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(71) Applicant: **Unitech Textile Machinery S.p.a.**
59013 Oste di Montemurlo (PO) (IT)

(72) Inventor: **Giorgetti, Guido**
59100 Prato (IT)

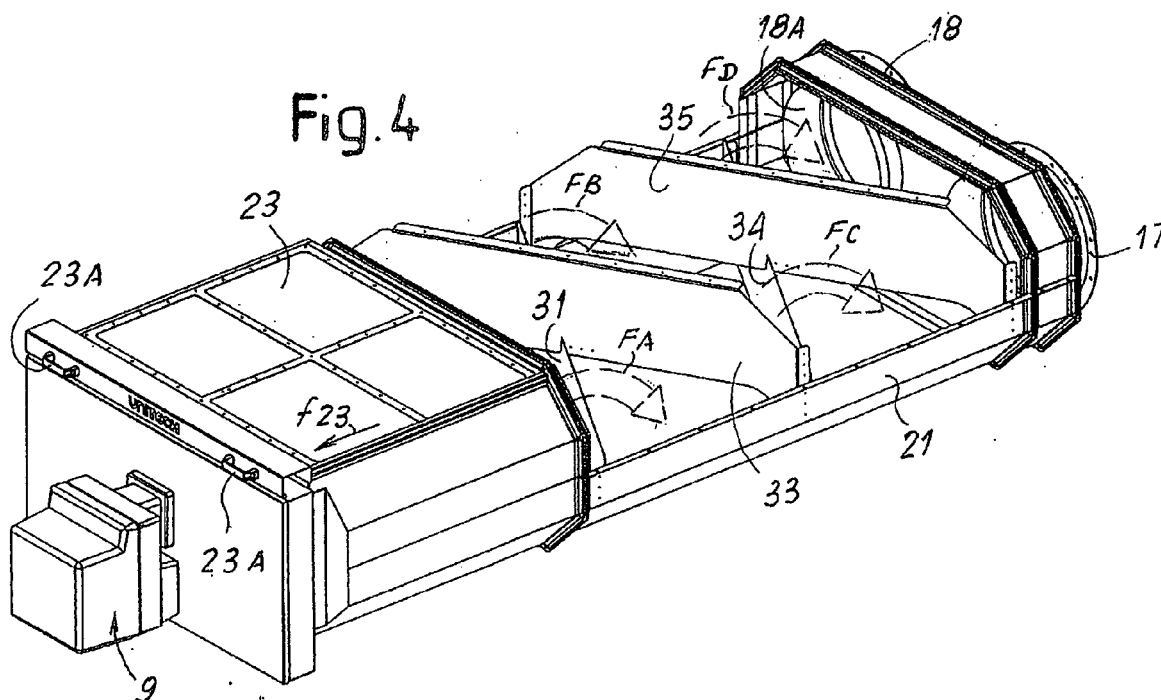
(74) Representative: **Mannucci, Michele et al**
Ufficio Tecnico Ing.A. Mannucci S.r.l.
Via della Scala 4
50123 Firenze (IT)

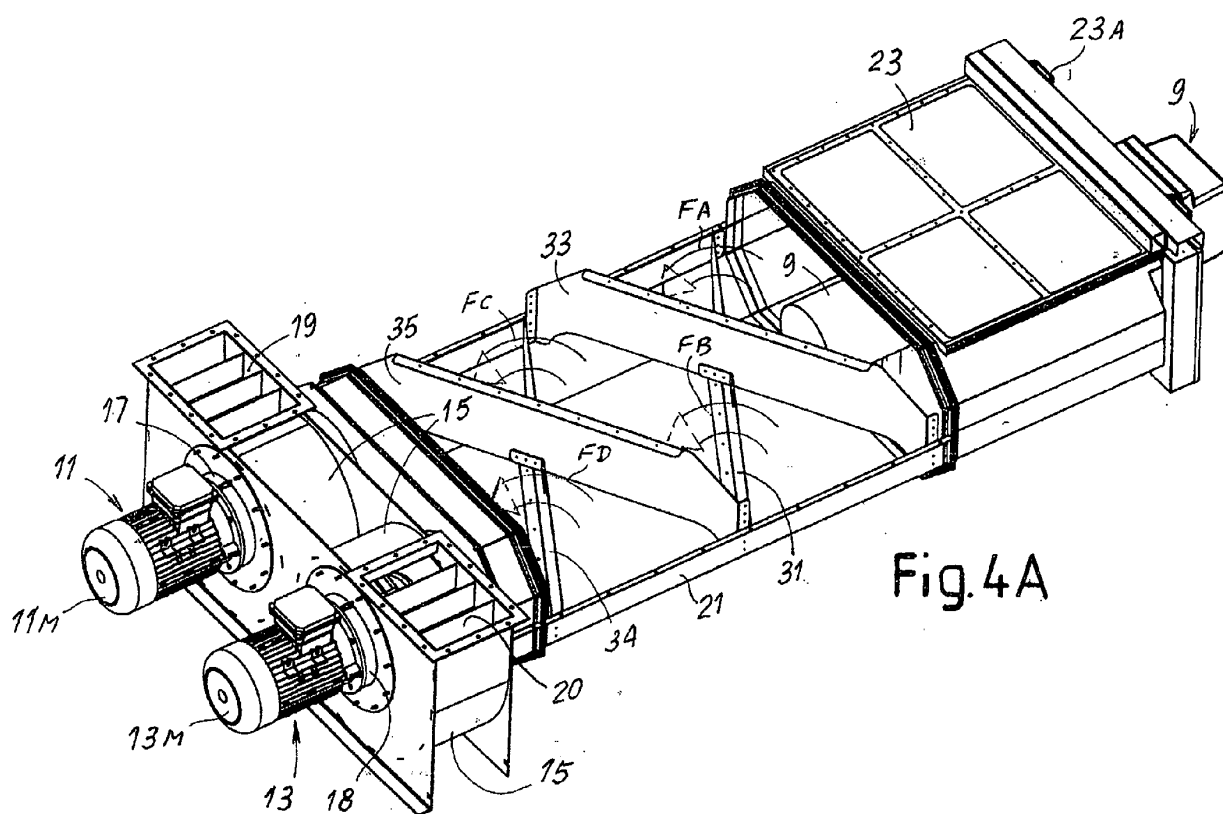
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(54) **Stenter**

