2003

PATENT ATTORNEYS

EXAMINATION

PAPER D

The Preparation of Specifications for
New Zealand Patents

Regulation 158 (1) (d)

Duration: 4 hours (plus 10 minutes for reading).

NOTES TO CANDIDATES

1. When answering the following questions do not prepare what is commonly known as the title page for the specification.

2. You are to assume that there is no prior art apart from that set out in the questions.

QUESTION 1

Draft a New Zealand provisional specification for your client's fishing sinker as described below. Given that the invention is fairly simple, it is important that your drafting covers some embodiments of the invention not necessarily described by the client.

You have conducted patent searching and have found the enclosed prior art. This must be taken into account when drafting the provisional specification.

Your client's new fishing sinker design is illustrated in Figure 1. A second copy is provided for you to use in your specification.

The design essentially consists of a lead weight situated at one end of the sinker and a length of wire extending out from the back of the sinker.

The sinker is used for casting. In use the fishing line is attached to the loop at the end of the attachment wire and the line with the sinker attached is cast forward.

The applicant believes that the shape of the sinker weight is aerodynamic which helps in its passage through the air. The applicant also believes that the casting action is assisted as a consequence of

a) the length of the wire being greater than the length of the weight, and
b) the mass of the weight being greater than the mass of the wire.

Sand grips in the form of wires extend from the weight.

The client has provided you with a table showing typical weights and lengths as below. Please note the wire length refers to the amount of wire that extends out from the weight and does not refer to the actual total length of the wire.

Weight (g)	Attachment Wire length (mm)	Weight length (mm)
84	78	30
112	89	38
140	100	46

The sinkers are designed so that for each 28 gram increase in the weight of the sinker, the length of the weight increases by 8mm and the wire length increases by 11mm.

A typical method of making a sinker is as follows. A jig is used to bend the wire for the wire length and for the sand grips. The wires are held into a mould into which lead is poured. A cooling jacket cools the mould. A further advantage of the tapered shape of the weight is that once the lead is cooled the jacket can be readily removed by pulling the attachment wire.

On a separate page relay to the client in bullet point form brief questions or comments you want the client to be aware of.

50 MARKS

QUESTION 2

Your client comes to you with a provisional specification which has been drafted by another firm (copy enclosed).

Since the specification was drafted, your client has found two relevant pieces of prior art, GB1309359 and US4321729 (copies enclosed).

Draft a set of claims for the invention that distinguishes it over the new prior art found.

Draft a letter to the client discussing the prior art and explaining how you drafted the claims to distinguish the invention.

50 MARKS

Question 1 - Client's Invention

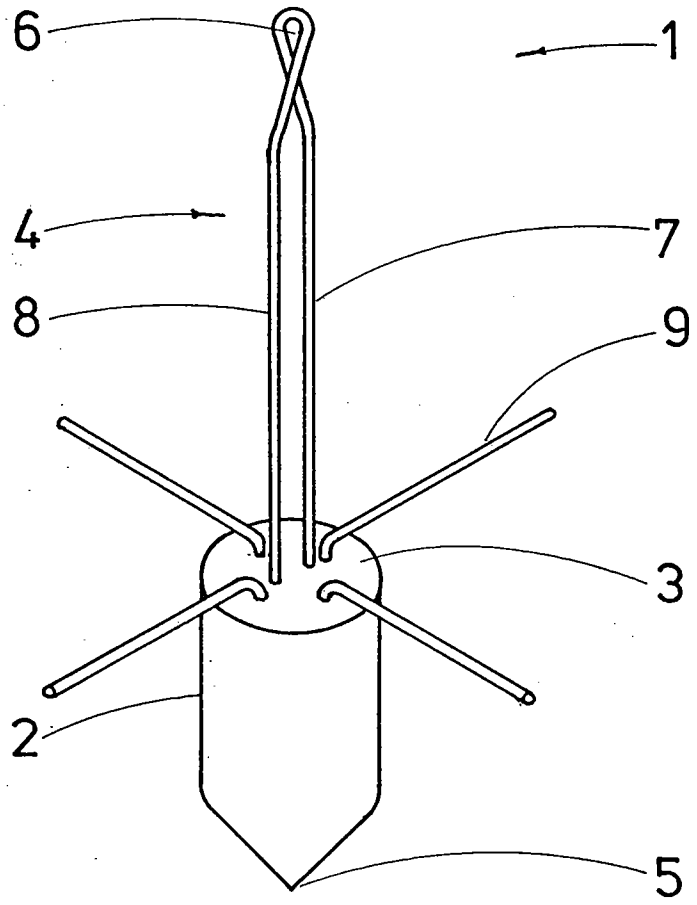

FIGURE 1

Question 1 - Client's Invention

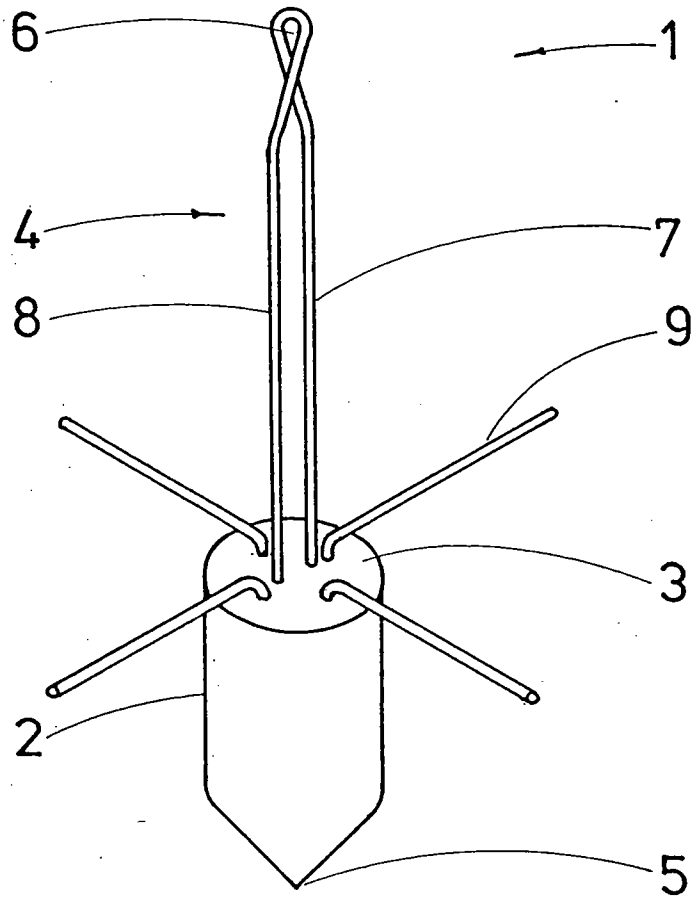

FIGURE 1

Question 1 Prior Art

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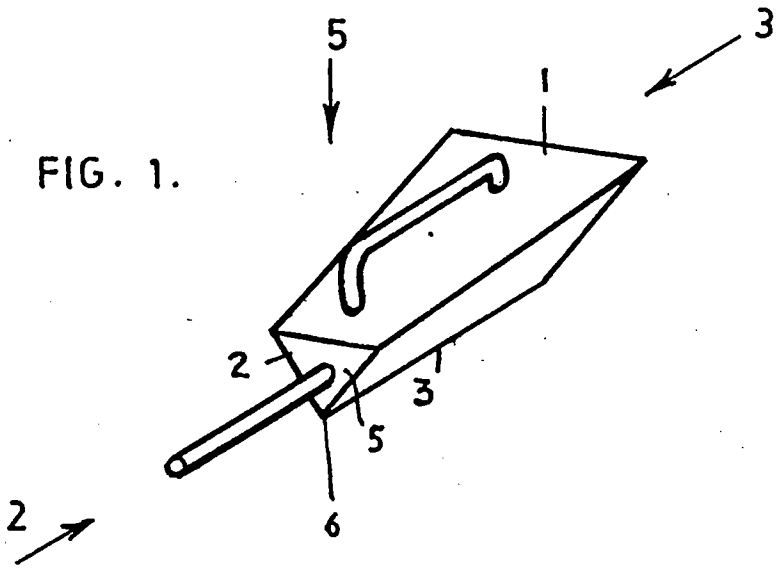


FIG. 1.

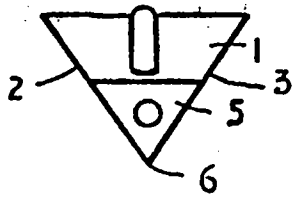


FIG. 2.

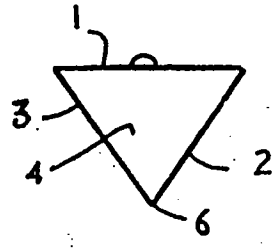


FIG. 3.

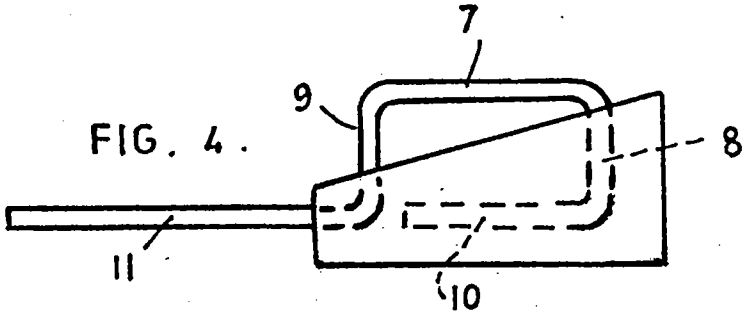


FIG. 4.

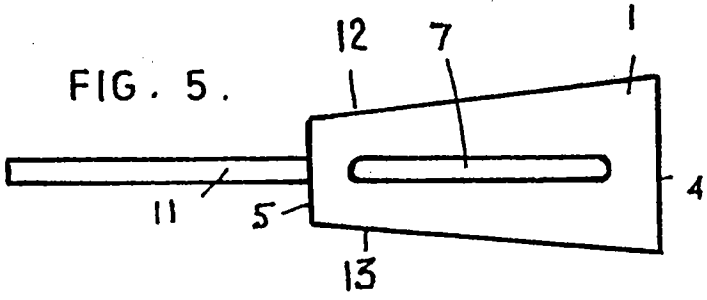
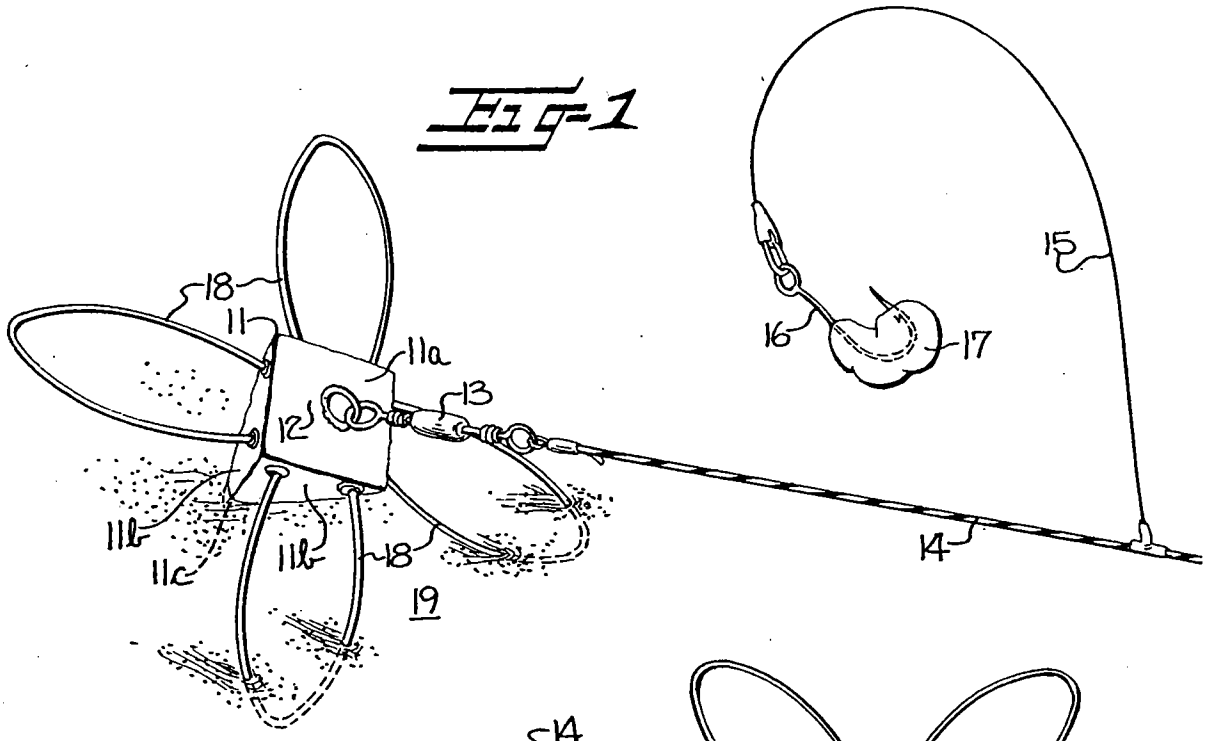


FIG. 5.

