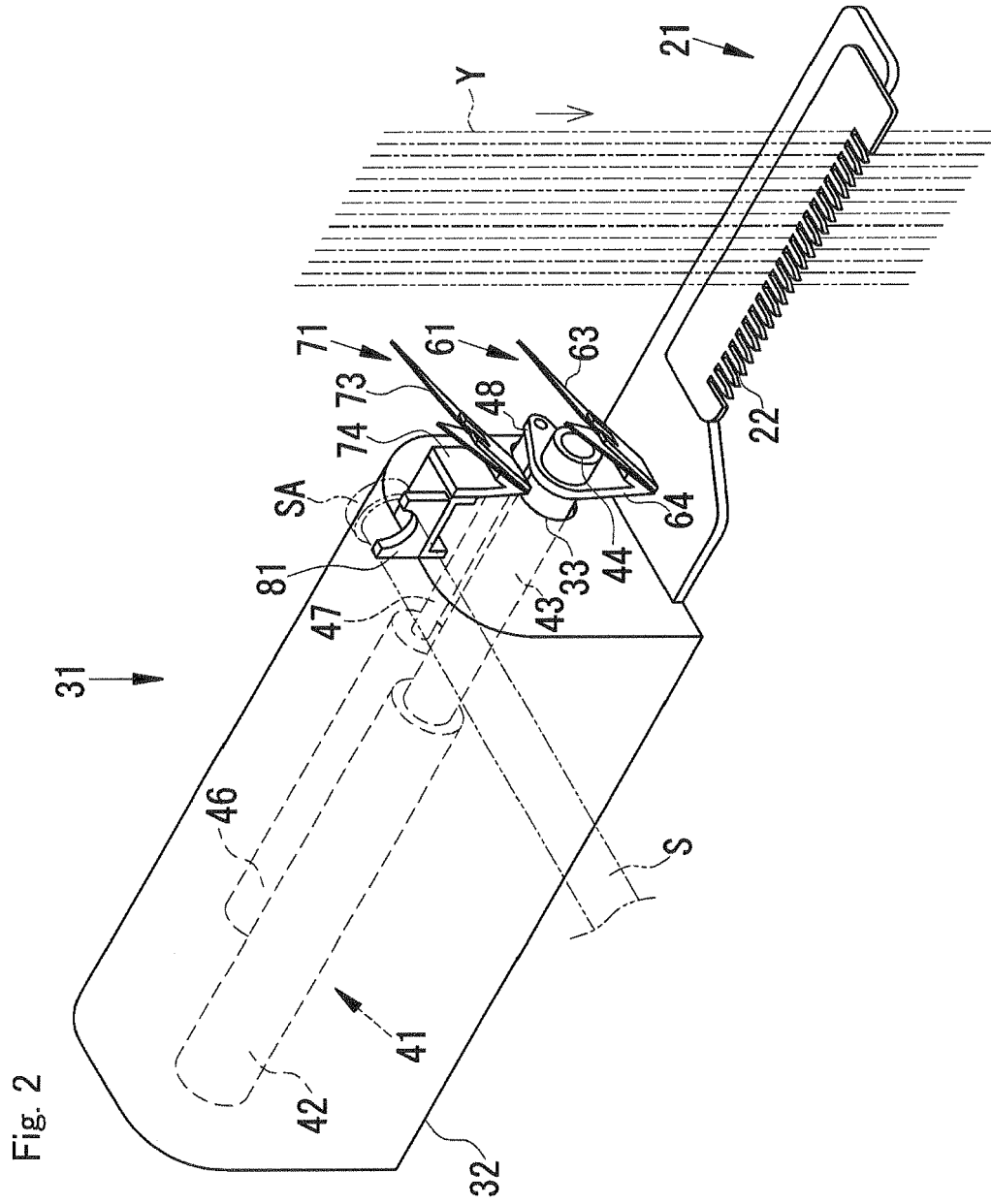
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Fig. 1





