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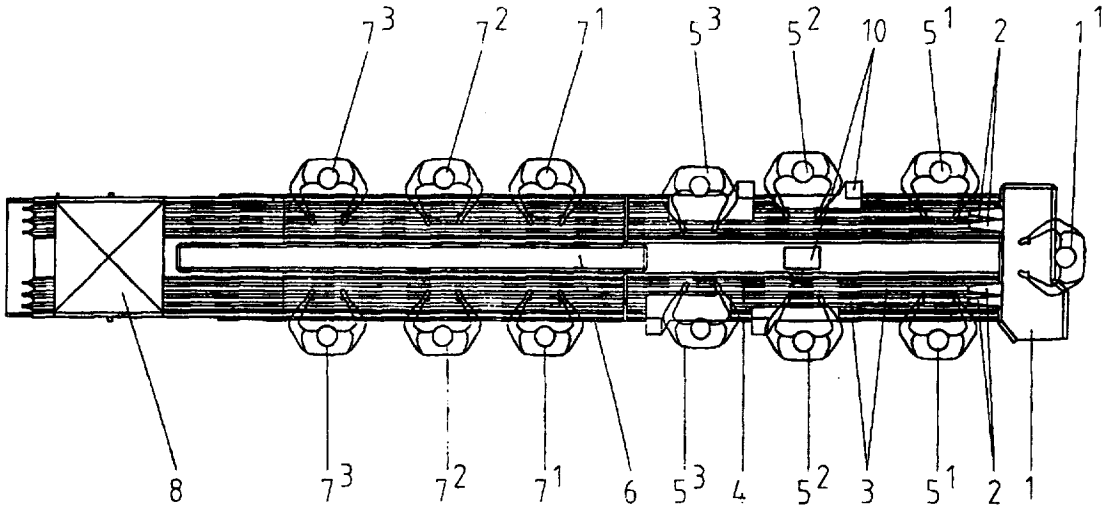
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(54) Title: METHOD FOR CUTTING AND CLEANING OF FARMED FISH AND EQUIPMENT FOR CARRYING OUT THE METHOD



(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.

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METHOD FOR CUTTING AND CLEANING OF FARMED FISH AND EQUIPMENT FOR CARRING OUT 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 inappropiate working posture and the resulting strain injuries.

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

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 effected 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 belts 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.

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 slit the belly of the fish open and the fish is conveyed further to the second pair of operators 5^2 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 fiber 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 belts 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 fig. 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. 5 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.

CLAIMS

1. A method for gutting and cleaning of farmed fish **characterized** in that the fish is taken whole and is gutted and cleaned while it lies on a conveyor belt which keeps moving while the method is being implemented.

2. The method of claim 1 **characterized** by the following steps:

i) the fish arrives into a feed trough (1) and is from there placed by an operator on one of two longitudinal conveyor belts (4) in gutters (3), belly up;

ii) when the fish passes in front of operators who are standing along the processing line, the various operations for gutting the fish, removal of the kidneys and cleaning of the abdominal cavity are effected;

iii) when the fish arrives at the end of the device, it is flushed and cleaned externally.

3. The method of one or several of the previous claims **characterized** in that the first operator (1) places the fish on a conveyor belt (4), the second operator (5^1) slits the belly of the fish lying in each gutter (3), the fish being then transported to a third operator (5^2) who removes the fish guts and disposes of them in a chute (10), and where the fish is further transported to a fourth operator (5^3) who slits the fish's throat and kidneys with a knife, the fish continuing thereafter to a fifth operator (7^1) who removes the fish's kidneys with a suction device, the fish being then transported to a sixth operator (7^2) and a seventh operator (7^3) who each in a gutter (3) clean the fish's abdominal cavity with a flushing and suction device, the fish continuing thereafter through a flushing box (8) for external flushing with water and cleaning before it leaves the conveyor belt (4), the last operation being the flushing of the conveyor belt with water.

4. A device for the implementation of the method of claims 1 to 3, **characterized** by a steel frame (11) with a feed trough (1) with longitudinal

conveyor belts (4) on each side, each of said conveyor belts (4) being provided with two separate gutters (3) where the fish is placed, and the conveyor belts (4) being adjustable at an angle to allow the operators to stand or sit in a better working posture.

