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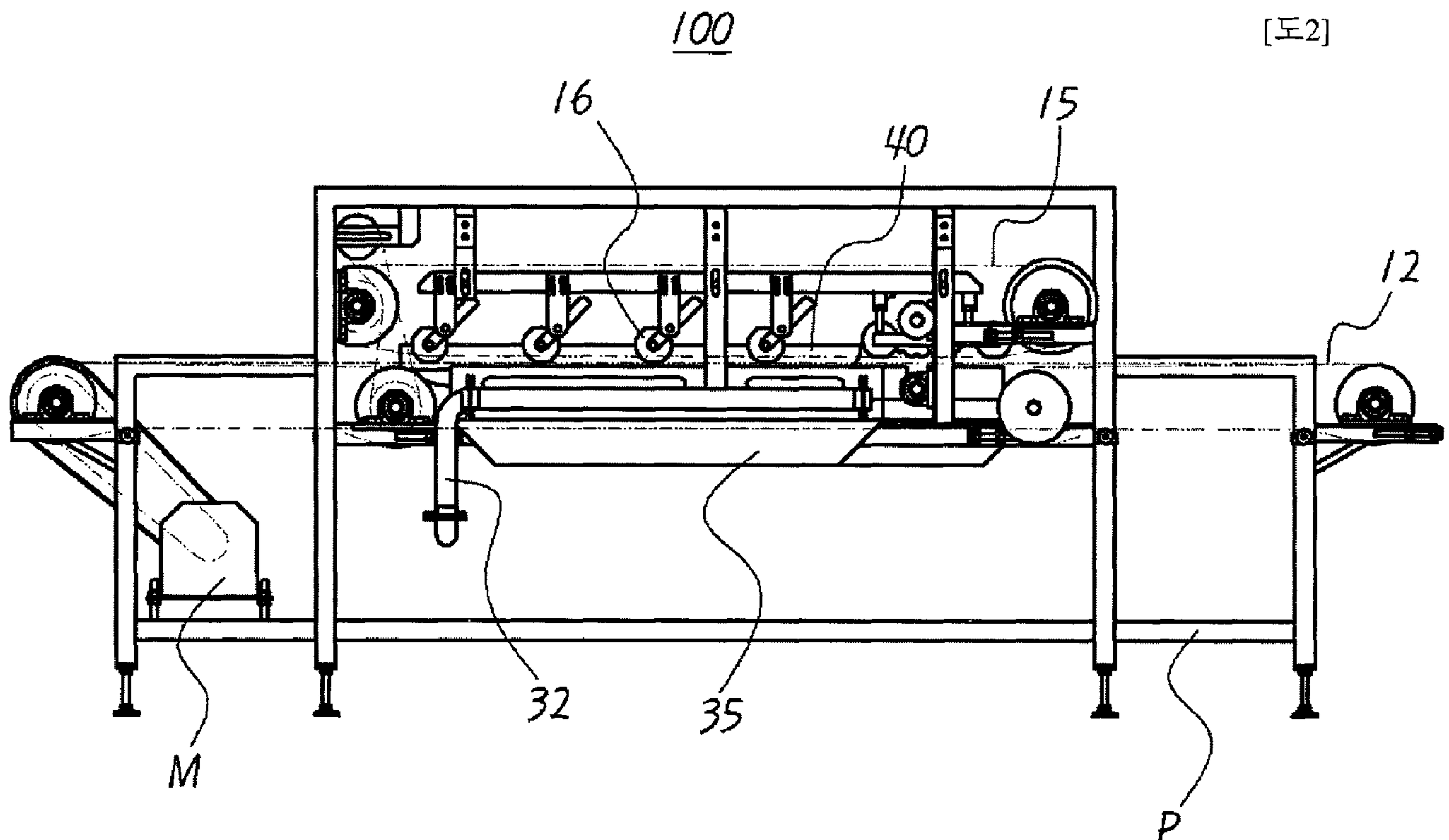
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(54) Titre : APPAREIL D'EXTRACTION DE CARAPACE DE CRABE PERMETTANT UN RETRAIT AISE DES
BRANCHIES

(54) Title: CRAB SHELL STRIPPING APPARATUS FOR EASILY REMOVING GILLS



(57) Abrégé/Abstract:

The present invention relates to a crab shell stripping apparatus for easy removal of gills and, more particularly, to a crab shell stripping apparatus for easy removal of gills which reduces the time of manual labor required for removing gills, and reduces the

(57) **Abrégé(suite)/Abstract(continued):**

failure rate of the operation and the loss of crab meat caused during the operation by quickly and easily removing gills through a high-pressure water spraying to a crab with a front shell and carapace removed. To this end, the present invention comprises: a conveyor for conveying a crab in a state in which the carapace is seated toward the bottom; a shell stripping unit for removing the carapace of the crab being conveyed onto the conveyor; and a spraying unit, located on both sides of the rear of the shell stripping unit, for spraying high-pressure water to remove the gills of the crab exposed by removing the carapace.

ABSTRACT

Disclosed is a crab shell stripping apparatus for easily removing gills, and more particularly, to a crab shell stripping apparatus for easily removing gills which reduces the number of manual operations required for removing gills and reduces an operation failure rate and a loss of crab meat caused during operation by quickly and easily removing the gills by spraying high-pressure water to a crab with an abdominal shell and a dorsal shell removed. For this, the apparatus includes a transfer portion which transfers a crab mounted with a dorsal shell facing a bottom, a shell stripping portion which removes the dorsal shell of the crab transferred by the transfer portion, and a jet nozzle portion which is located on both sides of a rear of the shell stripping portion and removes gills of the crab, which are exposed by the dorsal shell being removed, by jetting high-pressure water thereto.

CRAB SHELL STRIPPING APPARATUS FOR EASILY REMOVING GILLS

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to and the benefit of Korean Patent Application
5 No. 2015-0117553, filed on August 20, 2015, the disclosure of which is incorporated
herein by reference in its entirety.

BACKGROUND

1. Field of the Invention

10 The present invention relates to a crab shell stripping apparatus for easily
removing gills, and more particularly, to a crab shell stripping apparatus for easily
removing gills which reduces the number of manual operations required for removing
gills and reduces an operation failure rate and a loss of crab meat caused during
operation by quickly and easily removing the gills by spraying high-pressure water to a
15 crab with an abdominal shell and a dorsal shell removed.

2. Discussion of Related Art

Crabs, with about 4,500 species worldwide and 183 species in Korea, are
classified decapod crustaceans belonging to the phylum Euarthropoda due to their ten
legs. The ten legs are functionally divided into a pair of claws and four pairs of
20 crawling legs. Crabs vary in their living environments and appearance characteristics
as much as a variety thereof. Since crabs have food-habits of clearing bodies of dead
marine life which fall to the bottom of a body of water while crawling on the bottom,
crabs are also called marine sweepers.

