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KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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(54) Title: ROVING FRAME OF A TEXTILE LINE WITH A CLEANER DEVICE

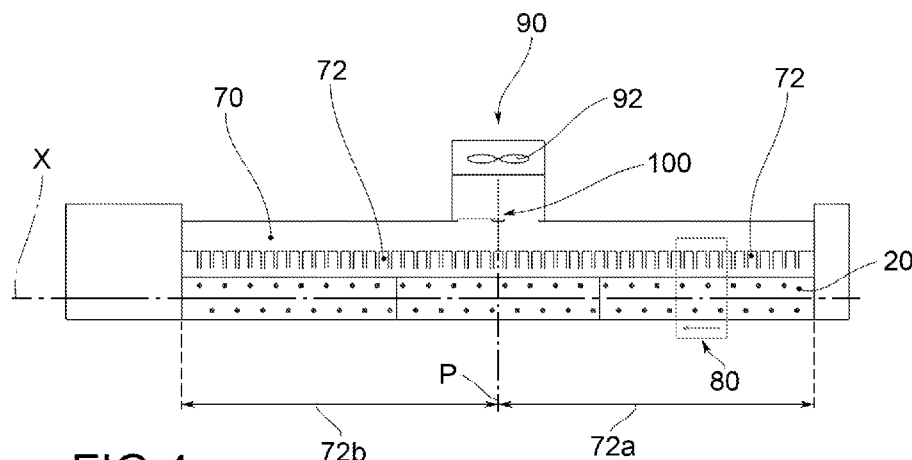


FIG. 4a

(57) Abstract: In a spinning line, a traveling cleaner device (80) is coupled to a roving frame (1) provided with a plurality of nozzles (72) for suction from the rail plane (21). During the movement of the cleaner device along the rail, the suction flow from the nozzles is increased or reduced according to the position of the cleaner device, to optimize its action and reduce energy consumption.

DESCRIPTION**"ROVING FRAME OF A TEXTILE LINE WITH A CLEANER DEVICE"**

[0001] The present invention relates to the field of textile machines for converting the staple fiber into a yarn wound on bobbins. In particular, the object of the present invention is a roving frame for processing a fiber web, typically coming from a drawing frame, and obtaining a roving wrapped in spools for a spinning machine.

10 [0002] During operations at the roving frame, the web travels from the cans to the drawing device and then towards the fins, where it is wound for the formation of the spools. During the transit, which takes place at high speed, it is inevitable that numerous fibers, for example the shorter or broken ones, detach from the web, accumulating on the different planes of the roving frame.

[0003] To ensure that the material thus accumulated does not interfere with the operations carried out by the machine, and also to ensure a clean working environment, 20 the material must be removed in a timely manner, that is to say so as not to interfere with the work performed.

[0004] For this purpose, the roving frame is provided with a cleaner device which moves continuously back and forth along the machine, blowing and sucking air in a targeted manner towards/from the regions of the machine where the 25

material accumulates.

[0005] Part of the removed material is generally intercepted by the suction channels of the roving frame, so that the material is sucked into said channels.

5 [0006] It is clear that such accessory operations require adequate devices, which contribute to increasing the energy consumption of the machine, without likewise directly contributing to an increase in production.

[0007] The object of the present invention is to provide a
10 cleaner system for a roving frame which contributes to reducing energy consumption, while continuing to meet the requirements mentioned above.

[0008] Such an object is achieved by a cleaner system according to claim 1. The dependent claims describe
15 further advantageous embodiments of the invention.

[0009] The features and the advantages of the cleaner system, according to the present invention will appear more clearly from the following description, made by way of an indicative and non-limiting example with reference
20 to the accompanying figures, in which:

- figure 1 shows a roving frame according to a preferred embodiment of the present invention;
- figure 2 shows a partially sectional view of an upper region of the roving frame;
- 25 - figure 3 shows a roving frame and a cleaner device

according to a preferred embodiment of the present invention; and

- figures 4a to 4f schematically show a sequence of configurations of the roving frame and of the cleaner device, according to a preferred embodiment of the present invention.

[0010] With reference to the accompanying figures, reference numeral 1 indicates as a whole a roving frame of a spinning line.

10 [0011] Typically, upstream of the roving frame 1 there is a drawing frame which produces a stretched fiber web fed to the roving frame; the roving frame works the web and produces roving wrapped in spools, intended to be transported to a spinning machine downstream of the roving frame for subsequent processing.

[0012] The roving frame 1 has a deposit region 2, located at the rear of the machine; in the deposit region the web coming from the drawing frame is deposited, wrapped and kept in cans 4.

20 [0013] In this deposit region 2 there is also placed a creel 6 consisting of a frame provided with rollers 8 having a prevalent extension along a longitudinal direction X, generally having a hexagonal section and typically motorized, arranged above the cans 4.

25 [0014] The web coming out of the cans 4 is placed above the

rollers 8 and fed to the roving frame 1.

[0015] The roving frame 1 comprises a machine body 2 comprising a stretching device 10 consisting of pairs of superimposed pressure cylinders having peripheral
5 rotation speeds which increase from upstream to downstream, so as to progressively stretch the web passing between the coupled cylinders.

[0016] In particular, the stretching device 10 comprises lower motorized cylinders, for example four, each of
10 which extends in the longitudinal direction X along the entire frame. Each lower cylinder cooperates with a plurality of separate upper idle cylinders, supported, generally in pairs, by pressure arms.

[0017] Preferably, the pressure arms are pushed
15 pneumatically to ensure pressure coupling between the lower cylinder and the upper cylinders.