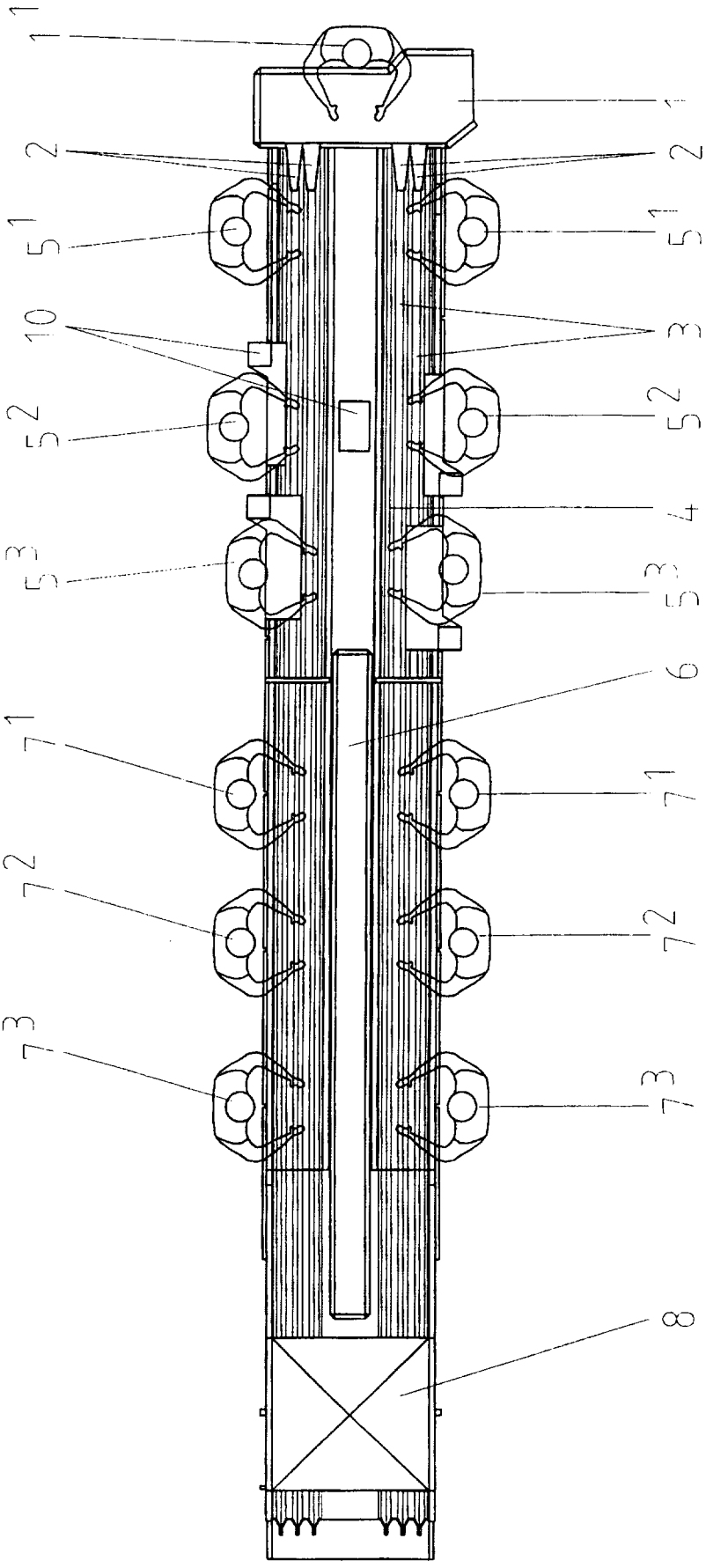
5. The method-implementation device of claim 4 **characterized** in that the device is composed of a feed trough (1) for receiving and storing fish, said feed trough (1) being provided with guides (2) along the side which faces the conveyor belts so that the fish is fed into gutters (3) running lengthwise on the conveyor belts (4).

6. The method-implementation device of claims 4 and 5 **characterized** by a steel gutter (6) fitted on top of the steel frame (11) for temporary placing of the fish which the operators are unable to finish processing, said steel gutter (6) being equipped with a water outlet to drain any water accumulating in it.

