OPIC
OFFICE DE LA PROPRIÉTÉ INTELLECTUELLE DU CANADA

CIPO
CANADIAN INTELLECTUAL PROPERTY OFFICE

(12) (19) (CA) **Brevet-Patent**

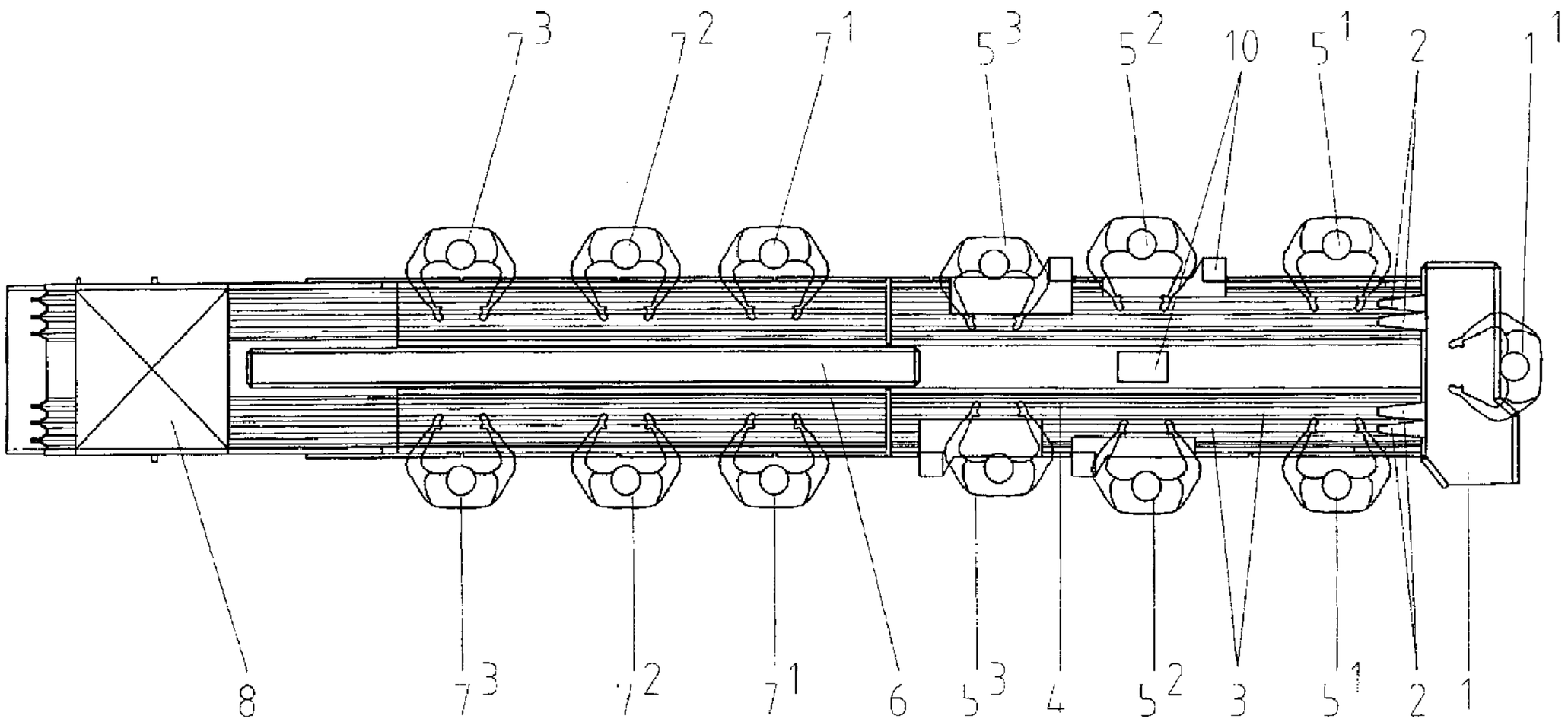
(11) (21) (C) **2,263,926**
(86) 1996/09/27
(87) 1998/04/02
(45) 2000/11/28

(72) EILERTSEN, Stein Grov, NO
(72) ÅSBAKK, Torbjorn, NO
(73) MELBU VERFT AS, NO
(73) SOTRA BEDRIFTSRÅDGIVNING, NO

(51) Int.Cl.[6] A22C 25/14

(54) **PROCEDE DE DECOUPE, D'EVISCERATION ET DE NETTOYAGE DE POISSONS D'ELEVAGE ET MATERIEL SERVANT A L'EXECUTION DE CE PROCEDE**

(54) **METHOD FOR CUTTING AND CLEANING OF FARMED FISH AND EQUIPMENT FOR CARRYING OUT THE METHOD**



(57) On décrit un procédé d'éviscération et de nettoyage de poissons d'élevage, ainsi qu'un dispositif servant à la mise en oeuvre de ce procédé et comprenant un dispositif d'alimentation (1), des éléments de guidage (2) destinés à placer les poissons, ventre en l'air, dans des gouttières placées sur transporteurs à bande (4), deux transporteurs à bande, parallèles et séparés (4) et dont le côté éloigné longitudinal peut être basculé vers le haut vers les opérateurs (5^{1-3}, 7^{1-3}), une gouttière de retour (6) montée entre les transporteurs à bande, dans la dernière section (4) de ceux-ci, ainsi qu'un compartiment (8) destiné au rinçage des poissons et des transporteurs à bande (4), avant le retour de ces transporteurs via un bac de lavage (9), aux fins d'achèvement de l'opération de nettoyage.

