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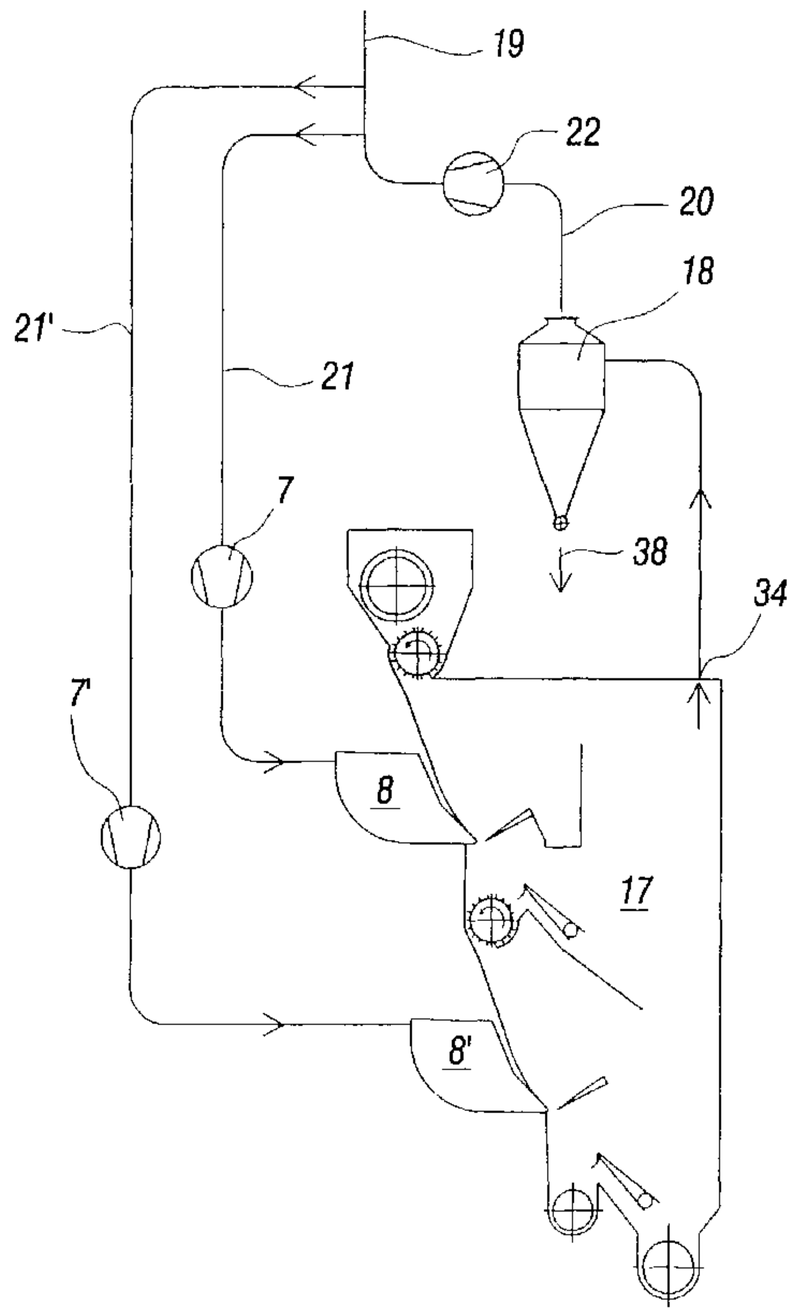
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(54) Titre : SYSTEME FERME DE CIRCULATION D'AIR
(54) Title: CLOSED AIR CIRCULATION SYSTEM



(57) Abrégé/Abstract:
The invention relates to a closed air circulation system for an apparatus used for sorting wood chips (1), containing chips (11, 12) in a variety of sizes and/or fines particles (13), in a wood chips processing chamber (17), in separate fractions by means of a gas flow (4), which is delivered from one or more nozzle chambers (8, 8') by way of a nozzle slit (3) into the wood chips processing chamber (17) and which applies an impulse action to the processing-bound wood chips (1) sliding along an inclined support surface (2). Air is circulated from the wood chips processing chamber (17) by way of a dedusting cyclone (18) into said one or more nozzle chambers (8, 8').