Such crabs are one significant fishery resource of Korea which has three coastal sides. Crabs are steamed when they are eaten, boiled in boiling water to separate body or leg meat, or marinated with soy source and the like and preserved to be eaten. Due to their unique slightly salty taste and flavor, their demand has grown such that crabs are
5 being sold after being processed to have a variety of forms such as crab sticks or various types of frozen food.

However, to process crabs into a variety of processed food, it is necessary to sort meats of each part in a dorsal shell of a crab, which have different tastes. For this, first, an operation of separating each part of a crab has to be previously performed.

10 Accordingly, workers generally manually sort crabs by cutting the crabs into bodies, legs, and claws one by one with a cutting knife such that a lot of workforce is necessary and workers are frequently wounded by shells of the crabs or the knives while the workers manually cut dorsal shells of the crabs with the knives.

Additionally, to alleviate an inconvenience caused by manual operations,
15 Korean Patent Publication No. 1997-0032404 discloses a processing apparatus capable of automatically processing crabs.

However, the above processing apparatus merely removes an abdominal shell or a dorsal shell of a crab and cuts the crab, and thus a lot of problems occur when removing gills of the crab, which needs a largest number of operations in crab
20 processing.

In Korean Patent Publication No. 1997-0032404, gills are removed by installing a rotating brush at a rear end of a shell stripping shaft which strips a dorsal shell to remove the gills. However, when a position of the rotating brush is too low, gills may

be completely removed but most of crab meat of a body is lost. When the position of the rotating brush is too high, the loss of crab meat may be reduced but gills are incompletely removed such that inconvenience of additionally performing an operation in which a worker has to sort crushed gill pieces one by one in a following process
5 occurs.

This is because a part of gills in contact with a body of crab meat is formed at a lowest edge part of the dome-shaped body. Accordingly, a fundamental limit is present in optimization of operation by adjusting the position of the rotating brush.

In addition, since crabs vary in types and have different shapes and sizes, it is
10 impossible to set the position of the rotating brush to be usable in all of a variety of crabs.

Accordingly, in a current operation state, a shell stripping operation or a body or leg part cutting operation has been performed using an automated apparatus in Korea and other countries. However, a gill removing process is manually performed by a worker due to a concern about the loss of crab meat and a high gill removal failure rate.

15 According thereto, due to a working environment in which a large amount of crabs has to be processed in a relatively short period of time, many workers manually remove gills of crabs with shells stripped in the shell stripping operation, and thus production costs increase and a production yield decreases in consideration of a state in which it is difficult to secure manpower and labor costs are increased.

20 [Prior Art Document]

[Patent Document]

Korean Patent Publication No. 1997-0032404

SUMMARY OF THE INVENTION

The present invention is directed to providing a crab shell stripping apparatus for easily removing gills capable of greatly increasing efficiency of removing gills and sharply reducing the number of operations and workforce by arranging a plurality of jet
5 nozzles, which jet high-pressure water to a gill-attached part of a rear end of a crab with its shells stripped, on each of both sides and installing a shielding plate for collecting the jet high-pressure water and preventing jetting to other parts.

According to an aspect of the present invention, there is provided an apparatus includes a transfer portion which transfers a crab mounted with a dorsal shell facing a
10 bottom, a shell stripping portion which removes the dorsal shell of the crab transferred by the transfer portion, and a jet nozzle portion which is located on both sides of a rear of the shell stripping portion and removes gills of the crab, which are exposed by the dorsal shell being removed, by jetting high-pressure water thereto.

The crab shell stripping apparatus may further include a shielding plate which
15 separates and divides both sides of the jet nozzle portion to prevent high-pressure water jet from both of the sides by the jet nozzle portion from interfering with each other. The shielding plate may include an upper plate which is installed in an open area at a central part of the transfer portion along a longitudinal direction and is disposed in a horizontal plane shape along the longitudinal direction and a lower plate disposed
20 therebelow along a central line in the longitudinal direction of the upper plate to be perpendicular thereto.

The jet nozzle portion may include a plurality of jet nozzles which jet the high-pressure water to an attachment part of the gills, a transfer pipe which is connected to the

plurality of jet nozzles and supplies water thereto, a water storage tank with a certain accommodation space formed therein, and a high-pressure pump which receives water from the water storage tank and transfers the water to the transfer pipe.

5 The crab shell stripping apparatus may further include a collecting hopper which guides the high-pressure water jet by the jet nozzles to fall downward. Here, the collecting hopper may include an open top and bottom such that the jet high-pressure water flows in through the top and flows out through the bottom to the water storage tank therebelow such that the jet high-pressure water is circulated. The water storage tank may further include a filter plate for collecting foreign substances including the
10 gills included in the high-pressure water supplied from the collecting hopper.

In the transfer portion, a first conveyer and a second conveyer driven by a motor may be installed in parallel with a certain interval therebetween to be driven at the same speed in the same direction, and a third conveyer and a fourth conveyer driven by a motor may be installed at one side end and the other side end of a space part formed
15 between the first conveyer and the second conveyer to be driven at the same speed in the same direction as the first conveyer and the second conveyer. The crab shell stripping apparatus may further include a pair of blotter conveyers installed above the first conveyer and the second conveyer and driven by the motor at the same speed in the same direction as the first conveyer and the second conveyer.

20

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will become more apparent to those of ordinary skill in the art by describing exemplary embodiments thereof in detail with reference to the accompanying drawings, in which:

5 FIG. 1 is a perspective view of a crab shell stripping apparatus according to one embodiment of the present invention;

 FIG. 2 is a side view of the crab shell stripping apparatus according to one embodiment of the present invention;

 FIG. 3 is a plan view of the crab shell stripping apparatus according to one
10 embodiment of the present invention;

 FIG. 4 is a cross-sectional view along line A-A in FIG. 1;

 FIG. 5 is a cross-sectional view along line B-B in FIG. 1;

 FIG. 6 is a bottom perspective view illustrating a jet nozzle portion side according to one embodiment of the present invention when viewed from below;

15 FIG. 7 is a view simply illustrating an arrangement relationship among a jet nozzle portion, a shell stripping portion, and a shielding plate according to one embodiment of the present invention; and

 FIG. 8 is a view illustrating components of a jet nozzle portion according to another embodiment of the present invention.

20

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to the attached drawings. For reference, sizes of components, thicknesses of lines, and the like shown in the drawings referred to for describing the present invention may be slightly exaggerated for convenience of understanding. Also, the terms used when describing the present invention are defined in consideration of functions in the present invention and may vary according to users, intentions of operators, practices, and the like. Accordingly, the terms should be defined on the basis of content throughout the specification.

10 FIGS. 1 to 7 are views illustrating a crab shell stripping apparatus according to one embodiment of the present invention.

Referring to the drawings, a crab shell stripping apparatus 100 according to one embodiment of the present invention mainly includes a transfer portion 10, a shell stripping portion 20, a jet nozzle portion 30, and a shielding plate 40.