GEORGE ALEXIS PEROFF,
By His Authorised Attorneys,
JOHN A. REMMINGTON & ASSOCIATES

Question 1 Prior Art

Fig-1



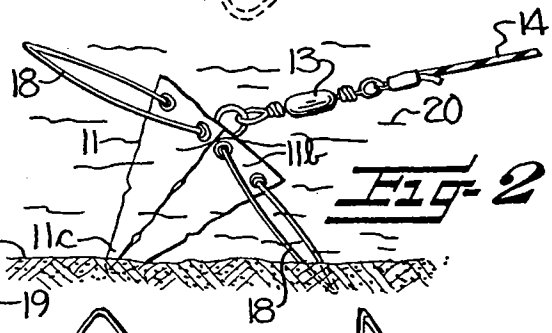


Fig-2

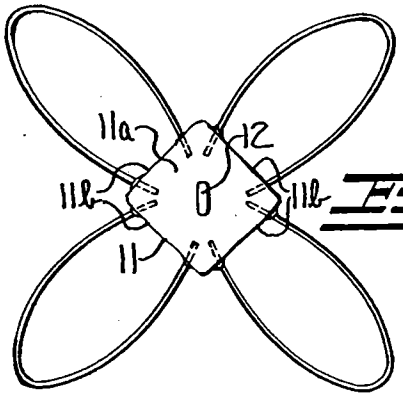


Fig-3

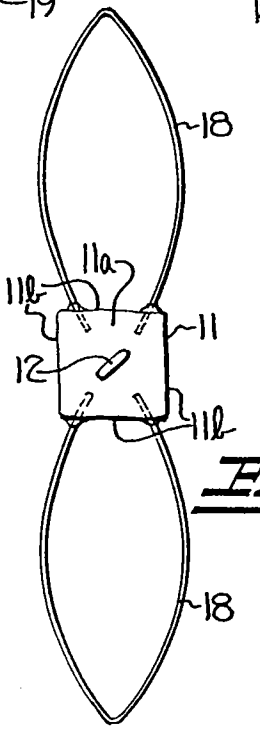


Fig-4

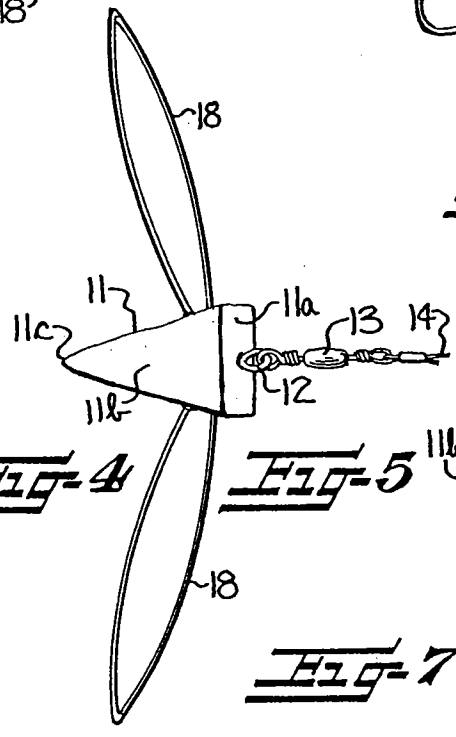


Fig-5

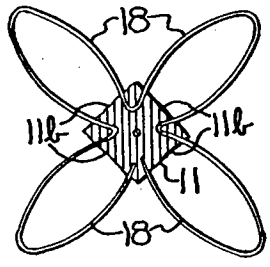


Fig-6

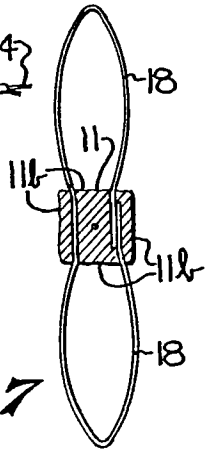


Fig-7

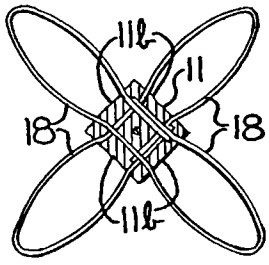


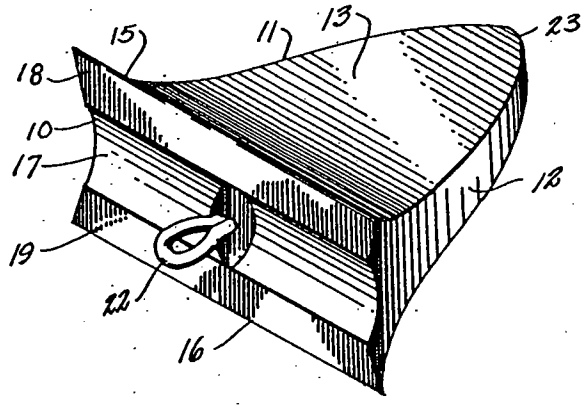
Fig-8

Question 1 Prior Art

L. F. UPDEGROVE 2,644,266

FISHING LINE SINKER

FIG. 1.



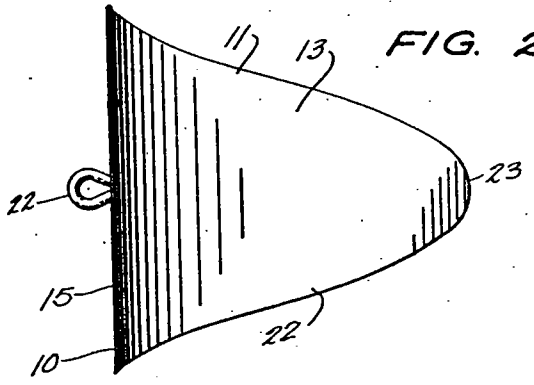


FIG. 2.

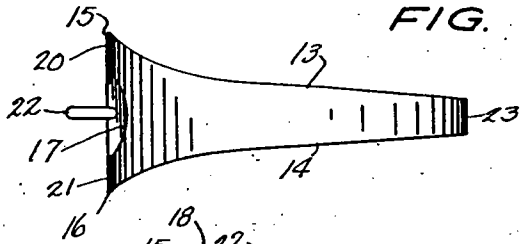


FIG. 3.

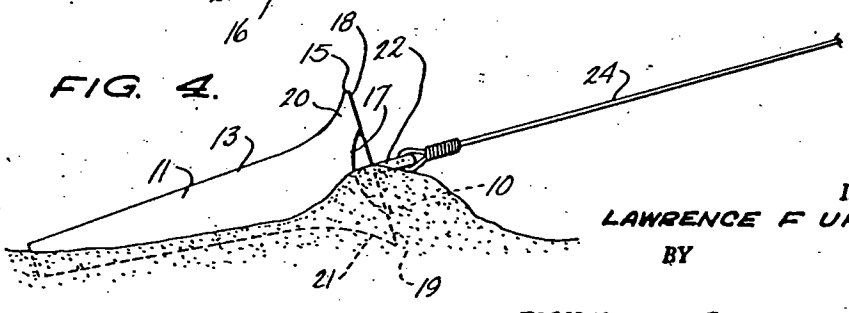


FIG. 4.

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BY

McMorrow, Berman + Davidson
ATTORNEYS.

Question 1 Prior Art

Nov. 20, 1956 K. ILLGNER 2,770,909

FISHERMAN'S ANTI-FOULING SINKER

Filed Jan. 3, 1956

Fig. 1.

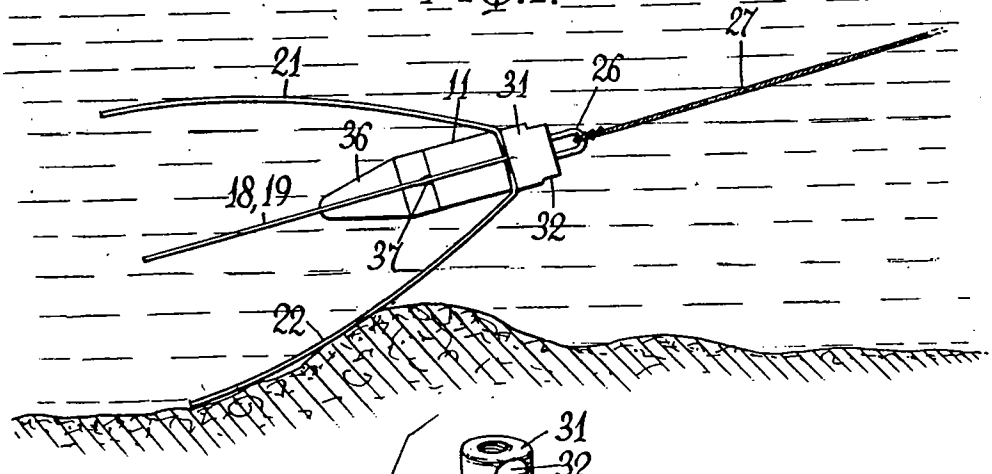
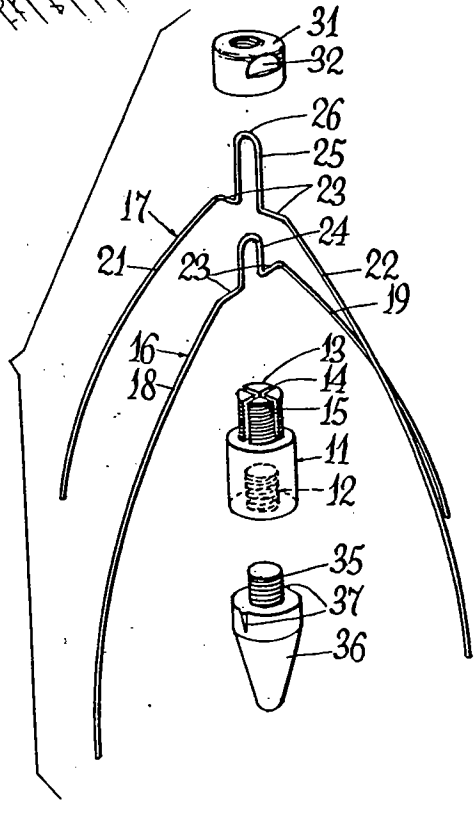


Fig. 2.



INVENTOR.
Karl Illgner,
BY
ATTORNEY.

Question 2 - Provisional Specification

Method and apparatus for aligning a dead fish

Description:

The invention concerns a method for aligning a dead fish, a head-side section of which is to be separated from its torso at a preset location with a blade of which the cutting edge runs transversely to the orientation of the fish in a cutting plane relative to which the fish is aligned.

