Two patented pinbone solutions

Investment prospect

pescatech
INNOVATIVE SOLUTIONS

INTRODUCTION

- EASY TO UNDERSTAND SALES PITCH

Intelligent pin bone removal is the best way to describe these patented solutions. They differ from conventional solutions by adding dynamic and individual treatment of each filet. They are granted in a postrigor and prerigor version, where a target area-controlled heating is the difference.

Both versions will have a drastic impact on today's markets, because the much faster and more accurate removal of pinbones will mean better filet quality, less people, less footprint and less equipment in front and behind the machines. Being uniquely capable of handling filets moving forward or backwards it doesn't matter, which filleting machine is placed before it.

The offspring from these patents will potentially revolutionize the salmon industry by also cracking the unbreakable prerigor code. Customers will line up to get these new formula 1 machines, their factories will change, markets will change, and products will change forever.

Several of todays finest equipment suppliers have the tools and technology in place to build and market these as products. Newcomers will get a free ticket / open invitation to whenever a filleting line is sold, because the patents can become the most sought-after machines the fish and seafood industries have ever seen.

TODAY'S METHODS

With today's technology it can be done in following ways:

1. Manually, where operators have small tools to pick the bones from the flesh (figure 1)
2. Semi-automatic, where a handheld rotating shredded drum is positioned to rip the bones from the flesh (figure 2)
3. Automatic, where a conveyor takes the fish through one or more rotating drums (figure 3)
4. High speed, but where fillets have to be divided from 2 to 6 lanes due to the line speed, and merged from 6 to 2 lines after pinbone removal.

Figure 1: Manually –rough on filets

Figure 2: Semi-auto more angle flexible

The speed of today's filleting machines calls for 6 lanes (fig 4), which demands significant space lengthwise as in width. It is expensive, not easy to maintain or clean, while also posing one of the most serious bacteria hazards in a factory. In addition, the above methods have not worked properly on fresh (pre-rigor) fish fillets, where the firm flesh and bone fastens to the skin make this impossible without damaging the flesh. The comparable version will do more accurate bone removal, ensure better quality and less people to check for remaining bones + use 1/3 of below illustrated length and width.

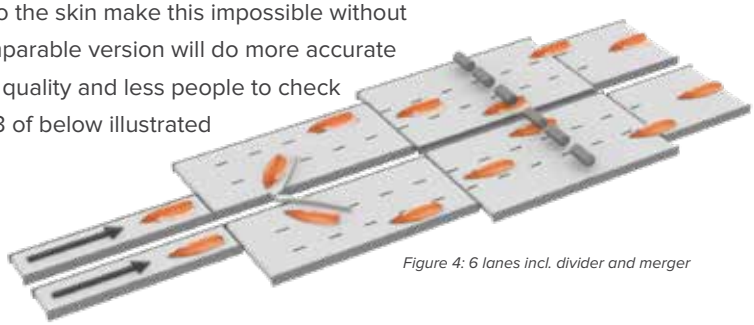


Figure 4: 6 lanes incl. divider and merger

Figure 3: Auto less angle flexible

CONCEPT 1

The process can be summarized as a two-step procedure, but not limited to (figure 6, 7, 8)

1. Positioning and bone detection by advanced scanning methods.
2. Target temperature manipulation of bone root areas in the fillets
3. Intelligent pinbone removal with flexible rotator heads adjusted to individual fillets.

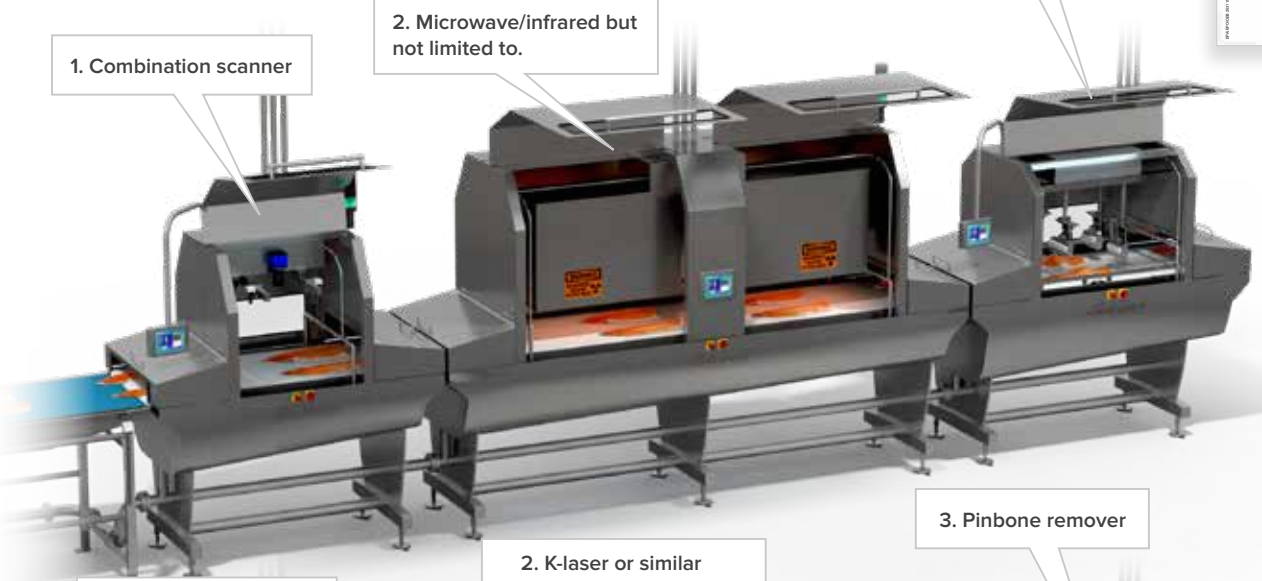
Above no. 2 can be achieved by means of target micro- or infrared waves (figure 6), but also with laser technology (figure 7).