15 Here, the transfer portion 10 is provided to transfer crabs while the crabs are mounted thereon such that dorsal shells face the bottom, and allows shell stripping and gill removing to be performed on the crabs while they pass through the shell stripping portion 20 and the jet nozzle portion 30 in a process in which the crabs are mounted on a foremost end and then transferred to a rear end.

20 In the above transfer portion 10, as shown in FIGS. 1 to 4, a first conveyer 11 and a second conveyer 12 driven by a motor M are installed at a certain interval to be driven at the same speed in the same direction. The first conveyer 11 and the second

conveyer 12 are places at which legs of a crab on both sides are disposed, and are configured to connect the foremost end to the rear end of the transfer portion 10.

In addition, a third conveyer 13 and a fourth conveyer 14 driven by a motor are installed at one end and the other end of a space portion formed between the first
5 conveyer 11 and the second conveyer 12. The third conveyer 13 is a place at which a body part of the crab disposed on the foremost part is disposed and transfers the body of the crab to a fore end of the shell stripping portion 20.

In addition, the fourth conveyer 14 guides a crab moved with both its leg parts separated, to the rear end. The third conveyer 13 and the fourth conveyer 14 may
10 receive a rotating force of a driving shaft which drives the first conveyer 11 and the second conveyer 12 to be driven and moved at the same speed as that of the first conveyer 11 and the second conveyer 12.

Meanwhile, a blotter conveyer 15 is installed above each of the first conveyer 11 and the second conveyer 12. The blotter conveyer 15 is provided to pressurize leg
15 portions of both sides of a crab so that they do not move during a shell stripping process or a gill removing process.

In addition, above the blotter conveyer 15, a plurality of tension rollers 16 for maintaining tension thereof are provided to be spaced certain intervals apart.

Since the blotter conveyers 15 should move at the same speed as the first
20 conveyer 11 and the second conveyer 12, the blotter conveyers 15 are also configured to receive the rotating force of the driving shaft which drives the first conveyer 11.

Meanwhile, the shell stripping portion 20 is disposed on a movement path of crabs transferred over the transfer portion 10 to remove dorsal shells and abdominal

shells of the crabs. The shell stripping portion 20 includes an abdominal shell removing cutter 21 for removing an abdominal part of a crab moved while upside-down and installed at a central position on the movement path of the crabs and a dorsal shell removing cutter 22 for removing a dorsal shell of a crab and spaced a certain interval
5 apart from a bottom of the abdominal shell removing cutter 21.

The abdominal shell removing cutter 21 and the dorsal shell removing cutter 22 are installed with a gap smaller than a thickness of a body of a crab such that a dorsal shell of the crab is easily removed by the dorsal shell removing cutter 22 while the abdominal shell removing cutter 21 pressurizes an abdominal part of the crab.

10 Meanwhile, the jet nozzle portion 30 is provided on both sides behind the shell stripping portion 20 to remove gills of a crab, which are exposed by a dorsal shell thereof being removed, by jetting high-pressure water thereto. The jet nozzle portion 30 includes a plurality of jet nozzles 31 which jet high-pressure water to a gill-attached part and a transfer pipe 32 connected to the plurality of jet nozzles 31 to supply water
15 thereto.

Here, the plurality of jet nozzles 31 are arranged at certain intervals on both sides of a bottom behind the shell stripping portion 20 and separate gills attached to a body part of an upside-down crab by jetting high-pressure water.

For a preferable high-pressure water jet direction, the jet nozzles 31 are installed
20 to face each other at a bottom side behind the shell stripping portion 20 while being installed to be inclined upward to jet water upward at an angle of about 20° to 50°.

This is to most efficiently hit a gill-attached part of a crab with high-pressure water and to prevent crab meat of a body from being lost due to the high-pressure water.

In addition, the shielding plate 40 is installed to separate and divide the jet nozzle portion 30 on both sides to prevent high-pressure water jet from both of the sides
5 by the jet nozzle portion 30 from interfering each other. The shielding plate 40 is installed in an open area between the third conveyer 13 and the fourth conveyer 14 behind the abdominal shell removing cutter 21 along a longitudinal direction.

Also, the shielding plate 40 includes an upper plate 41 disposed in a horizontal plane shape along the longitudinal direction and a lower plate 42 disposed to be
10 perpendicular to a lower side along a central line in a longitudinal direction of the upper plate 41 such that jet high-pressure water is deflected by the upper and lower plates 41 and 42 to fall downward.

When the shielding plate 40 is not provided, high-pressure water jet by the jet nozzles 31 on one side interferes with high-pressure water of the other side such that
15 efficiency of jetting high-pressure water is decreased and crab meat of a body of a crab on the other side is hit and lost.

Accordingly, to reduce a loss of crab meat of a body, it is necessary to use the shielding plate 40 to shield the jet nozzles 31 on both sides from each other.

In addition, as shown in FIG. 5, the upper plate 41 of the shielding plate 40 is
20 located above a crab body B of a crab to prevent a position of the crab from being changed according to upward movement of the crab body B caused by the crab body B being hit by jet high-pressure water.

Accordingly, it is necessary to form a height of the upper plate 41 to be adequate in consideration of a thickness of the crab body B.

Also, the jet nozzles 31 receive high-pressure water to be jet through the transfer pipe 32, and a high-pressure pump is disposed on one side of the transfer pipe 32 to
5 perform high-pressure jetting.

FIG. 8 is a view illustrating components of a jet nozzle portion according to another embodiment of the present invention.

Referring to the drawing, the jet nozzle portion 30 according to the embodiment includes a circulation structure in which jet high-pressure water is collected and jet again.

10 For this, the jet nozzle portion 30 according to the embodiment includes the plurality of jet nozzles 31 which jet high-pressure water and the transfer pipe 32 connected to the plurality of jet nozzles 31 to supply water thereto, like the above-described embodiment, and further includes a water storage tank 33 with a certain accommodation space formed therein and a high-pressure pump 34 which receives water
15 from the water storage tank 33 and transfers the water to the transfer pipe 32.

In addition, a collecting hopper 35 is installed to guide high-pressure water jet by the jet nozzles 31 to fall downward, and includes a top and a bottom formed to be open such that jet high-pressure water which flows in through the top and falls down through the bottom is transferred to the water storage tank 33 disposed therebelow.

20 Meanwhile, a filter plate 33a for collecting foreign substances including gills, which are included in high-pressure water supplied from the collecting hopper 35, may be installed at the water storage tank 33.

According to the embodiments of the present invention, there are provided effects of fundamentally preventing a gill removal failure rate by using jet nozzles which jet high-pressure water and sharply reducing a loss of crab meat caused thereby.

5 In addition, since it is possible to replace an additional washing process performed as a following process with a gill removing process, there is an effect of reducing additional installation costs and working time.