(57) A method for gutting and cleaning of farmed fish and a device for the implementation of said method consisting of a feed trough (1), and guides (2) for positioning the fish belly up in gutters (3) on conveyor belts (4). Two separate and parallel conveyor belts (4), the longitudinal far side of which can be tipped upwards towards the operators (5^{1-3}, 7^{1-3}). A return gutter (6) provided between the conveyor belts in their last section (4) and a flushing box (8) for flushing of the fish and of the conveyor belts (4) before said conveyor belts return via a washing trough (9) to complete the cleaning operation.

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
A22C 25/06

A1

(11) International Publication Number: **WO 98/12929**

(43) International Publication Date: 2 April 1998 (02.04.98)

(21) International Application Number: PCT/NO96/00232

(22) International Filing Date: 27 September 1996 (27.09.96)

(81) Designated States: AU, CA, CN, IS, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

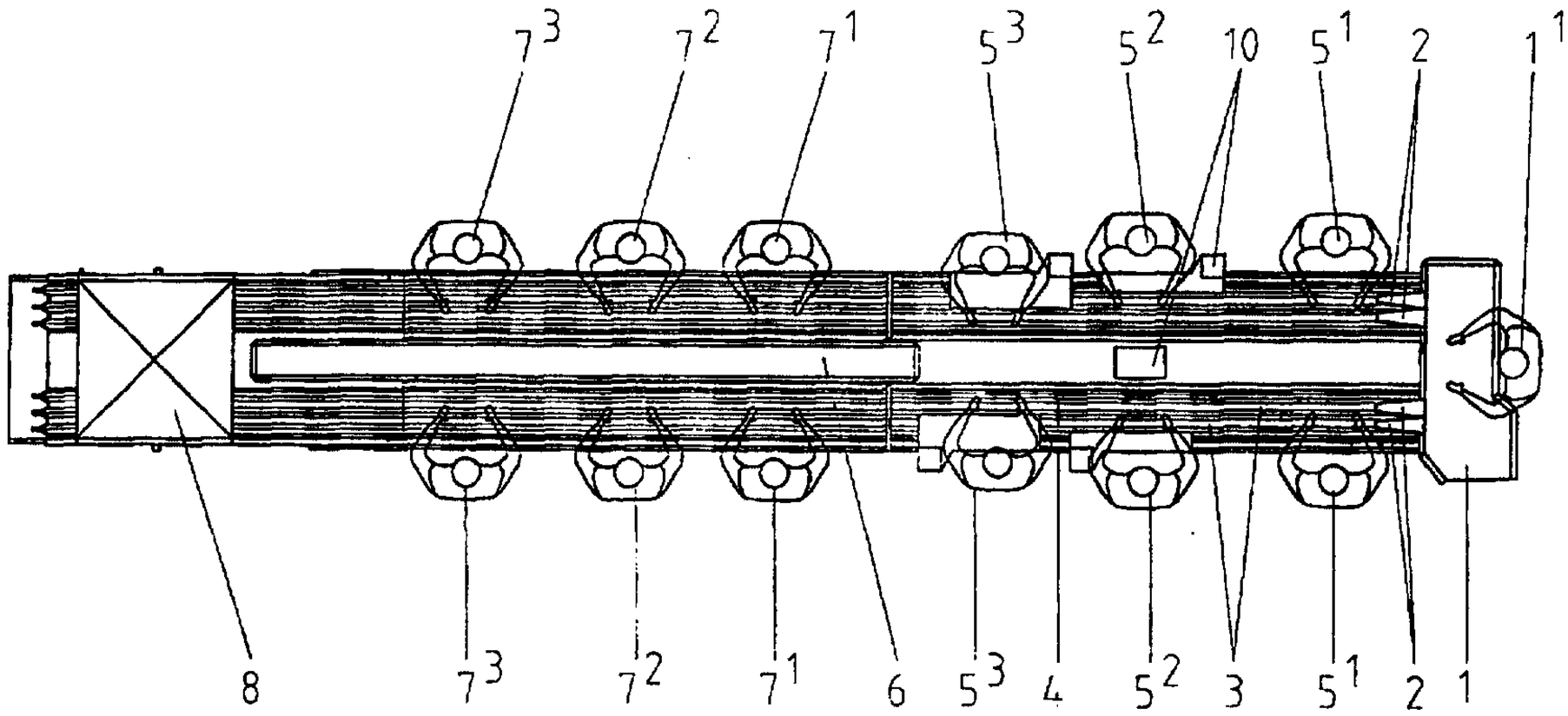
Published
With international search report.
In English translation (filed in Norwegian).

(71) Applicants *(for all designated States except US)*: MELBU VERFT AS [NO/NO]; P.O. Box 4, N–8490 Melbu (NO). SOTRA BEDRIFTSRÅDGIVNING [NO/NO]; Misje, N–5363 Ågotnes (NO).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: EILERTSEN, Stein, Grov [NO/NO]; Misje, N–5363 Ågotnes (NO). ÅSBAKK, Torbjørn [NO/NO]; Fjellveien 4, N–8490 Melbu (NO).