EUROPÄISCHES PATENT | EUROPEAN PATENT
BREVET EUROPÉEN

EP3490385 07.06.2023

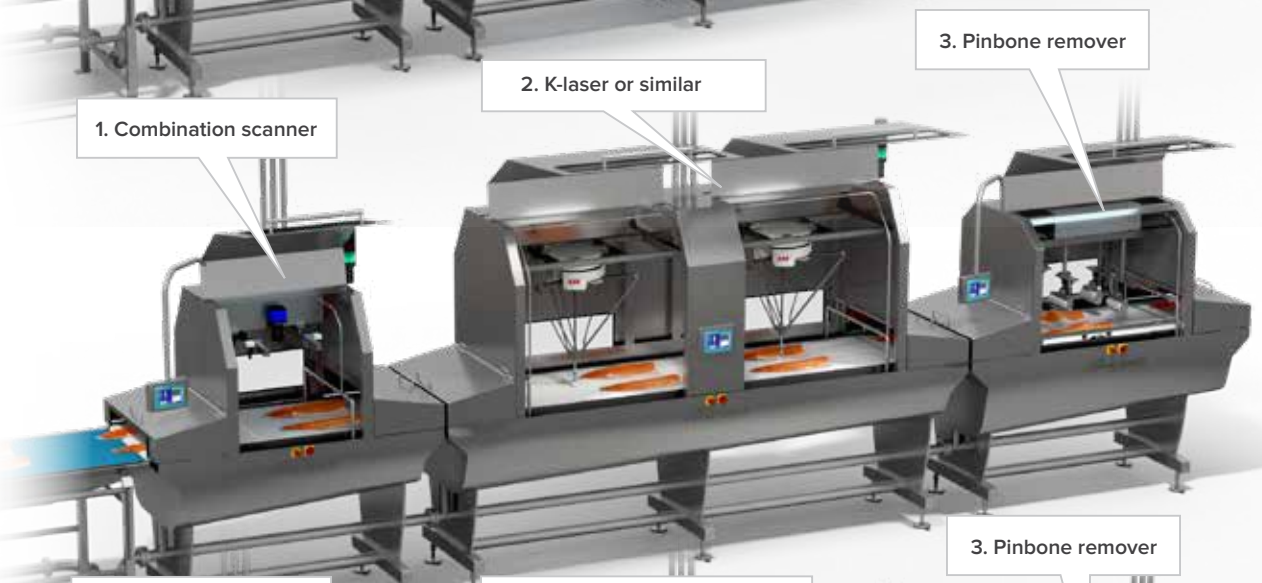
PRE-RIGOR AND FRESH FISH PIN BONE REMOVAL APPARATUS

Pescatech ApS



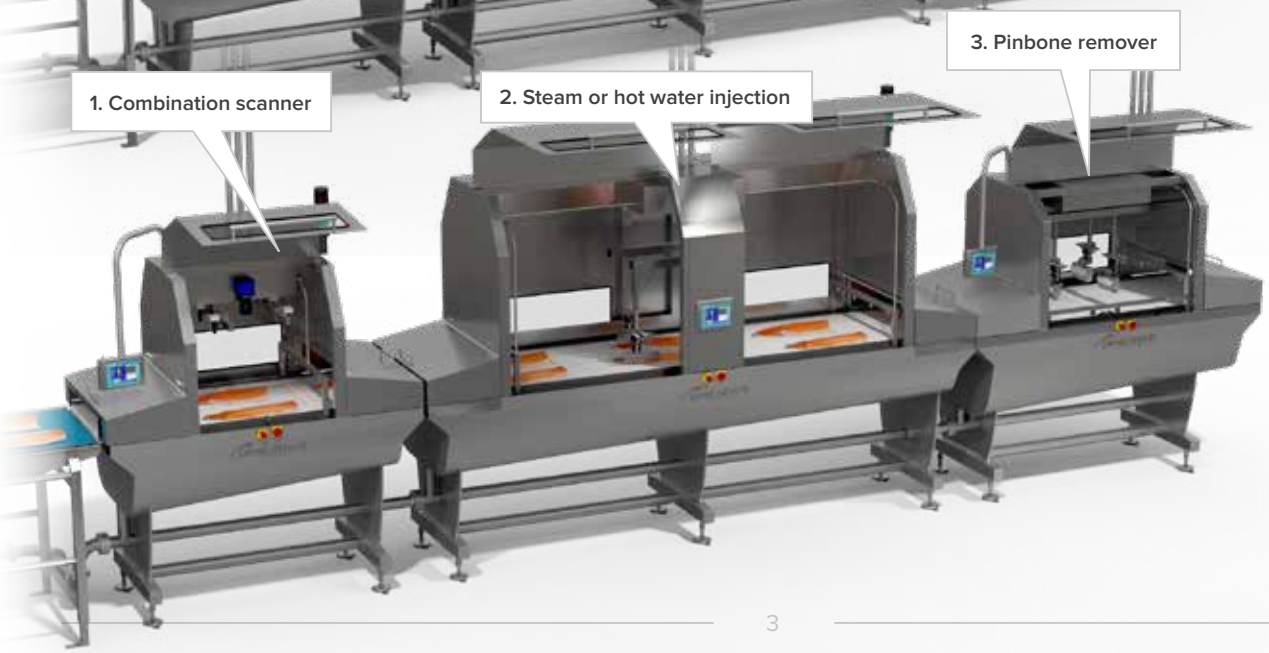
Line 1 - open:

Figure 6:
Infrared or microwave



Line 2 - open:

Figure 7:
Laser



Line 3 - open:

Figure 8:
Steam injection

CONCEPT 2

The process can be summarized as a two-step procedure, but not limited to (figure 8 and 9)

1. Positioning and bone detection by advanced scanning methods.
2. Intelligent pinbone removal with flexible rotator heads adjusted to individual filets

The above is conventional pinbone removal in an improved and intelligent way, but the patent application also includes target temperature manipulation in the front.


EUROPÄISCHES PATENT | EUROPEAN PATENT
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EP3490384 09.08.2023

PIN BONE REMOVAL APPARATUS

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Integrated solution - closed:

Figure 8

Integrated solution - open:

Figure 9

UNIQUE AND PATENTED FEATURES

COMBINATION SCANNER

The fillets will pass through a combination scanner, which can measure the individual fillets as they pass through (figure 10).

1. This is done by 3D surface scan and/or
2. x-ray to detect inside bone position and angle and or
3. MR- scanning methods or similar

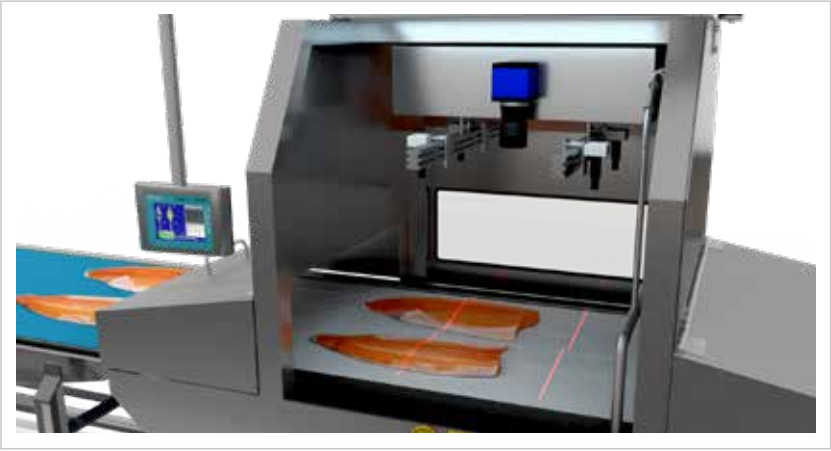
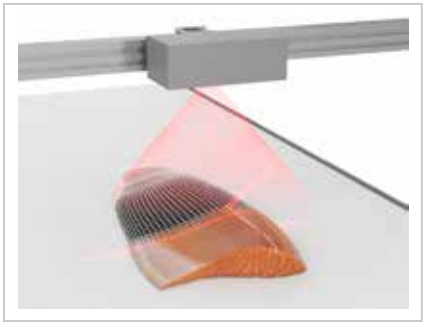
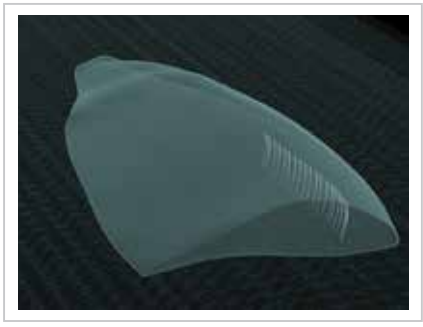