Also, as gills are automatically removed and a subsequent additional gill sorting process is omitted, the number of necessary operations is reduced such that there are effects of reducing a difficulty in securing manpower and reducing production costs.

10 Although the detailed embodiments of the present invention have been described above, the present invention is not limited to the embodiments disclosed in the specification and the attached drawings and may be diversely modified by one of ordinary skill in the art without departing from the technical concept of the present invention.

15

WHAT IS CLAIMED IS:

1. A crab shell stripping apparatus for easily removing gills, comprising:
a transfer portion (10) which transfers a crab mounted with a dorsal shell facing
5 a bottom;
a shell stripping portion (20) which removes the dorsal shell of the crab
transferred by the transfer portion (10); and
a jet nozzle portion (30) which is located on both sides of a rear of the shell
stripping portion (20) and removes gills of the crab, which are exposed by the dorsal
10 shell being removed, by jetting high-pressure water thereto.
2. The crab shell stripping apparatus of claim 1, further comprising a shielding
plate (40) which separates and divides both sides of the jet nozzle portion (30) to prevent
high-pressure water jet from both of the sides by the jet nozzle portion (30) from
15 interfering with each other.
3. The crab shell stripping apparatus of claim 2, wherein the shielding plate (40)
comprises:
an upper plate (41) which is installed in an open area at a central part of the
20 transfer portion (10) along a longitudinal direction and is disposed in a horizontal plane
shape along the longitudinal direction; and
a lower plate (42) disposed therebelow along a central line in the longitudinal
direction of the upper plate (41) to be perpendicular thereto.

4. The crab shell stripping apparatus of claim 1, wherein the jet nozzle portion (30) comprises:

5 a plurality of jet nozzles (31) which jet the high-pressure water to an attachment part of the gills;

a transfer pipe (32) which is connected to the plurality of jet nozzles (31) and supplies water thereto;

a water storage tank (33) with a certain accommodation space formed therein; and

10 a high-pressure pump (34) which receives water from the water storage tank (33) and transfers the water to the transfer pipe (32).

5. The crab shell stripping apparatus of claim 4, further comprising a collecting hopper (35) which guides the high-pressure water jet by the jet nozzles (31) to fall
15 downward,

wherein the collecting hopper (35) comprises an open top and bottom such that the jet high-pressure water flows in through the top and flows out through the bottom to the water storage tank (33) therebelow such that the jet high-pressure water is circulated.

20 6. The crab shell stripping apparatus of claim 5, wherein the water storage tank (33) further comprises a filter plate (33a) for collecting foreign substances including the gills included in the high-pressure water supplied from the collecting hopper (35).

7. The crab shell stripping apparatus of claim 1, wherein in the transfer portion (10), a first conveyer (11) and a second conveyer (12) driven by a motor are installed in parallel with a certain interval therebetween to be driven at the same speed in the same direction, and a third conveyer (13) and a fourth conveyer (14) driven by a motor are
5 installed at one side end and the other side end of a space part formed between the first conveyer (11) and the second conveyer (12) to be driven at the same speed in the same direction as the first conveyer (11) and the second conveyer (12).

8. The crab shell stripping apparatus of claim 7, further comprising a pair of
10 blotter conveyers (15) installed above the first conveyer (11) and the second conveyer (12) and driven by the motor at the same speed in the same direction as the first conveyer (11) and the second conveyer (12).

