

# Shrimp Sorting Machine

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**Abstract** - This machine is particularly adapted some-what flat and elongated bodies or products such as shrimps and size-sort them under their smallest transverse dimension. The present disclosure of the invention deals particularly with its use for handling either head-on shrimps or headless shrimps. The machine is to provide a simple, practical and highly effective machine which will assort shrimps into desire size and which will satisfactorily grade head-on shrimps just as they come from the water. All shrimps, whether fresh, frozen or canned are sold in accordance with recognized size grades. It is therefore essential that they are purchased from the boats on a basis of size. As a catch is comprised of various size shrimps it is now customary to estimate the percentage of the various sizes in the load or to hand grade, and then pay the fisherman accordingly. Either method is not entirely satisfactory as estimating is not sufficiently accurate and hand sorting is both slow and expensive

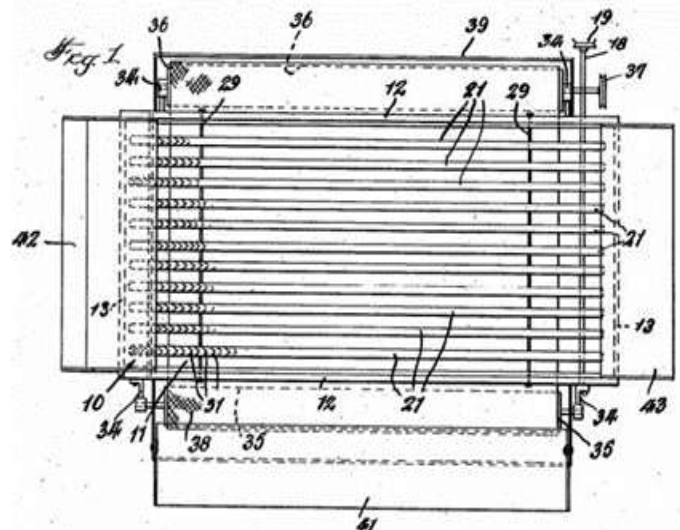
**Key Words:** Sorting, Grading, Shrimp, Prawns, Onboard.

## 1. INTRODUCTION

Shrimp are typically gathered for marketing by means of shrimp trawls which are pulled through the water, typically along the bottom of a body of water by shrimp boats or by other suitable means. After the shrimp are caught, they are typically stored in cold storage until they can be transported to a shrimp processing facility. At the shrimp processing facility, the shrimp may be packed in a heads-on condition or in a headless condition for transportation to a marketing facility or to the ultimate consumer. The sales price of shrimp is decreased materially by the various handling processes that are employed in a grading and subsequently deheading the shrimp or deheading and then grading them for size and quality. it is desirable to accomplish grading of the shrimp so that they may be sold and shipped without significant further handling. Such on-board grading of shrimp is ordinarily not practical since most shrimp grading machines are of such larger dimension that they cannot be efficiently mounted on a typical shrimp trawler. Moreover, shrimp grading machines are typical of sufficiently expensive nature that it is impractical to consider locating those on-board shrimp trawlers. Although in many cases fresh caught shrimp are graded by manual operations on-board shrimp trawlers for the purpose of protecting the catch by immediate cooling with ice to thus enhance the storage life thereof, manual shrimp grading operation can only be conducted if the volume of shrimp being caught

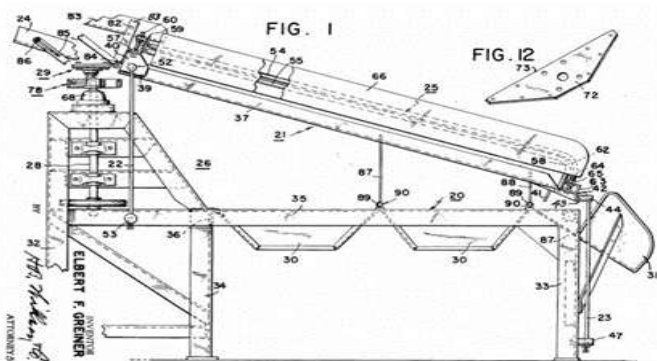
is fairly low. In fact, it has been determined that only approximately 10% of the shrimp being caught are manually graded and/or deheaded. Further manual grading operations during shrimp catching and on-board processing activities significantly enhance the cost of the shrimp that these activities are generally considered impractical. It is considered desirable therefore to place on-board shrimp trawlers and other such vessels a shrimp grading machine of sufficiently small dimensions and of sufficiently low cost as to be commercially acceptable for most shrimp trawlers.