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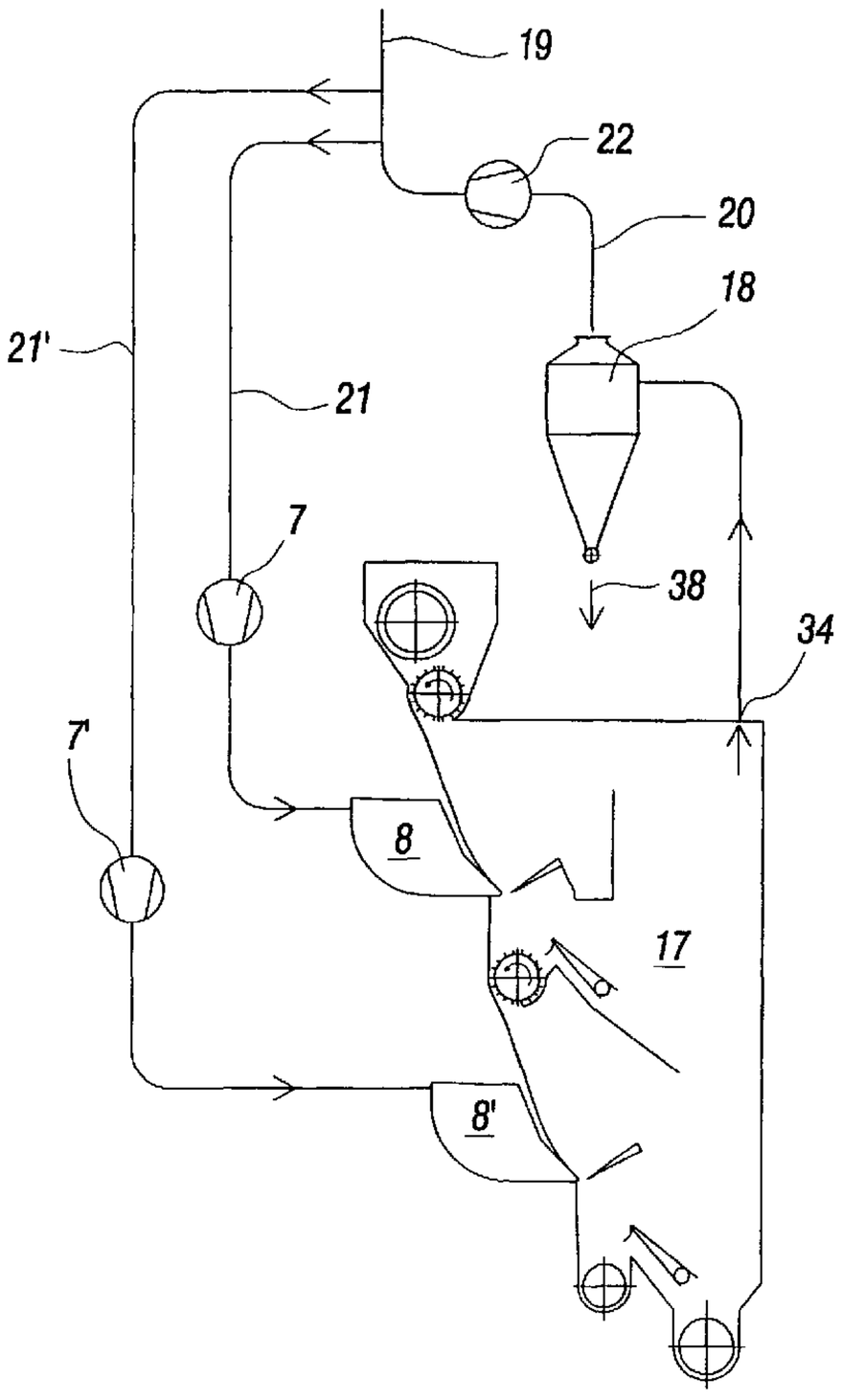
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(54) Title: CLOSED AIR CIRCULATION SYSTEM



(57) Abstract: The invention relates to a closed air circulation system for an apparatus used for sorting wood chips (1), containing chips (11, 12) in a variety of sizes and/or fines particles (13), in a wood chips processing chamber (17), in separate fractions by means of a gas flow (4), which is delivered from one or more nozzle chambers (8, 8') by way of a nozzle slit (3) into the wood chips processing chamber (17) and which applies an impulse action to the processing-bound wood chips (1) sliding along an inclined support surface (2). Air is circulated from the wood chips processing chamber (17) by way of a dedusting cyclone (18) into said one or more nozzle chambers (8, 8').