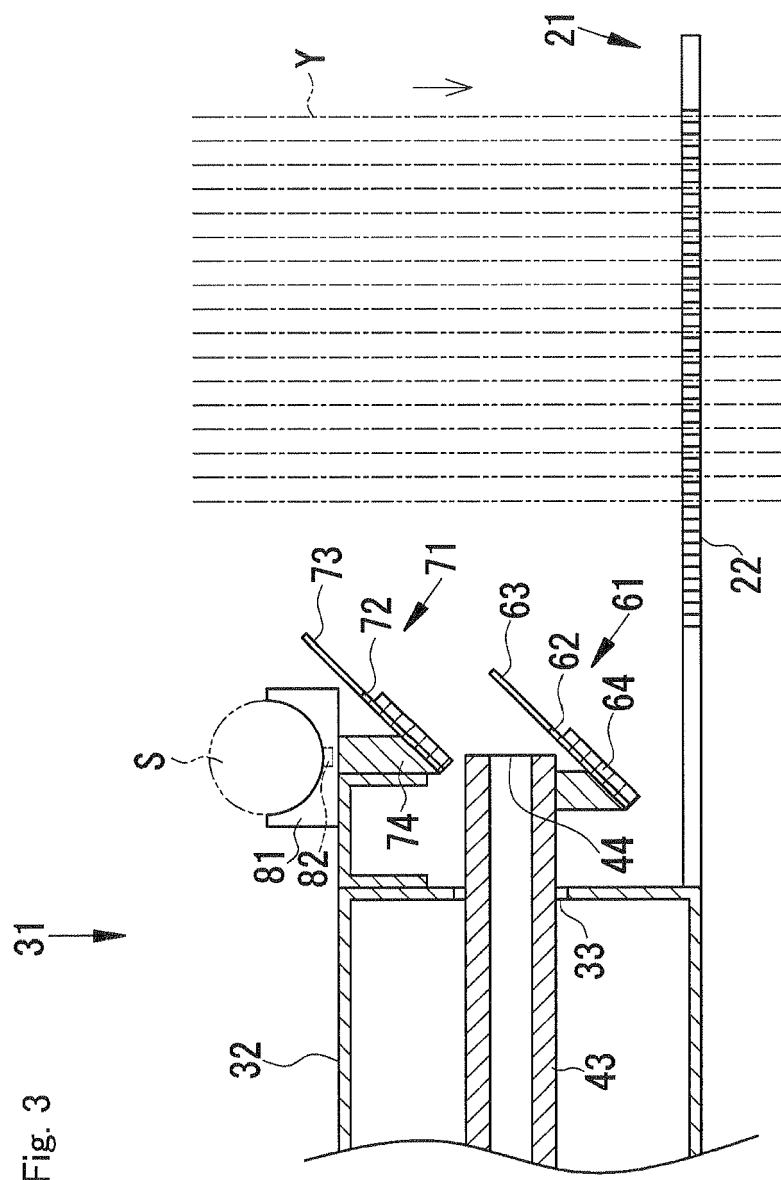


Fig. 4