Figure 10: Combination scanner





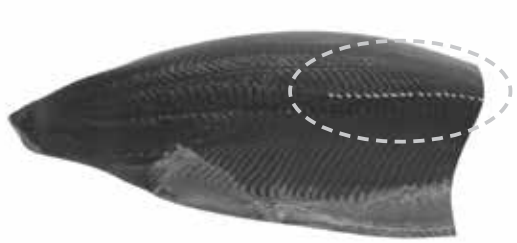


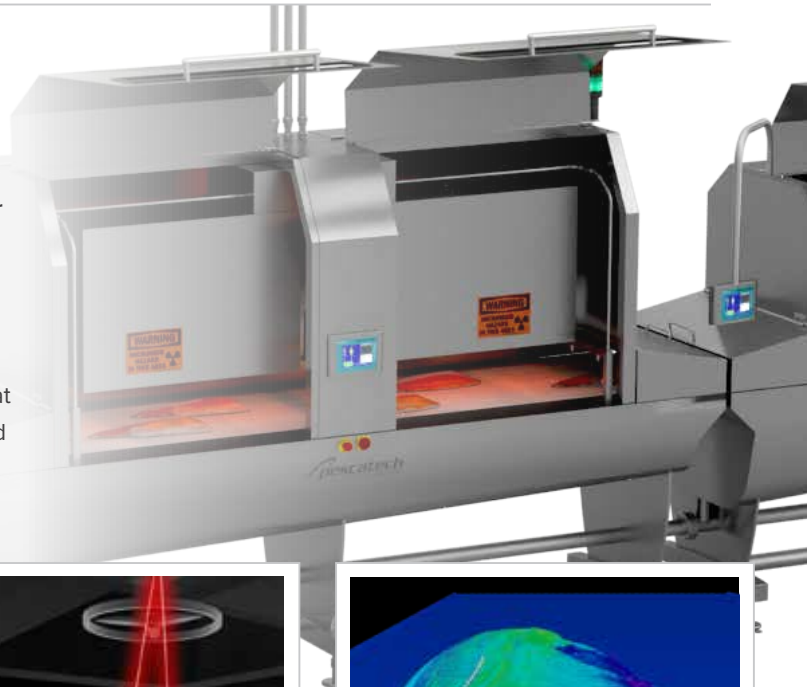
Figure 11: surface and bone scanning

MICROWAVE/INFRARED TUNNEL

The fillets are now "locked" and the bones detected, where after tendering process is activated. This is achieved by manipulating the temperature, where especially the bones are fastened.

This can be done by letting the fillets pass through a controlled microwave chamber either in step or in a flow. The flesh will heat up the fastest, where the fat layer is thick and bones are fastened to the skin. The temperature control ensure, that it will only allow the area to tender and not the fillet to cook.

TESTS HAS PROVEN, THAT TENDERING OF FLESH IS POSSIBLE AND THAT THIS WILL LOSEN THE BONES. IT MUST BE NOTED, THAT SETTING THE CORRECT TEMPERATURE MANIULATION DEPENDS ON INDIVIDUAL FILLET SIZE AND IT IS IMPORTANT TO AVOID ADRESSING THINNER FLESH OUTSIDE TARGET AREA.



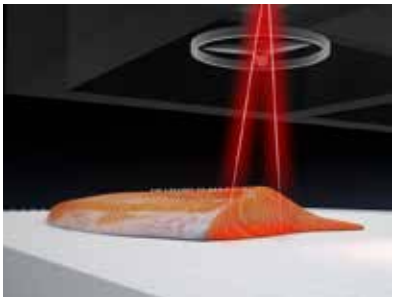


Figure 12: Microwaves

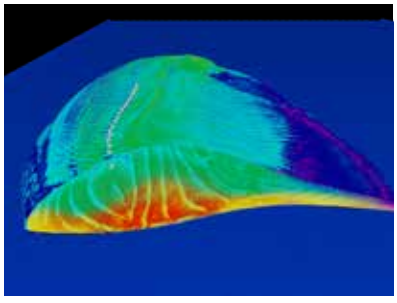


Figure 13: "Thermal mode" with depth impact shown as "sinus heat curves"

LASER TECHNOLOGY

Another method is equally unique, where we use e.g. K-Laser or other laser to heat up specific area and depth with laser precision. Here the positioning of fillet and bones from step 1 becomes more important.

This method is adopted from the treatment of e.g. sports injuries, where laser technology is widely used as an improvement on ultra sound conventional in depth muscle treatment.

THIS TECHNOLOGY IS MORE ADVANCED AND NATURALLY MORE COSTLY, BUT CAN ADD HIGHER PRECISION TO THE TARGET TEMPERATURE MANIPULATION OF THE FILLETS.