FIG. 1

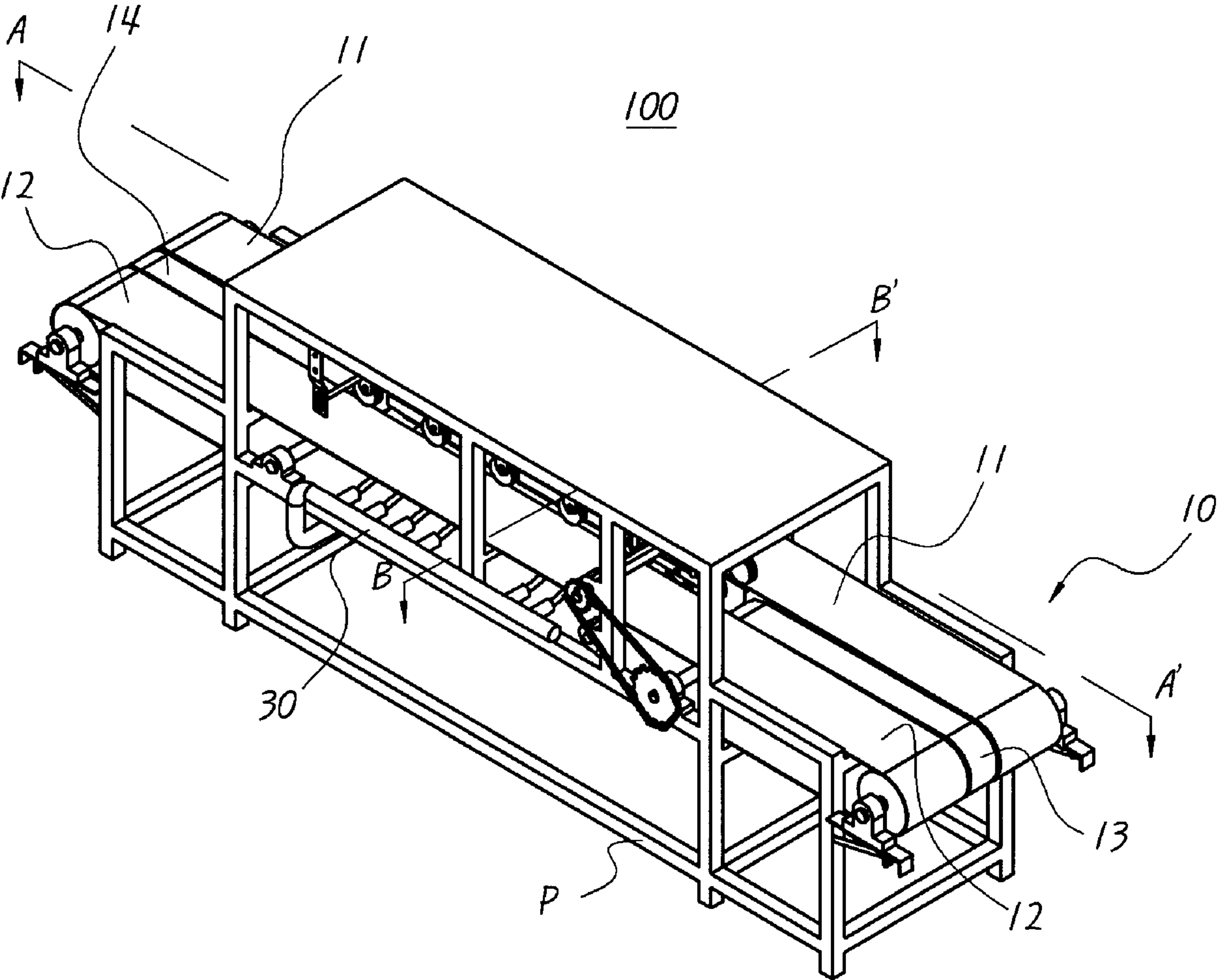


FIG. 2

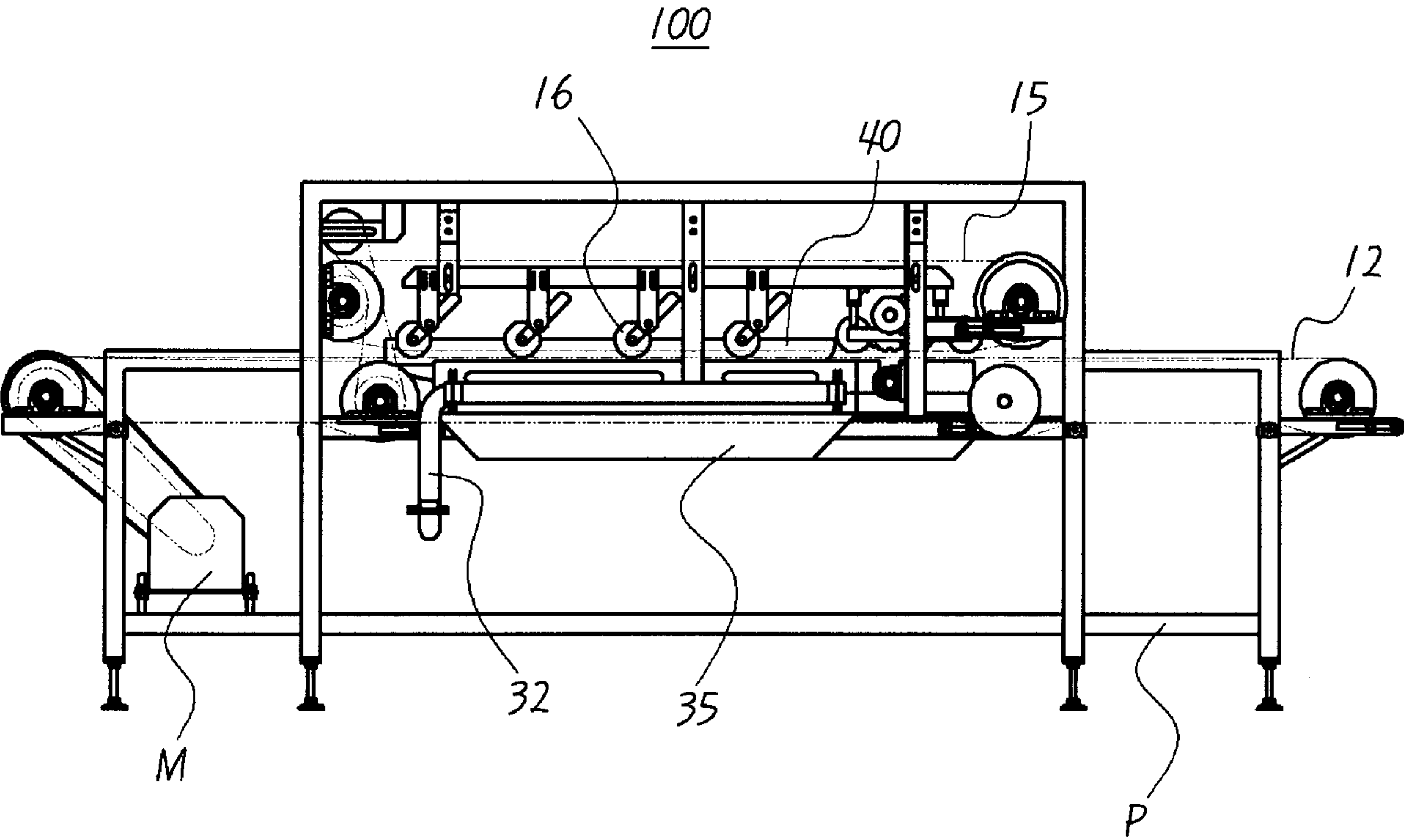


FIG. 3