(57) There is described a stenter comprising: a fabric feeding path (P); on top and below the path (P), respectively a first blowing member (3A) and a second blowing member (5A); a heat generator (9) for heating a air flow; a first fan (11) for feeding hot air towards the first blowing

member (3A) and a second fan (13) for feeding hot air towards the second blowing member (5A); an air flow conduit (7) from the heat generator (9) to the fans (11,13). Baffle plates (31,33,34,35) are arranged in the flow conduit, which favor the mixing of the air flows sucked by the two fans (11,13).





Description

Technical field

[0001] The present invention relates to improvements in machines for treating fabrics and in particular in so-called stenters for drying fabrics.

Prior art

[0002] In some cases, machines called stenters are used for drying fabrics continuously, substantially consisting of a drying oven wherethrough the fabric is fed in a substantially continuous manner for being impinged by a hot air flow. The fabric is engaged to chain conveyor members that hold it stretched and move it forward between two overlapped blowing members. Air heated by a heat generator, normally consisting of a gas burner, is fed to said blowing members

[0003] Machines of this type are described for example in EP-A-0471162 and in EP-A-0935112. Normally, two separate fans are used in these machines for sucking air from a flow conduit and pushing it into two overlapped manifolds, each feeding a respective blowing member. For various reasons it may happen that two fans suck in different air flow rates. When this happens there may occur unbalances in the temperature of the air sucked by the two fans, and thereby of the air blown on the two opposite faces of the fabric. This especially happens when the heat generator comprises a burner that operates blown-wise, that is, the flame whereof burns inside the air flown sucked in by the machine. In that case, in fact, a flow rate difference between the two fans causes a movement of the burner flame, which heats at a higher temperature the air fed to the fan at a higher flow rate. This causes an uncontrollable variation in the temperatures of the air blown on the top face and on the bottom face of the fabric passing between the two blowing members with consequent difficulties in controlling the fabric treatment.

[0004] EP-A-1.262.726 describes a stenter wherein the fabric drying air is indirectly heated through heat exchange with a combustion gas that circulates in a heat recovery exchanger in flow connection with the combustion chamber of a burner. The air circuit is made so as to optimize the thermal exchange between the air circulating outside the conduits of the heat exchanger and the combustion gases that circulate within said conduits.

Summary of the invention

[0005] The invention aims at reducing the above drawbacks of the traditional stenters at least partly. To this end, according to one embodiment of the invention, a stenter is provided which comprises: a fabric feeding path; above and below said path, respectively a first blowing member and a second blowing member; a heat generator for heating an air flow; a first fan for feeding hot

air towards the first blowing member and a second fan for feeding hot air towards the second blowing member; an air flow conduit from the heat generator to said first fan and to said second fan. According to the invention, baffle plates are arranged in the flow conduit, which favor the mixing of the air flows sucked by said first fan and said second fan.

[0006] In some embodiments, the baffle plates are arranged at two different heights within said flow conduit.

[0007] According to advantageous embodiments, the baffle plates are arranged inclined, according to two different inclinations, relative to the longitudinal development of the air flow conduit between the heat generator and said first fan and said second fan.

[0008] In some embodiments there are provided at least two bottom baffle plates and at least two top baffle plates, arranged at different heights and with different inclinations in the flow conduit, defining an intermediate mixing zone between the heat generator and the first and second fan, wherein air currents mix, sucked by means of the two fans from the heat generator to suction inlets associated to the two fans.

[0009] Preferably, the first fan and the second fan are controlled independently of one another, for example by two inverter motors.

[0010] Further advantageous features and embodiments of the invention are indicated in the appended claims, which are an integral part of the present description, and will be described with reference to a non-limiting embodiment of the invention.

Brief description of the drawings

[0011] The invention will be better understood by following the description and accompanying drawing, which shows a non-limiting practical embodiment of the invention. More in particular, in the drawing:

Fig. 1 shows a stenter according to the invention, in an axonometric view;

Fig. 2 shows the stenter of Fig. 1 wherefrom the outer panels and a part of the blowing members have been removed;

Fig. 3 shows an axonometric view of the air flow conduit;

Fig. 3A shows an axonometric view similar to the view of Fig. 3, but according to a different angle;

Fig. 4 shows an axonometric view similar to the view of Fig. 3, but with the conduit partly open for showing the arrangement of the inside baffle plates;

Fig. 4 shows an axonometric view similar to that of Fig. 4, but according to a different angle;

Figs. 5 and 6 show a side view and a plan view of the conduit of Figs. 3 and 4, and

Figs. 7, 8 and 9 show sections according to horizontal trace planes VII-VII, VIII-VIII and IX-IX of Fig. 5.

Detailed description of an embodiment of the invention

[0012] Fig. 1 shows a drying machine of a fabric fed continuously and in open width, so-called stenter, globally indicated with reference numeral 1. More in particular, in Fig. 1 the machine is shown from the fabric inlet side. This figure shows two blowing members 3 and 5, respectively a top and a bottom member, developing according to substantially horizontal planes, spaced from one another, wherein between a fabric feeding path P is defined. The blowing members 3 and 5 may be made in various manners. For example, the blowing members may each comprise a series of cross conduits 3A and 5A extending in a cross direction relative to the fabric feeding direction F along path P. Each conduit 3A, 5A has holes, whereof Fig. 1 only shows holes 5B of the bottom conduits 5A. Air is blown through these holes towards the corresponding fabric face.