(74) Agent: ABC– Patent; Sivilingeniør Rolf Chr. B. Larsen AS, Brynsvei 5, N–0667 Oslo (NO).

(54) Title: METHOD FOR CUTTING AND CLEANING OF FARMED FISH AND EQUIPMENT FOR CARRYING OUT THE METHOD



(57) Abstract

A method for gutting and cleaning of farmed fish and a device for the implementation of said method consisting of a feed trough (1), and guides (2) for positioning the fish belly up in gutters (3) on conveyor belts (4). Two separate and parallel conveyor belts (4), the longitudinal far side of which can be tipped upwards towards the operators (5^{1-3}, 7^{1-3}). A return gutter (6) provided between the conveyor belts in their last section (4) and a flushing box (8) for flushing of the fish and of the conveyor belts (4) before said conveyor belts return via a washing trough (9) to complete the cleaning operation.

METHOD FOR CUTTING, GUTTING AND CLEANING OF FARMED FISH AND EQUIPMENT FOR IMPLEMENTING THE METHOD.

The present invention relates to a method for cutting, gutting and cleaning of farmed fish and a device necessary for implementing the method. The device receives the whole fish after the fish has bled to death and is ready for cutting, gutting and cleaning.

Killing of the fish is effected by bleeding, and the fish is let out in a tank of water where it bleeds to death. Subsequently, the fish is taken up on benches where it is gutted. The fish is then either sent from the gutting bench via a conveyor belt to the cleaning area, or cleaning is effected directly on the gutting bench. This is for the personnel an unsuitable and non-rational way of working. In addition, such working conditions present a health hazard for the personnel as a result of the inappropriate working posture and the resulting strain injuries.

The known art

Conveyor belts has been known from car production assembly lines for several decades, and is rather advanced. However, the development of machines for cutting, gutting and cleaning of fish, which vary in weight, shape and size, is less advanced, and has been heavily relying on manual processing.

DE 268 759 and FR 1 435 117 both show production lines with conveyor belts for fish processing. None of the patents mention that the conveyor belt move during the processing of the fish. DE 268 759 shows an apparatus where the conveyor belt transports the fish into a wash drum and back out of the drum. FR 1 435 117 describes a conveyor belt arranged for moving fish between separate workstations, where the fish is to be taken off the conveyor belt for each operation on the fish. Swedish patent SE 192 745 describes a machine organizing the fish on a conveyor belt with their heads leading, in order to thread a string through the fishes' heads in a transverse manner.

The object of this invention is to provide a more effective and work-environment friendly work station for the

processing of farmed fish.

According to the invention there is provided an apparatus for gutting and cleaning of fish, comprising one or more conveyor belts running mostly horizontally along several work stations for operators along the conveyor belt, with a feed trough for the conveyor belt, characterized by

a) "U"-shaped gutters arranged on the work surface of the conveyor belt to receive and keep the fish in its abdomen-up position from the feed trough and to stabilize the fish in its abdomen-up gutting position, said "U"-shaped gutters comprising rows of pairs of inverted "Y"-profile elements having "Y"-base plates wherein the inverted "Y"-profile elements are arranged with the "Y"-base plates parallel to the conveyor belt and attached standing perpendicularly out from the work surface of the conveyor belt; and

b) several working stations arranged along the conveyor belt arranged for sequential operations on the fish, where these operations are to be performed on the fish lying in the "U"-shaped gutters on the conveyor belt which is to be continuously moving past the operators.

Additionally, the invention provides a method for gutting and cleaning of fish, comprising the use of one or more conveyor belts running mostly horizontally along several work stations for operators along the conveyor belt, using a feed trough for the conveyor belt, comprising the steps of:

a) feeding the fish into "U"-shaped gutters on the work surface of the conveyor belt, receiving and keeping the fish in its abdomen-up position from the feed trough and stabilizing the fish in its abdomen-up gutting position, said "U"-shaped gutters comprising rows of pairs of inverted "Y"-profile elements having "Y"-base plates wherein the inverted "Y"-profile elements are arranged with the "Y"-base plates parallel to the conveyor belt and attached standing perpendicularly out from the work surface of the conveyor belt; and

b) sequential gutting and cleaning operations on the fish

lying in the "U"-shaped gutters on the conveyor belt which is continually moving past the operators.

This is achieved by sending the fish into a feed trough. From the feed trough the fish is placed by an operator onto one of two longitudinal conveyor belts, in gutters, belly up. As the fish passes the various work stations along the belt, the various operations of gutting, removal of the kidneys and cleaning of the abdominal cavity are affected by operators standing next to the processing line. When the fish reaches the end of the line, it is cleaned and flushed externally.

Further details of the invention will appear from the description of a preferred embodiment of the invention and from the claims.

Fig. 1 is a schematic representation of the device.

Fig. 2 is a lateral representation illustrating the vertical placement of the conveyor system for the fish through the device.

Fig. 3 is a cross-sectional view of the device at the feed end.

Fig. 4 illustrates the principle of the vertical walls of the gutter on the conveyor belt.

Fig. 5 is a cross-sectional view of the conveyor system.