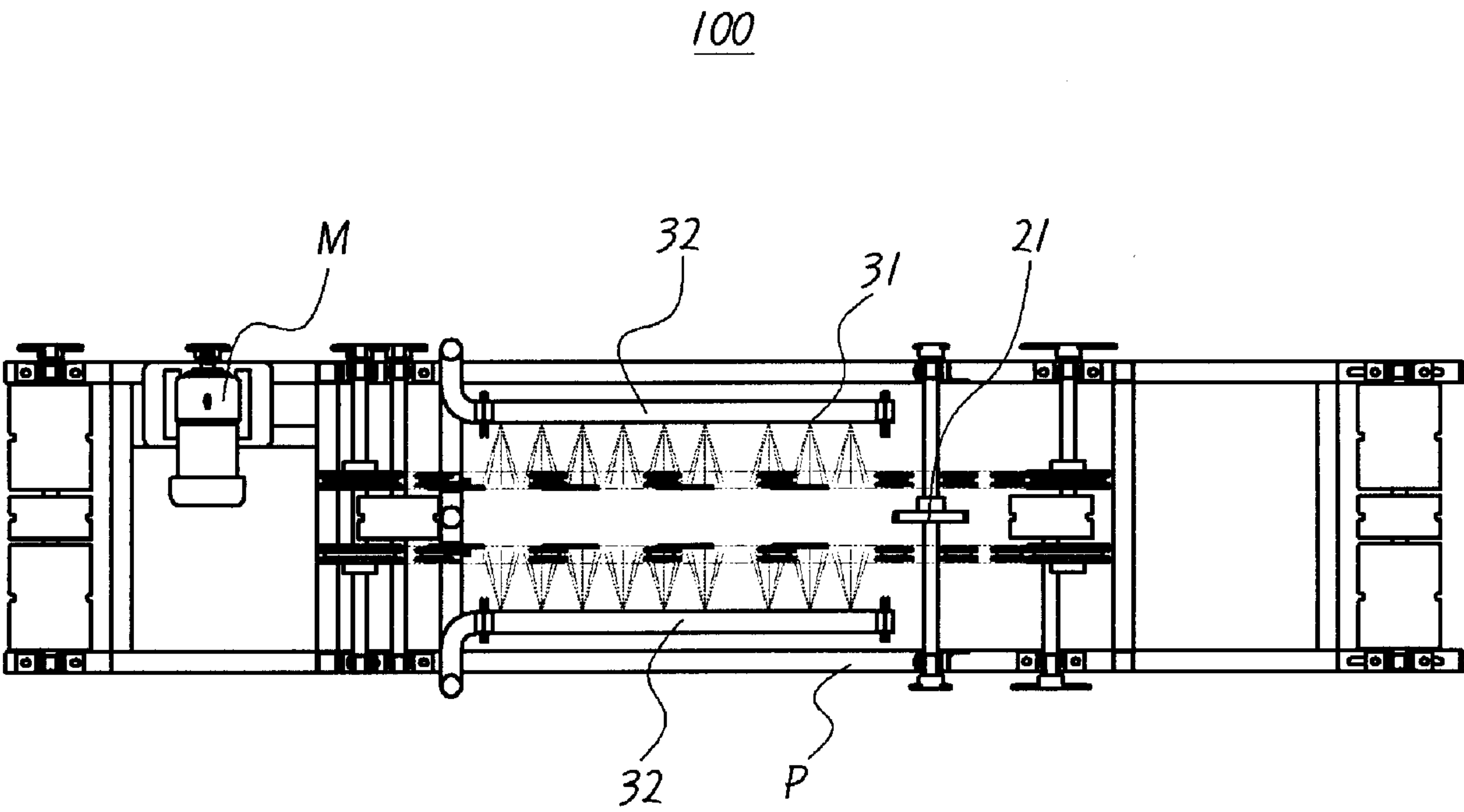


FIG. 4

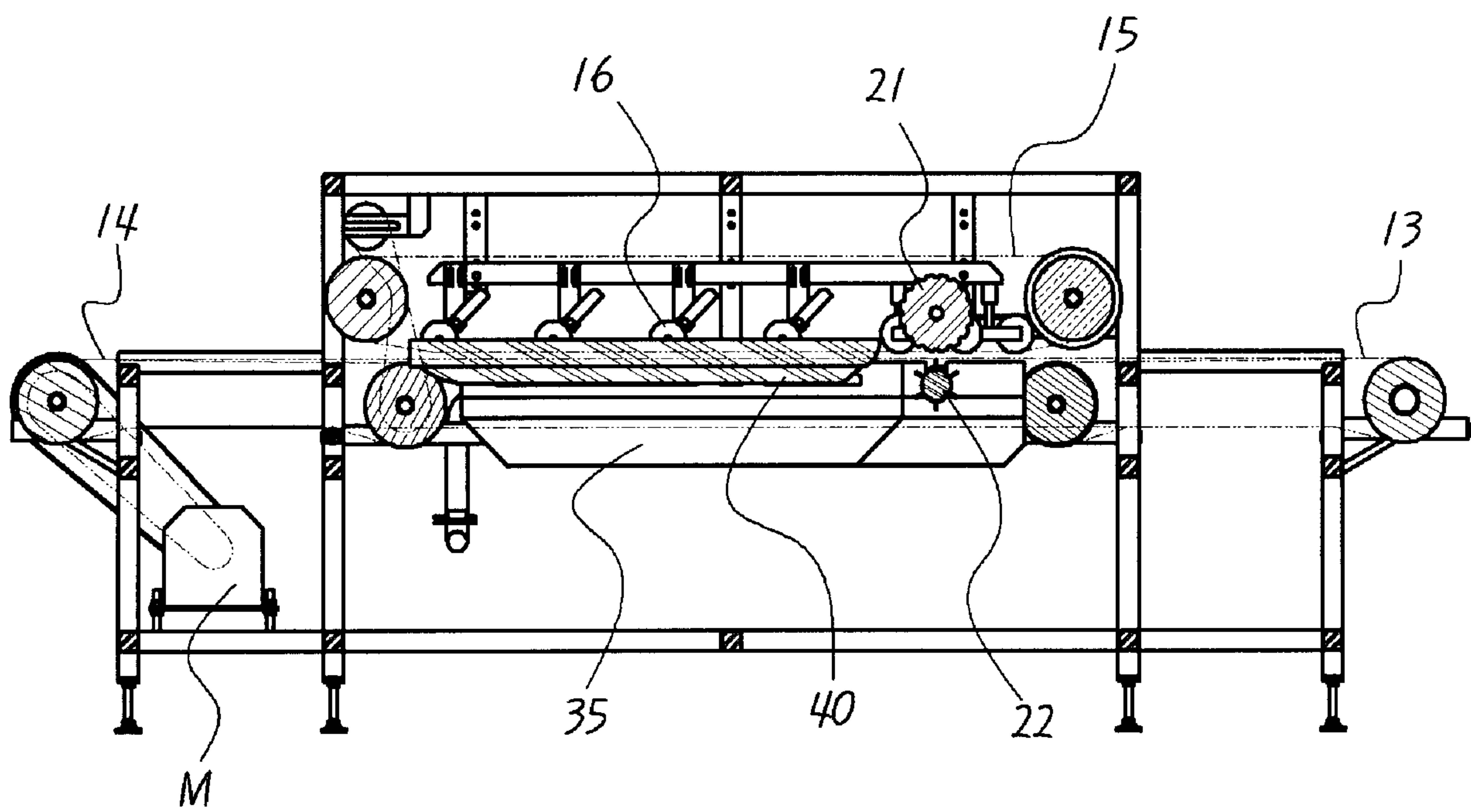


FIG. 5