Furthermore the invention consists in an apparatus for aligning a dead fish of which a head-side section is to be separated from its torso at a preset location with a blade of which the cutting edge is arranged transversely to the orientation of the fish in a cutting plane relative to which the fish can be arranged to make a blade cut.

In the following, the term "head" is to be understood to mean a head-side portion of a fish also possibly including the gills, side fins and/or collar bones. Therefore, fish of which the head as such has already been cut off with such elements left on the torso also have to be considered to fall within the scope of the invention.

Machines for separating a head from a torso of a fish are known. The blade for separating the head is to be guided at a location of the fish at which as much fish flesh as possible remains on the torso, and the head is separated along a rear boundary of its bone facing towards the torso. Here it turned out that side fins mark with sufficient reliability this location which is particularly suitable for separating the head. For this reason the dead fish is aligned with respect to these side fins in a trough which transports the fish and which is divided into head and body supports. A cut is made with a blade along this division, this being either immediately in front of the side fins in a direction towards the head or immediately behind the side fins in a direction towards the torso.

Here it should be taken into account that the dead fish lies in the trough used to convey it with a clearance which allows a movement of the fish in its longitudinal direction. This clearance is smaller for large fish than for small fish. The clearance is limited by means of the side fins which serve as a measure for a cut which separates the head from the torso. These side fins catch when the fish is displaced within the trough in

a catching device which is provided for this purpose and in relation to which a cutting plane in which the blade used to separate the head is moved, is positioned.

With known devices for aligning the fish, displacement of the fish within the trough was a problem. This was caused by the fact that the dead fish could not be gripped with the necessary reliability within the trough, so that misalignments were common. In that case for example the fish for the purpose of displacement within the trough was acted upon in the region of its mouth by a slide plate which was intended to displace the fish rearwards in its longitudinal direction in a direction facing away from the head. Depending on the resistance with which the fish met within a trough, the head was deformed without displacement of the fish taking place. The fish therefore could not be moved into a position in which optimum separation of the head from the torso was possible.

Furthermore it has also been attempted to grip the fish in form-locking relationship in the region of its torso in order to align it within the trough. In this case difficulties arose in so far as the torso essentially consists of fish flesh which was deformed elastically when forces were applied by means of a form-locking coupling device, so that in this respect too there was no alignment of the fish, only a random combination of individual influencing variables.

Finally a method for coupling a dead fish to a displacement tool in which the head was coupled to the displacement tool has also already been practised. The latter had a spike on which the fish head was impaled. The spike extended through the eye sockets of the fish head. This method requires considerable attention and concentration capacity of an operator performing impalement of the head. The operator however over a manageable period of his work with a fish succession of 30 to 40 fishes per minute could not ensure with the necessary reliability that the spike passed through the eye sockets, so that the head was not coupled to a displacement tool with the necessary reliability. Dependence of coupling on the attention of an operator therefore proved to be inadequate.

It is therefore the object of the present invention to couple the fish to an alignment tool so reliably that the head is separated from the torso at a preset location.

This object is now achieved with respect to the method by the fact that the fish is gripped in form-locking relationship at a dimensionally stable location by a movable

positioning device and displaced in a direction towards the cutting plane until the preset location lies in the cutting plane.

By coupling the positioning device to a dimensionally stable location of the fish body it is ensured that no inaccuracies in positioning of the fish occur due to elastic deformations of the fish body.

With respect to the apparatus the set object is achieved by the fact that a positioning device which can be brought into form-locking engagement with a dimensionally stable location of the fish and which is provided with a slide mechanism that aligns the fish, is provided.

Due to this positioning device, coupling of the fish becomes independent of the attention of an operator. Coupling to the dimensionally stable location ensures that elastic deformations of the fish body do not lead to unwanted shifting of a cutting point.

According to a preferred embodiment of the invention the preset location is oriented by side fins of the fish. These mark with sufficient reliability the transition from the head to the torso so that, depending on requirements, the head is separated on a side of the side fins facing towards it or on a side of the side fins facing away from it.

According to a further preferred embodiment of the invention the positioning device is caught in form-locking relationship in the region of the head. As the head is the only dimensionally stable location of a fish body, it is especially suitable for transmitting the forces applied to the fish body in its region, to the whole of the fish body.

According to a further preferred embodiment of the invention the positioning device penetrates with at least one pointed object into a flesh cover of a skull bone which is present in the course of the lateral boundary surface and in which it is clamped in form-locking relationship. This flesh cover is so thick that the positioning device can be clamped in it. On the other hand the thickness of this flesh cover does not allow deformation with respect to a skull bone covering it. Forces which are applied to the flesh cover are imparted directly to the skull bone and hence to the whole of the fish body.

Further details of the invention are apparent from the detailed description below and the attached drawings in which a preferred embodiment of the invention is illustrated by way of example.

The drawings show:

Figure 1 partly sectional side view of the positioning device at the beginning of the sliding process,

Figure 2 partly sectional side view of the positioning device at the end of the sliding process,

Figure 3 front view of a tool carrier,

Figure 4 schematic side view of a catching device,

Figure 5 front view of a rocker mounted in a guide,

Figure 6 top view of a positioning device, and

Figure 7 top view of a positioning device for a fish which has been pre-decapitated but with the side fins and collar bones left on the torso.

A machine for positioning fish 1, 2 essentially consists of troughs 3 and a positioning device 4. The fish 1, 2 lie in the troughs 3 in which they are conveyed transversely to their longitudinal extent 5 by means of chains 6 to which the troughs 3 are connected by bolts 7. The troughs 3 are divided into a head support 8 and a body support 9. Between the head support 8 and the body support 9 extends a slot 10 in the region of which is arranged a blade 11. This blade 11 is constructed as a circular blade which is mounted in rotating relationship in the region of the slot 10. It is however also conceivable to arrange other blades 11, for example translationally operating blades, in the region of the slot 10. Furthermore, instead of one blade 11 a pair of blades can be provided in the region of the slot 10 if, depending on the kind of fish 1, 2 to be decapitated, a so-called wedge cut is to be made.

The fish 1, 2 lies with its torso 12 on the body support 9 and with its head 13 on the head support 8. The head 13 is the most dimensionally stable part of the fish 1, 2, which is firmly surrounded with a thin flesh cover 14. The fish 1, 2 lies in the respective trough 3 on one of its lateral boundary surfaces 15. From these lateral boundary surfaces 15 protrude, in the side position of the fish 1, 2, side fins 16, 17 which are embedded by their respective roots 18, 19 in the lateral boundary surfaces 15.

Above the troughs 3 the positioning devices 4 are arranged in a carousel 20 which rotates about a shaft 21. This shaft 21 is mounted rotatably in a stand 22. The carousel 20 has two side plates 23, 24 which run with planes parallel to each other and which are rigidly connected to the shaft 21.

The positioning devices 4 are mounted rotatably on shaft ends 25, 26 in the two side plates 23, 24. Furthermore the positioning devices 4 are mounted in a channel curve 27 on rolling bodies 28 or on slide pieces which roll in the channel curve 27. The channel curve 27 extends in an oval 29. Here the oval 29 is arranged relative to a circle curve 30 described by the carousel 20 such that the oval 29 and the circle curve 30 overlap each other such that together in a bottom position 31 facing towards the troughs 3 they convey the positioning devices 4 in a path running roughly parallel to the troughs 3. In this way, in the bottom position 31 the positioning devices 4 which are guided on the carousel 20 and the channel curve 27 run with their lower boundaries 32 roughly parallel to a trough inner surface 33 acted upon by the fish 1, 2.

From the lower boundaries 32 of the positioning devices protrude pointed objects 34, for example nails. The latter become buried in the flesh cover 14 of the head 13 in the bottom position 31, and so guide the head 13 and hence the whole fish 1, 2 of which the head 13 is the most dimensionally stable part. The carousel 20 and hence also the rolling bodies 28 passing through the channel curve 27 are connected mechanically, for example by a chain, to the chains 6 of an advance mechanism with which the troughs 3 are conveyed. In this way the carousel 20 has a speed which leads to the path speeds of the positioning devices 4 in the bottom position 31 corresponding to the advance speed at which the troughs 3 are conveyed. In this way the heads 13 of the fish 1, 2 lying in the troughs 3 remain during a whole function length 35 in form-locking engagement with the pointed objects 34 of the positioning devices 4. This function length 35 is composed of a lowering section 36 in which the positioning device 4 is lowered so far onto the head 13 of the fish 1, 2 that the pointed objects 34 become

engaged in form-locking relationship with the head. The lowering section 36 is followed by a sliding section 37 in which the fish 1, 2 is displaced along its longitudinal extent 5 in the trough 3 until it lies with a preset location 38 in the region of a cutting plane 39 in which the blade 11 rotates.

The sliding section 37 is followed by the last section 40 of lifting out the function length 35. In this lifting section 40 the positioning device 4 is lifted out of form-locking engagement with the head 13 and conveyed away by the carousel 20 until in the region of the lowering section 36 it is again lowered in a direction towards a head 13 lying in the trough 3.

On this movement of the fish 1, 2 transversely to its longitudinal extent 5 is superimposed a movement of the fish 1, 2 in the direction of the longitudinal extent 5. This movement of the fish takes place in the direction of the troughs 3, which runs at right angles or obliquely relative to a blade plane spanned by the blade 11. A tilted position of the troughs 3 allows for the fact that the head 13 is separated from the torso 12 appropriately obliquely to the longitudinal extent 5 of the fish 1, 2. This alignment of the fish 1, 2 relative to the blade plane 41 leads to the head 13 being separated from the torso 12 along a blade plane 41 in which essential parts of the fish flesh which are located in the upper part 42 of a fish 1, 2 remain on the torso 12, so that the blade plane 41 extends directly in the region of one end of the head 3 facing towards the torso 12.

In this region are also located the roots 18, 19 of the side fins 16, 17, so that the latter are also a measure for separation of the head 13 from the torso 12. For this purpose transversely to the direction of the troughs 3 are provided catching devices 43, 44 which have an upper portion 45 and a lower portion 46. The upper portion 45 faces in a direction towards the positioning device 4 and is associated with an upper portion of the fish 1, 2 protruding from the trough 3. By contrast the lower portion 46 is provided in the region of the slot 10 between the head support 8 and the body support 9 and serves to catch the side fin protruding from this slot 10. The upper portion 45 of the catching device 43, 44 is mounted on a linkage 47 which is vertically yielding. The latter can be mounted in plain bearings, not shown.

The pointed objects 34 are attached to a plate 49 which is attached by a spring arm 50 to two parallel pivot levers 51, 52. These two pivot levers 51, 52 are mounted pivotably on the positioning device 4. Its pivot plane extends in the longitudinal extent 5 of the fish 1, 2.

The two pivot levers 51, 52 are connected by a coupling device 53 to a spring element 54 which is permanently mounted in the stand 22. The spring element 54 pulls the two pivot levers 51, 52 and the plate 59 provided with the pointed objects 34 in a direction towards the head 13 of the fish 1, 2 which is lying in a trough 3. Furthermore the spring arm 50 is acted upon by a compression spring 55 which biases the spring arm 50 downwards in a direction towards the head 13. This compression spring 55 is attached to one of the levers 51, 52. The spring element 54 pivots the two levers 51, 52 about the pivot points 56, 57, so that the ends 58, 59 of the pivot levers 51, 52 facing away from the pivot points 56, 57 are pivoted in a direction towards the fish 1, 2. In the process the plate 59 is biased in a direction towards the head 13, so that form locking is produced between the pointed objects 34 and the head 13. This is sufficient to apply the forces transmitted by the spring arm 50 to the head 13 of the fish and displace the latter together with the torso 12 within the trough 3. In the process the side fins 16, 17 are caught by the catching device 43, 44 until the movement of the fish 1, 2 comes to rest not later than in the region of the roots 18, 19. In this position the blade 11 makes the separating cut by which the head 13 is separated from the torso 12.