[1] In 1944 the Inventor Curtis Mauroner.et.al, design this grading machine a framework.in this comprising a transverse shaft, at each end of the trough, a plurality of pulleys mounted on each shaft and spaced apart, each pulley having a substantially v-shaped peripheral groove, a grader belt trained about aligned pulleys of the shaft. A rotating movement of the shaft affects the grader belts in unison and parallel relation to each other, The shrimp is receiving from the conveyer belt. Then the product is passing between the grader belts, and the grader belts having a spaced rib on the upper semi-circular contour of the belts, ribs being inclined downwardly upon respective sides in a direction opposite the line of travel of belts.

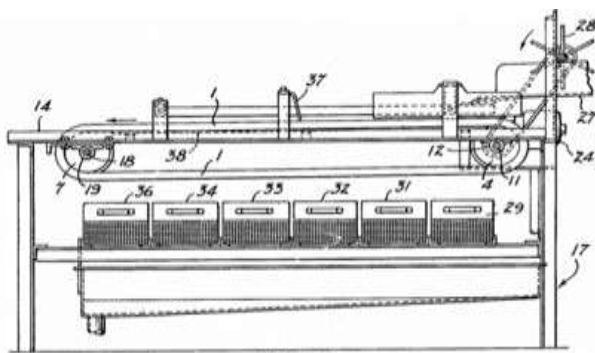


[2] In September 1954 The Inventor Elbert F. greiner.et.all On that Paper we understand the shrimp body or tail portion is longitudinally curved and tapered and in cross section it is somewhat oval or egg-shaped. the thickness and dimension from side to side

of the body in approximately one half of the vertical dimension, that is, the height or thickness from the back to the underside. The Inventor Design the shrimp grading machine that comprising an elongated grader member supporting upper and lower series of grader bars. The bar of the upper series, and the bars of the lower series being in a plane which diverges in a downward and rearward direction. The vibrator vibrates in both longitudinal and transverse direction with said bars downwardly inclined in rearward direction. This is how shrimp are separated on that machinery.

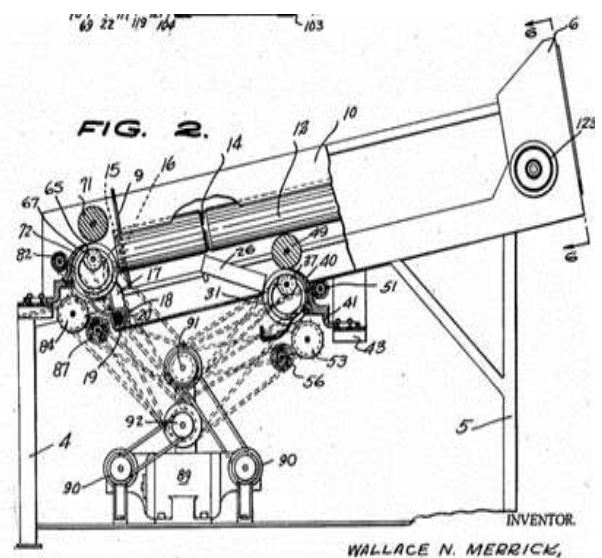


[3] In January 1957 the inventor Karl C. Envolden et al. design the machine in such a way that at least two belts gradually diverging from a narrow to wide end supported in the same plane by pulley wheels at the ends thereof, a discharge trough over the narrow end of said belts, said belts being of rubberlike material generally A-shaped in cross-section with rounded outer contour and a longitudinally grooved inner contour, said pulley wheels having circumferential ridges thereon which are received by the longitudinal grooves in the belt, longitudinally diverging guide rods mounted immediately beneath the upper portion of said belts so that the grooves in the belts fit over said guide rods and the belts are guided thereby, and means to drive said pulleys.

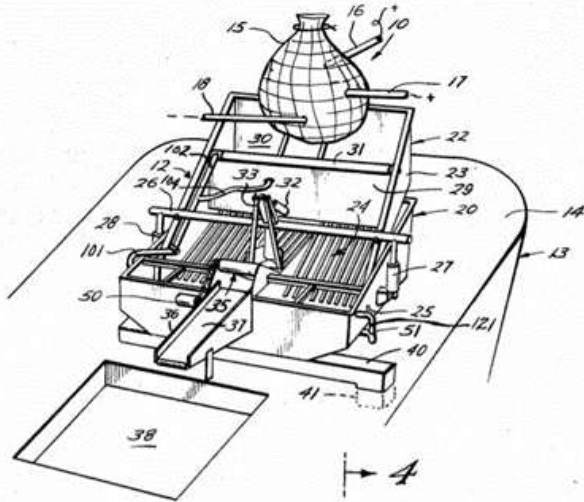


[4] In July 1957 the Inventor Wallace N. Merrick et al. Design the Shrimp sorting machine the primary object of the machine to remove the legs, clean and sand vein of the shrimp, partially split the body meat along the

length. On that machine a rotary conveyor of a configuration following the natural arc-shape configuration of the shrimp for the supporting and moving the shrimp in an annular path past doglegging, deveining, splitting and brushing elements surrounding and coordinating with conveyor for the processing of the shrimp.