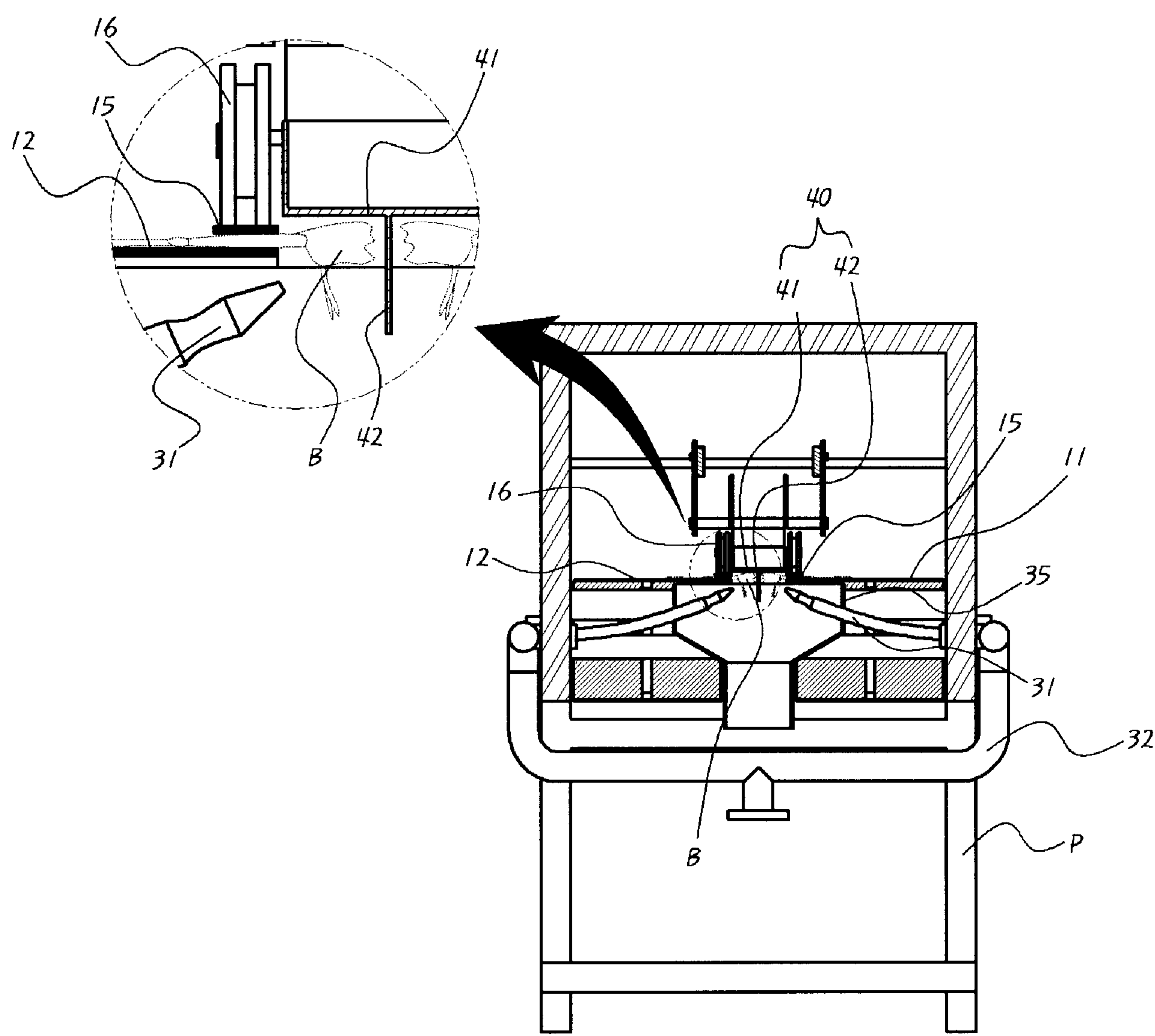


FIG. 6

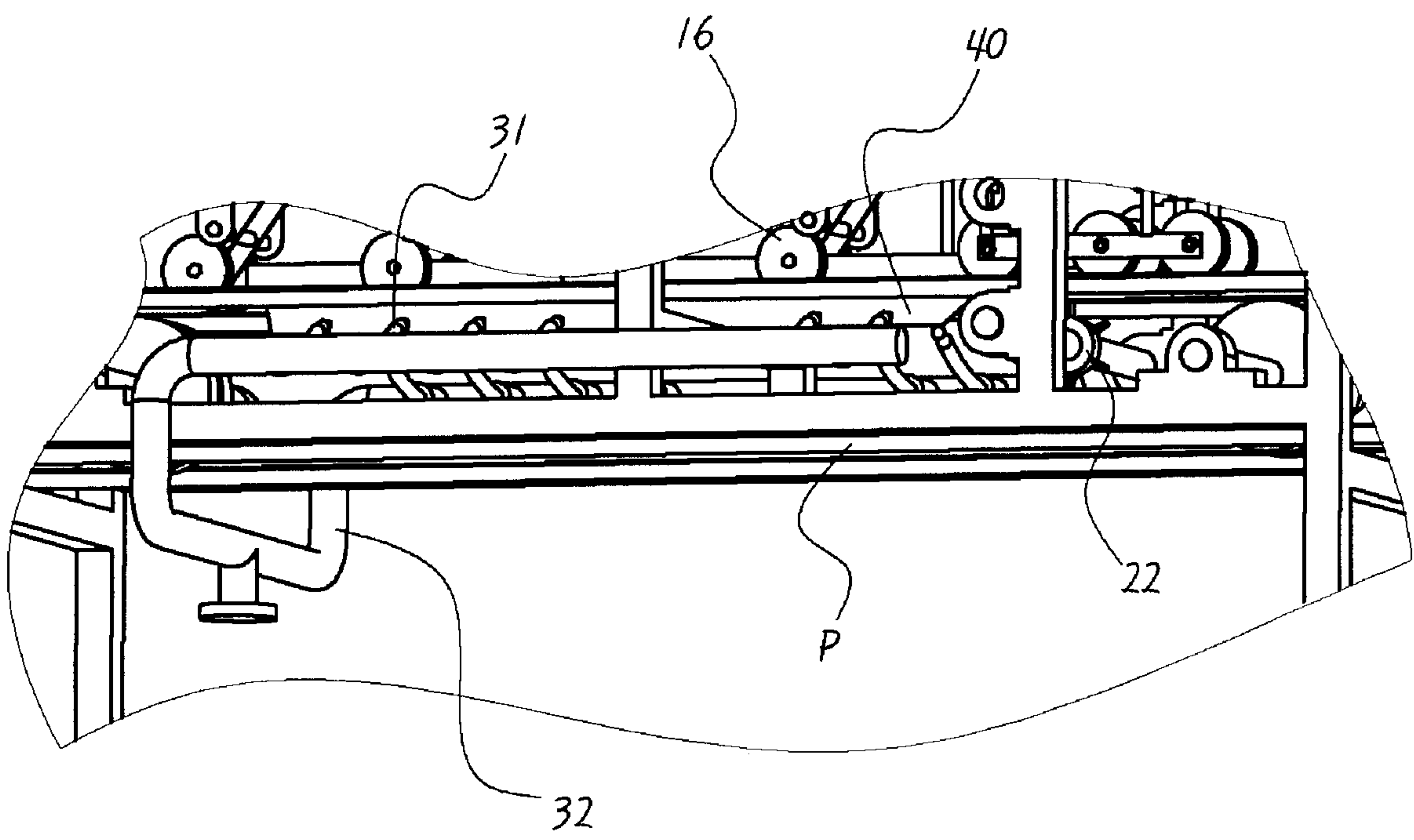


FIG. 7

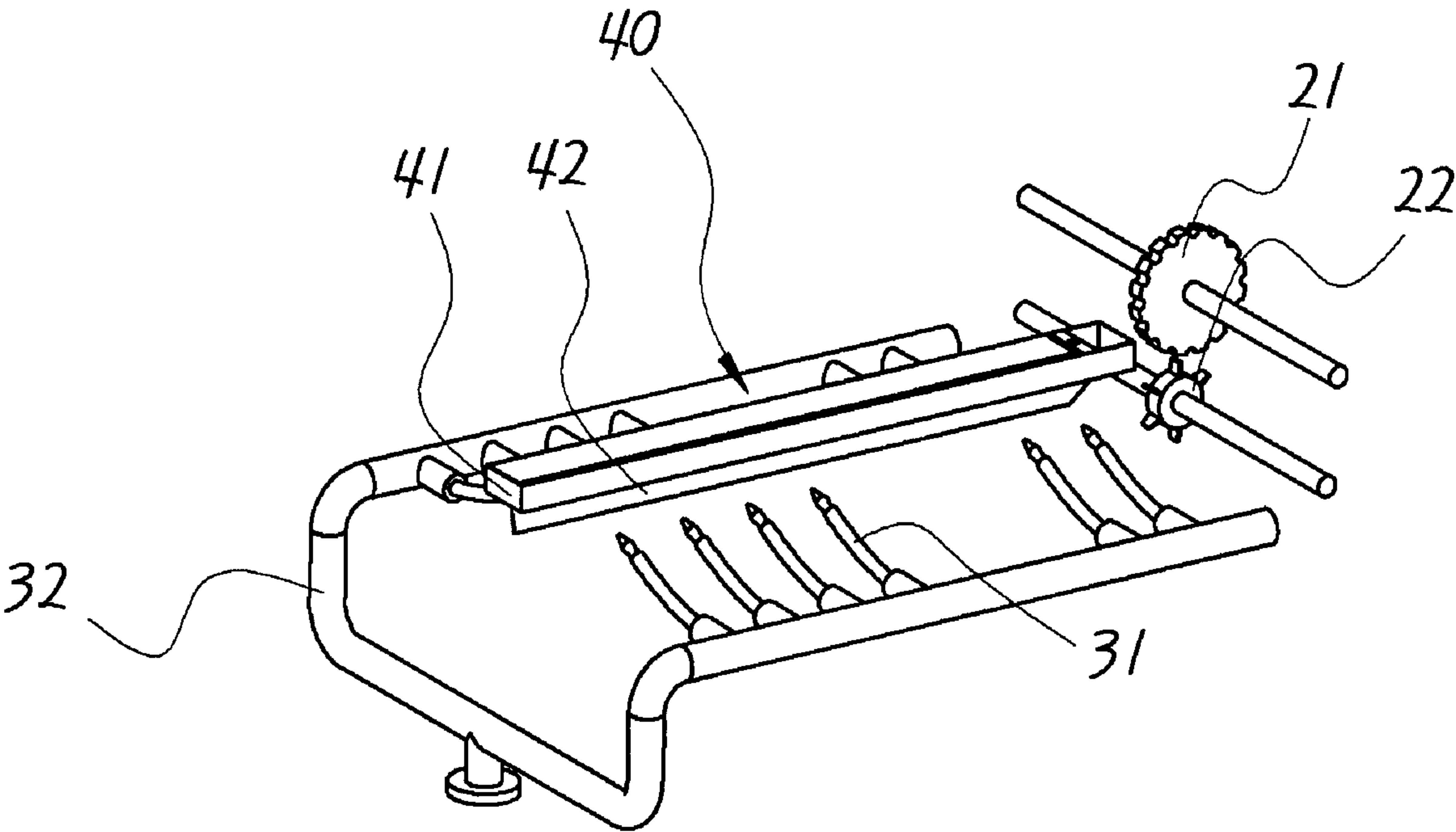