[0018] Downstream of the stretching device 10, the machine body 2 comprises a rail 20 extending along the longitudinal direction, along the entire length of the
20 frame, defining at the top an upper region of the frame and below a lower region.

[0019] The rail 20 houses a plurality of necks 22, arranged in two longitudinal rows, arranged longitudinally out of phase, protruding from a rail plane 21 of said rail 20.

25 [0020] The machine body 2 also comprises a plurality of

fins 30, arranged in the lower region at each neck 22, supported by the rail 20. The fins 30 are suitable for being rotated about a respective vertical axis Z by an electric fin motor.

5 [0021] The machine body 2 further comprises a carriage 40, arranged in the lower region, carrying a plurality of spindles 42, each coaxially arranged with the respective fin 30. The carriage 40 can be translated vertically with alternating motion for forming the spool, by means of a
10 first electric carriage motor.

[0022] Furthermore, the carriage 40 can be translated horizontally for the operations of removing the spools and loading the empty tubes, by means of a second electric carriage motor.

15 [0023] The spindles 42, aligned along the longitudinal direction X, can also be rotated coaxially with the fins 30, by means of an electric spindle motor.

[0024] The fins 30 are also provided with pneumatic forming means adapted to generate a stream of air under pressure
20 to keep the web attached to the tube inserted on the respective spindle 42 or attached to the spool being formed.

[0025] The web coming from the creel 6 passes through the stretching device 10 and then enters the respective neck
25 2, through which it passes into the lower region of the

frame.

[0026] Here, through the neck 22, it enters the respective fin 30 and comes out of the lower end; the carriage 40 is moved with alternating vertical movement, so that the web
5 is wound around the tube inserted on the spindle and forms a spool.

[0027] Once the spools are formed, they are picked up and transported, automatically or manually, to the spinning machine, for subsequent processing.

10 [0028] For this purpose, the carriage 40 can be moved horizontally, between a position for forming spools, in which it is located in the lower region of the frame, and a picking position, outside the lower region.

[0029] Moreover, the machine body 2 comprises a dashboard
15 frame 50 and a picking dashboard board 60, supported by the dashboard frame 50 well above the stretching device 10.

[0030] During the operations of the frame, it sometimes happens that the roving leaving the stretching device 10
20 and entering the necks 22 breaks, thus tending to accumulate on the rail plane 21 of the rail 20.

[0031] In order to prevent this accumulation from interfering with the work in progress, the roving frame 1 comprises a suction system comprising a primary duct 70
25 and a plurality of nozzles 72 for suction of the roving.

[0032] The primary duct 70 extends longitudinally along the whole machine, preferably below the stretching device 10, and from this the nozzles 72 branch out, arranged side-by-side longitudinally, projecting on the rail plane 21.

5 [0033] The primary duct 70 carries a stream of air in suction, so that, in the case of a broken roving, it is sucked in by one of said nozzles 72 and removed from the rail plane 21.

[0034] The roving frame 1 is further provided with a
10 cleaner device 80 suitable for blowing a stream of air towards the rail plane 21, so as to remove the accumulations of deposited material, such as fibers and dust.

[0035] The cleaner device 80 is suitable for translating
15 back and forth, in front of the rail 20 of the roving frame 1, supported by a frame 82 above the machine.

[0036] Preferably, said cleaner device 80 comprises at least one blowing pipe 86, configured to direct the air stream towards the rail plane 21.

20 [0037] The combined action of the cleaner device 80 and the nozzles 72 allows to remove the material deposited on the rail plane 21 or in the neighboring areas and to suck it into the primary duct 70.

[0038] Preferably, said cleaner device 80 comprises a
25 blowing assembly, suitable for generating and blowing air

streams towards areas of the roving frame, and a suction unit, suitable for generating and sucking air streams from areas of the roving frame.

[0039] For example, the suction assembly comprises a first
5 suction tube 82, directed towards the upper region of the frame. Moreover, preferably, the suction assembly comprises a second suction tube 84, directed towards the ground plane of the frame.

[0040] The blowing assembly preferably comprises a blowing
10 column 86 which extends vertically from the upper region to the lower region of the frame, from which one or more blowing outlets 88a - 88e branch off, directed towards different areas of the roving frame, in the upper region and/or in the lower region.

15 [0041] The primary duct 70, which extends longitudinally over the entire machine, is connected upstream through a suction mouth with an intake case 90, arranged in an intermediate position, preferably central, between the head area and the tail area of the machine.

20 [0042] The suction case 90 contains or is connected upstream with a fan 92, moved by the relative electric motor, to form the sucked air stream which is then distributed, downstream of the primary duct 70, between the nozzles 72.

25 [0043] The cleaner system according to the invention

further comprises a selector device 100 which can be activated, directly or indirectly, when the cleaner device 80 switches from a reference position P along the frame 1, for example coinciding with the position in which the suction case 90 is arranged.

[0044] The selector device 100 is adapted to reduce, preferably until it completely closes, the suction flow from the suction case 90 towards a first group 72a of predefined nozzles 72 and increase, preferably until it completely opens, the suction flow from the suction case 90 towards a second group 72b of predefined nozzles 72.

[0045] Advantageously, this allows the motor that drives the fan 92 to be sized for suction from a number of nozzles smaller than the total number present on the frame, since a part of these nozzles are excluded from the suction or divided by means of said selector device.