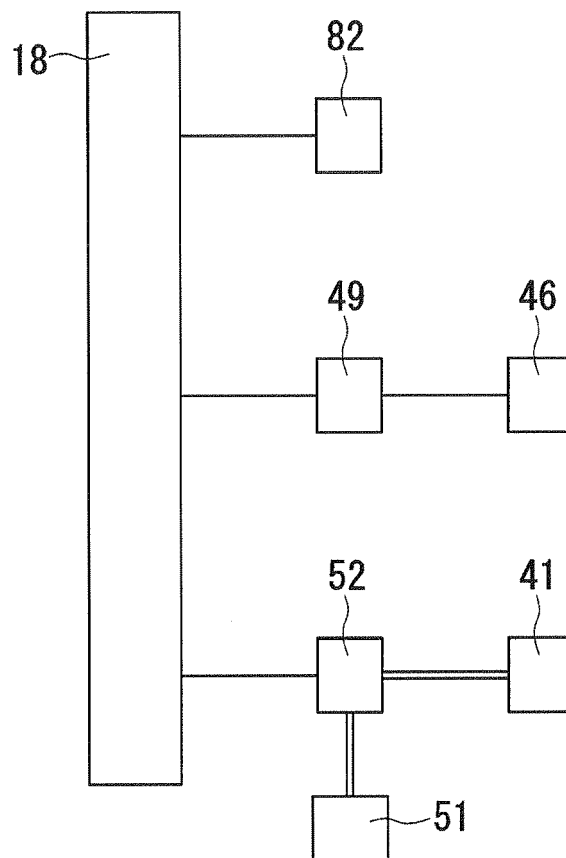