The pivot levers 51, 52 are pivoted as a function of a curve 60. The latter releases the levers 51, 52 for pivoting after the plate 49 with its pointed objects 34 has engaged in form-locking relationship in the head 13 of the fish 1, 2.

For reasons of safety, apart from the spring element 54 there is provided another spring element 61 which runs parallel to the spring element 54. This spring element 61 maintains operation of the whole apparatus in the event that one of the two spring elements 54, 61 breaks after exhaustion of its life. The two spring elements 54, 61 can have different spring forces for the transport of small or large fish, but each of the two can also have the same spring force.

A fish 1, 2 is laid in a trough 3 and conveyed transversely to its longitudinal extent 5 in a direction towards the positioning device 4. In the process it passes into the region of the function length 35, at the beginning of which in the lowering section 36 the pointed objects 34 of the plate 49 become buried in form-locking relationship in the head 13 of the fish lying on its lateral boundary surface 15. Now the positioning device 4 is conveyed at the same speed as the fish 1, 2 in its trough, so that form locking is maintained between the pointed objects 34 and the head 13. In the process the fish 1, 2 which is held fast by the positioning device 4 moves into the sliding section 37 and is

there, owing to the force of the spring elements 54, 61, displaced within the trough 3 until the movement of the fish 1, 2 comes to rest in the region of the side fins 16, 17. In this case the sliding region 37 can extend across several widths of the trough 3, as the catching device 43, 44 has several sections 43, 44 which are oriented relative to each other such that the side fins 16, 17 are guided on the sections 43, 44 of the catching device. In this way the fish 1, 2 can be displaced at a reduced speed which however does not impair the working speed of the whole apparatus.

After the fish 1, 2 in the region of the side fins 16, 17 is positioned in the trough 3, the fish 1, 2 lying on the trough 3 is cut by the rotating blade 11. This cut runs at an angle of for example 0 - 15° to the direction of the drive shaft 21 of the positioning device. In this way optimum cutting of the fish 1, 2 is obtained. Here it is possible to lock the sliding system consisting of the two pivot levers 51, 52 with a ratchet system 62, in order not to let the forces of the springs 54, 61 act on the fish 1, 2 during the following head cut. This ratchet system 62 is unlocked before the sliding section 37 by a curve 63 fixed to the stand. Due to the shape of this curve 63 the whole system can be locked again.

Here however it turned out that it is advantageous to maintain the pressure of the spring 54, 61 during the cutting process, in order to cause effective cutting. As soon as the blade 11 has approximately half penetrated into the fish 1, 2, the head 13 has an increased freedom of movement. The forces maintained by the springs 54, 61 and transmitted by the plate 49 lead to a slight rotation of the head 13 so that the blade 13 cuts further into the nape region of the fish 1, 2.

During cutting, form locking between the fish 1, 2 and the positioning device 4 is maintained. This prevents the fish 1, 2 from changing position while the cut is made due to the friction of the blade 11, for example moving fast forward uncontrolled. For this reason it is only after the cut is made that the plate 49 with the pointed objects 34 is raised, so that the positioning device 4 releases the head 13 which has meanwhile been separated.

Figure 7 shows, in principle, the possibility of processing fish, as well, whose head has been removed in part due to standards required following regulations and habits in various regions of the world. In such fish, the collar bone and side fins are still present on the torso and are to be cut off to prepare the torso for further processing such as filleting. To this end, and as can be taken from this figure, the plate 49 of the above-

mentioned embodiment has been replaced by plate 49a which is arranged to be essentially perpendicular to the bottom of troughs 3, with its pointed objects 34a facing towards the torso, i.e. the pre-cutting face. The plate 49a is attached to the positioning device 4 which moves the pre-headed fish, as described before, but with the pointed objects 34a preventing the backbone/vertebral column from sliding on the plate and thus losing its aligned and correct position.