When the fish has been thoroughly bled, it is fed into the trough 1 from which it is then manually fed onto two parallel conveyor belts 4, through four parallel guides 2, and is placed belly up in the separate gutters 3 of the conveyor belts 4. This operation is effected by a first operator 1^1. Fig. 3 illustrates how the gutters 3 are positioned in two rows along the conveyor belt 4. Fig. 1 shows that the operators can easily reach the fish in the gutters 3 on the conveyor belts 4 and the effectiveness is increased in that two fish arrive at the same time in the gutters 3 in front of the operators, although slightly staggered in relation to each other.

Figure 3 also illustrates that the conveyor belts' longitudinal far side, as seen from an operators side, are

arranged to rise to a tilted transversal position from a horizontal transversal position, in order to facilitate the operators' working posture.

The device comprises two entirely separate and parallel conveyor belts 4 running along the outer edges of the device, and the operators sit along each conveyor belt 4. This dual conveyor system removes the necessity of a conveyor belt of the same width as the device. The fish is fed onto the conveyor belts 4 from the trough 1 through the

guides 2 by one single operator 1^1 so that each operator of the first pair of operators 5^1 always have a fish to process at any time. The first pair of operators 5^1 who finish gutting the fish and dispose of the guts down a chute 10 positioned either next to the second pair of operators 5^2 or in the middle of the device. The fish is then transported to a third pair of operators 5^3 who, with a knife, slit over the fish's throat and kidneys. The fish is then transported further to a fourth pair of operators 7^1 who remove the fish's heart and kidneys with a kidney suction remover. The fish is then transported to a fifth 7^2 and a sixth 7^3 pair of operators who clean the fish's abdominal cavity of all blood, gut and fibre remnants with flushing and suction devices.

Between the conveyor belts 4 a return gutter 6 is provided where fish which is has not been satisfactorily cleaned can be placed and wait for later proper gutting and cleaning.

At the delivery end of the device, a flushing box 8 is provided for the fish and the conveyor belts 4. The conveyor belts 4 bring the fish under a set of nozzles which flush the fish in a normal way. Afterwards, the conveyor 4 receive additional flushing by a set of nozzles. None of those nozzles is shown on the drawings. The return of the conveyor belts 4, after passing the last roller, is effected via a washing trough 9 which further cleans the conveyor belts 4 before new fish is placed in the gutters 3 at the level of the feed trough 1.

The side walls of the gutters 3 are specially designed to allow the conveyor belts 4 to move from the horizontal plane to another plane, and to allow the fish to remain stable when it is placed belly up in the gutters 3. This is illustrated in Figs. 4 and 5. Fig. 5 is a cross-sectional view of the two gutters 3 which are found on each conveyor belt 4. The side walls consist of inverted Y-shaped elements 12. These Y-shaped elements 12 provide a U-shaped cross section for each gutter 3, where the fish remains stable in a belly up position.

Fig. 4 is a lateral view of a conveyor belt 4 illustrating the principle of the flexible side wall design.

The Y-shaped elements 12 which make up the side walls are positioned at a certain distance from one another along the conveyor belt 4, providing a stable support for the fish, and allowing satisfactory flexibility for the conveyor belt 4 to move into another plane or in a curve. This design provides great flexibility for the conveyor belts 4.

When several operators are placed to effect the same type of work on some or all of the work stations, the effectiveness of the system is further increased.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. Apparatus for gutting and cleaning of fish, comprising one or more conveyor belts running mostly horizontally along several work stations for operators along the conveyor belt, with a feed trough for the conveyor belt, characterized by
a) "U"-shaped gutters arranged on the work surface of the conveyor belt to receive and keep the fish in its abdomen-up position from the feed trough and to stabilize the fish in its abdomen-up gutting position, said "U"-shaped gutters comprising rows of pairs of inverted "Y"-profile elements having "Y"-base plates wherein the inverted "Y"-profile elements are arranged with the "Y"-base plates parallel to the conveyor belt and attached standing perpendicularly out from the work surface of the conveyor belt; and
b) several working stations arranged along the conveyor belt arranged for sequential operations on the fish, where these operations are to be performed on the fish lying in the "U"-shaped gutters on the conveyor belt which is to be continuously moving past the operators.

2. The apparatus according to claim 1, additionally comprising two or more parallel guides arranged lengthwise and parallel to the conveyor belt for an operator to feed fish in its abdomen-up position, from the feed trough, into the "U"-shaped gutters on the conveyor belt.

3. The apparatus according to claim 1 or 2, wherein the conveyor belts' longitudinal far side, as seen from an operators side, are arranged to rise to a tilted transversal position from a horizontal transversal position, in order to facilitate the operators' working posture.

4. The apparatus according to any one of claims 1 to 3, wherein the work stations comprise equipment for slitting; gutting; throat, kidney and heart cutting and removal; and

abdominal cavity cleaning by flushing and suction.

5. The apparatus according to any one of claims 1 to 4, additionally comprising a flushing box at the end of the horizontal path of the conveyor belt to complete the internal and external cleaning of the fish, and a washing trough arranged under the flushing box for further cleaning of the conveyor belt.