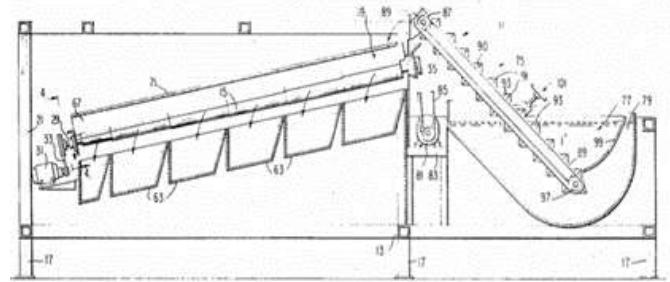


flotation tank. The lower portion of the flotation tank is filled with water and the shocked shrimp sink to the bottom of the tank, while the shocked fish float to the surface. Then the sink shrimp is used for the further process, and floating shrimp is removed from the flotation tank.

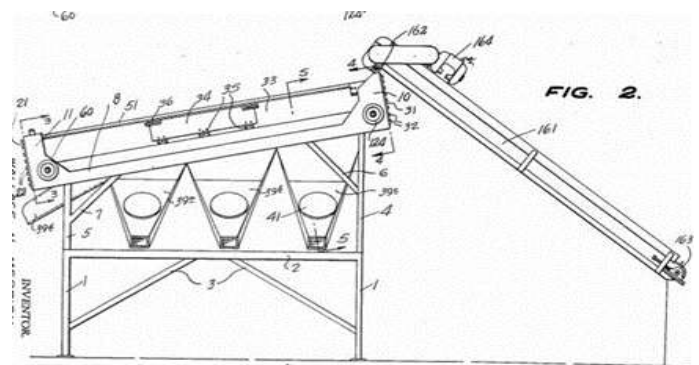


[7] In November 1973 the Inventor Joseph Marz design this machine patent, in this we can understand how the grading machine sorted shrimp with the help of the head thickness. This shrimp grading machine mainly consists of a driving device, a transmission drum, a conveyer belt, a groove type upper supporting roller, a lower supporting roller, a rack a sweeper, a tension device, a turnabout drum, a guide chute, an electric control device, etc.

The conveyer belt winds about the transmission drum and the turnabout drum. in the tail, part to form an annular sealing belt the conveyer belt winds about the transmission drum and turnabout drum. in the tail, part to form an annular sealing belt. The tension device enables the conveyer belt to have sufficient tensile force during working. the transmission drum is driven by a speed reducer to drive the conveyer belt through a tooth profile thus the materials enter from feeding device to move along with the conveyer belt and they search to discharge part via a certain distance to shift to net process. The smallest size of shrimp will be sent to the outlet of conveyer first and the other side of shrimp will slide down this is how this grading machine works.

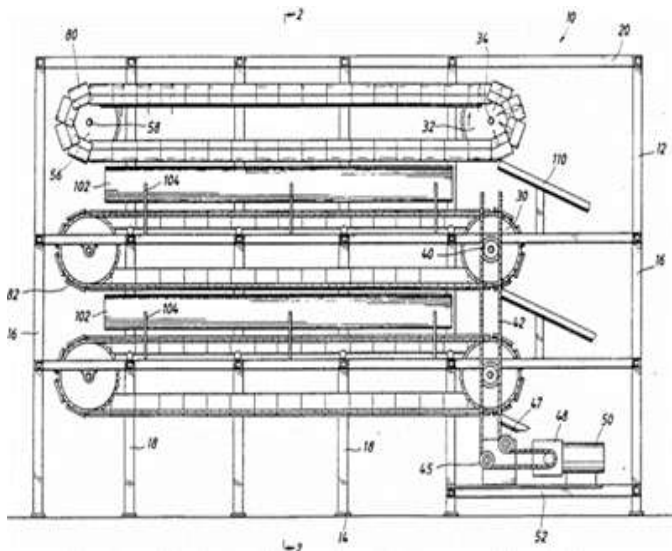


[8] In June 1961 The Inventor Wallace N. Merrick et al Design The Machine in such a way that It provided power driven machine is to provide a continuously receiving shrimp and the like of multitude of a size and various positions and separating the shrimp according to a plurality of size groups and distribution the shrimp of each size separately from those of other sizes.