[0046] For example, the cleaner device 80 is initially close to the tail area of the frame 1 and the selector device 100 is in a first configuration in which it allows the suction flow from the case 90 to the first group 72a of nozzles 72 arranged along the section in which said cleaner device 80 is located, while it closes the suction flow towards the second group 72b of nozzles 72 (figure 4a).

[0047] Having reached the reference position P, the cleaner

device 80 activates the selector device 100 (figure 4b), which moves into a further configuration in which it allows the suction flow from the case 90 to the second group 72b of nozzles 72, arranged along the section in which said cleaner device 80 is located, while it closes the suction flow towards the first group 72a of nozzles 72, which is no longer affected by the passage of the cleaner device 80 (figure 4c).

[0048] The same then happens when the cleaner device 80 moves from the head towards the tail of the roving frame 1 (figures 4d to 4f).

[0049] According to a further embodiment, the cleaner system comprises a plurality of suction cases arranged along the frame, each correlated to a single group of nozzles or to several groups of nozzles.

[0050] According to an embodiment, the cleaner system has two or more reference positions which identify respective groups of nozzles; correspondingly, said selector device is adapted to open the suction flow towards only one of said groups of nozzles and close the suction flow towards the others.

[0051] According to a further embodiment, the selector device is adapted to open the suction flow towards several groups of nozzle and at the same time to close the suction flow towards at least one further group of

nozzles.

[0052] According to a still further embodiment, the cleaner system provides for one or more activation reference positions and one or more deactivation reference
5 positions, whereby the cleaner device activates one or more nozzle groups when passing through a reference position of activation (without deactivating any further group of nozzles) and deactivates one or more groups of nozzles when passing through a deactivation reference
10 position.

[0053] According to an embodiment, the cleaner device directly activates the selector device, e.g. by a mechanical trigger at the reference position.

[0054] According to a further embodiment, the cleaner
15 device indirectly activates the selector device, for example by means of a sensor that detects the position of the cleaner device, sends a signal to an electronic control unit or to a PLC or to a microprocessor, which provides to operate the selector device.

[0055] In a still further embodiment, the cleaner device
20 indirectly activates the selector device, for example by means of a timer set so that, in the instant in which the cleaner device passes through a reference position, it sends a signal which controls the actuation of the
25 selector device.

[0056] According to an embodiment, instead of a local suction system, the suction mouth of the primary duct is connected to a centralized suction system of the machine.

[0057] According to a further embodiment, along the rail of
5 the machine two or more primary ducts are provided, possibly connected to respective local suction systems or to a single centralized suction system.

[0058] According to a still further embodiment, as an alternative to the passage by a reference position, the
10 selector device can be activated, directly or indirectly, to transit through a reference section along the frame, for example so that the selector starts the operations for increasing or reducing the flow of suction towards one or more of said nozzle groups in a position of the
15 reference section and completing them in another position of said reference section.

[0059] Innovatively, the cleaner system described above allows overcoming the drawbacks mentioned above with reference to the prior art, since it reduces the energy
20 consumption associated with accessory operations such as cleaning the rail.

[0060] It is clear that a man skilled in the art can make changes to the cleaner system described above in order to meet incidental needs, all falling within the
25 scope of protection defined in the following claims.

CLAIMS

1. Assembly comprising:

- a roving frame (1) for the processing of a fiber web and the formation of a roving wound in spools,
5 comprising:

A) a rail (20) predominantly extending in a longitudinal direction (X) and provided with a rail plane (21);

B) a suction system comprising a primary air suction duct (70) with longitudinal extension, a plurality of nozzles
10 (72) that branch off from the primary duct (70) and face the rail plane (21), wherein said nozzles (72) are grouped into at least one first nozzle group (72a) and at least one second nozzle group (72b);

- a cleaner device (80) suitable for blowing a current of
15 air towards the rail plane (21), displaceable forwards and backwards along said rail (20);

- a selector device (100) suitable for increasing or reducing the suction flow towards one or more of said nozzle groups (72a,72b);

20 wherein, along said longitudinal direction of the frame, at least one reference position (P) or at least one reference section is defined such that when the cleaner device passes through said at least one reference position or said at least one reference section, the
25 selector device (100) is activated, directly or

indirectly, to increase or reduce the suction flow to one or more of said nozzle groups.

2. Assembly according to claim 1, wherein the primary duct (70) provides a suction port for the input of a
5 suction current.

3. Assembly according to claim 2, wherein the inlet port is connected upstream with a fan (92) for suction.

4. Assembly according to claim 2, wherein the suction port is connected to a centralized frame suction system.

10 5. Assembly according to any of claims 2 to 4, wherein said suction port feeds one or more of said nozzle groups (72a,72b).

6. Assembly according to any one of the claims 2 to 5, wherein the longitudinal position of said suction port
15 defines a respective reference position (P) or a respective reference section.

7. Assembly according to any one of claims 2 to 6, wherein the primary duct envisages a single suction port.

8. Assembly according to claim 7, wherein the suction
20 system comprises only two nozzle groups (72a,72b).

9. Assembly according to claim 7 or 8, wherein said inlet port is centrally arranged along said primary duct (70).

10. Assembly according to any one of the preceding claims, wherein the cleaner device directly activates the
25 selector device, e.g. by a mechanical trigger at the

reference position or reference section.

11. Assembly according to any one of claims 1 to 9,
wherein the cleaner device indirectly activates the
selector device, for example, via a position sensor of
5 the cleaner device or via a timer.