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Closed air circulation system

The invention relates to a closed air circulation system for an apparatus used for sorting wood chips, containing chips in a variety of sizes and/or fines particles, in a wood chips processing chamber, in separate fractions by means of a gas flow, which is delivered from one or more nozzle chambers by way of a nozzle slit into the wood chips processing chamber and which applies an impulse action to the processing-bound wood chips sliding along an inclined support surface.

The above type of apparatus is necessarily provided with circulation of air, on the one hand because of aspects relating to energy economy, and on the other hand because of a dust problem. However, operation of the apparatus itself sets strict limits to facilities of implementing circulation in order not to cause trouble for the apparatus in terms of its operation.

It is an object of the invention to provide a closed air circulation system for the above type of apparatus, said air circulation system securing faultless operation of the apparatus for its part.

According to the invention, this object is accomplished in such a way that, and an air circulation system of the invention is characterized in that air is circulated from the wood chips processing chamber by way of a dedusting cyclone into said one or more nozzle chambers.

The wood chips processing chamber is adapted to be maintained at a negative pressure with respect to atmospheric pressure, such that the inevitable bleeding points present in the processing chamber - e.g. outlet ports for conveyors - do not release dust to environment. Thus, the arrangement is preferably such that the wood chips processing chamber has its negative pressure adapted to be maintained at a predetermined level by regulating the amount of air to be absorbed from the processing chamber into the dedusting cyclone.

In order to maintain pressure ratios in balance, the air to be circulated is adapted to be circulated through a duct or a chamber open to atmosphere. The duct or chamber open to atmosphere is preferably included in a pipe extending from the dedusting cyclone to the nozzle chamber. The pipe extending from the dedusting cyclone to the duct or chamber open to atmosphere is provided with a fan for regulating pressure in the processing chamber.

The pipe extending from the duct or chamber open to atmosphere is also provided with a fan. Thus, pressure in the nozzle chamber is preferably adapted to be regulated by means of said fan.

By virtue of said duct or chamber open to atmosphere, transient pressure fluctuations are equalized with the result that, on the one hand, there will be no significant discharges to atmosphere and, on the other hand, the apparatus performs its operation within set limits.

The invention will now be described in more detail with reference to the accompanying drawings, in which:

Fig. 1 shows in a diagrammatic vertical section an apparatus for sorting wood chips in a closed processing chamber by the application of an impulse action.

Fig. 2 shows in a diagrammatic section a closed air circulation system applied to the apparatus of fig. 1.

Fig. 1 shows schematically an apparatus for sorting wood chips 1 in separate fractions. Fines particles 13, possibly contained in the wood chips 1, are sorted out to form a separate fraction and individual chips 11, 12 are determined by the thickness thereof as excess thickness chips 11 (reject) and accepted chips 12 (accept).

The apparatus comprises a feeder 6 for supplying the wood chips 1 onto a sloping support surface 2 for a substantially single layer. The individual chips

11, 12 settle in a natural way on the support surface 2 to rest upon the largest surface thereof, i.e. in the case of wood chips, upon the longitudinal/lateral surface thereof.

The support surface 2 is a solid, plain, and durable flat surface, which forms a steeply sloping slide surface for the wood chips 1 to be sorted.

The wood chips 1 emerging from the feeder 6 are first adapted to slide down the sloping support surface 2 and then over a slit 3 arranged across the support surface, said slit being adapted to deliver an impulse action 4 directed away from said support surface 2 and applied to one or more chips 11, 12 or fines particles 13 presently in line with the slit. The impulse action is adapted to be produced by means of a gas flow 4, preferably an air flow. The impulse action 4 may have a direction which is perpendicular to the support surface 2, or also at an oblique angle relative to the support surface 2.

The air flow is generated by a fan 7. In order to secure uniformity of the impulse action 4, a nozzle chamber 8 is arranged between the fan 7 and the slit 3.

The varying thickness chips 11, 12 and the eventual fines particles 13 are adapted to be separated from each other along various trajectories defined by the impulse action 4 for the particles to be sorted.