[0013] Underneath the blowing members 3 and 5, an air flow conduit develops, which is globally indicated with reference numeral 7. The air flow conduit 7 extends crosswise relative to the fabric feeding direction F along path P between the blowing members 3, 5.

[0014] A heat generator is arranged at one end of the flow conduit 7, for example a gas burner 9, which generates the heat for heating the air that through the flow conduit 7 is sucked by means of two fans that feed the fan 3A and 5A thereof. The fans are schematically shown in Fig. 6 and in Figs. 3A and 4A they are shown along with the case and the respective supply thereof, and are labeled with reference numerals 11 and 13.

[0015] Fans 11 and 13 are seated into respective cases 15 connected to unions 17, 18 of the flow conduit 7 and are actuated by separate motors 11M and 13M which may be controlled independently of one another through a programmable central control unit, not shown. As is shown in particular in Fig. 2, where the outside panels and blowing members 3 and 5 have been removed from the stenter, the two fans seated in cases 15 push hot air sucked from the flow conduit 7 towards channels 19, 20 that feed the air respectively to a top case 3C of the blowing member 3 and to a bottom case 5C of the bottom blowing member 5 (see Fig. 1). The two fans may be driven independently of one another by two motors, not shown, so as to take different rotating speeds and thus operate in different points of the respective characteristic curves according to the operating conditions required for the machine. As a consequence thereof, the two fans 11 and 13 may suck in different amounts of air.

[0016] To prevent this from negatively affecting the air temperature entering into unions 17 and 18, a special configuration of the inside volume of the flow conduit 7 is provided, which shall be described hereinafter with particular reference to Figs. 4 to 9.

[0017] In Fig. 4 the flow conduit 7 is shown partly open. In Fig. 4A the flow conduit is shown from a different angle, still open at the top and fitted with the two fans 11 and 13, omitted in Fig. 4. The flow conduit is delimited by

outside walls 21 that define an inside volume which, in the example shown, has an elongated rectangular section with chamfered corners. In a manner known per se, the air is sucked into the flow conduit 7 passing through filters 23 removable through grips 23A from outside the machine with horizontal movement according to arrow f23. The air sucked through filters 23 enters into the flow conduit 7 and is heated by the flame of burner 9. In front of burner 9 into the flow conduit 7, between burner 9 and apertures 17A, 18A of union 17, 18 inclined walls or baffle plates are arranged, the function whereof is to prevent or reduce temperature unbalances into the air flows sucked by fans 11 and 13.

[0018] In the embodiment shown there are provided: a first bottom baffle plate 31, a second top baffle plate 33, a third bottom baffle plate 34 and a fourth top baffle plate 35. Baffle plates 31 - 35 are arranged inclined relative to the longitudinal axis A-A of the flow conduit 7. More in particular, the bottom baffle plates 31 and 34 are substantially parallel to one another and define a first angle A1 (Fig. 8) relative to axis A-A of the flow conduit 7, whereas baffle plates 33 and 35, parallel to one another and inclined relative to baffle plates 31 and 34, form a second angle A2 relative to axis A-A.

[0019] The height of baffle plates 31 and 33 is approximately half or preferably a little larger than half the overall height of the cross section of the flow conduit 7, so that in the intersection points of the baffle plates or walls 31, 33 and 34, 35 there is a reciprocal jointing zone of the same baffle plates. Actually, the bottom baffle plates 31 and 34 develop from bottom 7A of the flow conduit 7 up to about half the height of the conduit or slightly above the half, whereas baffle plates 33 and 35 develop from the top, that is, from the top wall 7B of the flow conduit 7 down to about half the height or slightly below the half.

[0020] As is understood in particular by looking at Fig. 4, in this way the inside volume of the flow conduit 7 is divided into zones that generate crossed air currents. More in particular, in front of the burner baffle plates 31 and 33 force the air sucked by fans 11, 13 to follow a path schematically shown by arrows FA and FB. The two flows FA and FB pass above the top edge of baffle plate 31 and cross in the zone comprised between the intersections of the pairs of baffle plates 31, 33 and 34, 35. Hence, the air flows continue according to arrows FC and FD towards the suction inlets 17A, 18A of unions 17, 18 passing on the top edge of baffle plate 34.

[0021] With an arrangement of this type, a mix of air flows sucked by the two fans 11, 13 is obtained in the central zone arranged between the crossing points of baffle plates 31, 33 and 34, 35 with consequent balancing of the temperatures of the flow sucked by the two fans. In this way, even when the two fans, for reasons resulting from the machine operating conditions, suck in different flow rates, the flame of burner 9 remains approximately in centered position and is not deviated to the left or to the right by the speed difference of the air, and above all the air flows mix with consequent temperature leveling.

[0022] In short, at the inlet of unions 17 and 18 there are two air flows with even different flow rate, but at a substantially equal temperature or in any case different by a limited value, with consequent possibility of a correct control of the fabric processing.

[0023] It is understood that the drawing shows just one example, provided merely as a practical demonstration of the invention, which can vary in its forms and arrangements, without however departing from the scope of the concept underlying the invention. Any reference numbers in the appended claims are provided to facilitate reading of the claims with reference to the description and to the drawing, and do not limit the scope of protection represented by the claims.