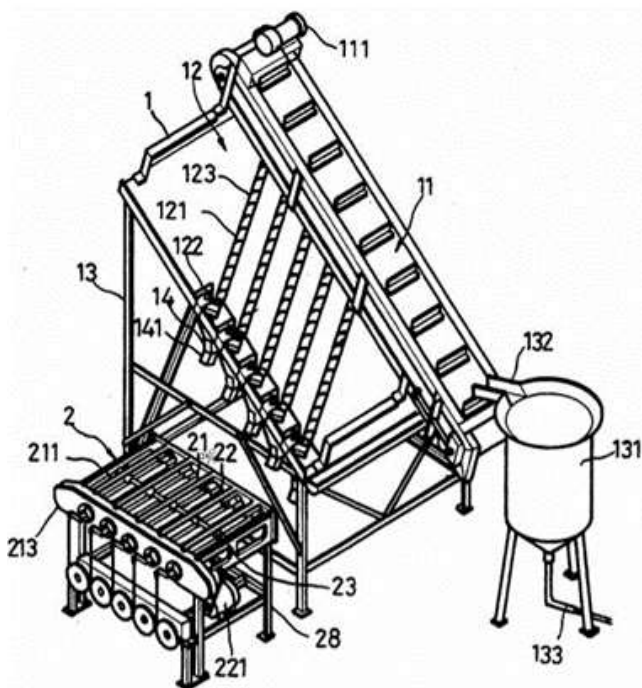


[9] In November 1991 the Inventor James J. Stipe. Design the machine. In this machinery firstly shrimp is received on a conveyor. This conveyor revolves about spaced circular derives. The opposite side of shrimp sorting machine has an engaging section with predetermined size range, the minimum of which being determined by the width of said grading slot by opposed pivotal engagement by this shrimp are pivotally supported at the joint of the head and body and smaller shrimp than said predetermined size range falling through said slot. This machine is placed in a cascading serial so that transfer of shrimp falling from one of the said conveyors to the other conveyor. The method for grading shrimp is to receiving shrimp on a conveyor opposed incline pan segments each having shrimp engaging section. The mechanism is used in this grading machine is to provide an incorporates a shrimp conveyor and shrimp oriented in head up, body down position along a linear path. This invention relates generally to apparatus for rapidly and accurately grading random sizes of shrimp. In this machine, the smaller size of shrimp that are preselected range will fall through the slot and shrimp of preselected size range will be gripped at the juncture of the heads and body by opposed pan segments of the conveyor. The shrimp to pivot downwardly such that each of the shrimp is positioned in head up and body down the relation. Shrimp grading machines are typically

sufficiently expensive that it is impractical to consider locating them on board shrimp trawlers, therefore, to place on board shrimp trawlers and other such vessels shrimp grading machine of sufficiently small dimensions and of sufficiently low cost as to be commercially acceptable for most shrimp trawlers.



[10] In September 1994 the Inventor Chiu, Yi-chich.et.al. Design This automatic size- grading and shrimp peeling machinery, and it comprises a plate-partition frame, and a plurality of feeding pipes for the shrimp peeling machinery the plate partition convener is fastened to the slanting platform. the peeling machine includes a plurality of small and large peeling rollers, of squeezing wheels, weighted racks, squeezing belts and weight assemblies.



[11] Dong Zhang.et.al., In this method, proposes an Evolution constructed feature-based method to automatically evaluate shrimp shape completeness. It does not depend on the human expert design feature. The advantages of this are it doesn't depend on human expert and if a new species of shrimp is added into the dataset or other shape evaluation criteria are adopted, for that new ECO feature can be constructed automatically rather than wait for an expert to make the necessary changes and important thing in this is that the recognition accuracy of the proposed method is not compromised

[12] Bahar gumus.et.al, Machine vision technology is a rapid, economic, consistent and objective inspection and evaluation. It can perform many functions at once in an aquatic food processing line i.e. sorting of species by size. Machine vision applications to aquatic foods are grouped under evaluation of size and volume, measurement of shape, detection of defect during quality evaluation. This technology aims to emulate the function of human vision by electronically. The main thing of machine vision will improve the industry's productivity and also provide better quality aquatic food for consumers.

**CONCLUSIONS**

After studying and searching research papers and collecting the information about all types of sorting & grading machine it is observed that sorting and grading machines are typically used in inland fish processing plants where large amount of fish is handled & processed for further operation. Compare to a scene on an ongoing vessel where price tag and size of a machine is main concern and fish load is quite low compare to a fish processing plant. Fishermen in IOR cannot afford a costly machine, also the dimensions of the machines available in the market are too large to be fitted in the smaller vessels used by the local fishermen. This is where need of smaller and cheaper sorting machine arises.

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