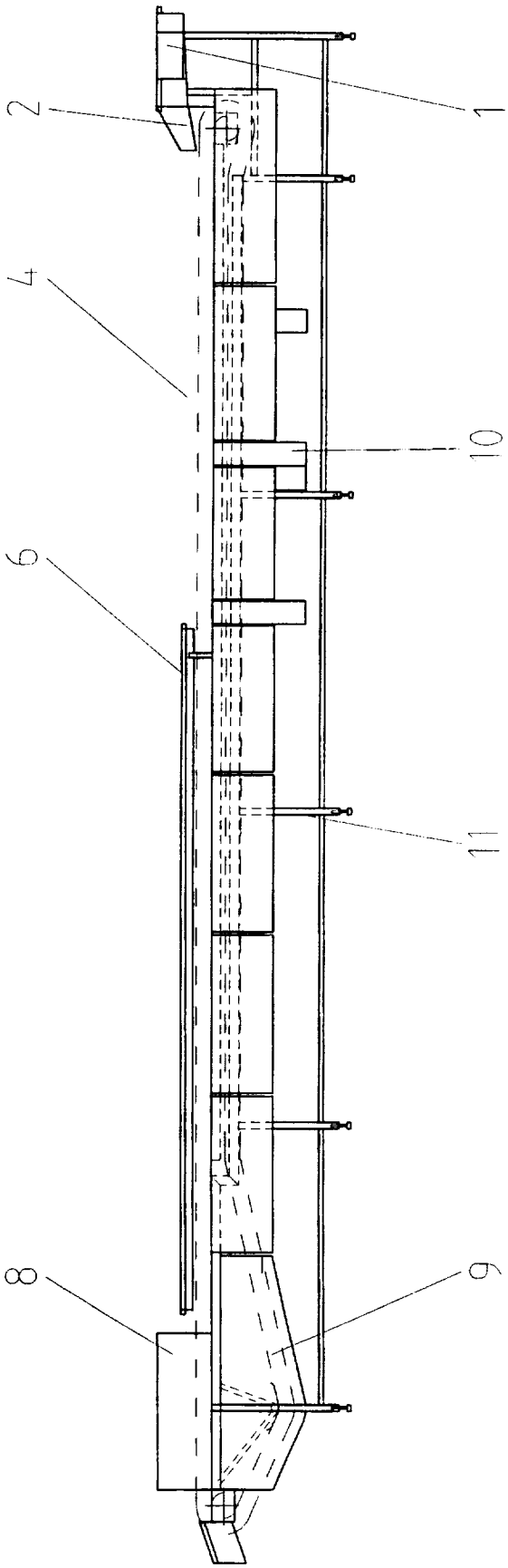
7. The method-implementation device of claims 4, 5 and 6 **characterized** by a chute (10) down which the fish guts are disposed of by the operators, and positioned on the steel frame (11) for disposal of the guts away from the device.

8. The method-implementation device of claims 4 to 7 **characterized** in that the conveyor belts (4) with fish pass in a flushing box (8) at the extremity of the steel frame (11) to complete the internal and external cleaning of the fish, and continue downwards into a washing trough (9) placed under the flushing box (8) for further cleaning of the conveyor belts (4).

9. The method-implementation device of claims 4 to 8 **characterized** in that side walls (12) on the gutters (3) consist of inverted Y-shaped elements positioned at a distance from one another along the conveyor belts (4).