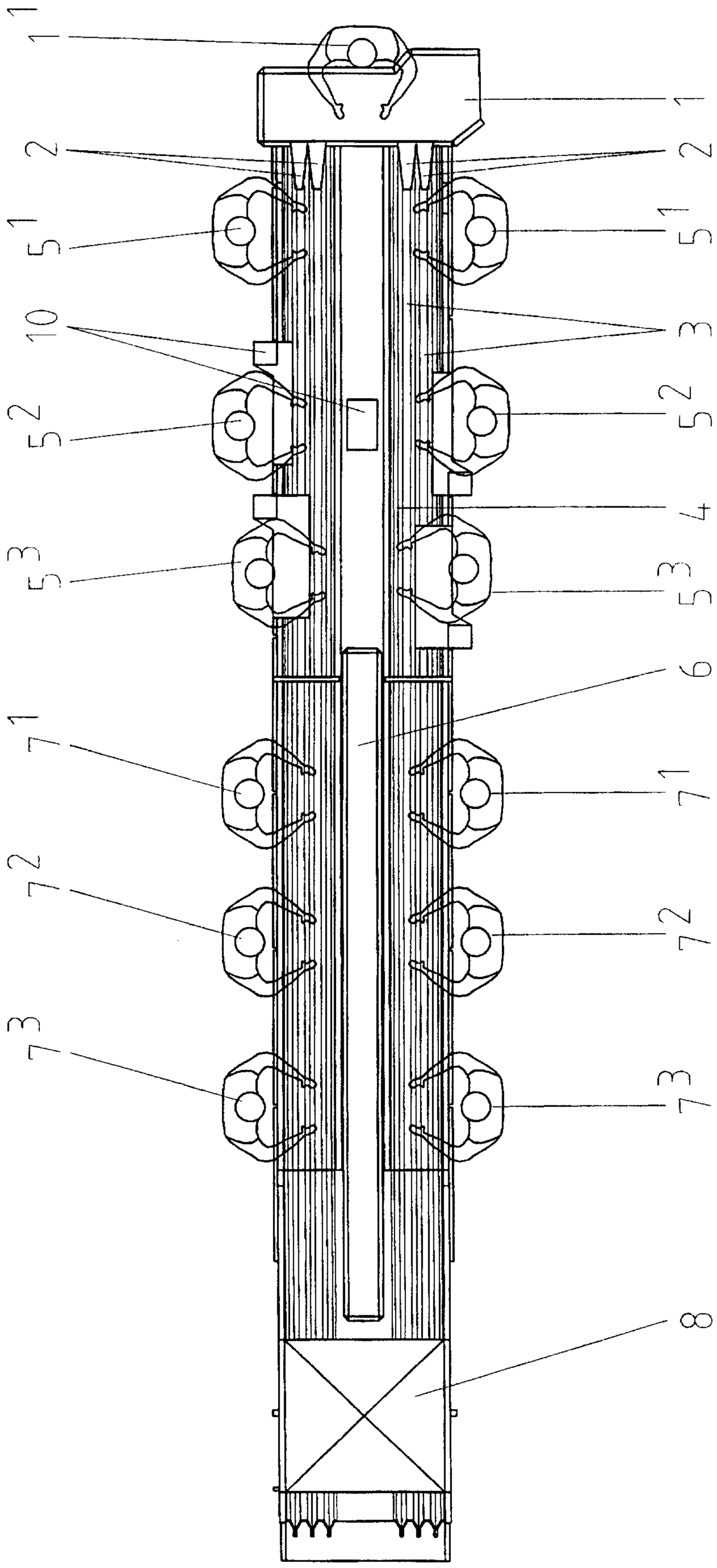
6. The apparatus according to any one of claims 1 to 5, additionally comprising chutes arranged between the work stations and/or between the conveyor belts for disposal of the fish guts from the fish gutting and cleaning.

7. The apparatus according to any one of claims 1 to 6, additionally comprising a steel gutter fitted between the conveyor belts for temporary storage of fish which is not finished gutting or cleaning.