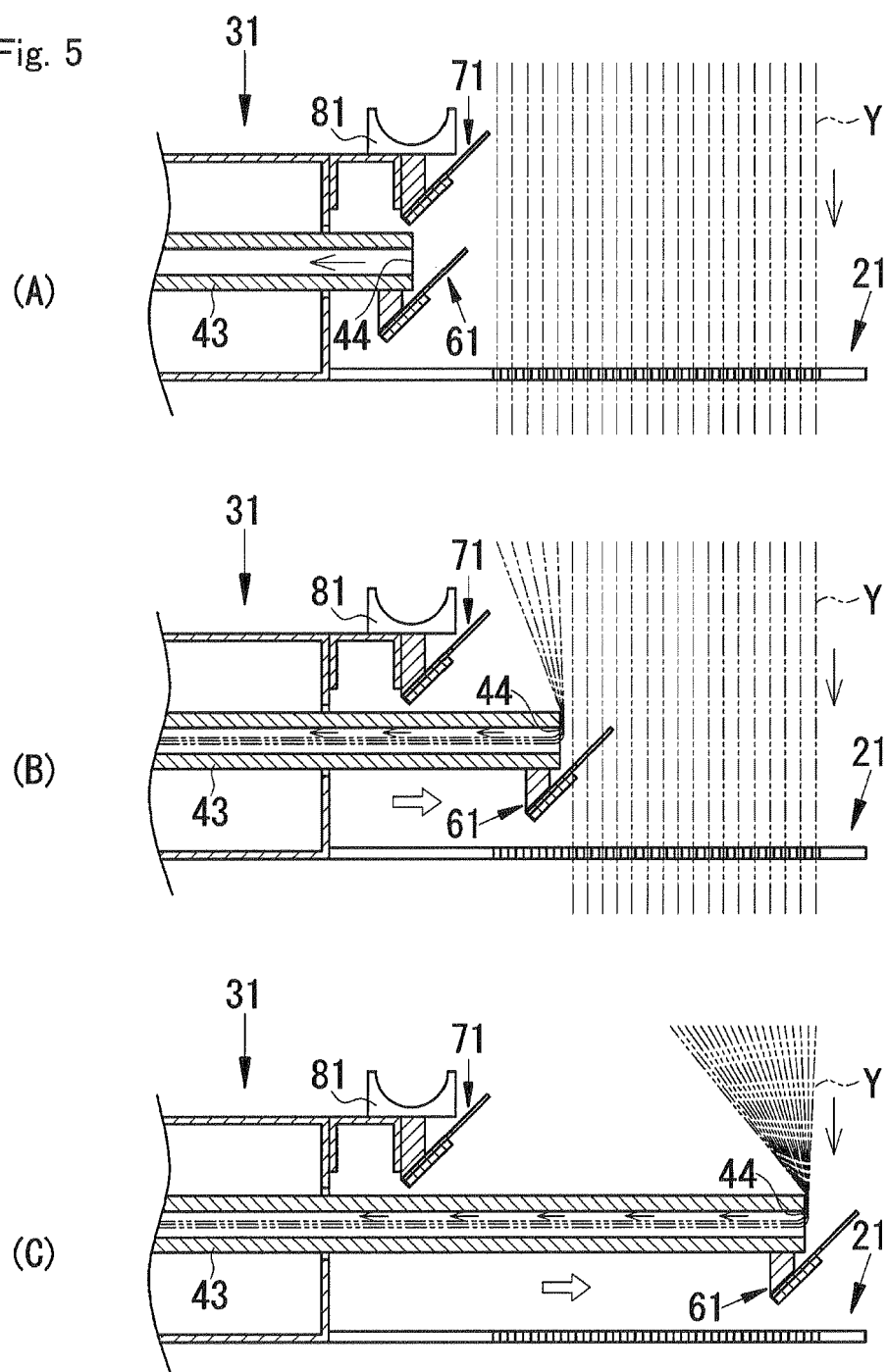
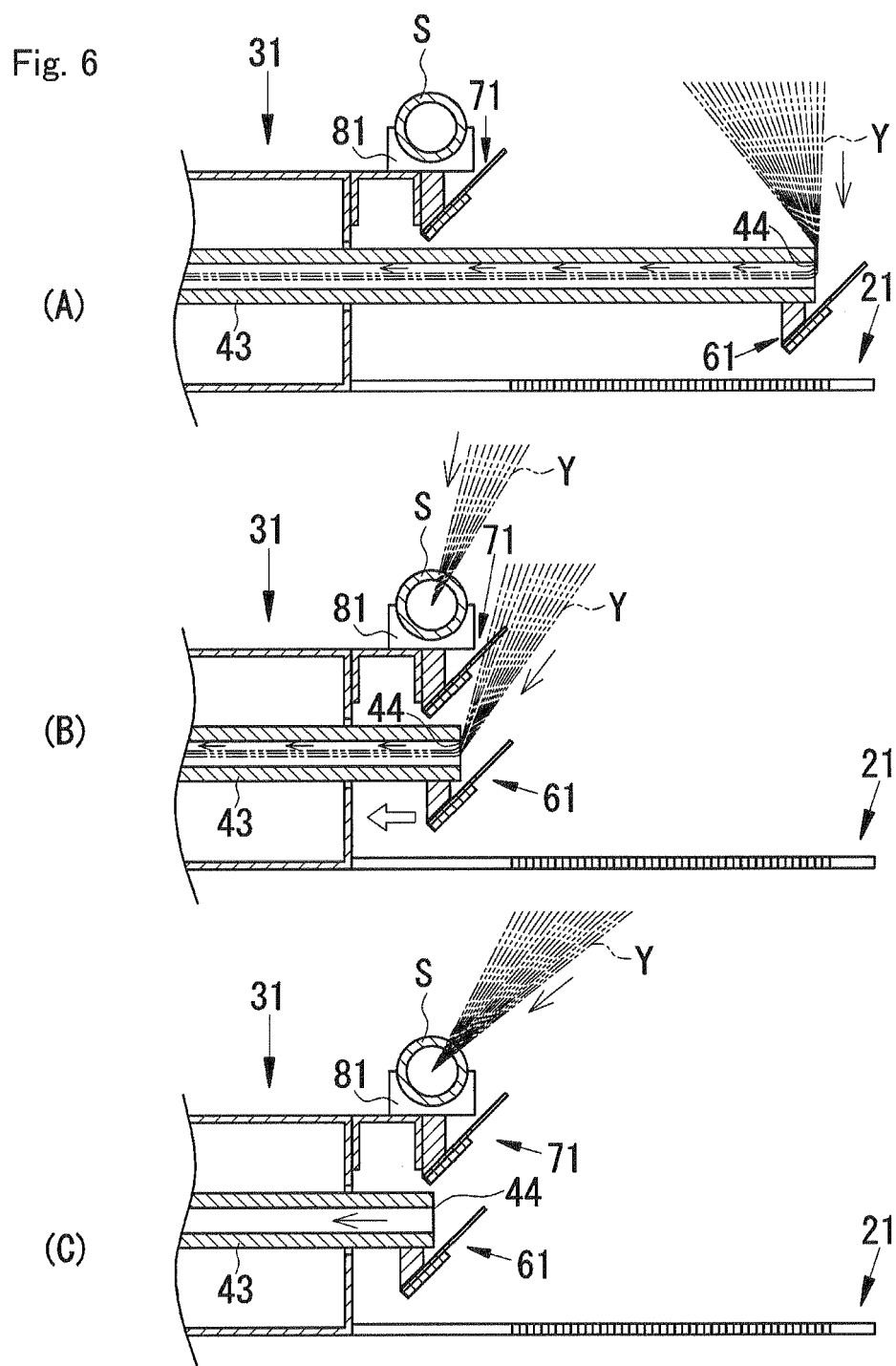