12. Working method of an assembly comprising a roving
frame (1) and a cleaner device (80)
- wherein the cleaner device (80) travels forwards and
backwards along a rail (20) of said roving frame (1),
10 blowing a stream of air towards a rail plane (21) of said
rail (20);

- wherein a frame suction system (1) provides for the
suction from the rail plane and adjacent zone by means of
a plurality of nozzles (72) arranged along said rail
15 (20), said nozzles being grouped into at least one first
nozzle group (72a) and at least one second nozzle group
(72b);

- wherein, when the cleaner device passes through at
least one predefined reference position (P) or at least
20 one reference section along said rail (20), only said at
least first nozzle group (72a) or only said at least
second nozzle group (72b) is activated in suction, either
directly or indirectly.

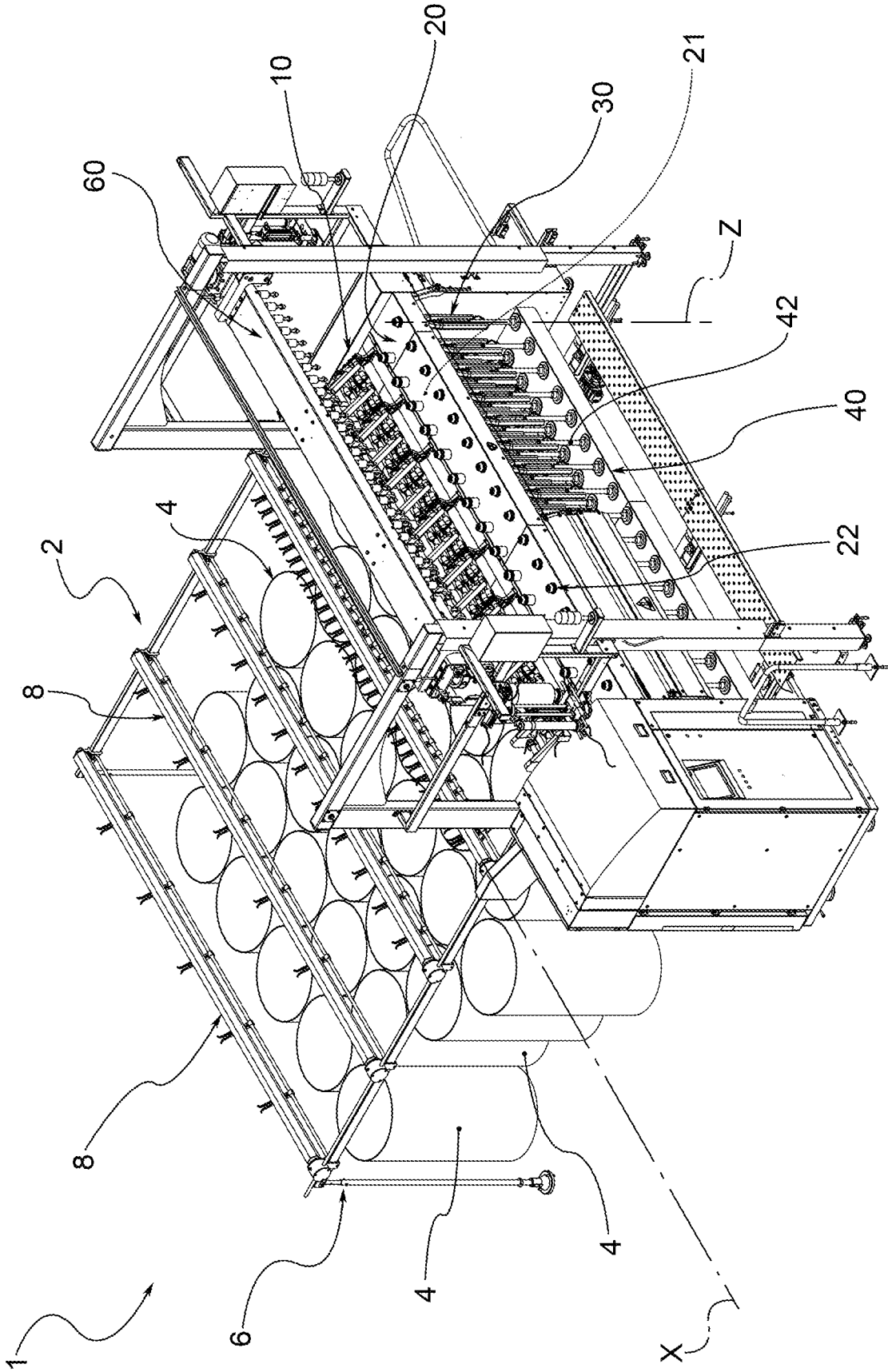
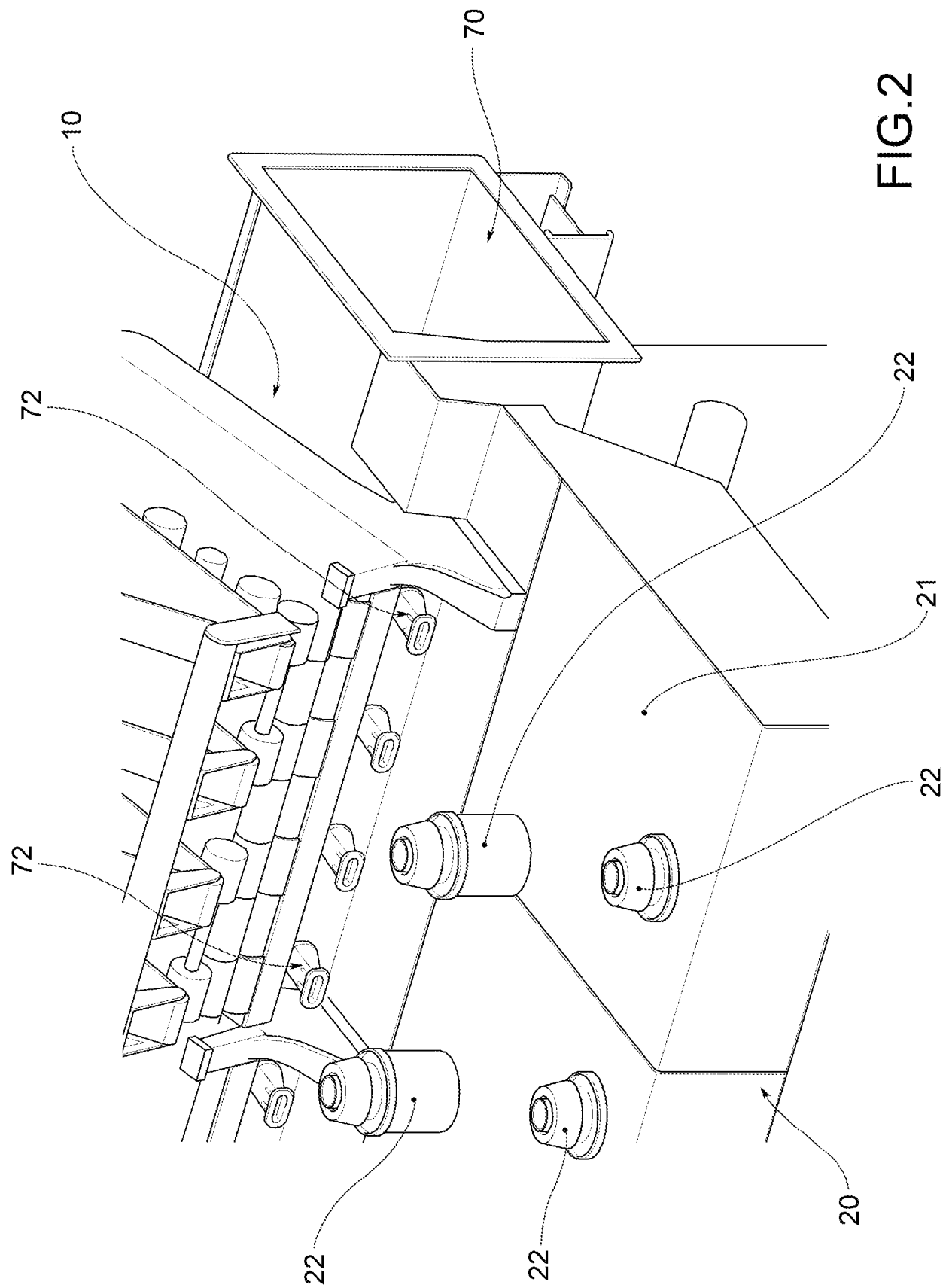