The fines particles 13, which are smaller in size than the width of the slit 3, adopt a maximum deviation of velocity and, thus, are adapted to be diverted by the action of a baffle/guide plate 14 in a separate fraction into a chute 15.

The individual chips 11, 12, which are substantially larger in size than the width of the slit 3 and, thus, heavier than said fines particles 13, adopt a deviation of velocity substantially less than that adopted by the fines particles 13 when present in line with the slit 3. A pressure-generated impulse sends the individual chips 11, 12 flying in different trajectories defined by a chip thickness, and the flow of chips is divided in separate fractions by means of a separating wall

5. The averagely minimum thickness chips 12 fly over the separating wall 5 and are further guided to a discharge screw 10. Respectively, the averagely maximum thickness chips fly a shorter distance and fall into a feeder 6' present between the separating wall 5 and the slit 3.

In the illustrated example, the averagely maximum thickness chips 11 received in the feeder 6' are reprocessed in a lower second apparatus, whereby a fraction thereof (the averagely lightest fraction) is guided over a separating wall 5' further onto the discharge screw 10, and another fraction (the averagely heaviest fraction) falls into a chute fitted between the separating wall 5' and the slit 3 and provided with a discharge screw 9.

Processing of the wood chips 1 is all in all adapted to take place in a dustproof processing chamber 17. The discharge of air from the chamber 17 is arranged through an opening represented by reference numeral 34.

Fig. 2 depicts diagrammatically a closed air circulation system for an apparatus as illustrated in fig. 1.

In the solution of fig. 2, air is circulated from the wood chips processing chamber 17 by way of a dedusting cyclone 18 into nozzle chambers 8, 8'.

The wood chips processing chamber 17 is adapted to be maintained at an underpressure with respect to ambient air pressure. Thus, eventual bleeding points present in the processing chamber 17 do not release dust to environment. The wood chips processing chamber 17 has its underpressure adapted to be maintained at a predetermined level by regulating the amount of air to be absorbed from the processing chamber 17 into the dedusting cyclone 18.

In order to enable the absorption of dust-mixed air uniformly across the entire width of the processing chamber 17, the intake opening 34 is adapted to extend across the entire width of the chamber 17.

The air to be circulated is adapted to be passed through a duct or chamber 19, which is in communication with the dedusting cyclone 18 by way of a pipe 20 and with the nozzle chambers 8, 8' by way of pipes 21, 21'.

The pipe 20 is provided with a fan 22, whereby pressure in the processing chamber 17 can be regulated. The fan 22 is used for absorbing dust-bearing air from the processing chamber 17. The air passes through the deducting cyclone 18, the dust separating and discharging from the cyclone (an arrow 38).

A fan 7 present in the pipe 21 is used for regulating pressure in the nozzle chamber 8, and thus the pressure of the gas flow 4 emerging from the slit 3. Respectively, a fan 7' present in the pipe 21' regulates pressure in the nozzle chamber 8'.

By virtue of the duct or chamber 19 open to atmosphere, transient pressure fluctuations are equalized with the result that there will be no significant discharges to atmosphere and, on the other hand, the fans 22; 7, 7' do not have an adverse effect on each other.

Claims

1. A closed air circulation system for an apparatus used for sorting wood chips (1), containing chips (11, 12) in a variety of sizes and/or fines particles (13), in a wood chips processing chamber (17), in separate fractions by means of an air flow (4), which is delivered from one or more nozzle chambers (8, 8') by way of a nozzle slit (3) into the wood chips processing chamber (17) and which applies an impulse action to the processing-bound wood chips (1) sliding along an inclined support surface (2), said air being adapted to be circulated from the wood chips processing chamber (17) by way of a dedusting cyclone (18) into said one or more nozzle chambers (8, 8'), **characterized** in that the operation of the dedusting cyclone (18) is adapted to be controlled by means of a fan (22) and the operation of the nozzle chamber (8, 8') is adapted to be controlled by means of a fan (7, 7'), and that between the fan (22) controlling the operation of the dedusting cyclone (18) and the fan (7, 7') controlling the operation of the nozzle chamber (8, 8') is arranged a duct or chamber (19) included in a pipe (20, 21, 21') extending from the dedusting cyclone (18) to the nozzle chamber (8, 8'), whereby said pipe extending from the dedusting cyclone to the nozzle chamber is in communication with atmosphere.