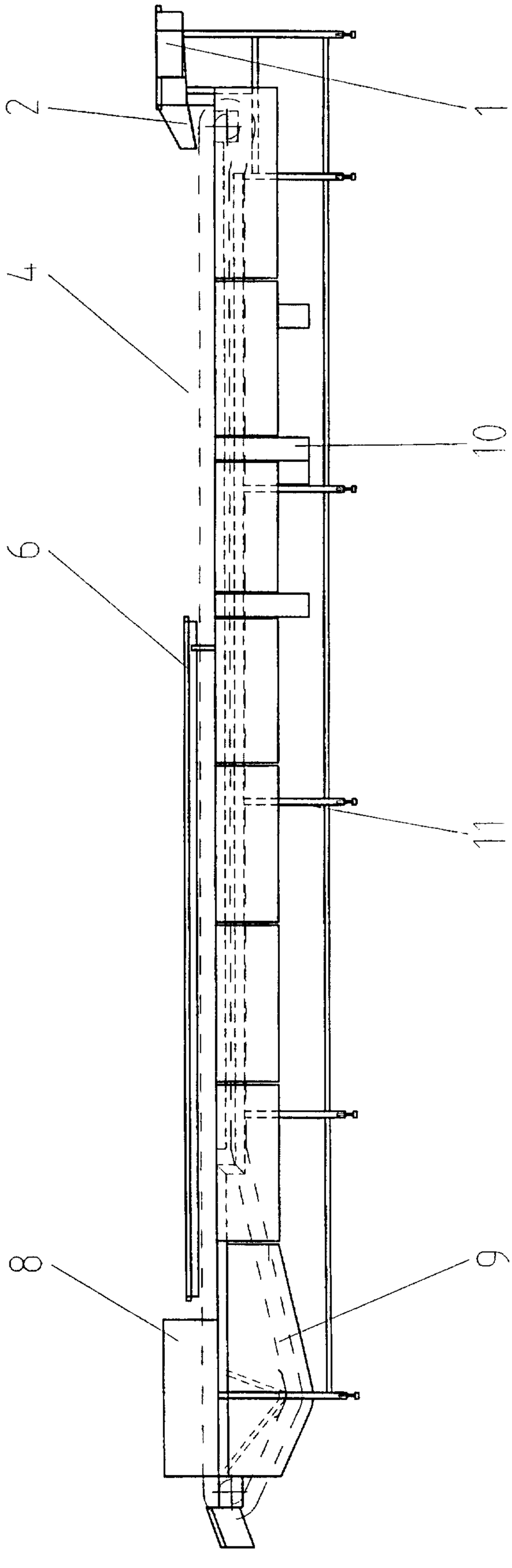
8. Method for gutting and cleaning of fish, comprising the use of one or more conveyor belts running mostly horizontally along several work stations for operators along the conveyor belt, using a feed trough for the conveyor belt, comprising the steps of:
a) feeding the fish into "U"-shaped gutters on the work surface of the conveyor belt, receiving and keeping the fish in its abdomen-up position from the feed trough and stabilizing the fish in its abdomen-up gutting position, said "U"-shaped gutters comprising rows of pairs of inverted "Y"-profile elements having "Y"-base plates wherein the inverted "Y"-profile elements are arranged with the "Y"-base plates parallel to the conveyor belt and attached standing perpendicularly out from the work surface of the conveyor belt; and
b) sequential gutting and cleaning operations on the fish lying in the "U"-shaped gutters on the conveyor belt which is continually moving past the operators.

9. The method according to claim 8, characterized in that the conveyor belts' longitudinal far side, as seen from the operators' side, are raised to a tilted transversal position from a horizontal transversal position, in order to facilitate the operators' working posture.

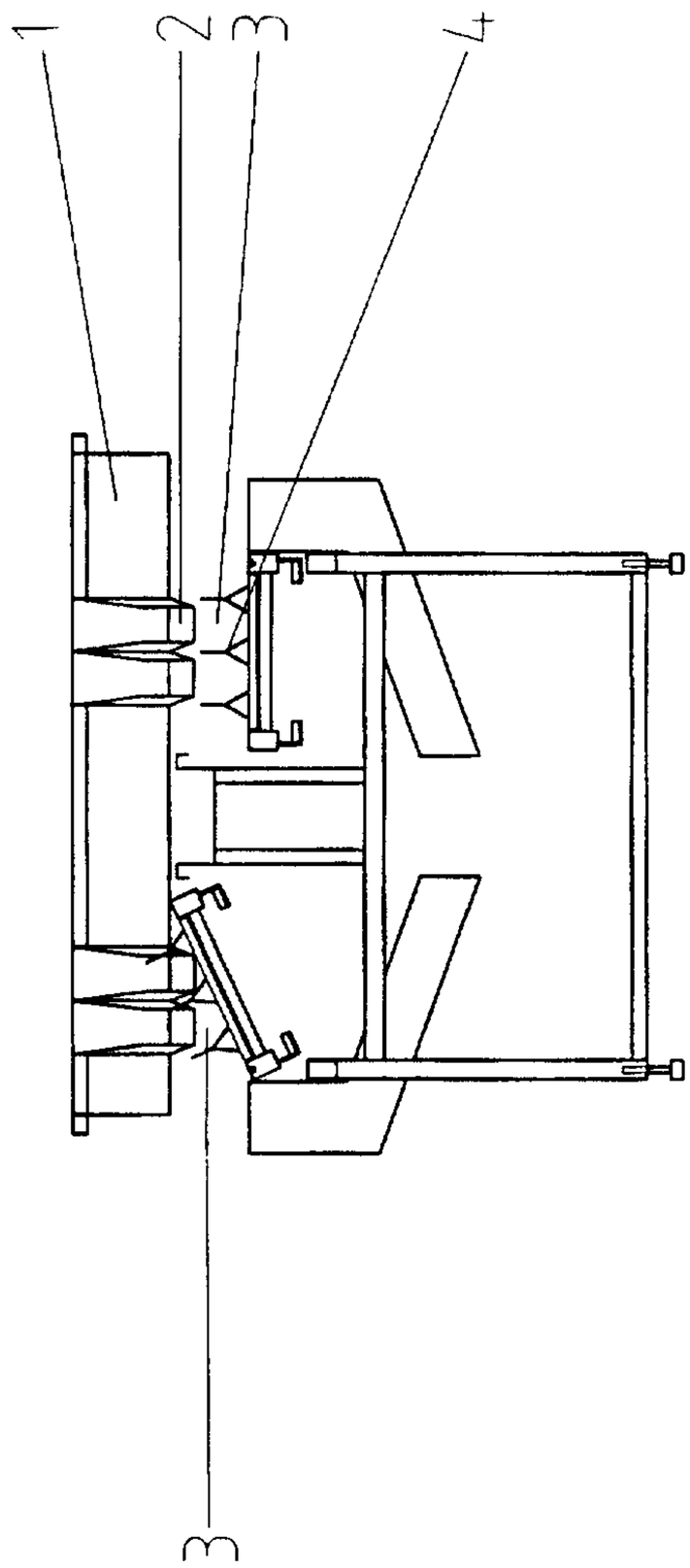
10. The method according to claim 8 or 9, characterized in that the operations at the work stations comprise slitting; gutting; throat, kidney and heart cutting and removal; and abdominal cavity cleaning by flushing and suction.