FIG.1



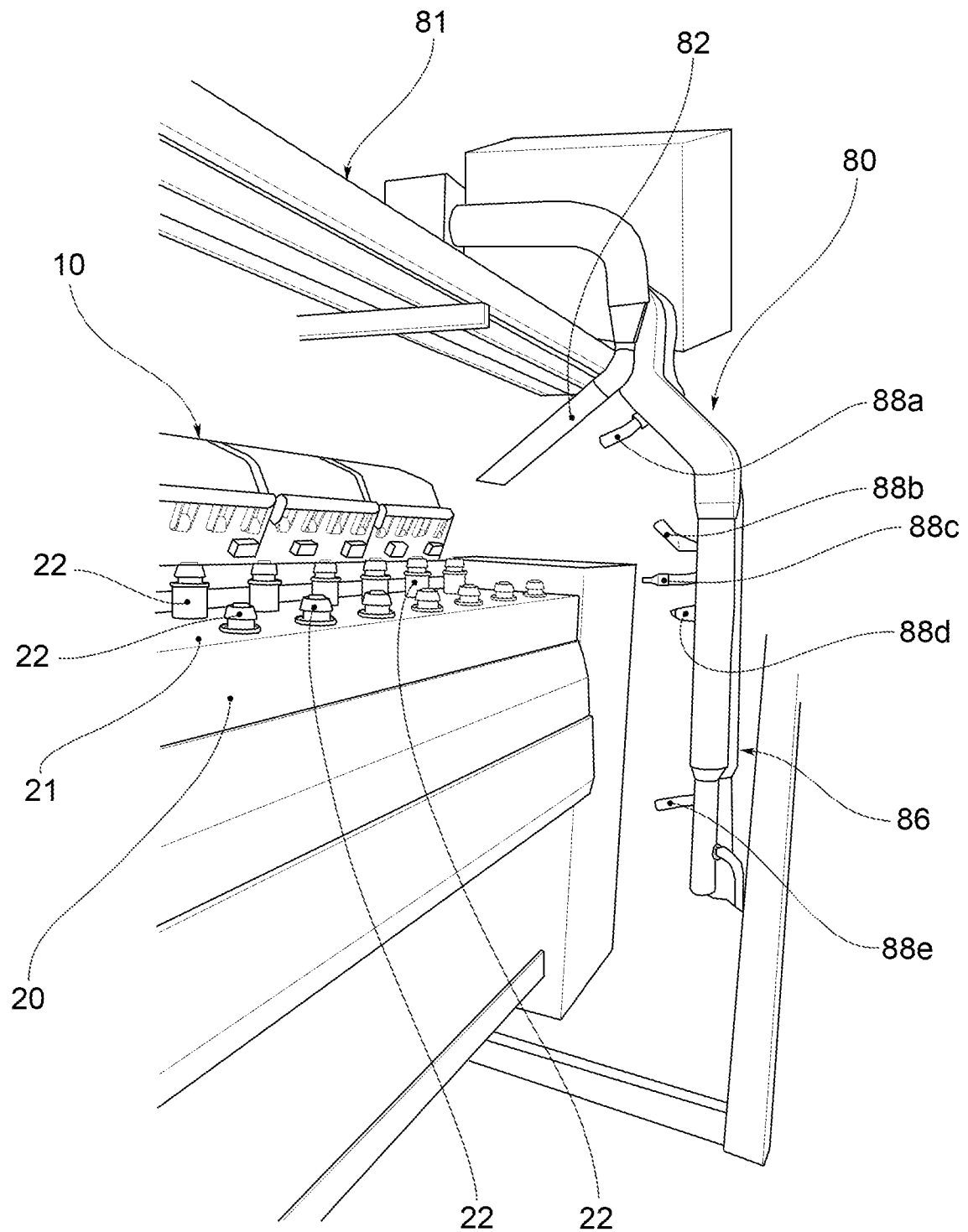


FIG.3

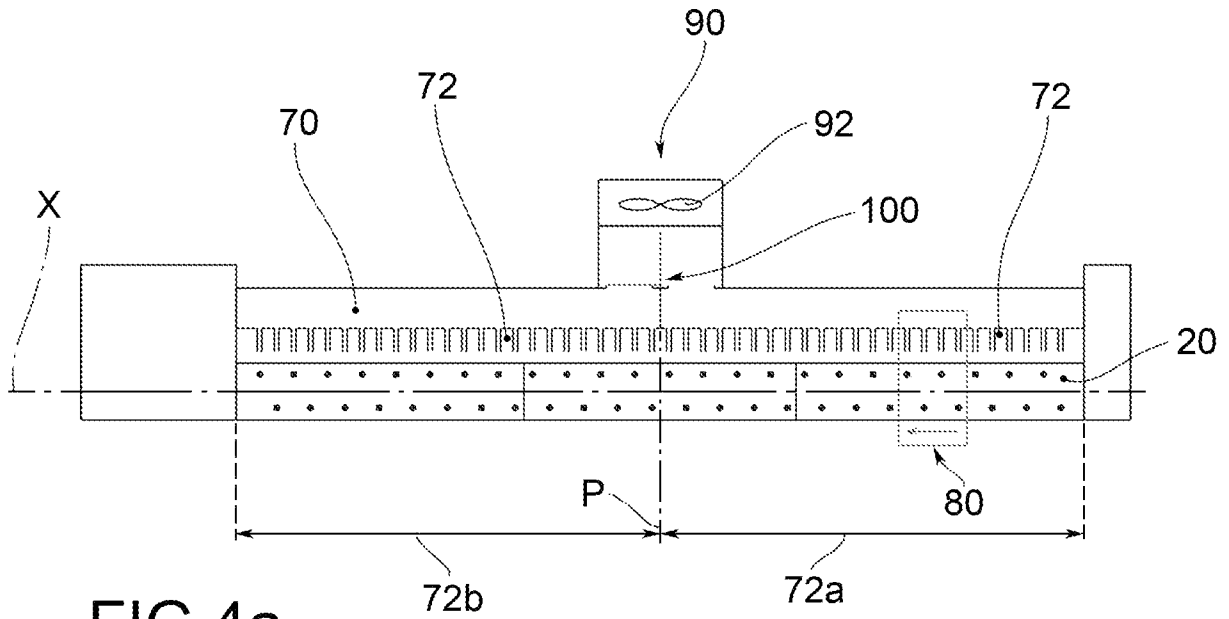


FIG. 4a

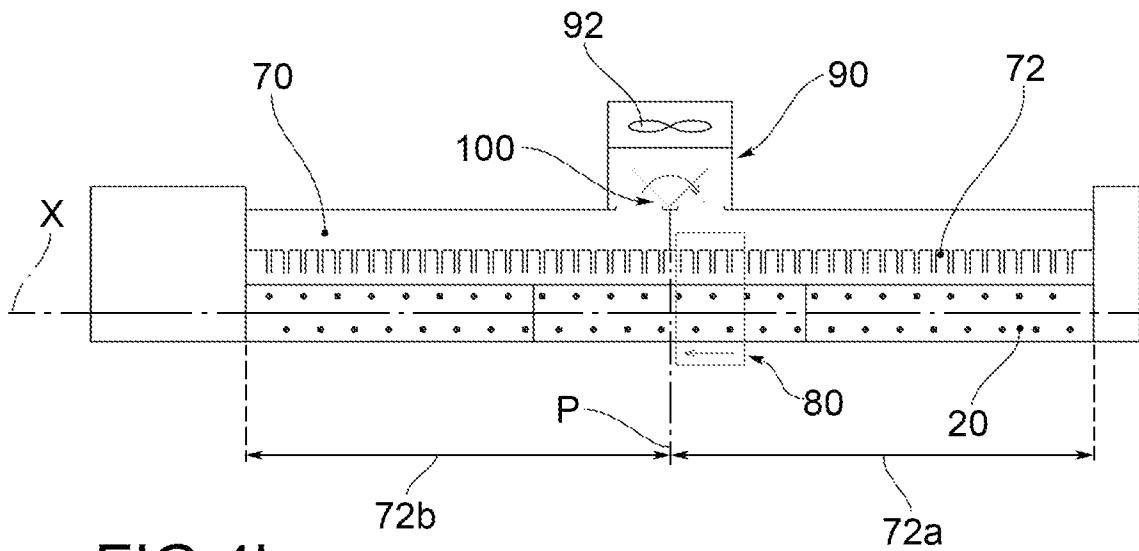


FIG. 4b

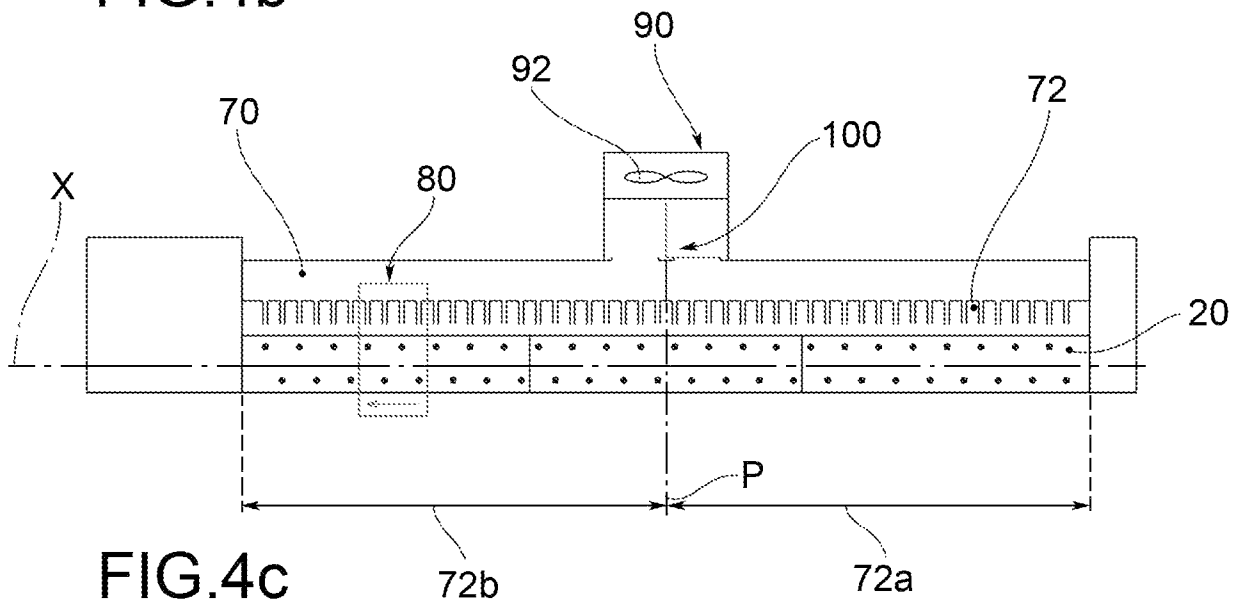
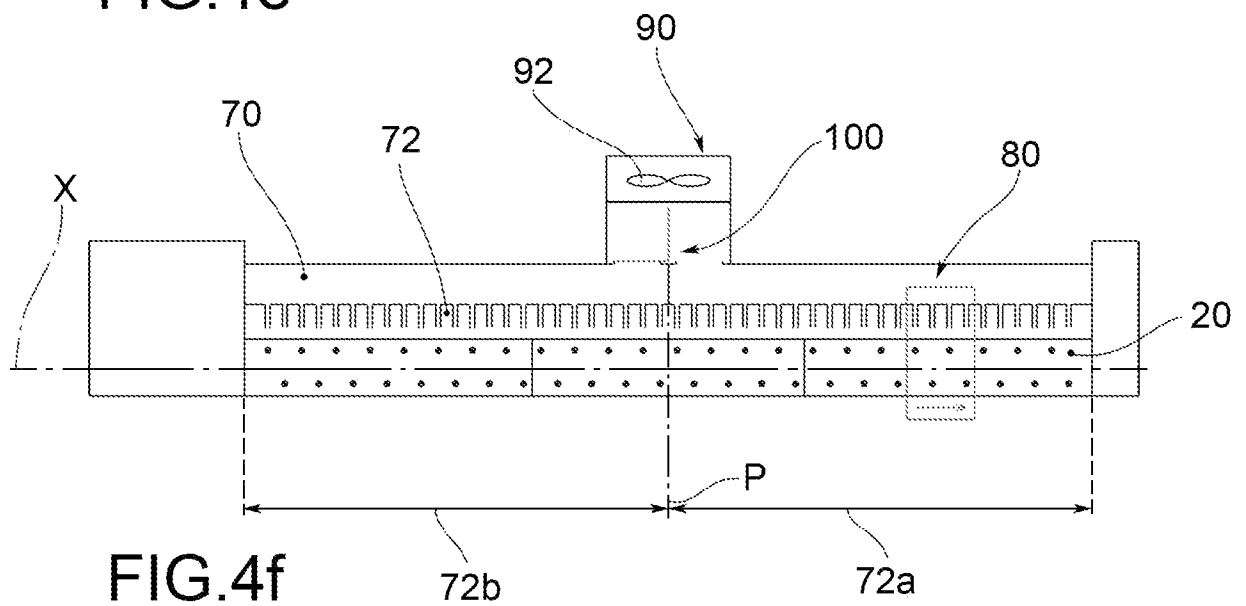
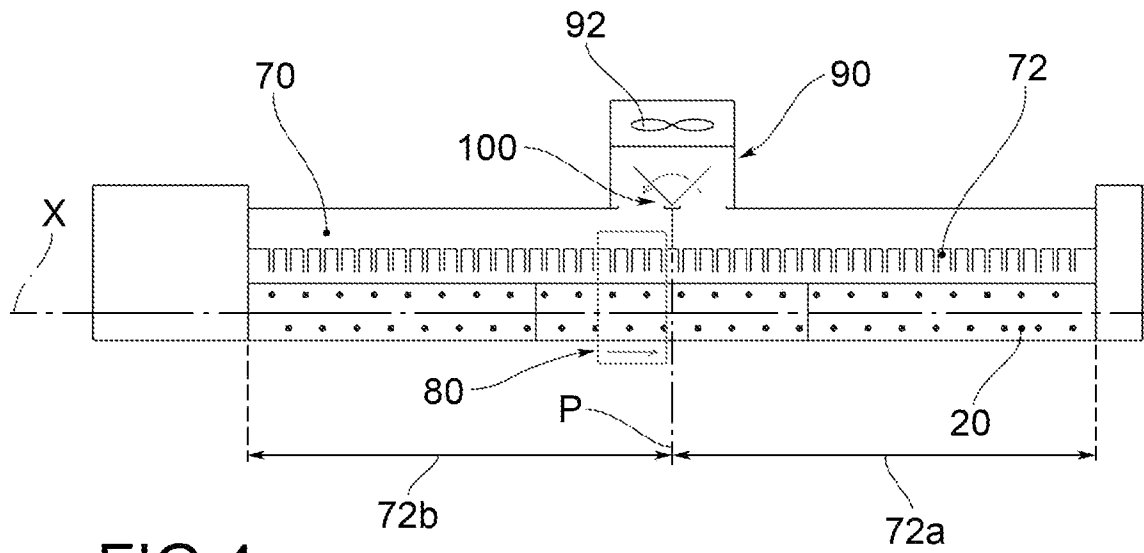
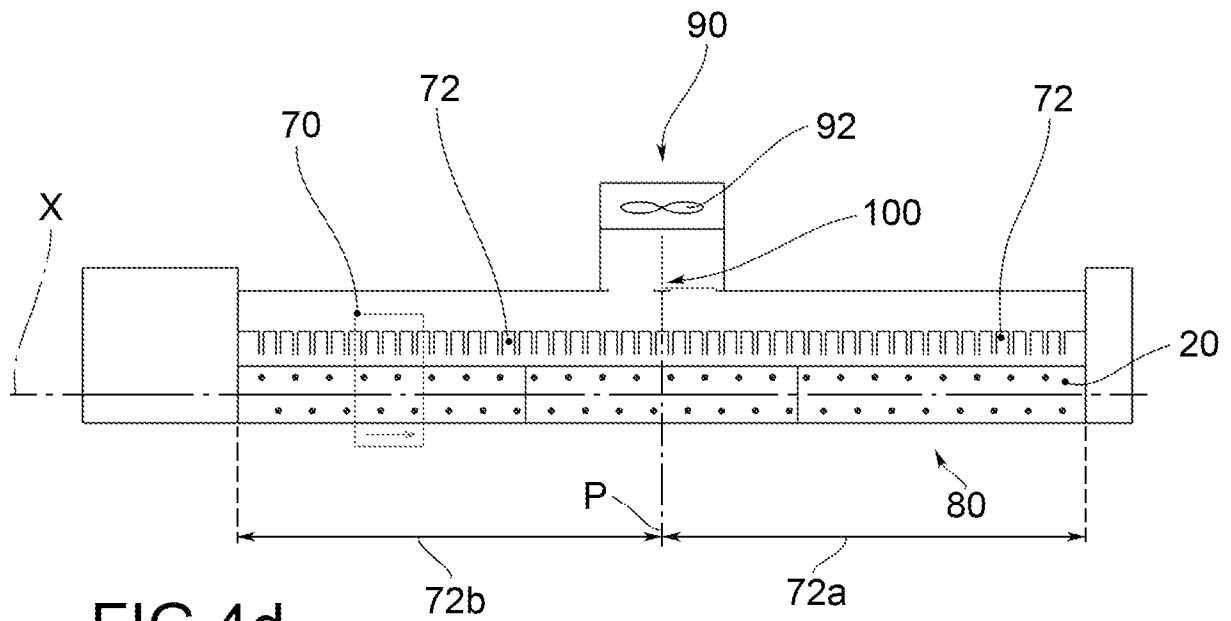


FIG. 4c



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/055490

A. CLASSIFICATION OF SUBJECT MATTER
INV. D01H11/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 977 181 A (FERDINAND REITERER) 28 March 1961 (1961-03-28) column 1, line 39 - column 1, line 62 column 3, line 8 - column 7, line 64; figures 1-6	1-12
X	----- US 2 976 668 A (FERDINAND REITERER) 28 March 1961 (1961-03-28) column 4, line 60 - column 5, line 64; figure 6	1-12
A	----- DE 40 20 421 A1 (RIETER AG MASCHF [CH]) 2 January 1992 (1992-01-02) column 4, line 39 - column 5, line 3; figures 1-3	1-12
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Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

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Name and mailing address of the ISA/

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Todarello, Giovanni

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2019/055490

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 410 070 A (SAMUEL DENIS) 12 November 1968 (1968-11-12) column 4, line 6 - column 4, line 22; figures 1-3 -----	1,11,12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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