Figure 14: K-laser mounted on Flexpicker robot

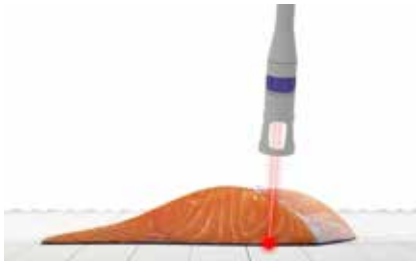


Figure 15: Laser beam from tool

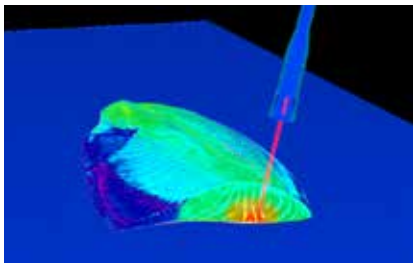
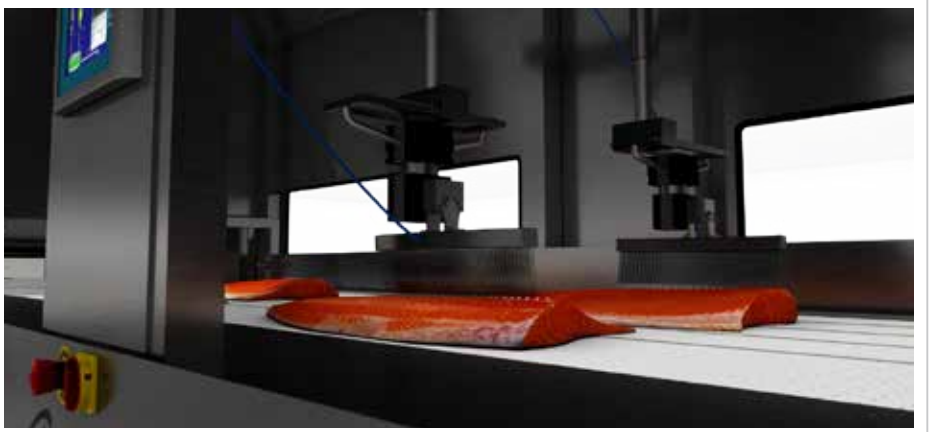
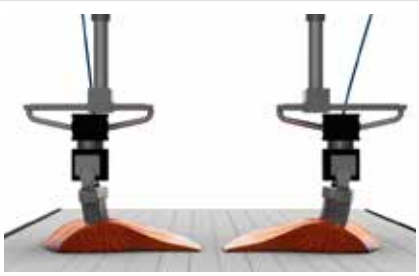


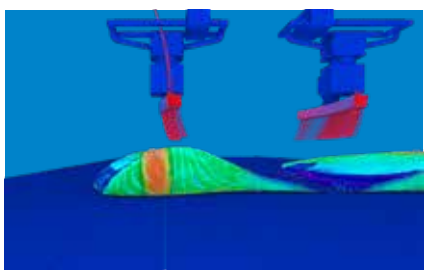
Figure 16: "Thermal mode" sinus heat curves

STEAM INJECTION

Injection of steam or hot water will temporarily heat up the meat surrounding the pinbones. It's possible to hit the target area with high precision and create a narrow corridor around the bones. This corridor will relatively fast cool down again due to the lower temperature of the rest of the fillet. The quality of the filet will remain the same, but you will loosen the bone area by manipulating temperature and thereby create a controlled pulling window. This method is by far the fastest and it's much easier to control, which makes it the most likely route towards proper pre-rigor pinboning.







INTELLIGENT PINBONE EXTRACTOR

The intelligent pinbone removal is achieved as a combination of flexible pulling positions to each individual fillet in motion. It gives you a slow straight pull but also a much higher speed and gentle handling of all individual fillets.

1. The position of individual fish and its bones + surface structure is tracked through to the pulling area
2. The rotating drums have servo motors and have full arm wrist flexibility
3. Each fillet is unique and the pull mechanism adapt all angles, speed accordingly, which will secure "straight" pulling from optimized angles.

Figure 17: Pinbone removal

The pinbones are exposed from the vertebra after filleting but piece of cartilage fastens this to the skin.

Our invention is attacking the challenge from a new angle, where we take the technological level up to a higher level with the use of both known and new technical methods. This allow the rotator drum to optimize the picking angle.