Claims

1. A stenter comprising: a feeding path for a fabric (T); above and below said path, respectively a first blowing member (3) and a second blowing member (5); a heat generator (9) for heating a air flow; a first fan (11) for feeding hot air towards the first blowing member (3) and a second fan (13) for feeding hot air towards the second blowing member (5); an air flow conduit (7) from the heat generator to said first fan and to said second fan; **characterized in that** in said flow conduit (7) baffle plates (31, 34; 33, 35) are arranged that favor the mixing of the air flows sucked by said first fan (11) and by said second fan (13).
2. Stenter according to claim 1, **characterized in that** said baffle plates are arranged at two different heights within said flow conduit.
3. Stenter according to claim 1 or 2, **characterized in that** said baffle plates are arranged in said flow conduit (7) according to inclined directions so as to intersect and define an intermediate mixing zone in said flow conduit wherein air current mix, which are sucked by said first and second fan (11, 13).
4. Stenter according to claim 1, 2 or 3, **characterized in that:** said flow conduit (7) comprises outside walls (21) that define an inside volume for the air flow, said flow conduit developing from an air inlet end to a dual air outlet towards said first fan and said second fan (11, 13); said baffle plates are arranged in said flow conduit (7) oriented crosswise and inclined in opposite directions relative to the air flow.
5. Stenter according to one or more of the previous claims, **characterized in that** said baffle plates (31, 33, 34, 35) are arranged so that the inside volume of the flow conduit (7) is divided thereby into zones that generate crossed air currents sucked by said first fan (11) and said second fan (13).
6. Stenter according to one or more of the previous claims, **characterized in that** said baffle plates (31, 34, 33, 35) are arranged inclined, according to two different inclinations, relative to the longitudinal development of the air flow conduit (7) between the heat generator (9) and said first fan (11) and said second fan (13).
7. Stenter according to one or more of the previous claims, **characterized in that** it comprises at least two bottom baffle plates (31, 34) and at least two top baffle plates (33, 35), arranged at different heights and with different inclinations in said flow conduit (7), defining an intermediate mixing zone between said heat generator (9) and said first fan and said second fan (11, 13), wherein air currents mix, sucked by means of said first fan (11) and said second fan (13).
8. Stenter according to one or more of the previous claims, **characterized in that** said first fan (11) and said second fan (13) are controlled independently of one another.
9. Stenter according to one or more of the previous claims, **characterized in that** said flow conduit (7) extends crosswise to the fabric feeding path (T) and underneath thereof.
10. Stenter according to one or more of the previous claims, **characterized in that** in said flow conduit (7) there are arranged: a first bottom baffle plate (31) having a first inclination relative to the longitudinal direction of the flow conduit (7); on top of said first baffle plate (31), a second baffle plate (33) crossing the first baffle plate (31), said first baffle plate and said second baffle plate being arranged so as to define two air flow passages; downstream of said first baffle plate (31) and said second baffle plate (33), a third bottom baffle plate (34) having approximately the same inclination as the first baffle plate (31); above the third baffle plate (34), a fourth baffle plate (35) crossing with the third baffle plate and having approximately the same inclination as the second baffle plate, said third and fourth baffle plates arranged to define two air flow passages towards said first fan (11) and towards said second fan (13); a flow crossing zone being defined between the intersection zones between the first and the second baffle plate and between the third and the fourth baffle plate.
11. Stenter according to one or more of the previous claims, **characterized in that** said flow conduit (7) has a longitudinal development transversal to the fabric feeding direction (T) along the feeding path, with the heat generator (9) at one end of the longitudinal development and a pair of suction apertures (17, 18) at the opposite end, said suction apertures

being in fluid connection each with a respective air delivery tube (19, 20) respectively towards the first blowing member (3) and towards the second blowing member (5) and said suction apertures being associated to the first fan (11) and the second fan (13). 5

12. Stenter according to one or more of the previous claims, **characterized in that** said heat generator comprises a burner and **in that** the flame of said burner is in the air flow sucked by said first fan and by said second fan. 10

13. Stenter according to one or more of the previous claims, **characterized in that** the height of the baffle plates (31; 33, 34, 35) is approximately the same, or preferably a little larger than half the overall height of the cross section of the flow conduit (7). 15

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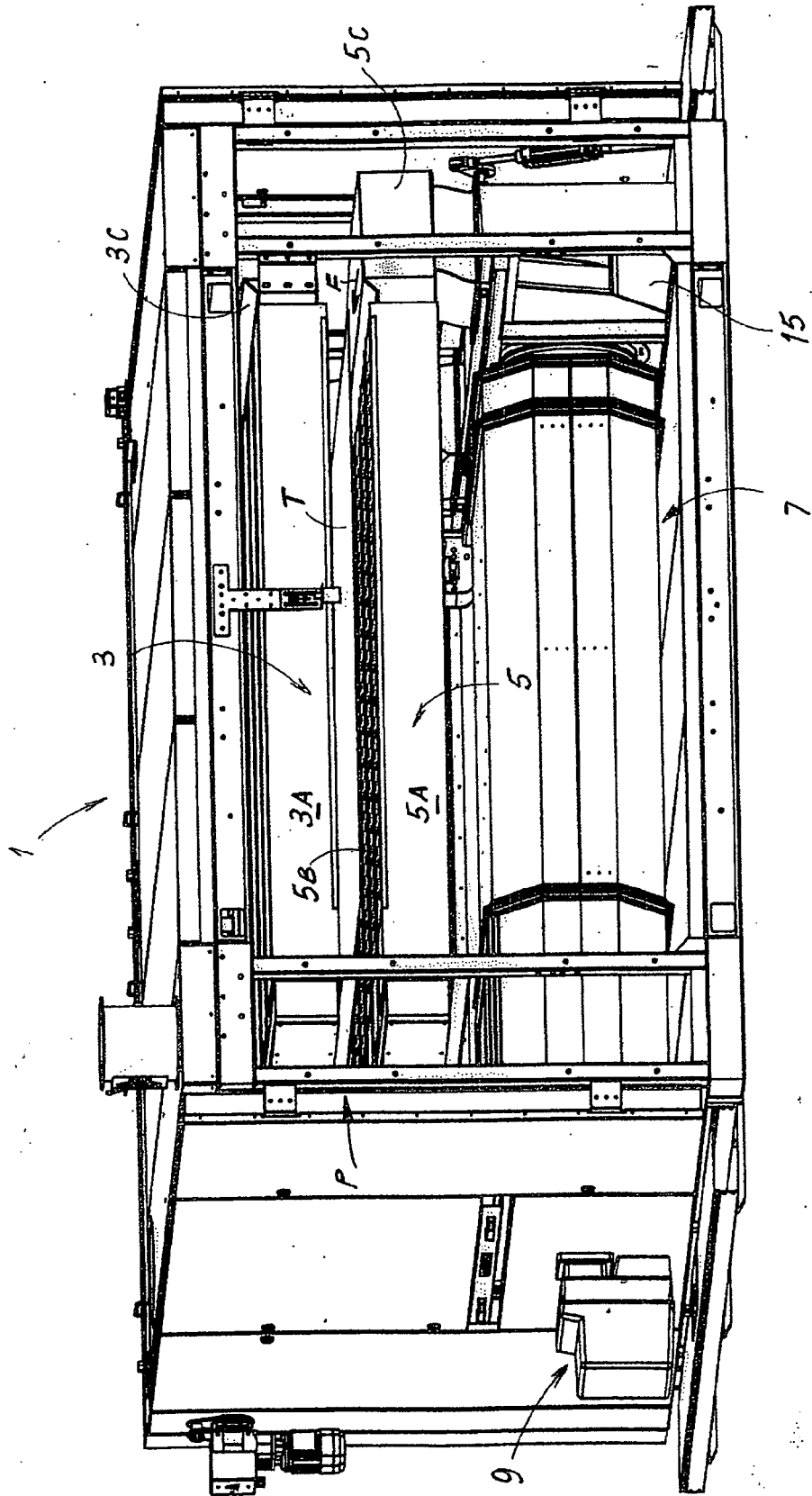