Fig. 1

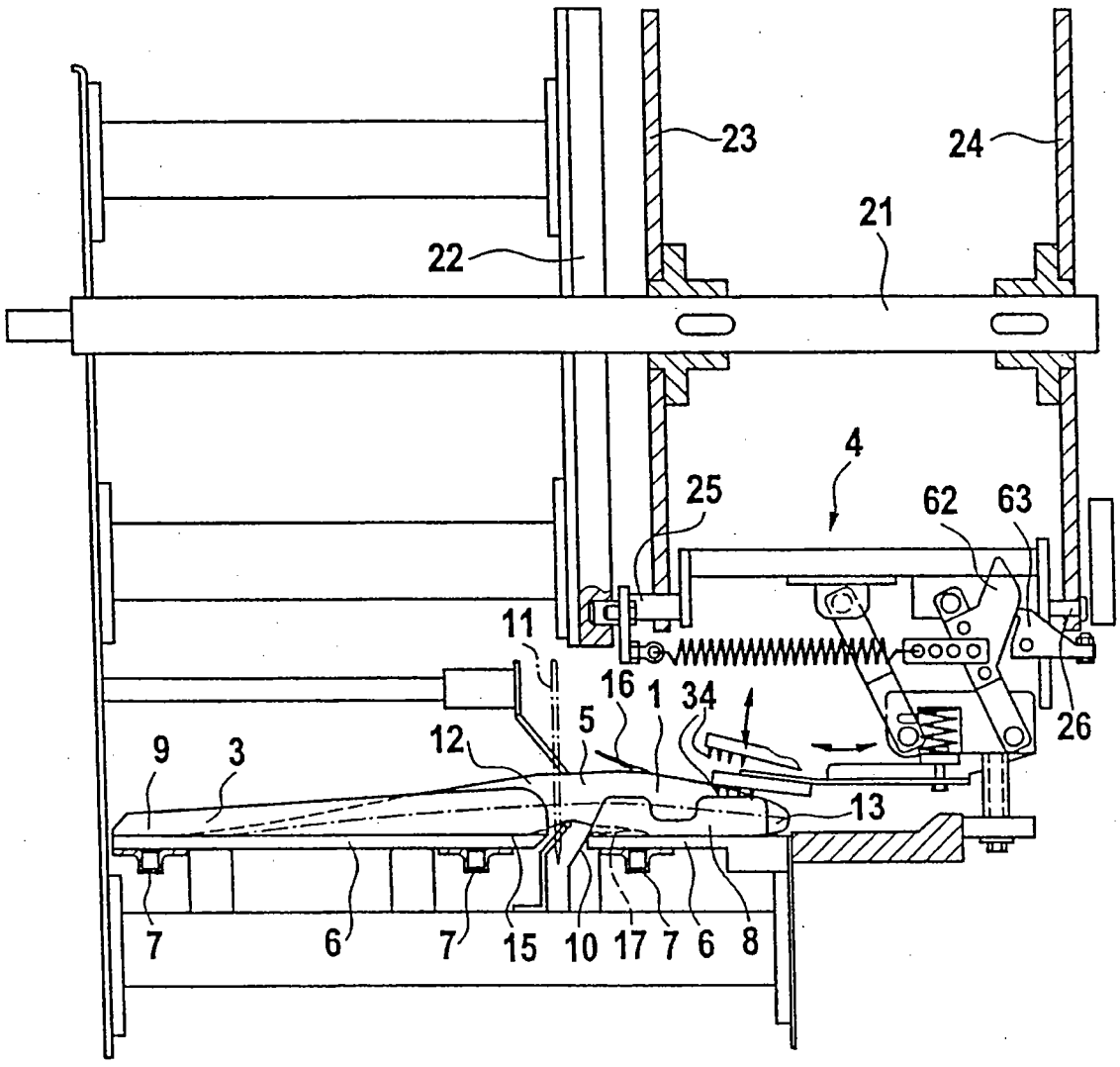


Fig. 2

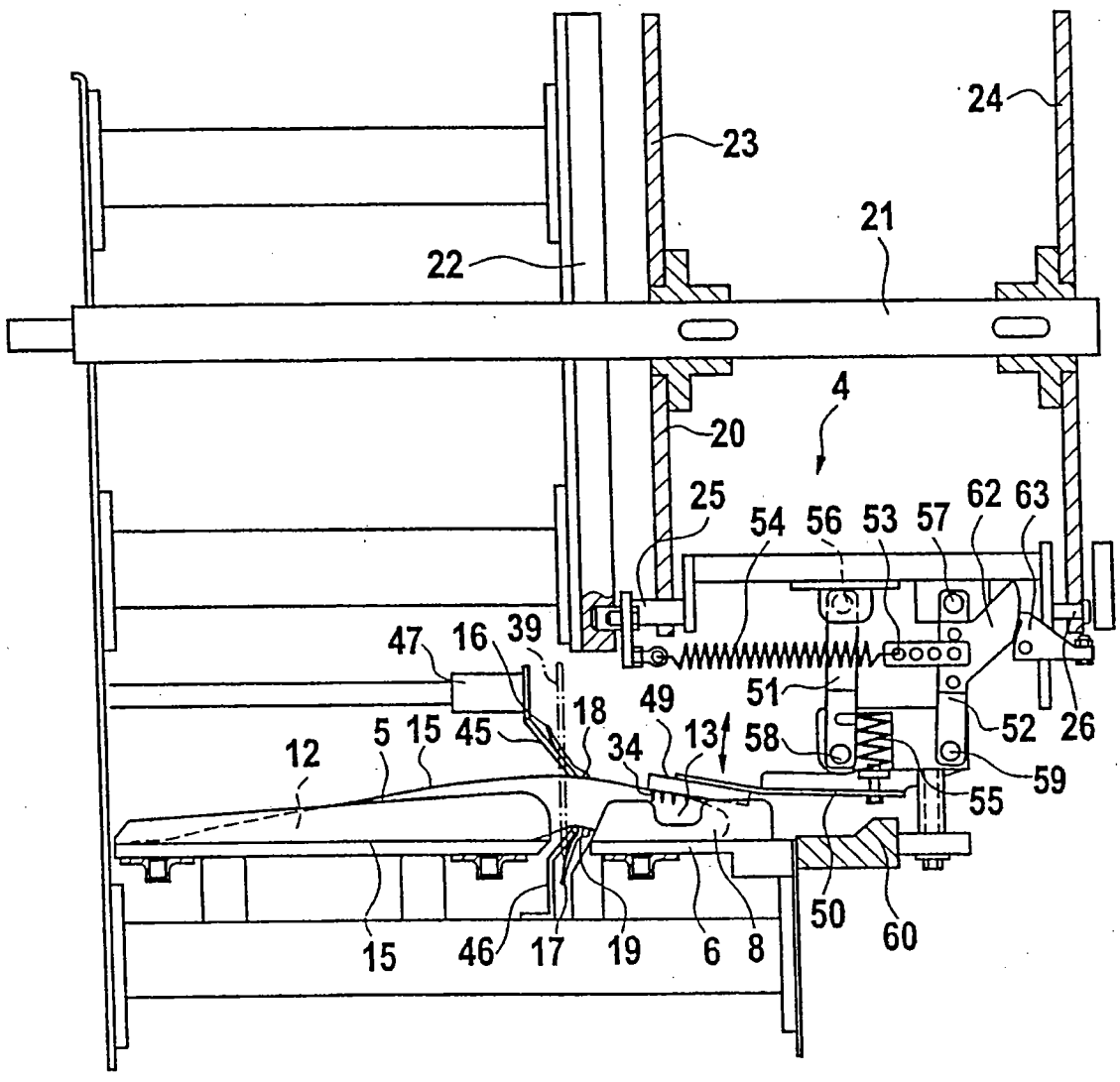

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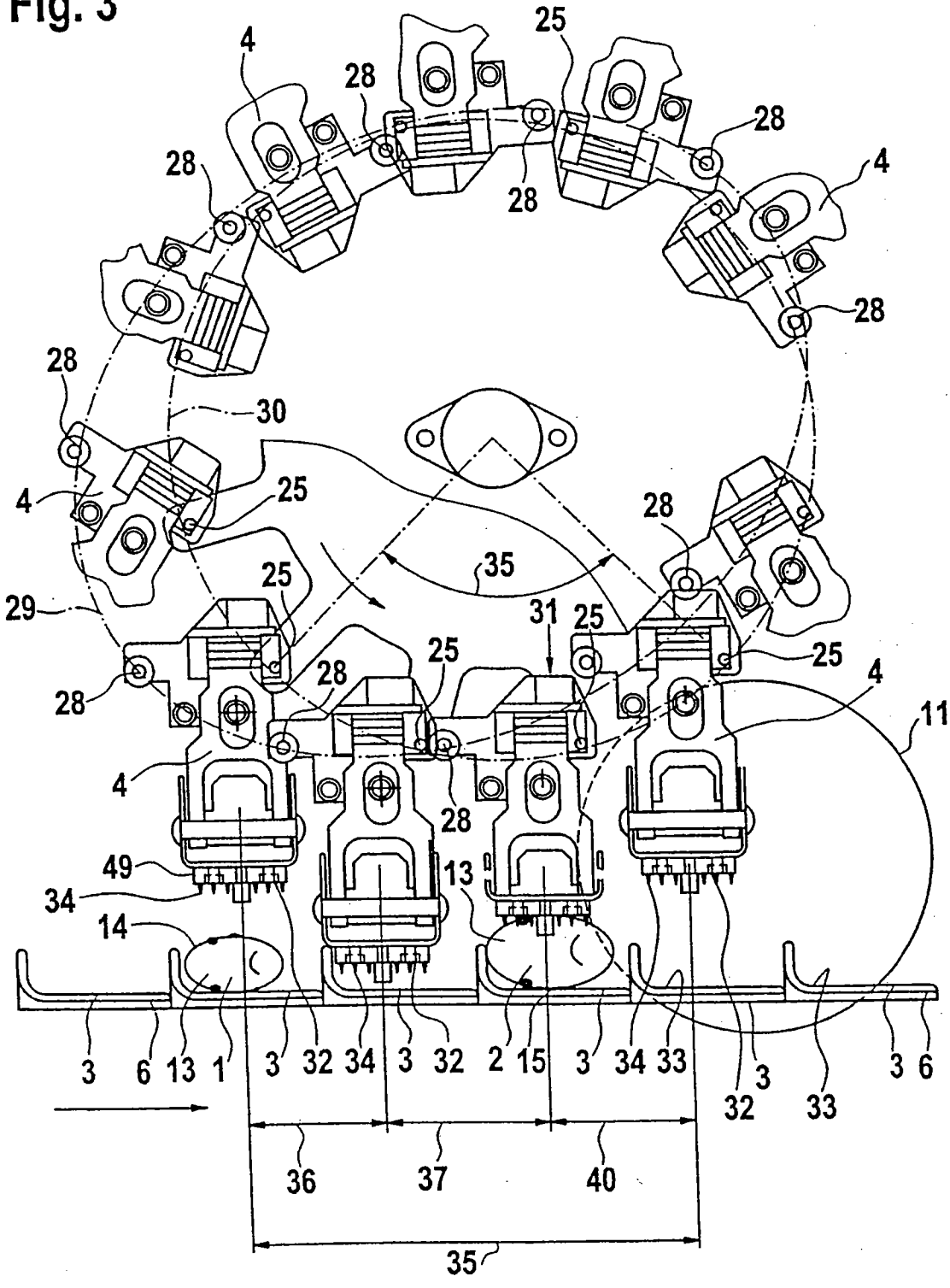
Fig. 3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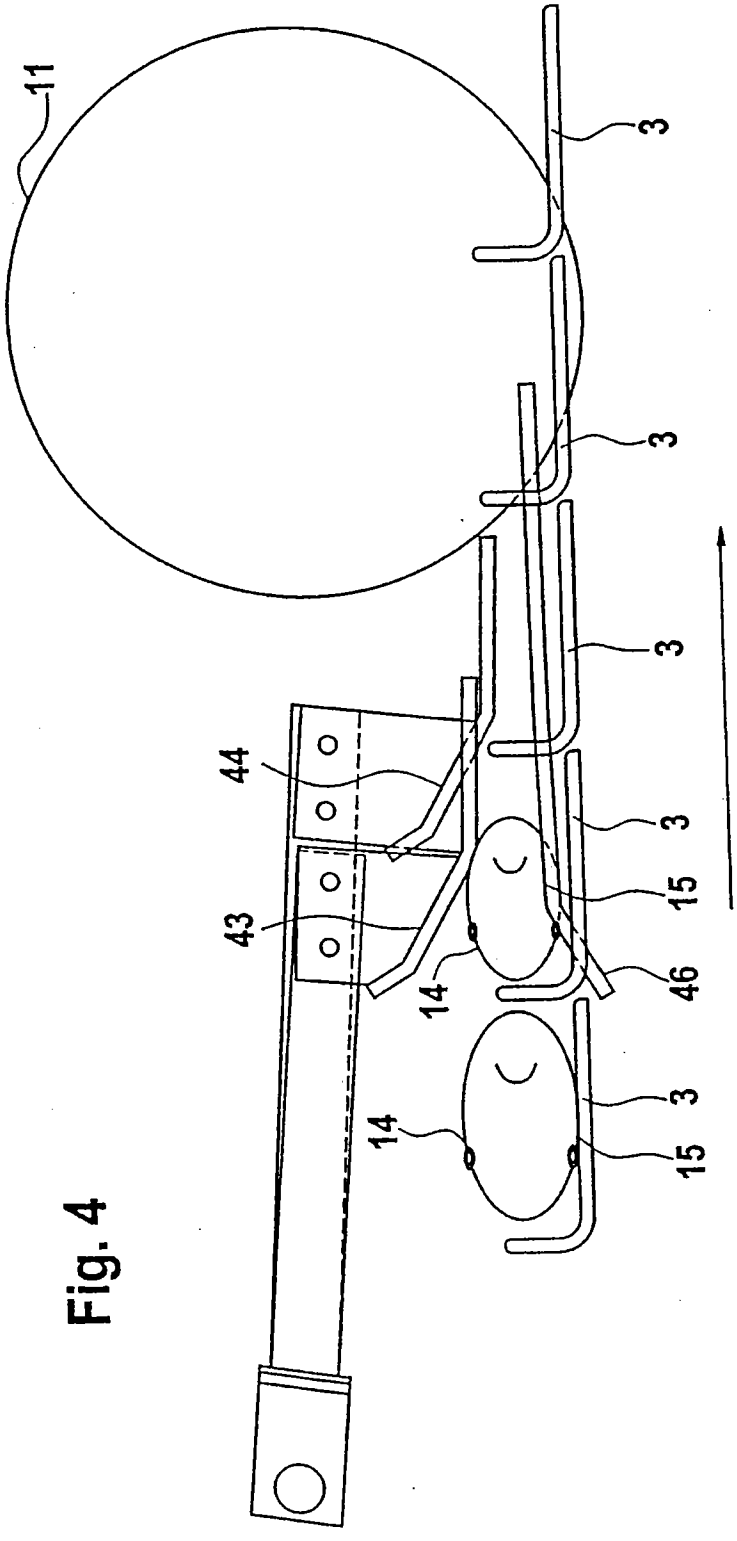
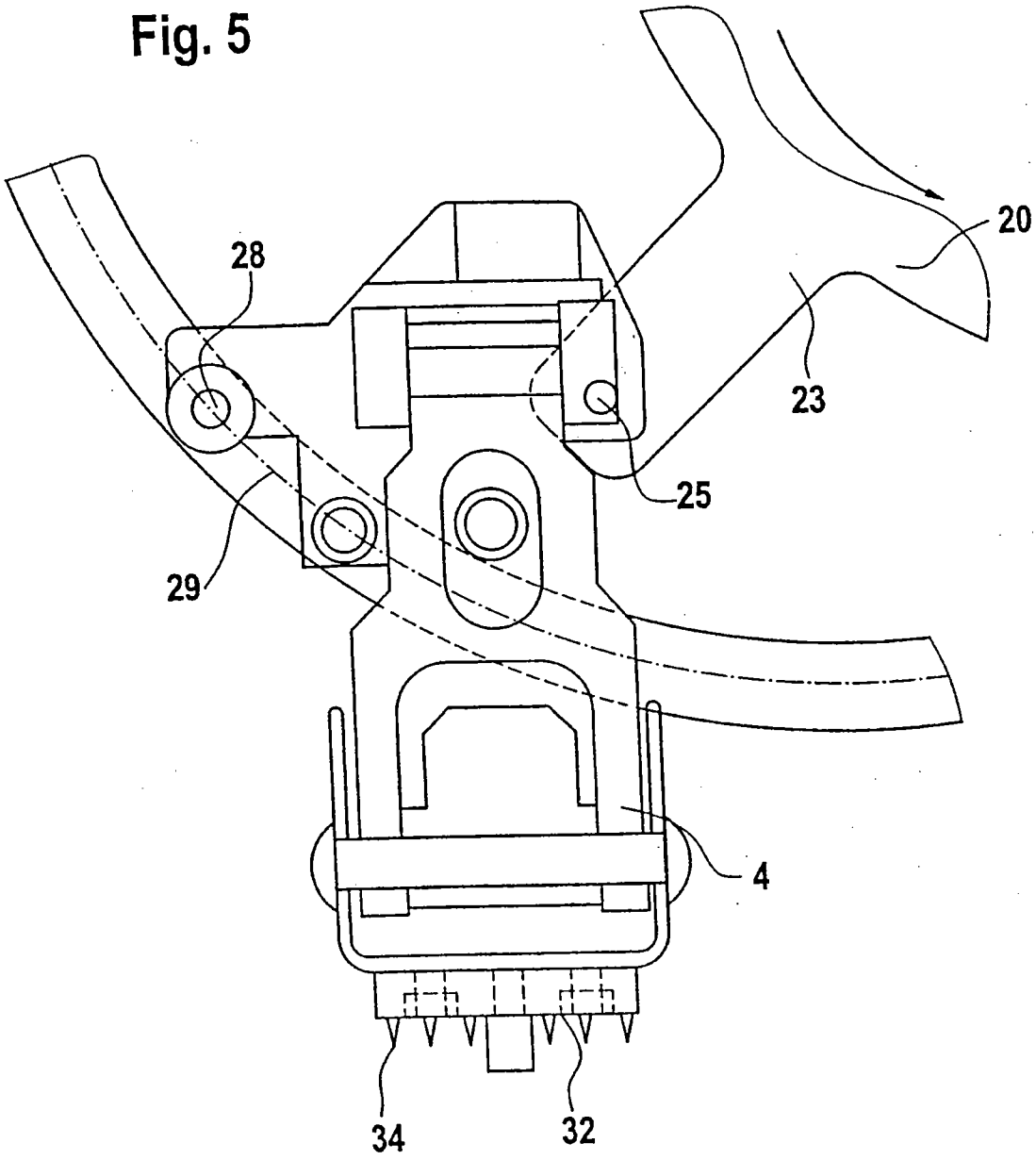