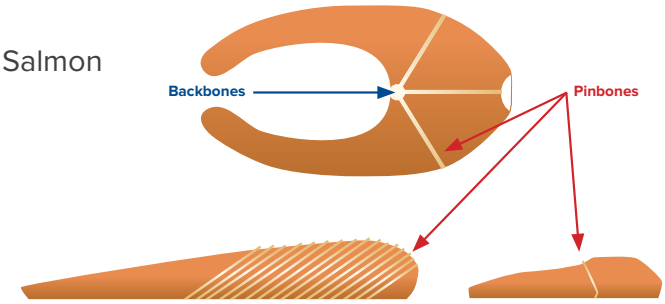


Figure 18: Salmon fillet w/bone structure

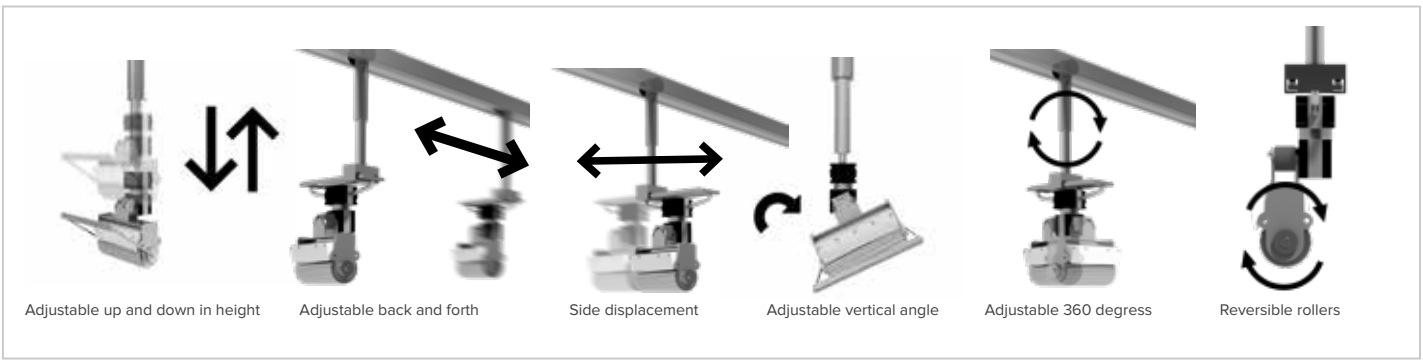


Figure 19: Rollers flexible in all directions to match fillet structure

Figure 20: Flexible rollers to match fillet structure

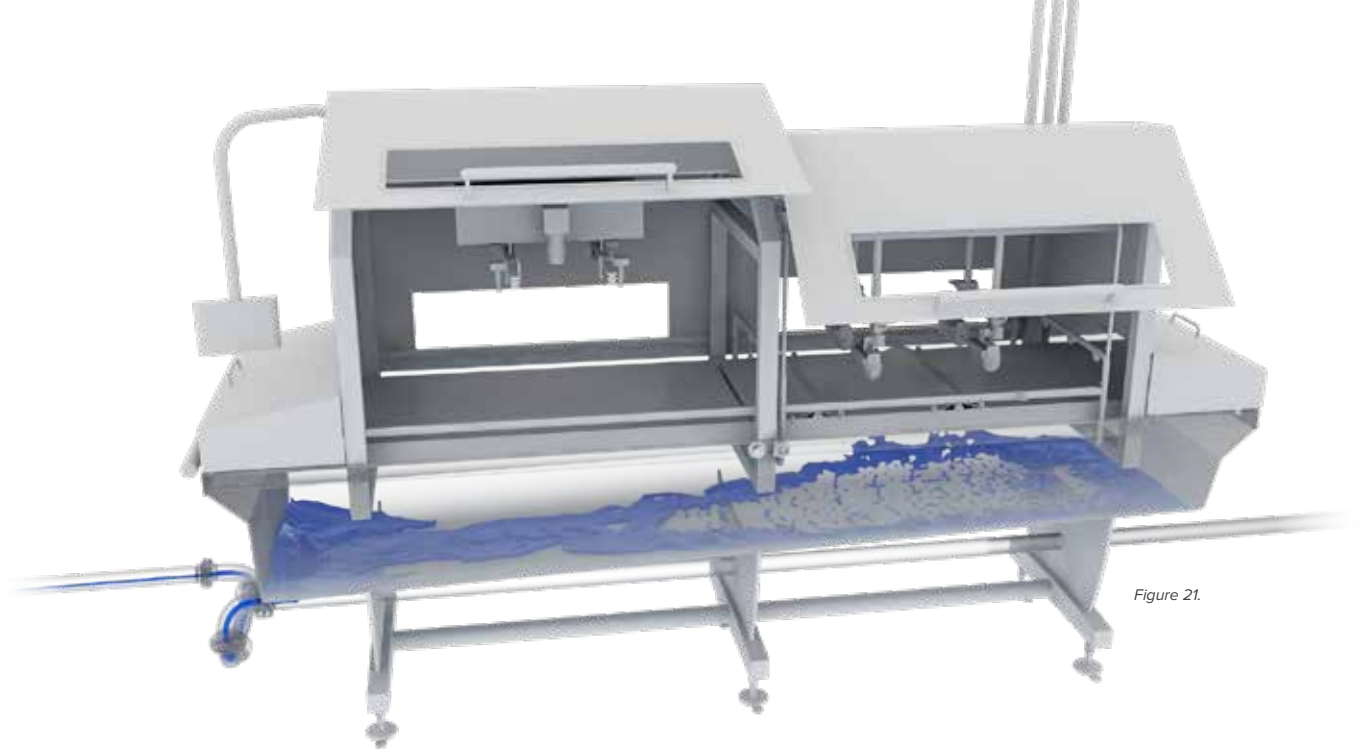


Figure 21.

HYGIENE CONCEPT

The uniqueness continues as a solution, where the machine frames and cabinets are designed to connect and allow for completely automatized inside cleaning. Movable and fixed spray bars combined with a sloped bottom section is making it possible to make a complete internal wash down.

During process, it has built in spray nozzles to rinse bones, flesh bits and pieces from rotation heads and conveyor as well as built in fillet washer to ensure proper cleaning of the raw material. The water and waste collects in the sloped bottom and is vacuumed away.

Figure 22: Build-in fillet washer

Figure 23.