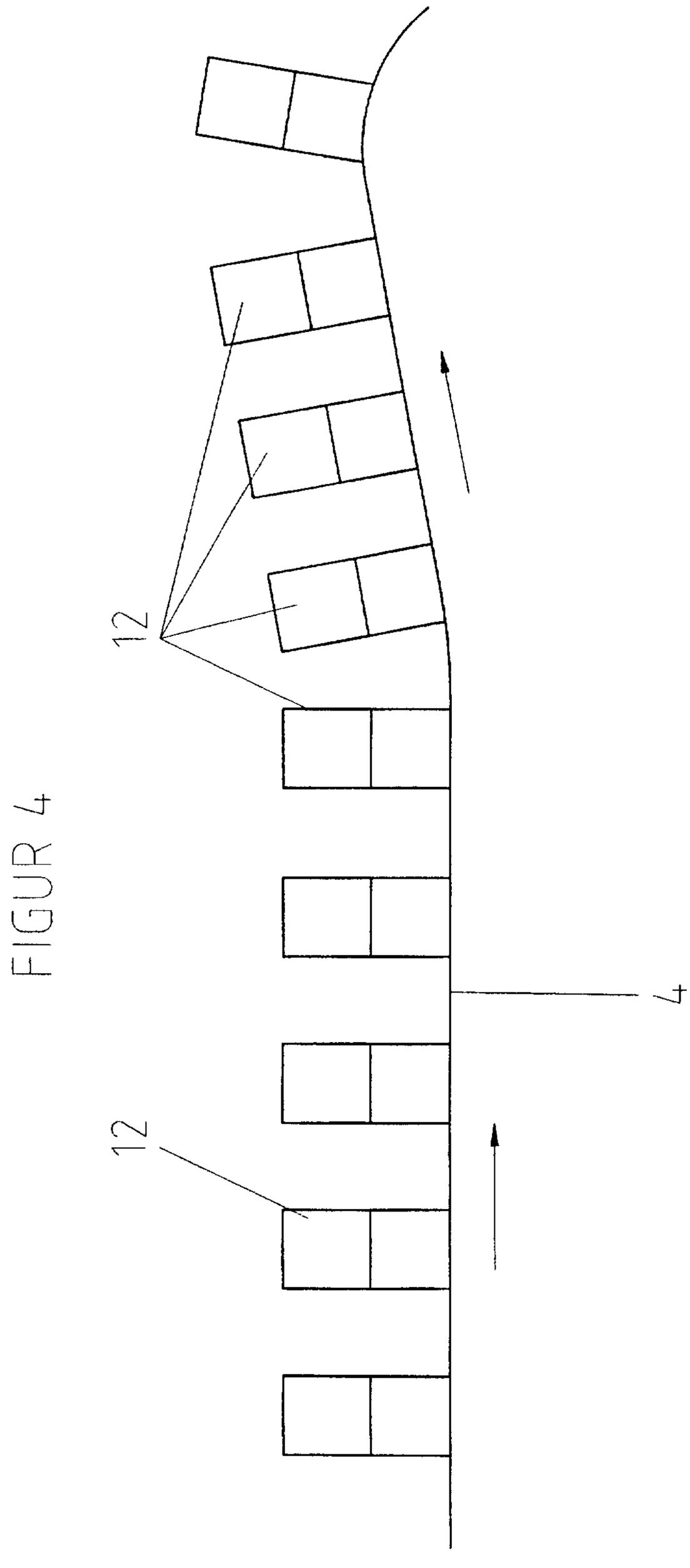
FIGUR 1



FIGUR 2

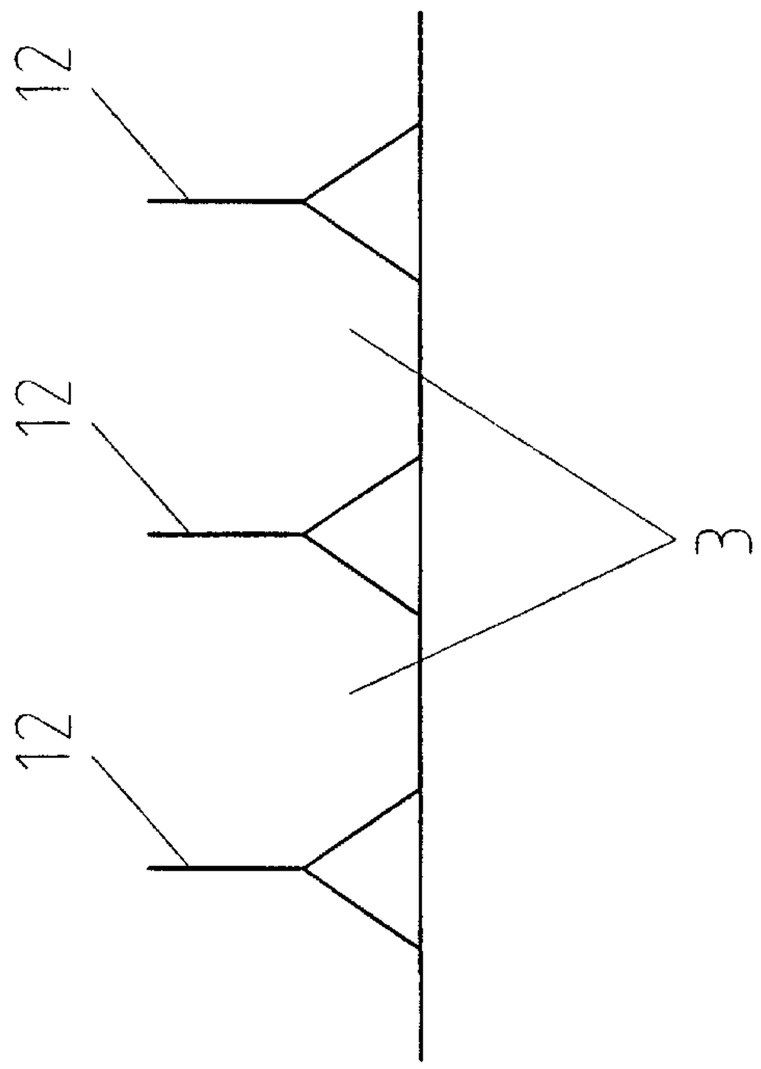