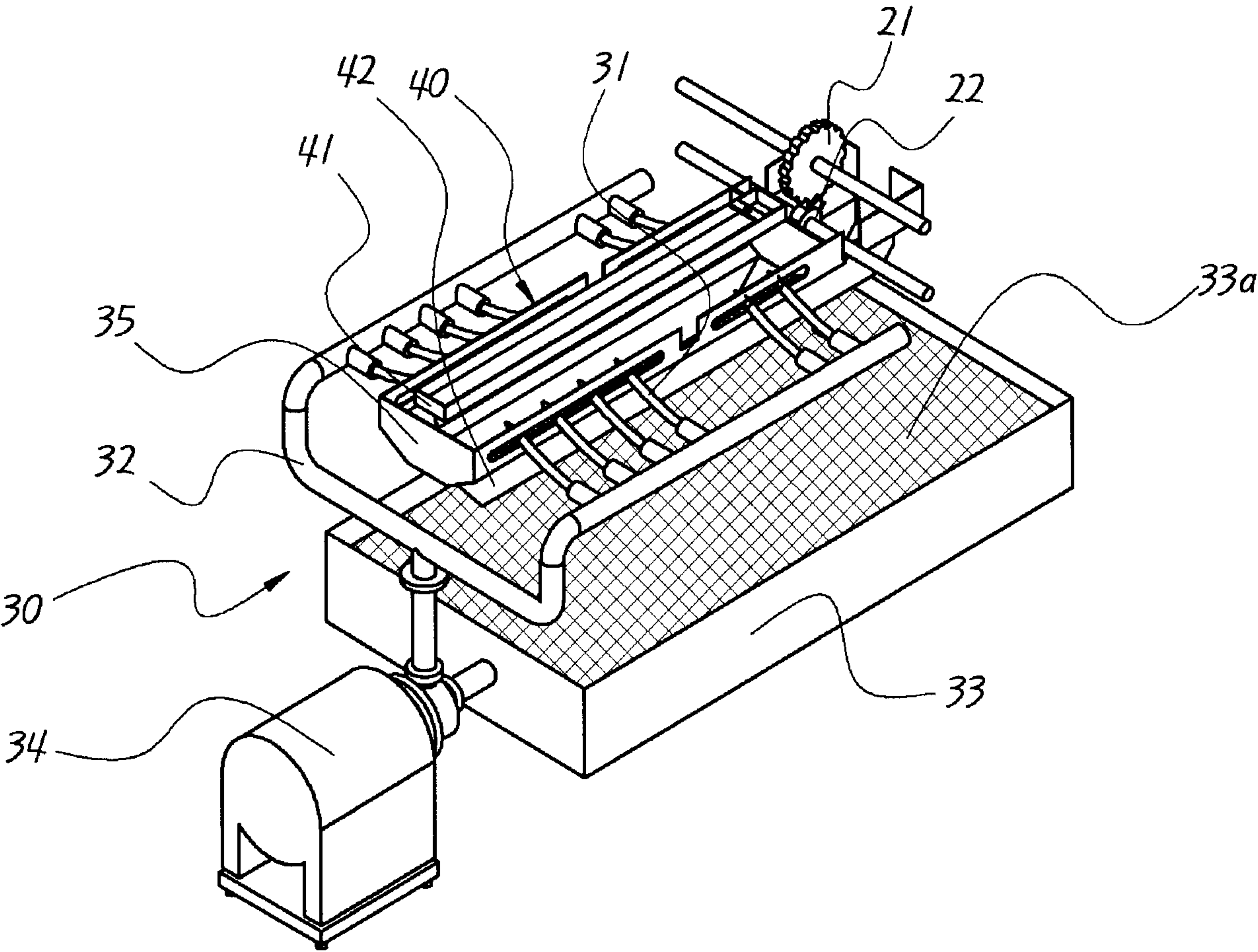


FIG. 8



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