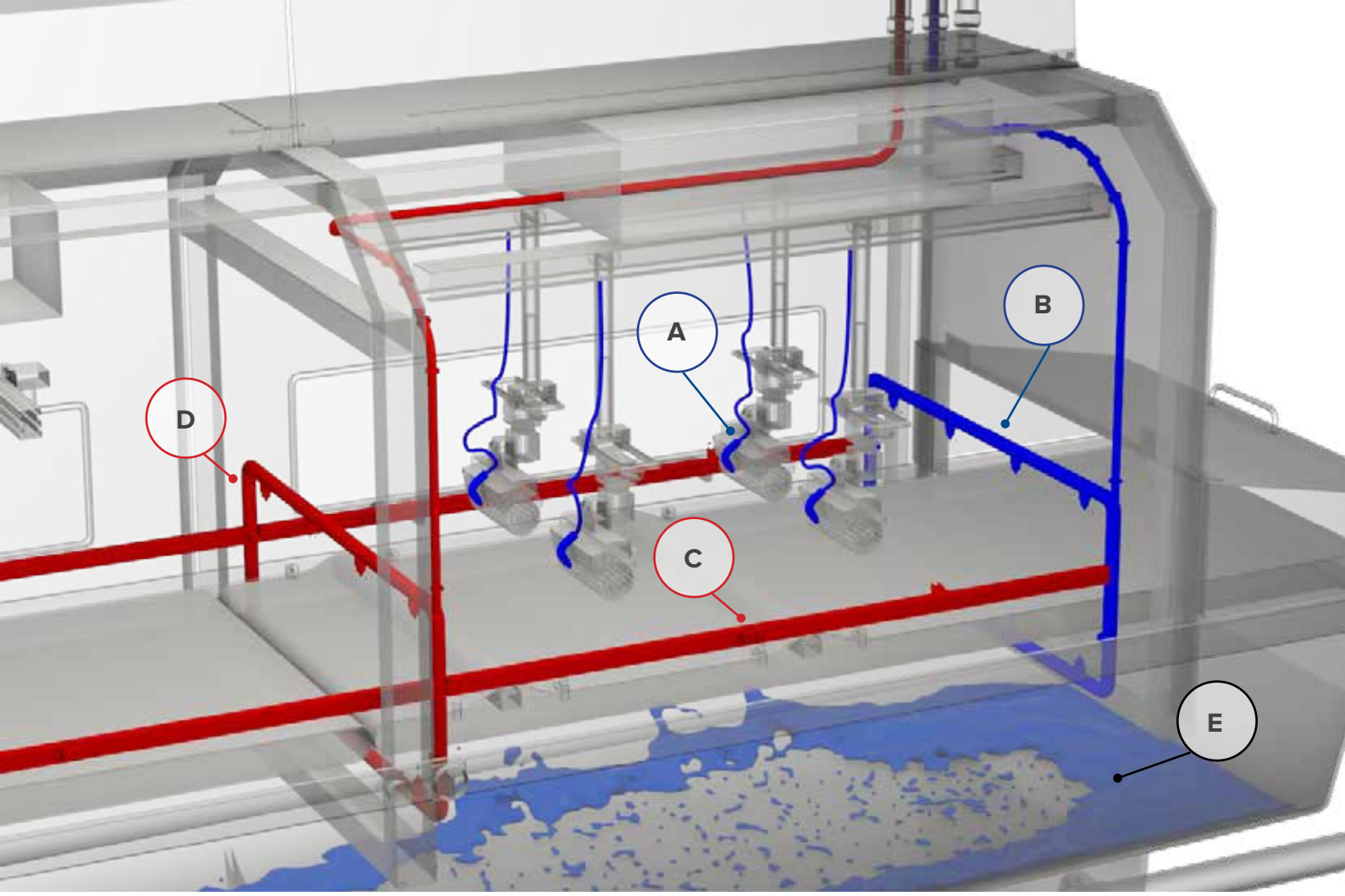


Figure 24.

During the cleaning process it has self-cleaning functions consisting of:

A. High-pressure nozzles mounted on the roller for cleaning of debris of salmon or bones.

B. Nozzle beam/bar clean water for desliming.

C. High pressure movable nozzles alongside the interior of the machine for cabinet cleaning.

D. High pressure nozzle beam/bar sprays chemicals and rinses with water for belt cleaning.

E. Sloped bottom drains connections for CIP cleaning if available in the factory.

Figure A.

Figure E.

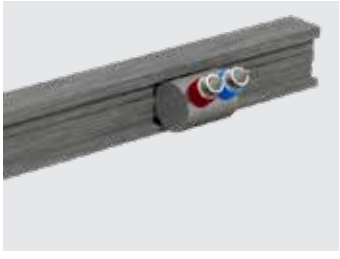


Figure C: Movable nozzles

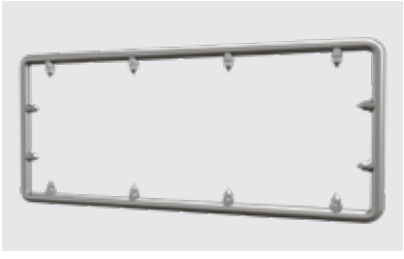


Figure B/D.

Issued patent concept 1

Issued patent concept 2

INVENTOR

Pescatech is a specialist processing designer and industry advisor. The aim was to use our knowledge in the development of new conceptual solutions and hand over the initiative to parties with ability to realize the inventions to the greater benefit of the industry, which means the intention was always selling the obtained patents to a motivated buyer.

This could be fish processors, development agencies, equipment suppliers or a combination of those parties? We are fully aware of the equipment supplier pursuits of exclusivity and therefore we shall resume a somewhat pragmatic approach on the next steps and future ownership. This can naturally lead to change of intellectual property rights to the parties with the greatest interest or capabilities to continue the developing of them.