Fig.1

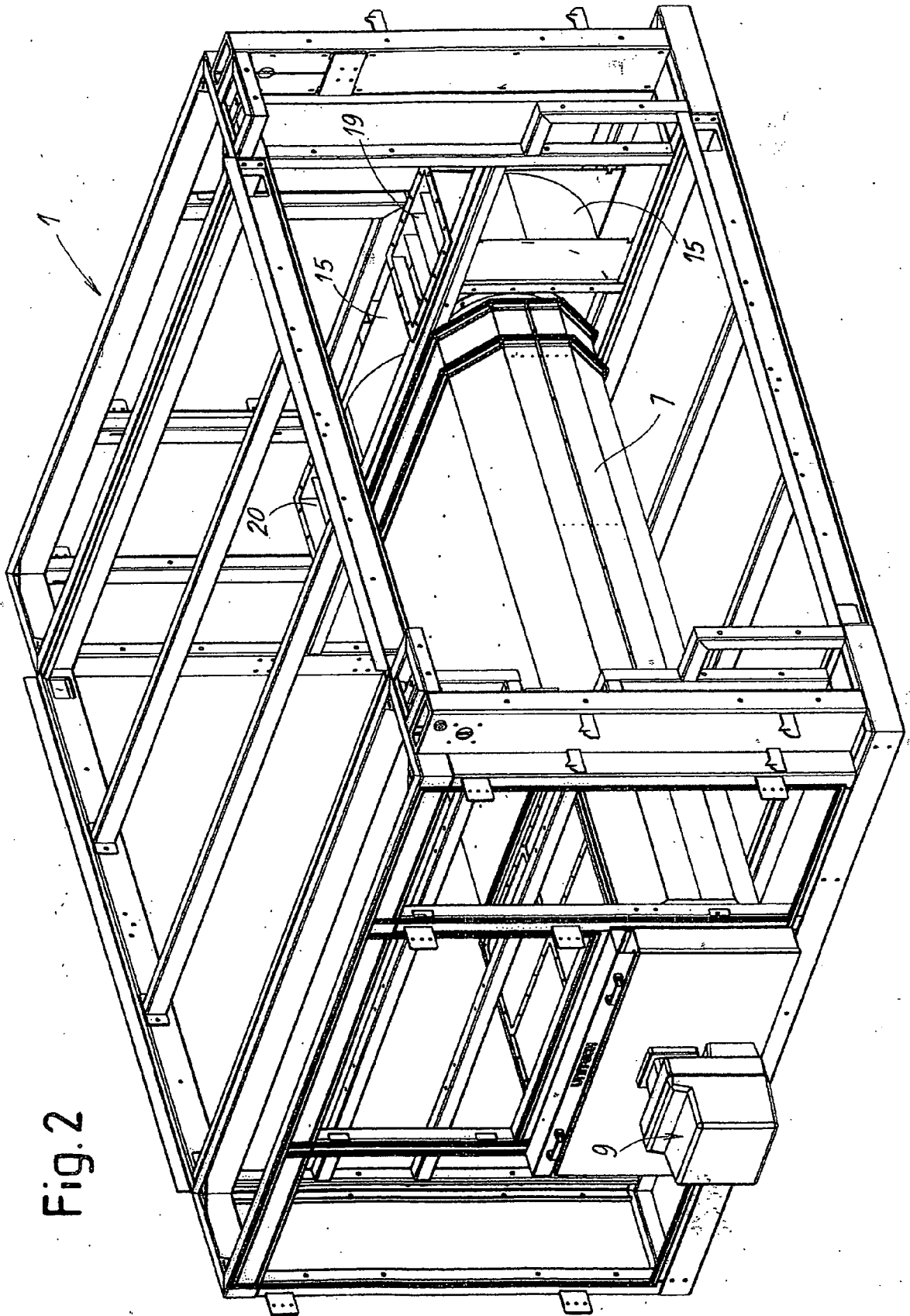