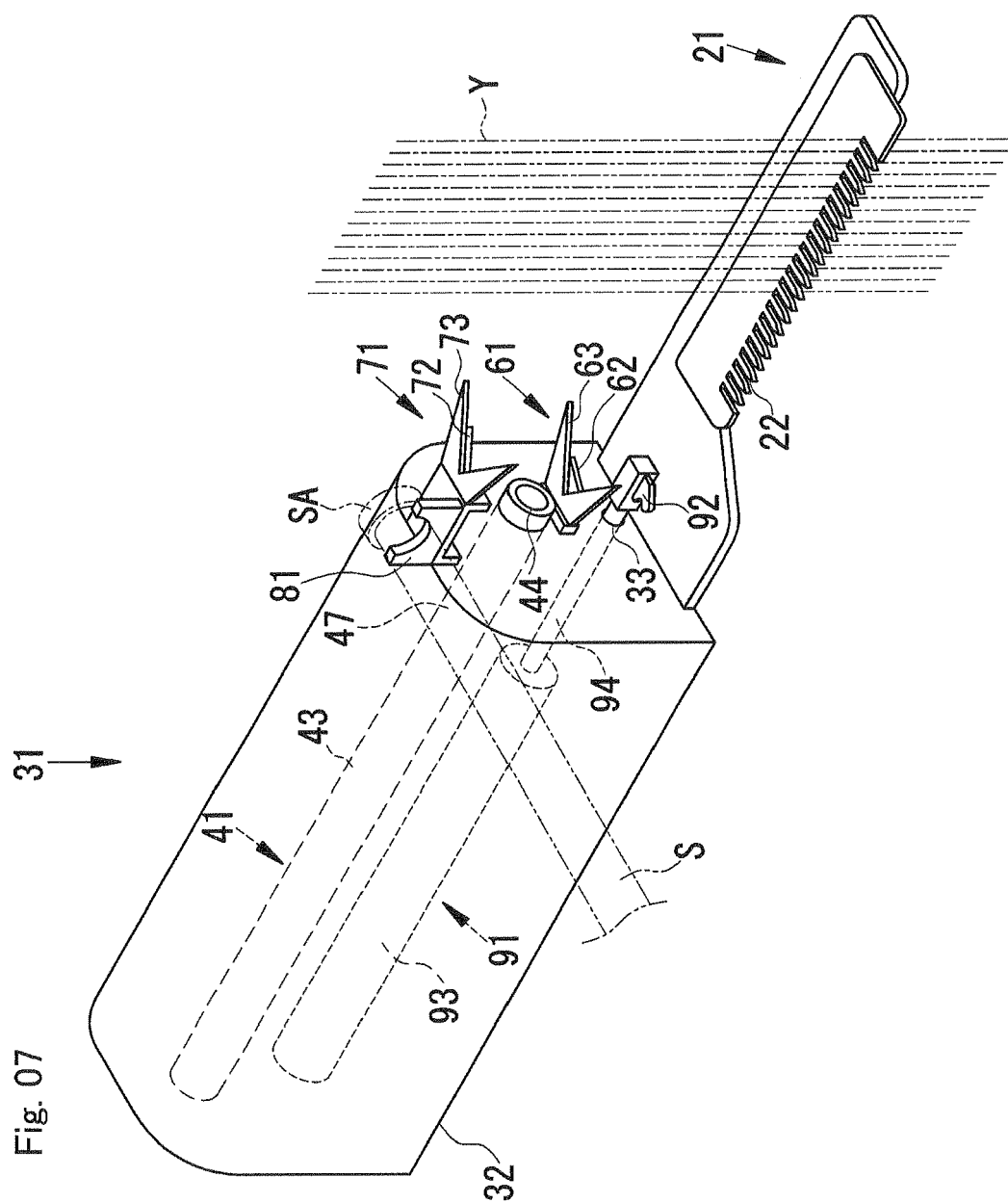