The patents have already attracted several industry partners willing to purchase the first many machines. The inventions have been introduced to parties from both fish processing and machine manufacturers. The potentials are enormous and represent a unique opportunity to make a positive difference for the future of the fish and seafood industries. As part of hando[1]ver it can be agreed to have Pescatech participate for an limited period to secure proper transition of knowledge and thoughts.

If this has awakened your interest and your company has genuine interest in pursuing this and/or would like to obtain the rights to do so, then please feel free to contact us. Pescatech aims to handover the rights to produce them under another brand against a reasonable fee reflecting the value as industry game changing development.

STATUS OF INVENTIONS

Development tasks:	Milestones																				Budgets								Total
	2016				2017				2018				2019				2020-2023				2016	2017	2018	2019	2020	2021	2022	2023	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					DKK	DKK	DKK	DKK	DKK	DKK	DKK	DKK	
1. Conceptual design		x	x	x	x																280.000								280.000
2. Patent descriptions		x	x																		190.000	204.000	100.000	200.000	200.000	200.000	50.000	25.000	1.169.000
3. Patent applications				x																	73.970	136.257	114.992	320.218	164.471	189.116	189.557	98.113	1.286.694
4. Concept testing					x	x															170.000	30.000	50.000	10.000					260.000
5. Sales visits					x		x														22.560	13.480							36.040
6. Animation			x	x	x																165.000								165.000
7. Brochures/materials					x	x															108.340								108.340
8. Patent expansion											x	x	x	x									100.000	100.000					200.000
Total																					**1.009.870**	**383.737**	**364.992**	**630.218**	**364.471**	**389.116**	**239.557**	**123.113**	**3.505.074**
Pre-rigor patent:																													
9. Machine design																					12.000.000								12.000.000
10. Software design																													-
11. Prototype building																													-
12. Prototype test																													-
13. Evaluation 1-2-3-4																													-
14. Adjustments																													-
15. Final version																													-
Total																					**12.000.000**	-	-	-	-	-	-	-	**12.000.000**
Post rigor patent:																													
16. Machine design																					5.000.000								5.000.000
17. Software design																													-
18. Prototype building																													-
19. Prototype test																													-
20. Evaluation 1-2-3-4																													-
21. Adjustments																													-
22. Final version																													-
Total																					**5.000.000**	-	-	-	-	-	-	-	**5.000.000**
Total (DKK)																					**18.009.870**	**383.737**	**364.992**	**630.218**	**364.471**	**389.116**	**239.557**	**123.113**	**20.505.074**

Next phase involves prototype development, testing and subsequent production of machines in series. We estimate the cost price per machine will be less than 30% of estimated sales price and all machines will bring both parts and service aftersales value with it. Worldwide market potentials are significant.

Estimated machine price for concept 2 could be around 3-400.000 EUR, where concept 1 machines could go as high as 750.000-1.000.000 EUR per machine (end user estimates). Both have conceptual power to become game changers and revolutionize the fish industry. The patents are strong and have proved themselves under pressure by fighting off objections from a large equipment supplier.

Market potentials are difficult to put an exact figure on, but naturally this is also a brand-new generation of intelligent machines in a relatively young and growing market. Paybacks will be in lesser footprint, higher capacity, less damage, better bone pulling and less people. The sales potentials are measured in the hundreds of machines for both versions (post-rigor with largest volume and pre-rigor with the largest value)

The development (building costs) is potentially subsidized by local development authorities, such as ”markedsmodningsfonden” in Denmark or similar in other countries. Pescatech is targeting to sell all the intellectual and commercial rights to a motivated party, who will bring onboard the necessary energy to take this to next phases.
We hope this will inspire a salmon producer or machine producer or a joint venture constellation, who can spot the obvious advantages in such an endeavor.

We welcome all serious bids – after all it’s not just about the money, but also the interest in seeing great ideas materialize to the greater benefit of the industry.

About Pescatech

Pescatech is an Esbjerg based company from 2008. Key persons from leading companies within the fish and seafood industry found together in this team of highly specialized consultants.

We understand the actual conditions in the fish and seafood industry, where we as consultants have gathered extensive knowledge during many years of optimizing production methods in hundreds of production plants.

Pescatech can deliver consultancy and specialist assistance in many levels especially within the fish and seafood industry all over the world. We support all the different segments in their needs right from recieving raw materials to shipment of finished goods. We consider ourselves the neutral advisors in a consolidating industry, where vendors and production units merge and the options are reduced. We can deliver knowhow in highest technical level and we can from our position assure a safe way to the ideal production scenario for each customer.

Pescatech aims at a position as the preferred sparring partner for processes and vendors within the fish and seafood sectors by delivering the highest level of honesty and integrity. We work under non-disclosure agreements with our customers and guarantee discretion regarding obtained knowledge through our efforts making our customers better in what they do.

Pescatech is subject to "Foreningen af rådgivende ingeniører, FRI", which implies respect for ethical rules regarding careful consultancy limited by the company's competence areas.

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