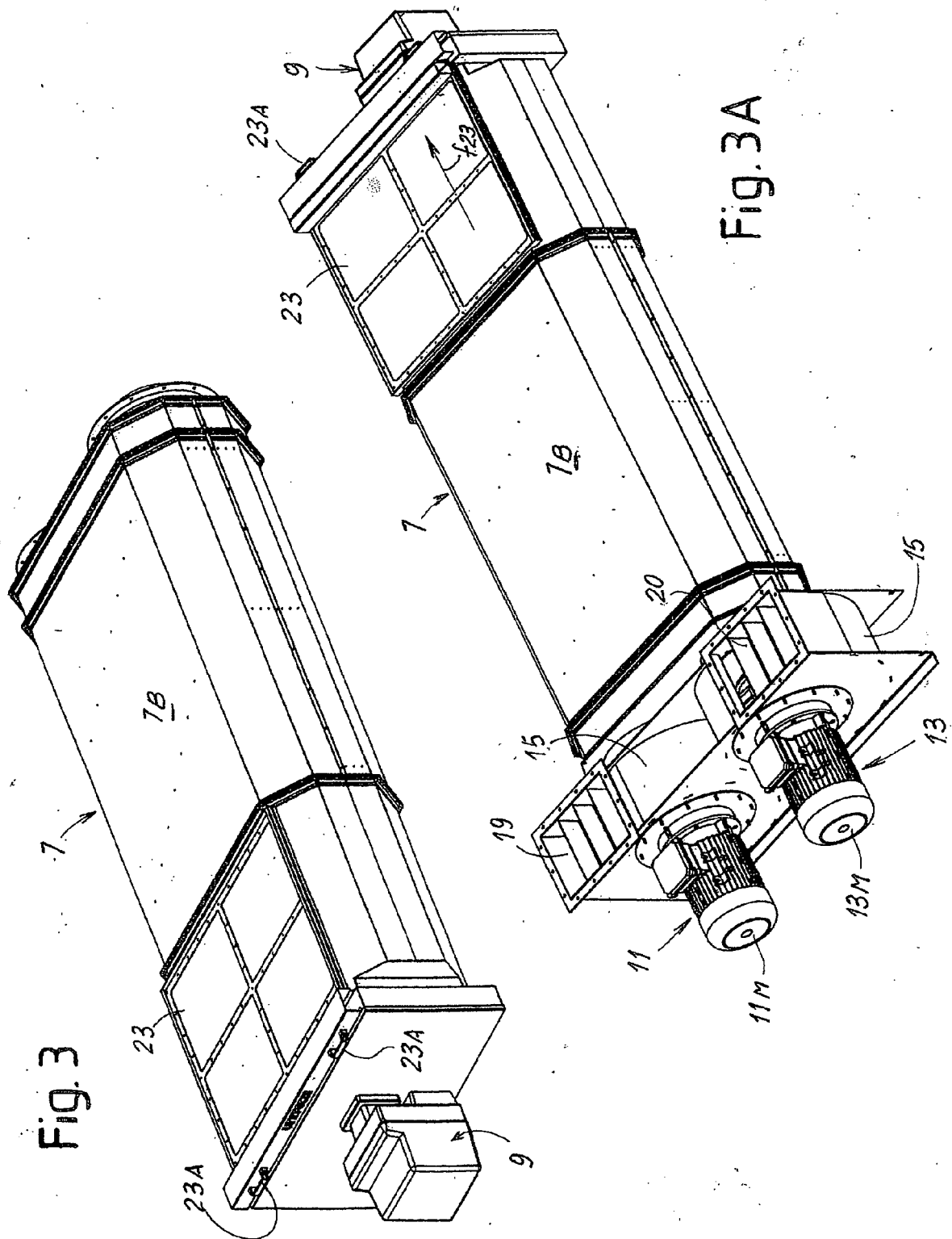
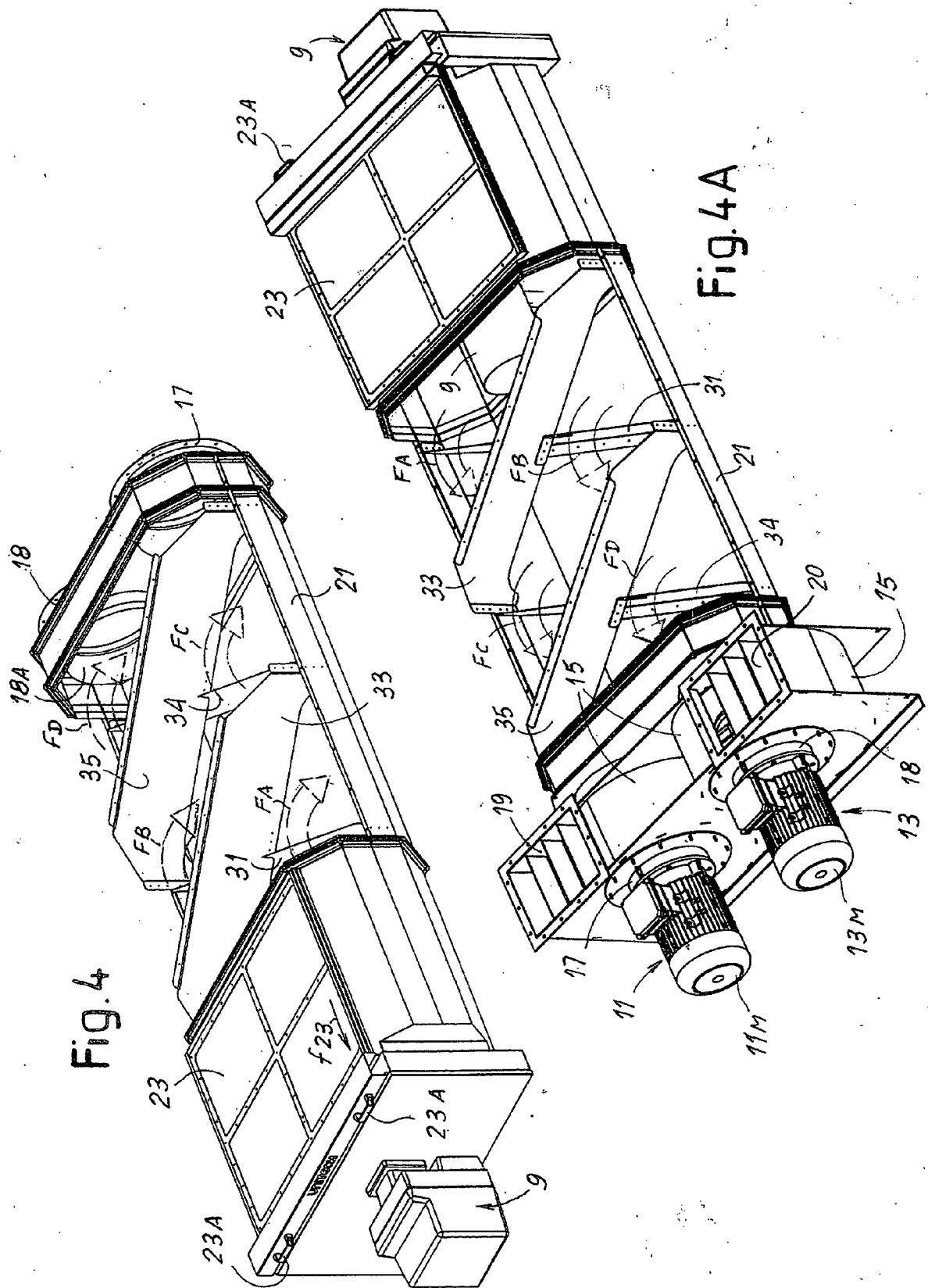