Fig. 4

Fig. 5



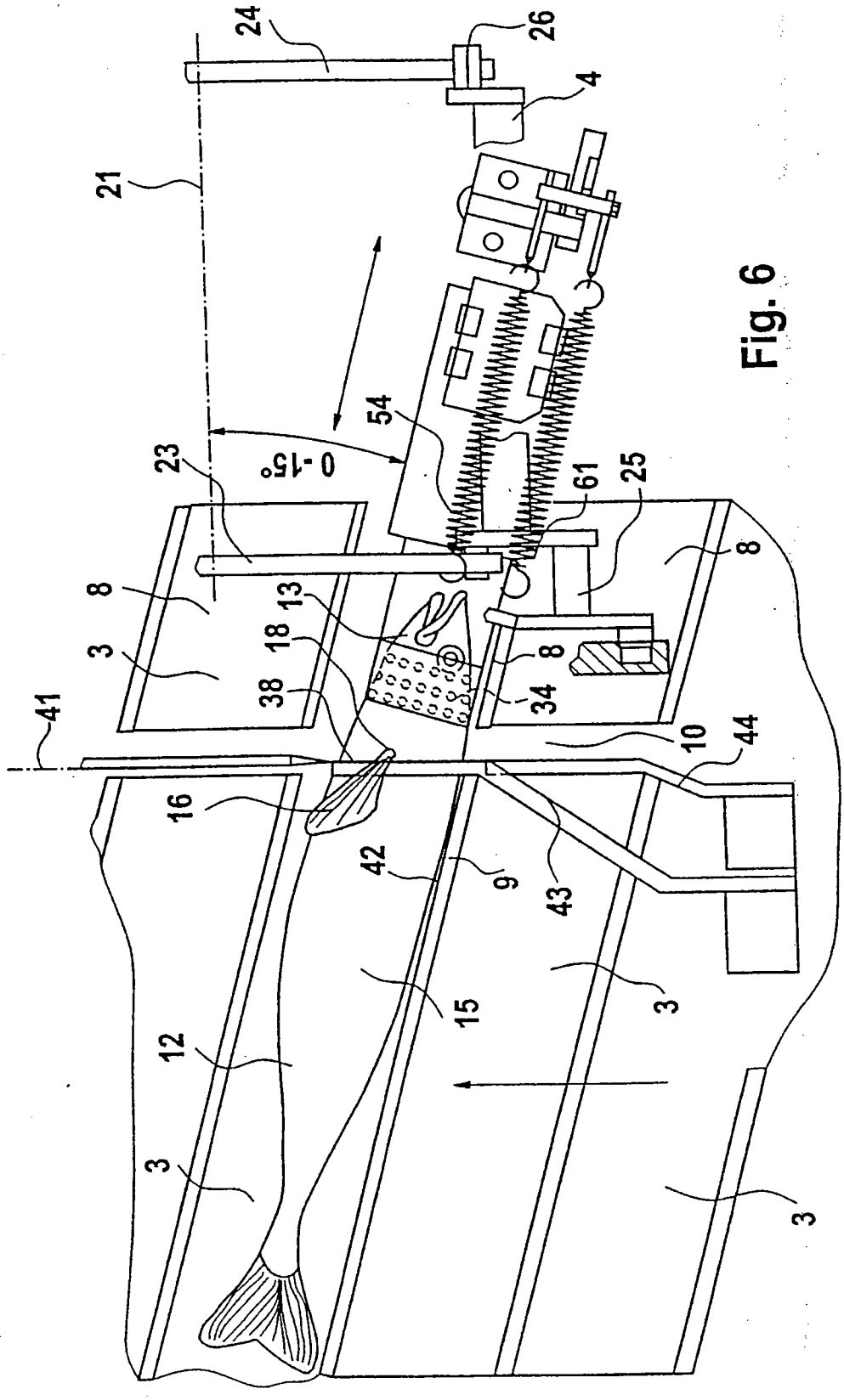


Fig. 6

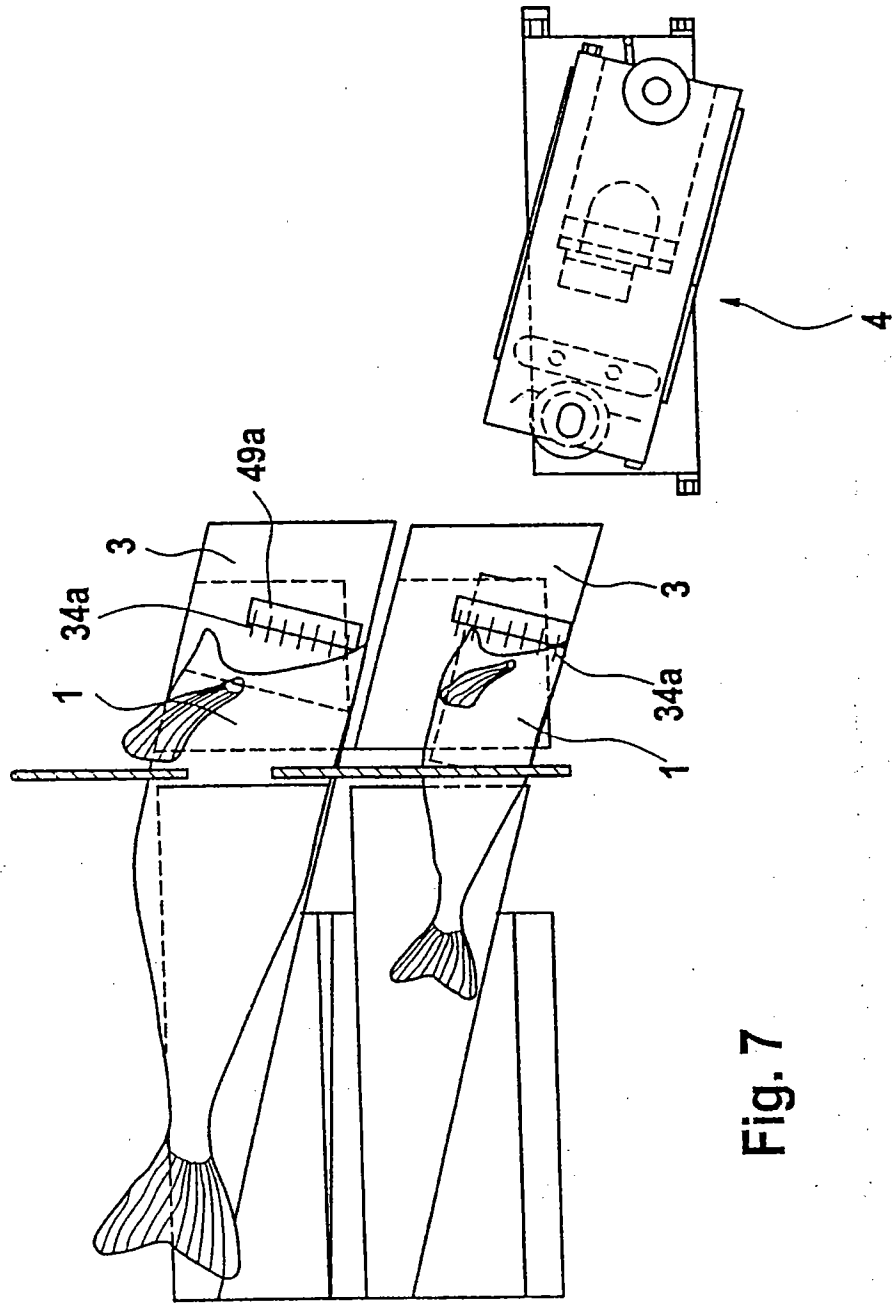


Fig. 7

QUESTION 2 - PRIOR ART

PATENT SPECIFICATION

(11) **1 309 359**

1309359

DRAWINGS ATTACHED

(21) Application No. 34388/71 (22) Filed 22 July 1971
(31) Convention Application No. P 20 36 538.2
(32) Filed 23 July 1970 in
(33) Germany (DT)
(44) Complete Specification published 7 March 1973
(51) International Classification A22C 25/08
(52) Index at acceptance A2U 1

(19)

(54) GUTTING MACHINE FOR FISHES

(71) We, NORDISCHER MASCHINENBAU RUD. BAADER, a Kommandit gesellschaft under the Laws of Germany, of 2400 Lubeck, Geminerstrasse 249, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a gutting machine for fishes.

A fish gutting machine has been proposed which comprises means for gripping a fish which is arranged to move the fish in a fixed orientation along a work path past a number of operating stations, and a number of tools adapted in combination to achieve gutting and head severence, the tools being disposed at the said operating stations and being arranged to move with a fish along the work path whilst performing their respective operations and on completion of their operations to return to their initial positions in time to perform the same operation on the next fish.

This machine uses a circular so-called "clip spider" which carries symmetrically opening body clips consisting of clip jaws arranged to grip fish whilst the operations on the fish are carried out. Specifically the body clip is provided with two flank grippers and a back support. The flank grippers and back support are arranged automatically to be brought into a gripping position at a predetermined rotary position of the clip spider. The flank grippers may be provided with serrations, spikes or any other suitable points close to their outer edges. In order to feed such a machine satisfactorily the body clips must be open to such an extent that the largest fish may be pushed between them. However smaller fishes have to be held by hand within the clip until the flank grippers come into contact from the sides.

Accordingly it is a principal object of the present invention to provide an improved gutting machine in which the fishes are otherwise held prior to the automatic gripping by the flank grippers.

According to the present invention therefore a gutting machine for fish includes a movable assembly for conveying the fish along a work path, a fish being adapted to be retained in a vertical disposition whilst it is conveyed along the work path by means of a gripping device including a back support and a pair of flank grippers, the grippers being arranged automatically to be moved towards one another at a predetermined position in the path, a pair of fish supports, which are biassed towards one another, being positioned above the flank grippers and affording supporting edges upon which the fish may be supported by means of its pectoral fins prior to being gripped by the flank grippers, the fish supports being separable in a symmetrical manner to permit insertion of a fish between the supports and flank grippers, and means being provided automatically to separate the fish supports against the said bias and to separate the flank grippers at a predetermined point or points along the said work path.

Such a construction provides the advantage that the gutting machine may be fed in a very simple manner the fish being manually pushed quite simply between the fish supports during the movement of the movable assembly, and the closing of the flank grippers may be performed at a position in the work path at a slightly later stage. This can ensure that a satisfactory alignment and adjustment and safe gripping of fishes of all sizes to be processed is achieved and a faster rate of operation is obtained.

Specifically according to one embodiment the fish supports are themselves guided on inclined tracks in order to be lowered as they are separated. The fish supports may alternatively be carried respectively by the members of a pair of rods which cross one another but which are coupled for synchronous movement with respect to one another.

The invention may be carried into practice in a number of ways but two specific embodiments will now be described by way of example with reference to the accompanying diagrammatic drawings in which:—

Figure 1 is a plan view of a gutting machine

according to the present invention;

Figure 2 is a side elevation of part of the machine of Figure 1 with certain parts cut away for clarification;

Figure 3 is a diagrammatic view of a certain form of body clip with the fish supports disposed above them, and

Figure 4 is a diagrammatic view of an alternative embodiment.

Figure 2 illustrates in side elevation a gutting machine which includes a so-called clip spider 4 which is mounted for rotation about a vertical axis within an outer framework for example comprising four supporting columns, the framework being designated generally by the large rectangle shown in Figure 1. The clip spider 4 is arranged to be continuously driven in a suitable manner and is provided at its periphery with a number of body clips 5 each of which comprises two symmetrically opening flank grippers 6 and a slidable back support 7. Thus their operation is automatically arranged such that at a predetermined time the flank grippers 6 and back support are moved inwards in order to grip a fish previously manually disposed between them. Thereafter a number of tools, shown diagrammatically in Figure 1, operate in turn on the fish. Each tool is arranged, whilst operating, to rotate with the clip spider and then to return to its initial position for the next fish. The tools can move laterally between operative and inoperative positions in an arcuate manner. Specifically the tools comprise, in Figure 1, a gullet cutter on the lower, left-hand side, a combined belly opener and intestine stripper on the right-hand side, and finally a neck cutter at the top of Figure 1.