Fig. 5







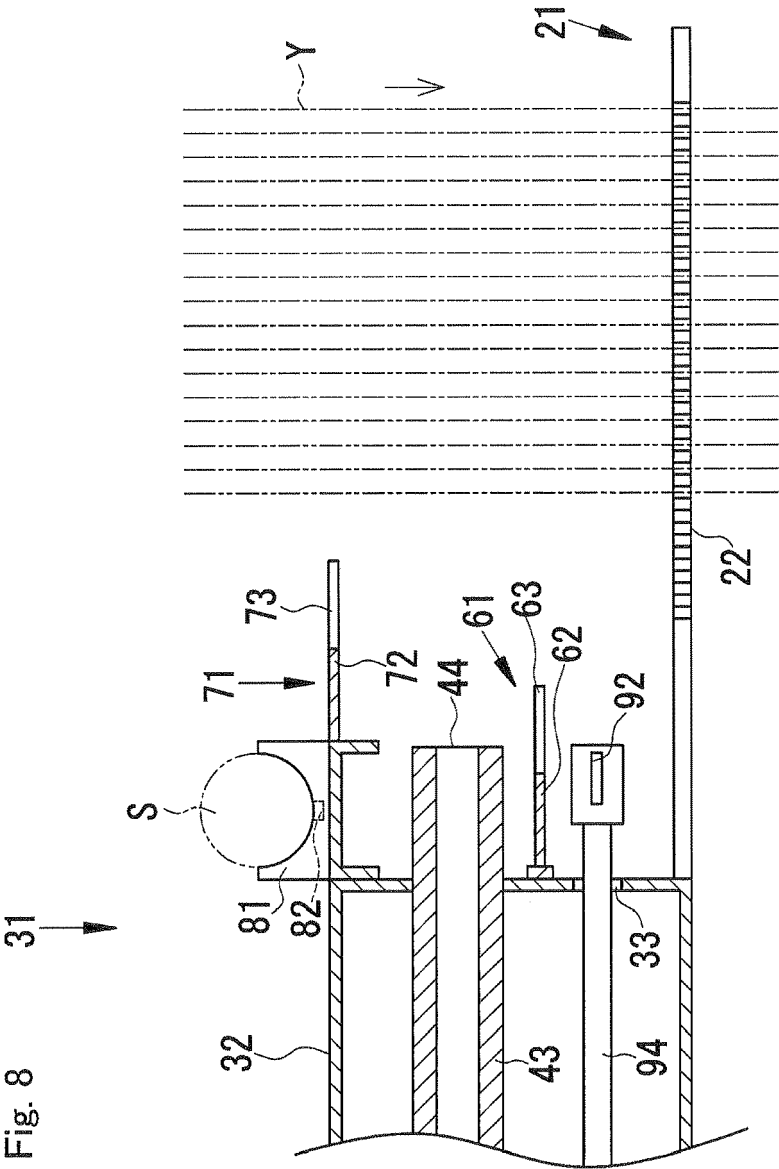


Fig. 9

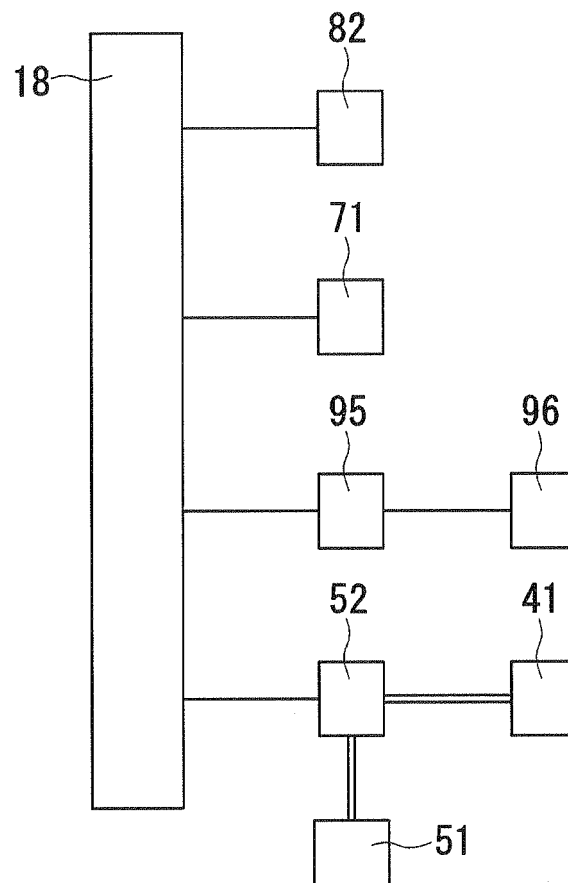


Fig. 10

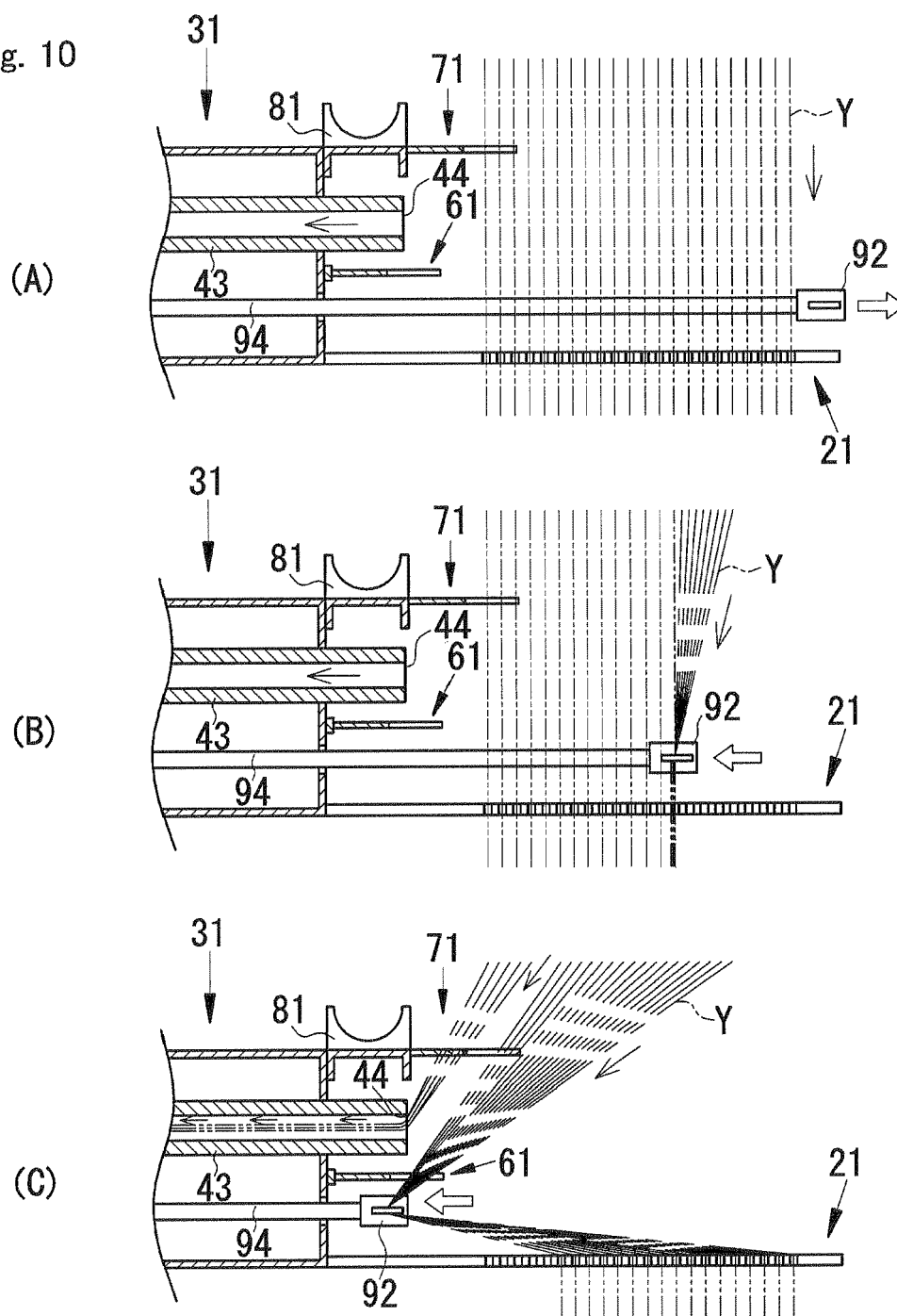
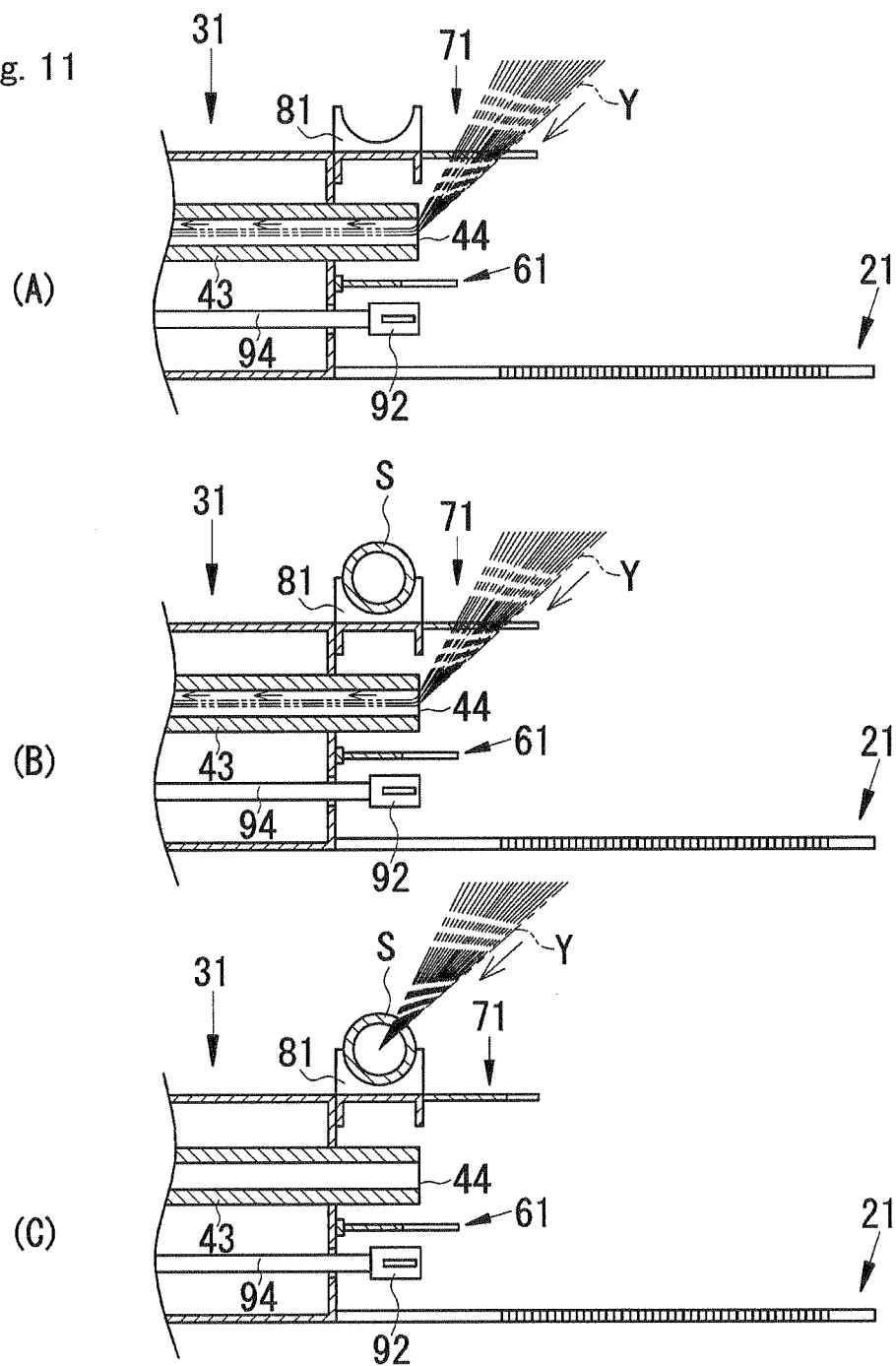


Fig. 11





EUROPEAN SEARCH REPORT

Application Number
EP 12 18 3289

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 7 278991 A (TEIJIN LTD) 24 October 1995 (1995-10-24) * abstract; figures *	1-4	INV. B65H54/71 B65H54/88 B65H57/16
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A	JP 57 098470 A (TEIJIN LTD) 18 June 1982 (1982-06-18) * abstract; figures *	1-4	
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			B65H D01D D02J
Place of search		Date of completion of the search	Examiner
The Hague		8 November 2012	Lemmen, René
CATEGORY OF CITED DOCUMENTS		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	
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ON EUROPEAN PATENT APPLICATION NO.**

EP 12 18 3289

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08-11-2012

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