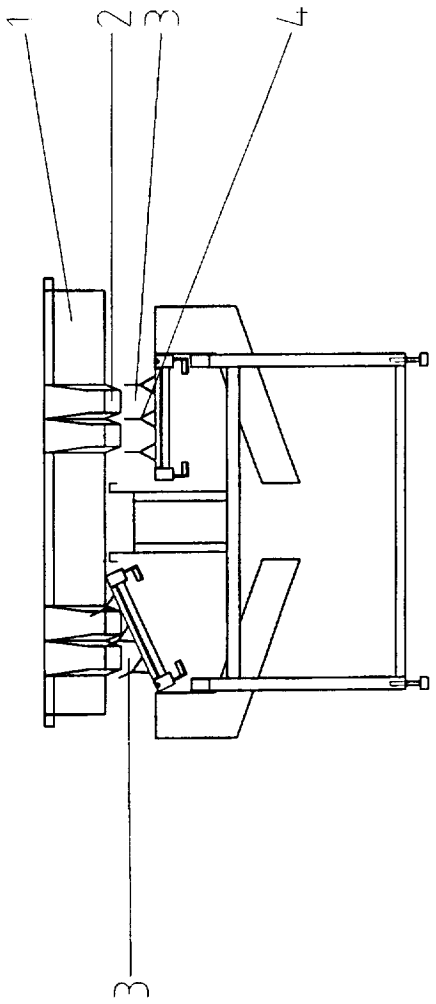


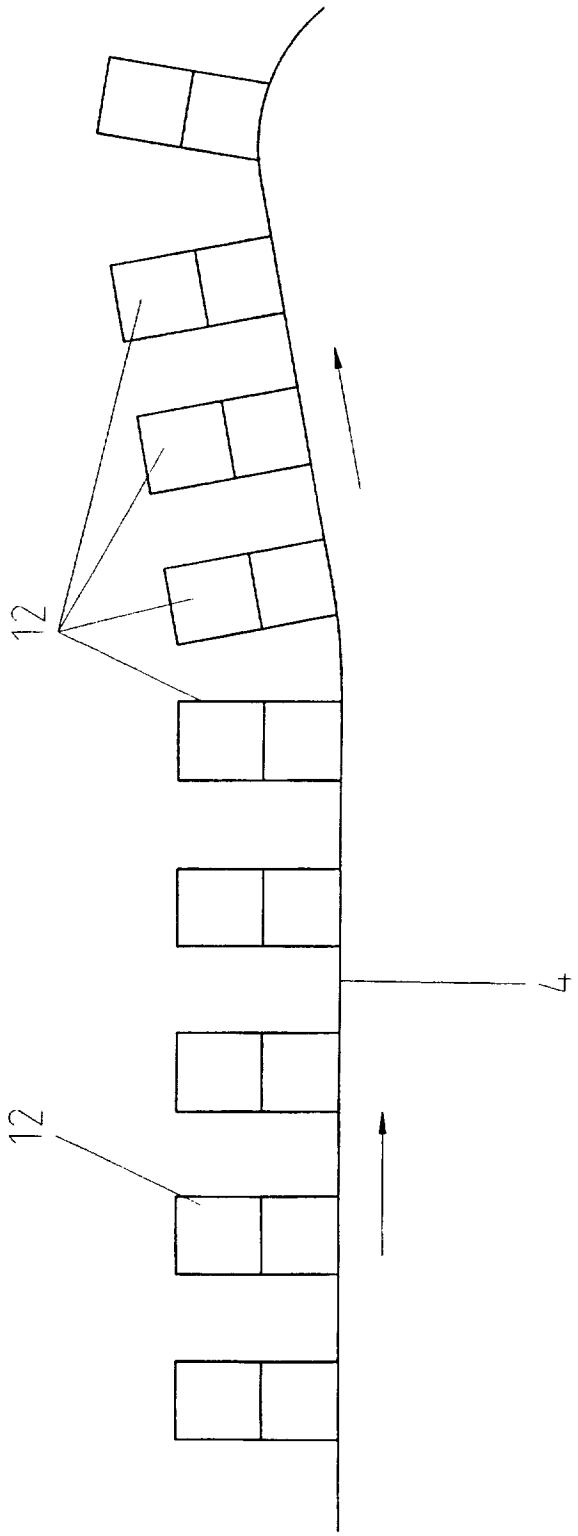
FIGUR 1



FIGUR 2

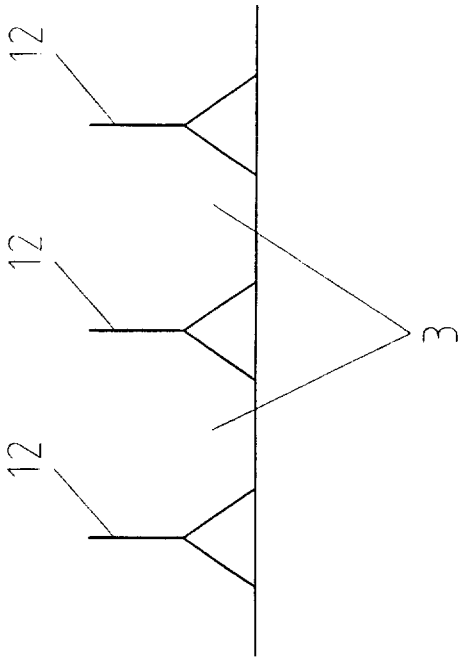
FIGUR 3





FIGUR 4

FIGUR 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 96/00232

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A22C 25/06
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)

IPC6: A22C

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	DE 268759 C (JOHANN VON EITZEN), 30 December 1913 (30.12.13), page 1, line 5 - line 14; page 1, line 53 - line 68 --	1,2
A	SE 192745 C (TRIO FABRIKKER A/S DE FORENEDE NORSKE LÖAASE- OG BESLAGFABRIKER), 17 November 1964 (17.11.64) --	2,4,5
A	NO 66303 C (DEUTSCHE HOCHSEEFISCHEREI A/G), 7 June 1943 (07.06.43) --	1,7

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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