Referring firstly to the embodiment shown in Figures 1, 2 and 4, disposed above the two flank grippers 6 are a pair of fish supports 91 and 92 comprising substantially flat inclined plates having upper support edges 93 and 94. The plates 91 and 92 are carried at the upper ends of guide rods 81 and 82 respectively. These guide rods cross one another as shown in Figure 4 and are pivotally connected to the clip spider 4 by horizontal hinges 84 and 83 respectively. In the region of the hinge connections with the clip spider the rods 81 and 82 carry co-operating synchronous levers 86 and 85 respectively which are coupled together in order to ensure synchronous inward and outward movement of the edges 93 and 94 of the fish supports. The rods 81 and 82 extend downward below the pivots 84 and 83 and the lower ends are interconnected by a tension spring 99 in order to draw the edges 93 and 94 together. The lower end of the rod 82 carries a lever 87 the lower end 88 of which is adapted to co-operate with a cam 100 integral with the frame of the machine in order to bias the edges 93 and 94 of the supports 91 and 92 apart, against the spring 99, at a predetermined time in order to release the fish from the machine.

The method of operation of this gutting machine is as follows:

As the clip spider 4 rotates, the body clips 5 in turn arrive at a feeding station at which a fish 101 is inserted by hand with the head uppermost and belly outermost. The fish is pushed with its back between the fish supports 91 and 92 which can separate against the action of the tension spring 99. The fish is then pressed lightly downwardly so that the attachment points of its pectoral fins lie upon the support edges 93 and 94. Since the fish are of varying sizes the supports 91 and 92 are spread to varying extents according to the thickness of the fish and are accordingly lowered so that the fish comes to lie at a correct height for the following processing steps independently of its size. Upon further rotation of the clip spider 4 the fish is guided into a position by the back support 7 by the closing body clip 5 in which the inner surface of its belly cavity lies at a predetermined radius with respect to the centre of the circular work path. In this position the fish is symmetrically clamped by the two flank grippers. By this method all fish irrespective of size are correctly oriented for operation by any one of the three tools shown in Figure 1.

After passing the processing tools, the fish reaches an ejection station at which the body clip 5 is automatically operated in order to separate the flank grippers 6, and the fish supports 91 and 92 are also withdrawn by means of the cam 100 so that the fish can be delivered from the machine.

Figure 3 shows a slightly modified construction in which the two rods 81 and 82 which carry the fish supports 91 and 92 extend generally vertically i.e. substantially parallel to one another. The rods 81 and 82 in this instance carry the fish supports 91, 92 at their upper ends by means of flexible links or joints 89 and 90 respectively. The free ends of the supports 91 and 92 are guided close to their support edges 93 and 94 respectively by means of guide rollers 95 and 96 which run on guide tracks 97 and 98 respectively formed integrally (in a manner not shown) with the clip spider 4. The guide tracks are inclined to each other in a roof-like manner in order to guide the upper edges 93 and 94 downwardly as they are separated to obtain a manner of operation which corresponds substantially to that of Figure 4.

WHAT WE CLAIM IS:—

1. A gutting machine for fish including a movable assembly for conveying the fish along a work path, a fish being adapted to be retained in a vertical disposition whilst it is conveyed along the work path by means of a gripping device including a back support and a

pair of flank grippers, the grippers being arranged automatically to be moved towards one another at a predetermined position in the path, a pair of fish supports, which are biassed towards one another, being positioned above the flank grippers and affording supporting edges upon which the fish may be supported by means of its pectoral fins prior to being gripped by the flank grippers, the fish supports being separable in a symmetrical manner to permit insertion of a fish between the supports and flank grippers, and means being provided to separate the fish supports against the said bias and to separate the flank grippers at a predetermined point or points along the said work path.

2. A machine as claimed in Claim 1 in which the fish supports are themselves guided on inclined tracks in order to be lowered as they are separated.

3. A machine as claimed in Claim 1 in which the fish supports are carried respectively by the members of a pair of rods which cross one another but are coupled for synchronous movement with respect to one another.

4. A machine as claimed in any one of the preceding claims in which the work path is circular.

5. A machine as claimed in Claim 4 including tools mounted to rotate with the fish whilst operating on the fish and thereafter to return to initial positions.

6. A machine as claimed in Claim 5 in which the tools include each or any one of the following:

(i) a gullet cutter

(ii) a combined belly-slitter and intestine stripper and

(iii) a neck cutter.

7. A gutting machine substantially as described herein with reference to Figures 1, 2 and 3 or Figure 1, 2 and 4 of the accompanying drawings.

KILBURN & STRODE,
Chartered Patent Agents,
Agents for the Applicants.

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Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1309359 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

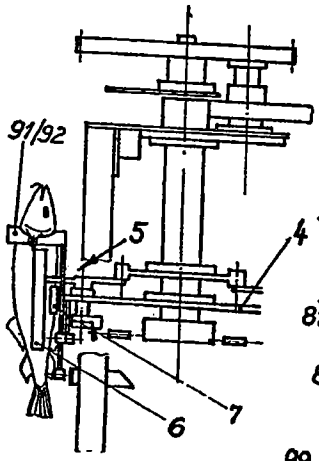

Fig. 2

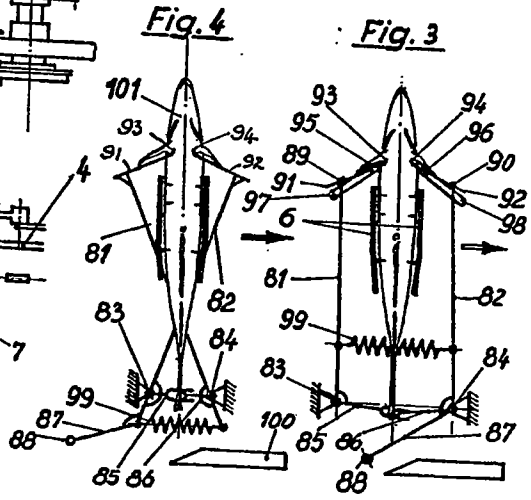

Fig. 4

Fig. 3

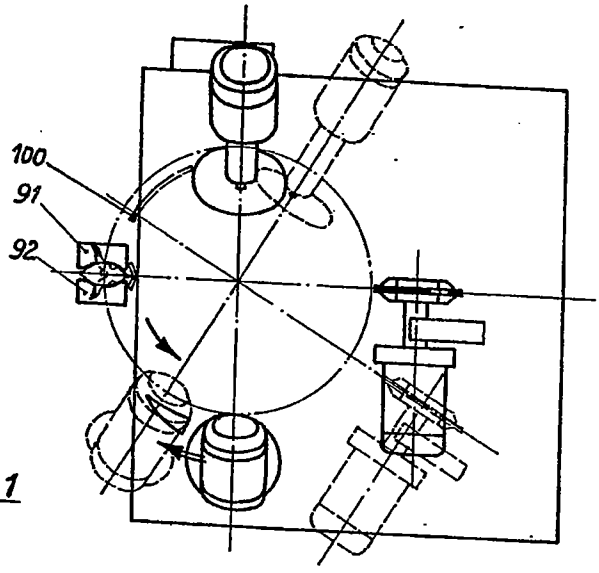

Fig. 1

QUESTION 2 - PRICR ART

United States Patent [19]

Ollik

[11] 4,321,729

[45] Mar. 30, 1982

[54] **APPARATUS FOR ALIGNING FISH**

[75] Inventor: **Reinhard Ollik**, Lübeck, Fed. Rep. of Germany

[73] Assignee: **Nordischer Maschinenbau Rud. Baader GmbH Co. & KG**, Lubeck, Fed. Rep. of Germany

[21] Appl. No.: **168,200**

[22] Filed: **Jul. 10, 1980**

[30] **Foreign Application Priority Data**

Feb. 1, 1980 [DE] Fed. Rep. of Germany 3003617

[51] **Int. Cl.**³ **A22C 25/08; A22C 25/14**

[52] **U.S. Cl.** **17/63; 198/385**

[58] **Field of Search** 17/55, 61, 63, 52, 53; 198/385

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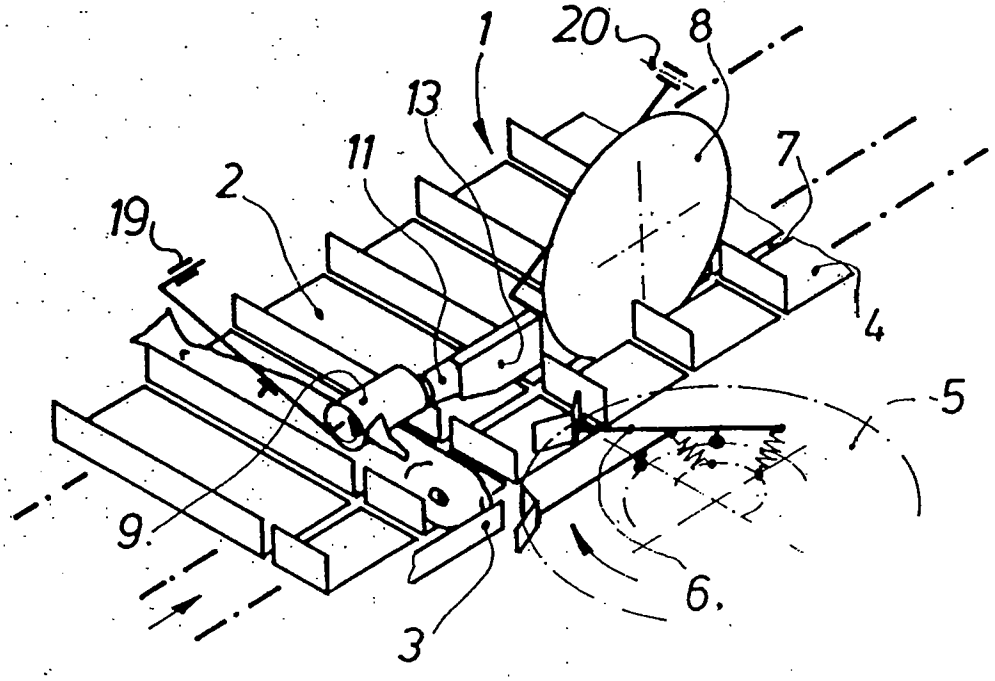
Primary Examiner—Willie G. Abercrombie

Attorney, Agent, or Firm—Edward F. Levy

[57] **ABSTRACT**

The invention relates to an apparatus for aligning fish in the position required for decapitation. For this purpose the fish is displaced by means of sprung displacement elements with the point of connection of at least one of its breast fins until the latter engages the catching edge of a brake shoe. The breast fin which is erected thereby is introduced, while being conveyed further, into a gap formed between the brake shoe and a guide track which ensures the guiding of the same and thus of the fish in a well-defined position for decapitation.

9 Claims, 3 Drawing Figures



APPARATUS FOR ALIGNING FISH

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a device for aligning fish lying on their side and conveyed perpendicular to their longitudinal axis into the position required for decapitation having a brake shoe provided with a catching edge which slides on the fish body and means for displacing the fish in the direction of their tail end.

2. Description of Prior Art

DE-PS No. 2 619 217 discloses an apparatus in which the fish which are conveyed transverse to their longitudinal axis come into co-operating engagement with an aligning disc which displaces the fish in the direction of their tail portion by engaging their snout by means of sprung head pushers. A brake shoe is lowered in synchronism with the passage of the fish on to the latter so that the braking edge of the brake shoe rests upon the flank of the fish. During the course of the displacement by the head pushers the rear edge of the gill cover reaches the catching edge of the brake shoe so that the displacement movement of the fish is stopped. In the position thus reached the decapitation stroke is carried out.

With this device it is found that with this manner of alignment the desired position can hardly be achieved, at least not with the required exactness. The cause of this is that the pressure of the braking edge against the fish must on the one hand have such a value that the fish is pressed in behind the gill flap so that its rear edge runs securely against the brake shoe and on the other hand should be kept as low as possible since the displacement must occur under the action of this engaging force. If the engaging force of the braking edge against the fish is so set that the gill cover edge runs securely against the brake shoe then the displacing force must be correspondingly high. This entails, however, the danger that the gill cover is compressed or even torn so that a precise positioning is no longer possible. The consideration of these two opposing requirements is satisfactory when processing freshly caught fish; but when processing fish having a softer consistency it is observed that the rear edge of the collar bone or the point of connection of the breast fins function as an opposing edge. This has the consequence that the fish does not reach its optimum decapitation position and therefore the decapitation stroke occurs with an unacceptably high loss of valuable fish meat.