Fig. 2





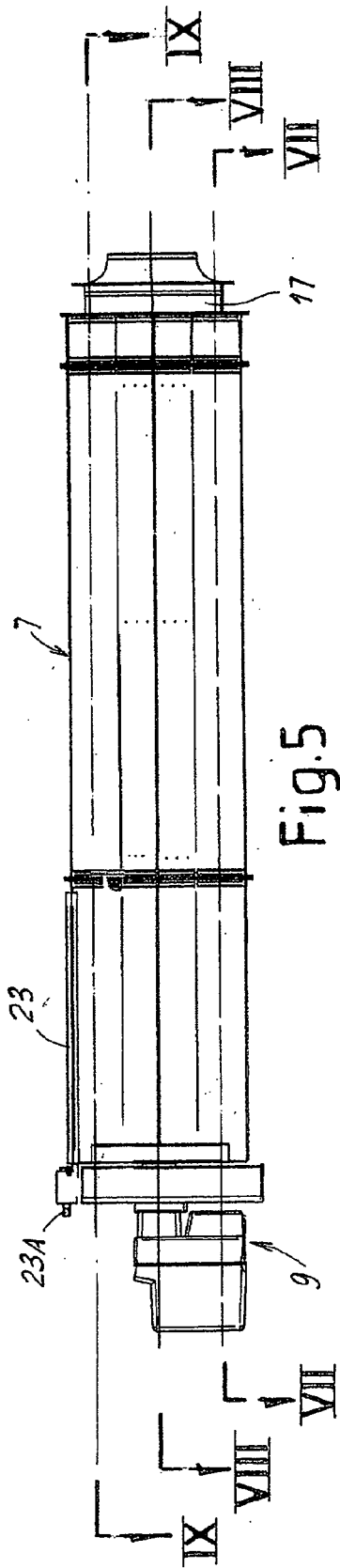


Fig. 5

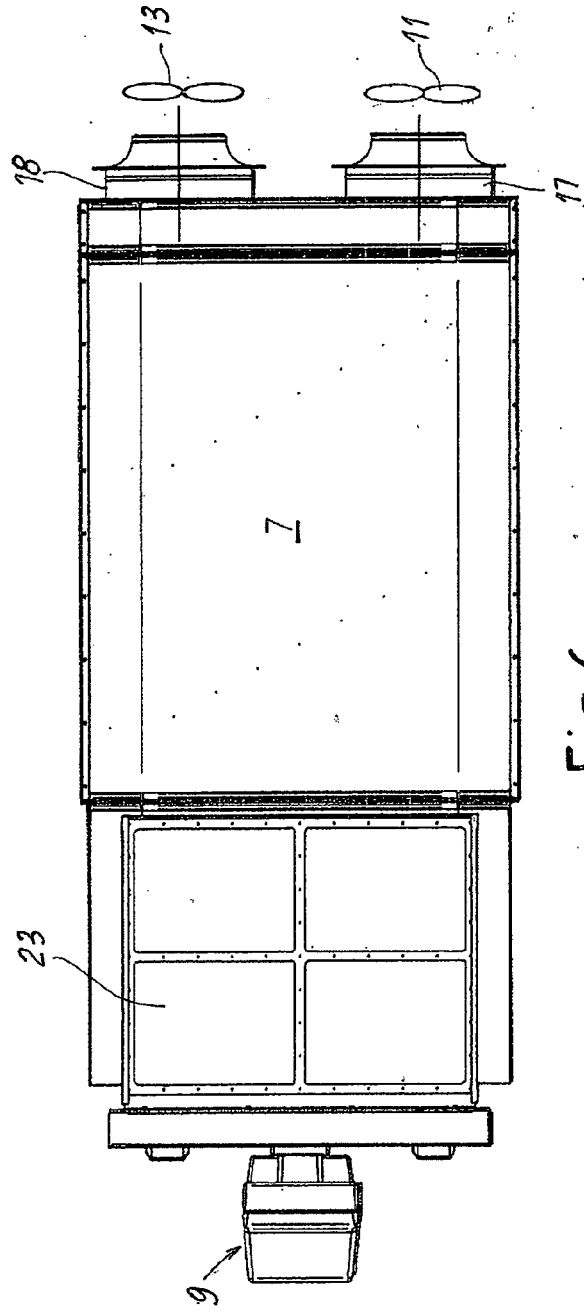


Fig. 6

Fig. 7

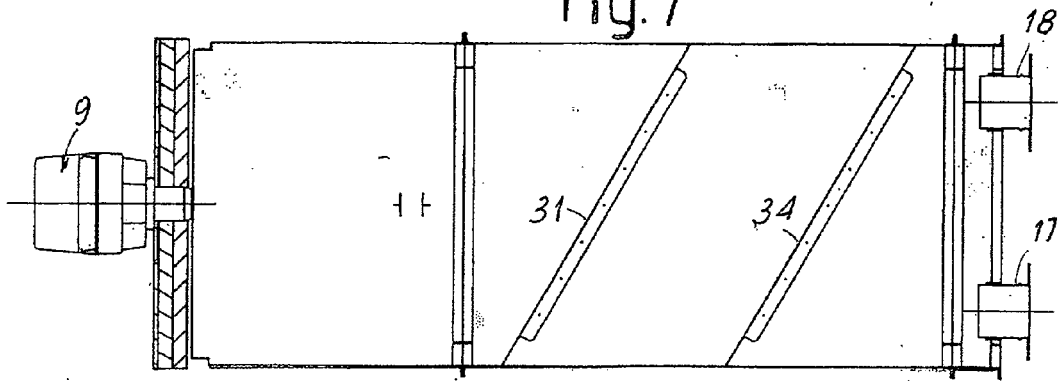


Fig. 8

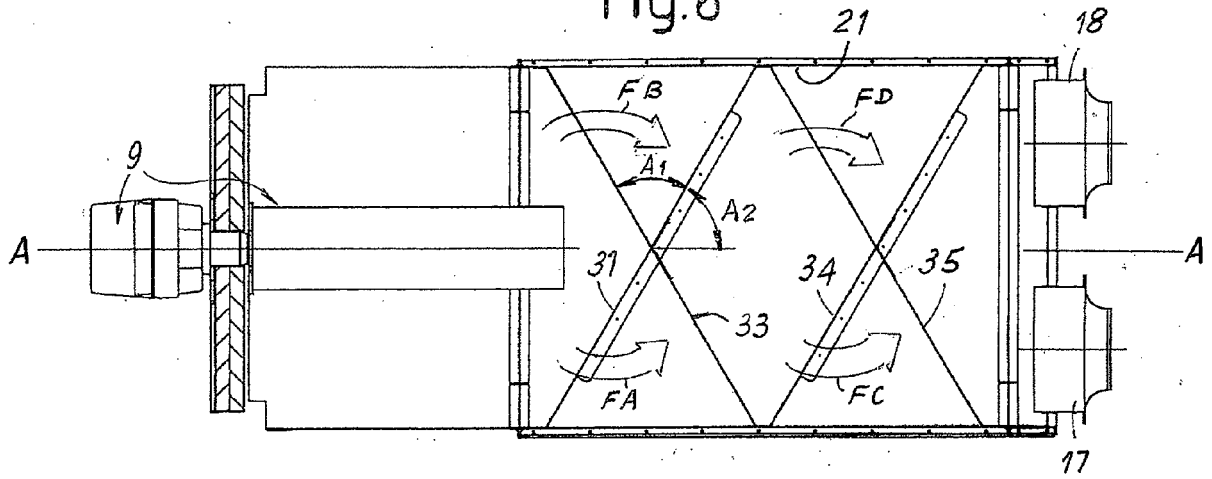
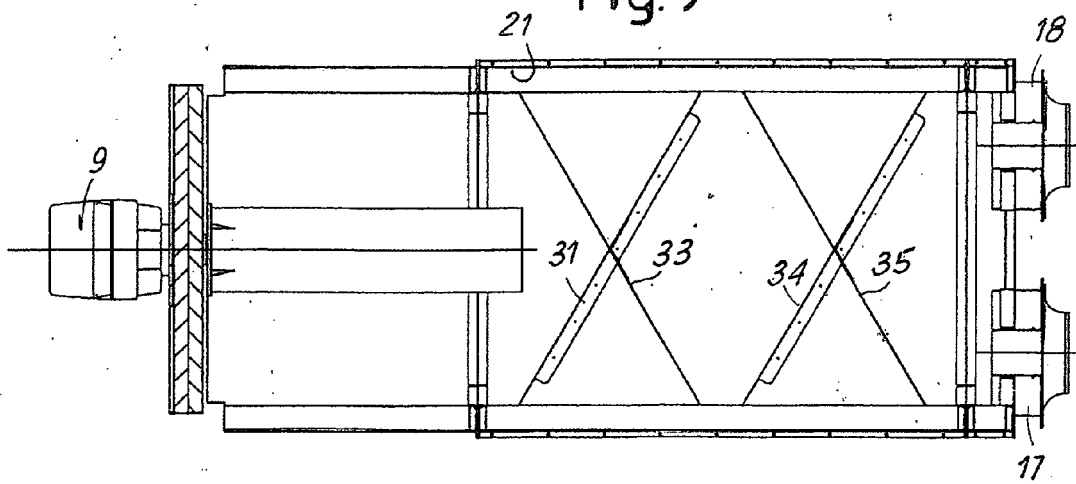


Fig. 9





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 Application Number
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		3 August 2011	Hauck, Gunther
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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