2. A system as set forth in claim 1, **characterized** in that the wood chips processing chamber (17) is adapted to be maintained at an underpressure with respect to ambient air pressure.

3. A system as set forth in claim 2, **characterized** in that the wood chips processing chamber (17) has its underpressure adapted to be maintained at a predetermined level by regulating the amount of air to be absorbed from the processing chamber (17) into the dedusting cyclone (18).

4. A system as set forth in claim 1, **characterized** in that the operation of the dedusting cyclone (18) is adapted to be controlled by means of the fan (22) included in the pipe (20) extending from the dedusting cyclone (18) to the duct or chamber (19) open to atmosphere.

5. A system as set forth in claim 1, **characterized** in that the nozzle chamber (8, 8') has its pressure adapted to be regulated by means of a fan (7, 7') included in the pipe (21, 21') extending from the duct or chamber (19) open to atmosphere to the nozzle chamber (8, 8').

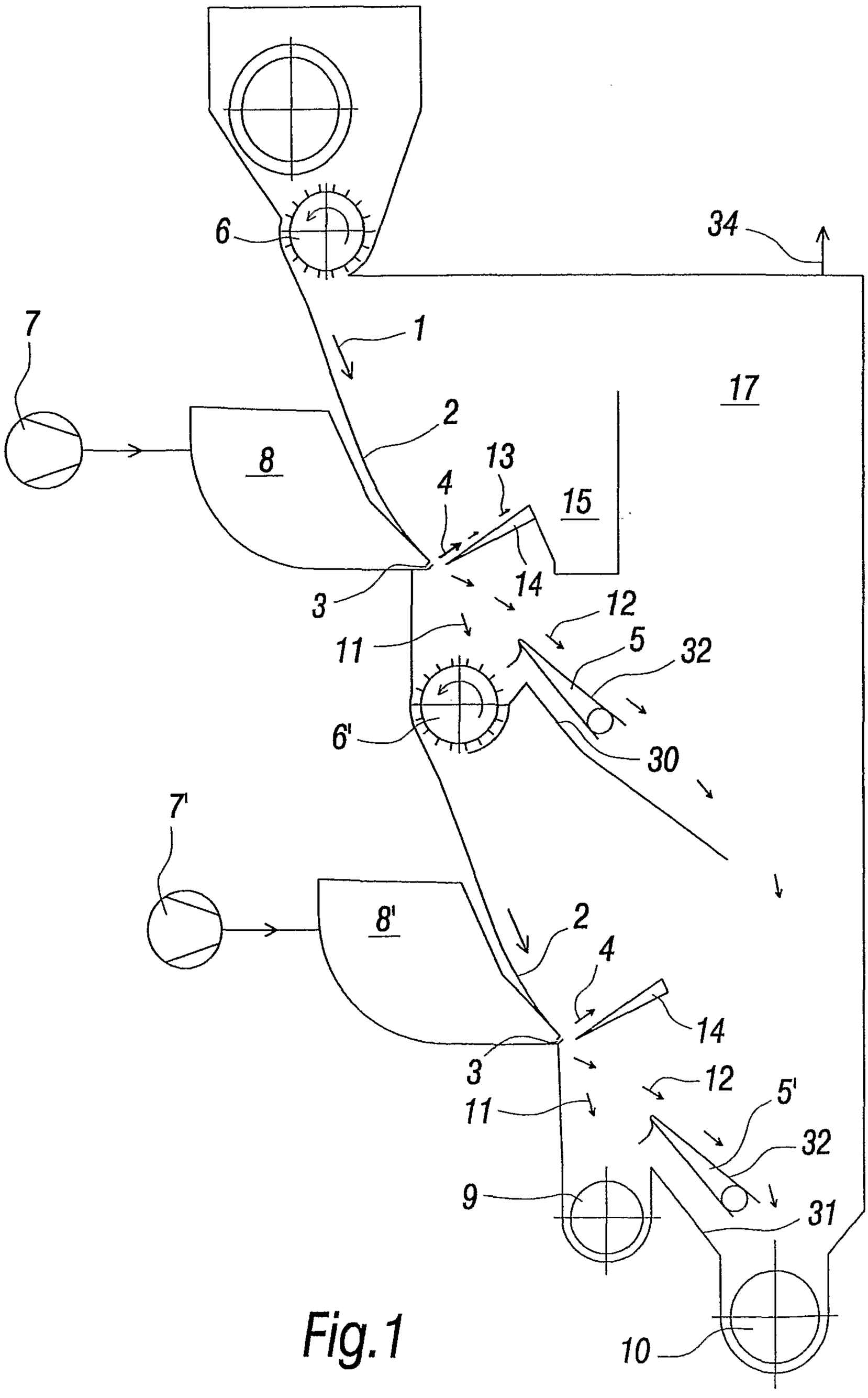


Fig.1

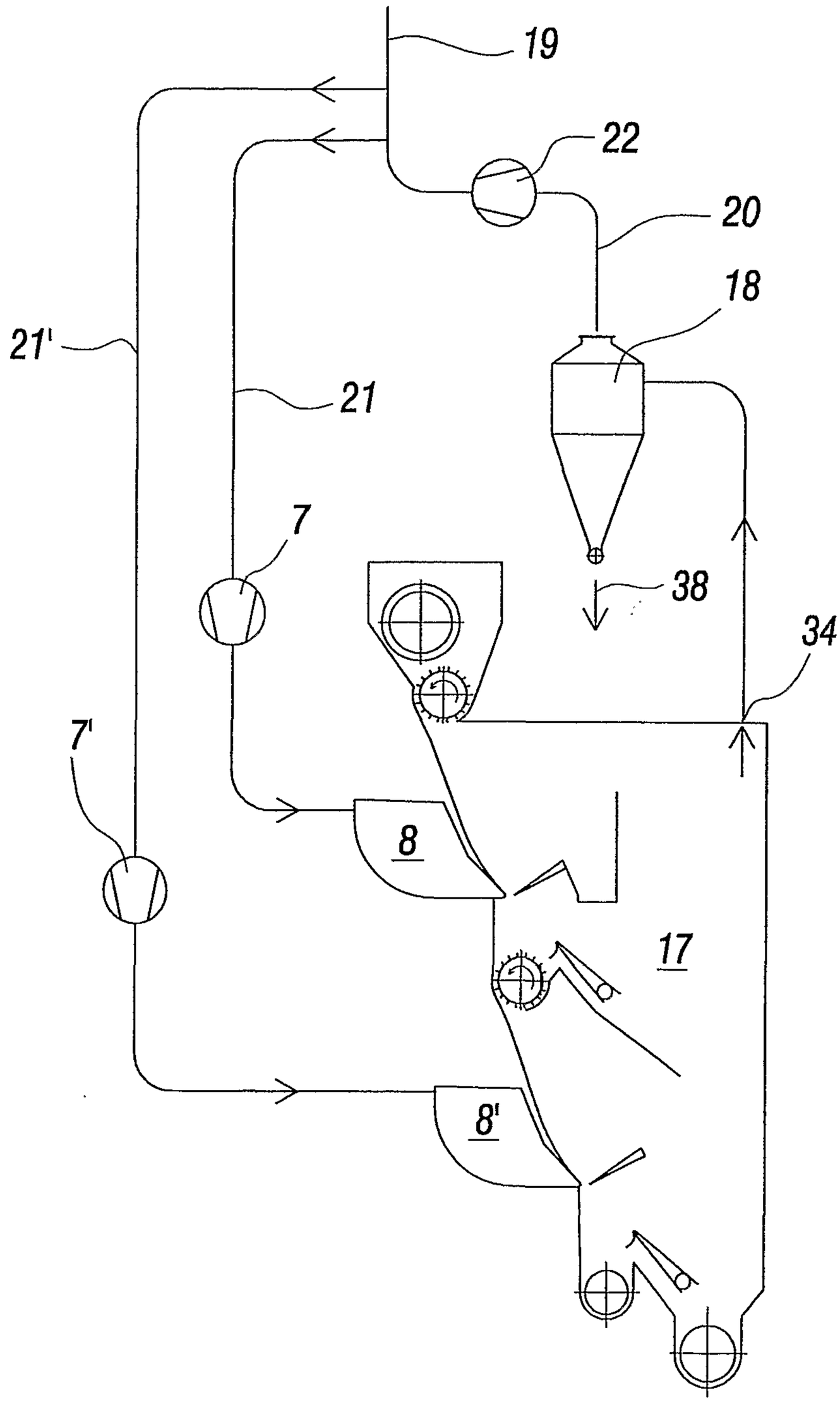
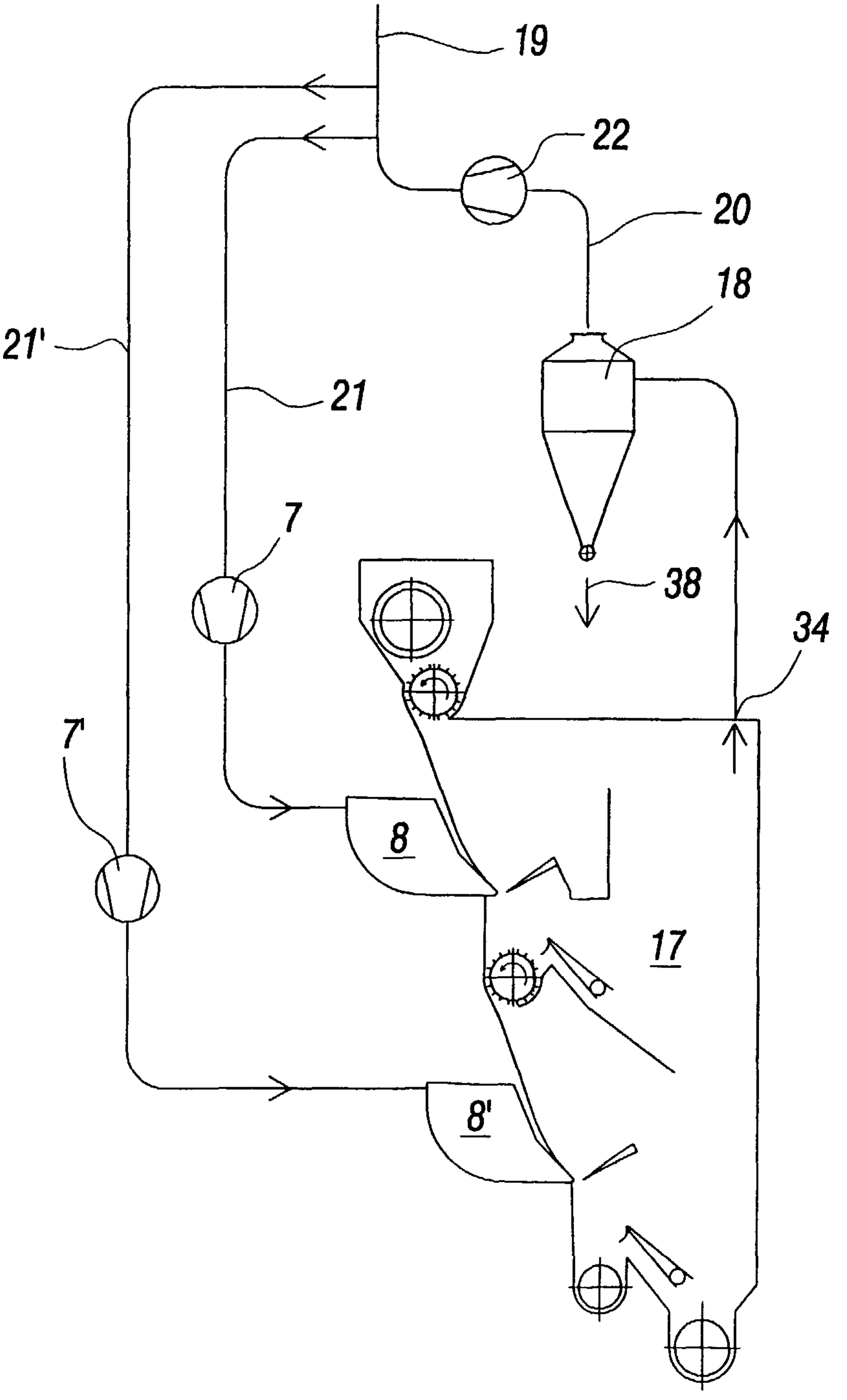


Fig.2


19
22
20
18
21'
21
7
38
34
7'
8
17
8'