OBJECT OF THE INVENTION

It is therefore a main object of the invention to devise an apparatus which in a simple manner enables a reliable and precise positioning of fish into their optimum position for the decapitation stroke.

BRIEF SUMMARY OF THE INVENTION

This object is achieved in accordance with the invention in that a guide track is associated to the catching edge of the brake shoe and lies upstream of the latter when seen in the displacement direction of the longitudinal axis of the fish, this guide track having a guide edge directed, in use, toward the fish and being set back by a few millimeters in height over at least part of its length with respect to the catching edge, the catching edge and the guide edge enclosing together a gap extending in the conveying direction of the fish.

The advantages achieved thereby reside particularly in that the breast fins which generally lie against the flanks of the fish are loosened from the fish body during the displacement of the fish by means of the catching edge, are erected against the surface defining the gap between the brake shoe and the guide track and are guided in the gap with a lateral engagement of the joints of the breast fins, which safely absorb the displacement pressure, with the catching edge of the brake shoe.

For the purpose of enabling the adjustment to varying sizes of fish the brake shoe can be constructed to be vertically yieldable i.e. yieldable in height. The guide edge of the guide track can also be formed rounded in order to ensure an unimpeded sliding of the same on the fish flank.

The construction of the brake shoe in which the entry end of the catching edge is arranged before the entry of the guide edge of the guide track ensures that the breast fin is loosened from the fish body before its entry into the gap between the brake shoe and guide track so that it can stand up in the said gap during the further displacement of the fish.

In order to facilitate and accelerate the erecting of the breast fins preferably there is provided a first roller vertically yieldably disposed above the conveying means, this roller being spaced from the brake shoe in a direction opposed to the conveying direction, being rotatable about an axis extending substantially parallel to the conveying direction, and having a periphery of which a part, in use, is directed towards the fish, this part of the periphery moving, in use, in a direction opposed to the displacement direction.

The arrangement of a second unit comprising a second brake shoe and second guide track essentially in the surface or plane carrying the fish approximately opposite the first unit comprising the first brake shoe and first guide track permits an increased security of the positioning to be achieved by simultaneously guiding the two opposing breast fins and furthermore makes possible a decapitation stroke extending accurately perpendicular to the backbone of the fish.

To improve this effect further, a second roller is arranged below the plane receiving the fish in a position opposite to the first roller, this second roller being rotatable in a direction opposed to the direction of rotation of the first roller. Advantageously the periphery of the first and second roller may be provided with a roughened surface, whereby the gripping effect of the roller on the breast fin is improved. The roughening can be provided by means of a fine grooving, toothing or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying schematic drawings, which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what now are considered to be the best modes contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the scope of the appended claims.

In the drawings:

FIG. 1 is a portion of a decapitation device embodying one upper roller only and shown in axonometric representation,

FIG. 2 shows a slightly altered embodiment of the device at a larger scale but comprising two rollers, with a fish in the position after running under the rollers for aligning the fins, and

FIG. 3 shows a portion of a device according to FIG. 2, with a fish in the position after entry of the breast fins into the gap between the brake shoe and the guide track, resp. into the support plane.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In a frame, which is not shown, there is an endlessly rotatable conveyor 1 driven in a suitable manner comprising a chain of conveyor trays 2 with each of which there is associated a synchronously moving head support 4. Laterally adjacent to the pathway of the head supports 4 there is a known per se snout track 3 and, following this, a known type of rotary table 5 driven to rotate in synchronysm with the conveyor 1 serving as a displacement means which carries spring biassed displacement elements 6 each of which engages the snout of one the fish 15. A gap 7 is left between the conveyor trays 2 and the head-supports 4, into which gap the decapitation knife 8, which is only schematically illustrated, extends. Above the conveyor trays 2 a roller 9 is arranged in the vicinity of the gap 7 which rotates about an axis parallel to the conveying direction of the fish and is vertically yieldable about a swivel axis 19. The direction of rotation of this roller 9 is so chosen that the speed vector of its periphery directed towards the fish 15 is in the direction of the head 17 of the fish. The periphery of the roller 9 is roghened e.g. by the provision of fine grooves. Directly behind the roller 9 there is situated upstream of the decapitation knife 8 above the fish pathway a brake shoe 11 mounted vertically yieldably about a pivot axis 20 and in the form of a plate perpendicular to the surface on which the fish are received with a catching edge 12 directed towards the fish. At the junction between the roller 9 and the brake shoe 11 the latter is adapted to the cylindrical shape of the roller so that in this region the brake shoe 11 has a similar profile as the periphery of the roller 9. In the direction of the displacement of the fish 15 before the brake shoe 11 and parallel to it there is situated a guide track 13 having a rounded guide track edge 14 directed towards the fish and arranged higher by a few millimeters with respect to the catching edge 12 of the brake shoe 11, so that the distances of the catching edge 12 and the track edge 14 to the reception surface for the fish differ from each other. The end of the guide track 13 directed against the conveying direction of the fish is set back with respect to the entry end of the brake shoe 11.

According to FIG. 2 there is arranged a second roller 10 of the same surface structure as roller 9 and rotating in an opposite direction to it below the reception surface for the fish. In this case the reception surface is arranged as a surface 23 fixed to the machine and above which there slide conveying elements for transporting the fish, which non-shown elements are driven to rotate endlessly. The lower roller 10 is arranged opposite to the upper roller 9 and extends with its periphery through an aperture 21 in the reception surface 23 so that its periphery is closely adjacent to the latter. As may be taken from FIG. 3 the aperture 21 tapers in the conveying direction to form a gap 22 the width of which corresponds essentially to that of the gap 7, and of the space between the brake shoe 11 and the guide track 13.

The operation of the apparatus is as follows:

The fish 15 to be treated are so presented to the continuously driven conveyor 1 that they come to lie on their side with their snout contacting the snout track 3, their trunk resp. rear body portion 16 in the conveyor tray 2 and their head 17 on the head support 4. Whilst being conveyed the fish 15 come, as shown in FIG. 1, under the roller 9 driven in rotation about an axis parallel to the conveying direction which begins to erect the breast fins 18 by virtue of its gripping ability which is enhanced by the fine toothing on the periphery. By reason of the engagement of the fish with the snout track 3 the fish 15 retains its position. Thus prepared, the fish when conveyed further runs under the catching edge 12 of the brake shoe 11 so that at least the tip of the breast fin 18 which has already been loosened from its position close to the trunk 16 is erected and rests against the inner surface of the latter. While the fish subsequently comes into the region of the guide edge 14 of the guide track 13 it is displaced in the direction of its tail by the displacement element 6. As a consequence of this the breast fin 18 erects further against the inner surface of the brake shoe 11, as seen in FIG. 3, until the catching edge 12 engages the point of connection of the breast fin with the trunk 16. The growing reaction to the displacement can no longer be overcome by the displacement element 6 so that the fish stays in this position. Thus the guide track 13 prevents the fish from springing back when the displacement element 6 moves away from the fish shortly before the decapitation process.

When the rollers are provided in pairs according to the embodiment of FIGS. 2 and 3 by using a second roller 10, the erection of the lower breast fin is performed in the gap 22, in an analog manner to the above described function of the brake shoe 11.

What I claim as my invention and desire to secure by Letters Patent is:

1. Apparatus for aligning fish in the position required for decapitation, said apparatus including means for conveying said fish lying on their side in a first or conveying direction essentially perpendicular to their longitudinal axis, a brake shoe having a catching edge adapted to slide along the body of said fish, and means for displacing said fish in a second or tail direction essentially perpendicular to said first direction, wherein a guide track is associated to said catching edge of said brake shoe upstream of said brake shoe when seen in said second direction of the longitudinal axis of the fish and forms a first unit with said brake shoe, said guide track having a guide edge directed, in use, toward said fish, and being spaced by a few millimeters in height over at least part of its length with respect to said catching edge, said catching edge and said guide edge together defining a gap extending in said first direction.

2. Apparatus as claimed in claim 1 wherein said brake shoe is adapted to yield in height.

3. Apparatus as claimed in claim 1 or 2 wherein said guide edge is rounded.

4. Apparatus as claimed in claim 1 or 2 wherein said catching edge has an end opposed to said first direction and said guide edge has an end opposed to said first

direction, and said end of said catching edge lies upstream of said end of said guide edge when seen in said first direction.

5. Apparatus as claimed in claim 1 further including a second unit formed by a second brake shoe and a second guide track, said second unit being positioned essentially in the plane receiving the fish in a position substantially opposite to said first unit and corresponding to the position of said brake shoe and said guide track.

6. Apparatus as claimed in claim 1 including a first roller vertically yieldably disposed above said conveying means, said roller being spaced from said brake shoe in a direction opposed to said first direction, said roller being rotatable about an axis extending substantially parallel to said first direction, said roller having a periphery of which a part, in use, is directed towards said fish, said part of said periphery moving, in use, in a direction opposed to said second direction.

7. Apparatus as claimed in claim 6 wherein the periphery of said first roller is provided with a roughened surface.

8. Apparatus as claimed in claim 6 wherein a second roller is arranged below said plane receiving the fish in a position opposed to said first roller, said second roller being rotatable in a direction opposed to the direction of rotation of said first roller.

9. Apparatus as claimed in claim 8 wherein said second roller has a periphery provided with a roughened surface.

* * * * *

Fig. 1

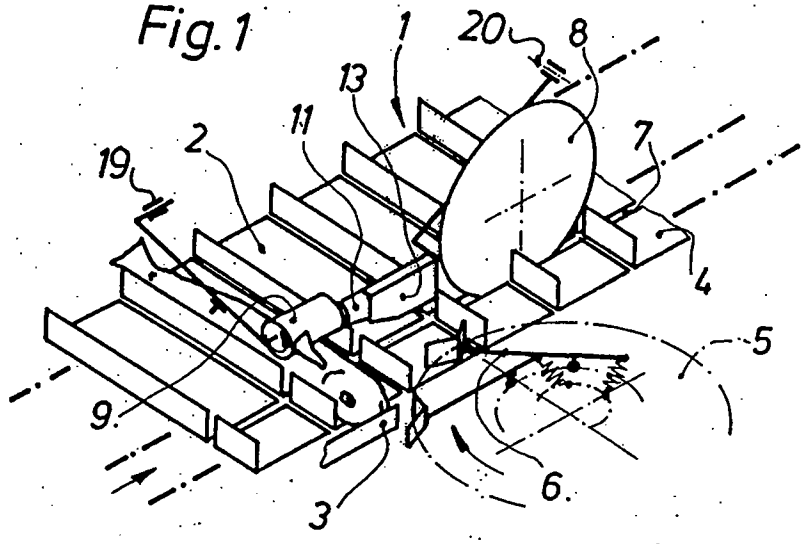


Fig. 2

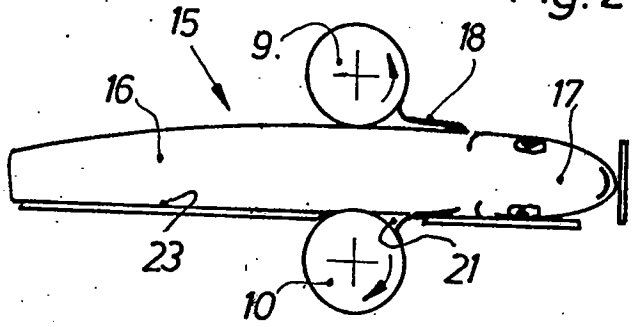


Fig. 3