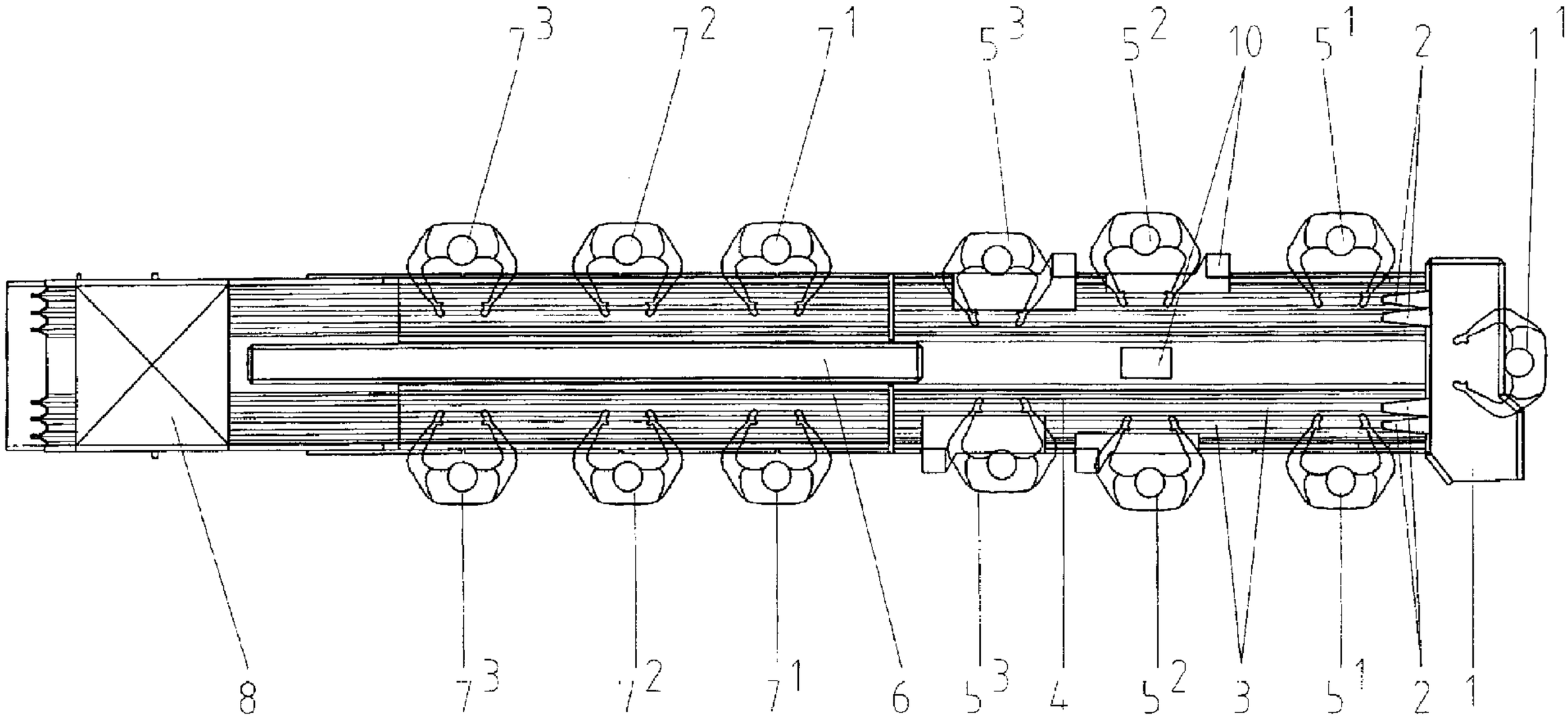
FIGUR 3



FIGUR 4

FIGUR 5




7 3
7 2
7 1
5 3
5 2
10
5 1
2
1 1
8
7 3
7 2
7 1
6
5 3
4
5 2
3
5 1
2
1