W. O. SMITH

MACHINE FOR DEHEADIN G SHRIMP

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3 Sheets-Sheet 2

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The present invention relates to a machine for deheading shrimps and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

Generally, the invention comprises an apparatus including a hopper wherein shrimps are placed and from which they are adapted to drop one at a time upon an endless belt surmounting which is a pair of guide rails which are adapted to cause the shrimps to assume a lengthwise position upon the belt from which the shrimps drop to a second endless belt. During their passage from the first to the second of such belts, they are subjected to a blast of air which causes them to fall in a head forward position upon the second belt which is also equipped with a pair of guide rails to assure the shrimps movement to the center of the belt in a head foremost, lengthwise position. The second belt is propelled at a sufficient rate of speed so that the shrimps are projected therefrom against a backstop. The backstop as adapted to be moved by the impact of the shrimps thereon to a more or less degree depending upon the weight of the shrimps. At the moment of impact a pair of parallel belts grasp the shrimps in a downward direction against a knife which is adapted to sever the tails of the shrimps delivering the same into a suitable trough or conveyor while the heads are carried downwardly to a second trough or conveyor.

It is, accordingly, an object of the invention to provide an apparatus whereby the heads and tails of shrimps may be automatically divided and classified.

A further object of the invention is the provision of a novel cutting mechanism.

A further object of the invention is the provision of a novel backstop for positioning objects in a conveyor.

A further object of the invention is the provision of a novel conveyor mechanism.

A further object of the invention is the provision of novel means for arranging objects upon an endless belt.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

Figure 1 is a side elevational view of an apparatus embodying the invention,
Figure 2 is a plan view of Figure 1,
Figure 3 is a sectional view taken along line 3—3 of Figure 1,
Figure 4 is a sectional view taken along line 4—4 of Figure 2,
Figure 5 is a sectional view taken along line 5—5 of Figure 1, and
Figure 6 is a sectional view taken along line 6—6 of Figure 1.

Referring more particularly to the drawings, there is shown therein a shrimp deheading machine comprising a platform 18 upon which is mounted a conveyor frame 11 at the upper end of which is mounted a hopper 12 provided with an opening 13 in the bottom thereof. The opening 13 lies immediately above an endless belt 14 which is mounted upon a drive roller 15 at the forward end of the frame and an idler pulley 16 at the rearward end of the frame. The idler pulley is carried upon one end of a lever 17 pivoted, as indicated at 18, to the frame 11 and interconnected at its other end by a spring 19 to the frame 11.

Carried by the frame 11 at its upper end is a pair of guide arms 20 which are preferably lined with a metallic substance as indicated at 21. The guide arms are supported by brackets 22 immediately over the belt 14 but not in contact therewith. The guide arms are shaped to leave a narrow opening 23 at their forward ends which lie to the rear of the forward end of the belt 14. A deflector plate 24 is mounted upon the frame 11 immediately over and forward of the roller 15. Mounted upon a cross arm 25 of the frame 11 is a motor 28 which is provided with an impeller 27 which is mounted within the larger end 28 of a substantially frusto-conically shaped wind tunnel 29 whose forward or smaller end 30 lies beneath and a little to the rear of the forward end of the belt 14. A second endless belt 31 extends forwardly and upwardly upon the frame 11 and is mounted upon a drive roller 32 which lies to the rear of the forward end of the belt 14 and an idler roller 33 at its forward end. The belt 31 is also provided with a pair of guide arms 34 attached to the upper end of the frame 11 and which are metallically lined as indicated at 35. The arms 34 are supported by brackets 36 and are so shaped as to provide a narrow opening 37 therebetween slightly to the rear of the forward end of the belt.

Forwardly of the frame 11 is a cutter frame 38 which is likewise mounted upon the platform 19. A bracket 39 at the upper end of the frame 38 supports a motor 40 which is connected by means of a belt 41 to a pulley 42 mounted at one end of a shaft 43 which extends laterally and is journaled as indicated at 44 in the upper end of the frame 38.

Inwardly of the frame sides and mounted upon the shaft 43 is a pair of pulleys 45 over each of
which is trained a belt 46 each of which is trained over a longitudinally extending idler pulley 47 and thence over pairs of like pulleys 48 and 49, which are so mounted as to provide a narrow passage 50 between the belts 46. The belts extend downwardly over pulleys 51 which are similar to the pulleys 47 and thence to pulleys 53 carried by a shaft extending shaft 53 journalled, as indicated at 54, in the lower end of the frame 38. The belts 46 are adapted to be tensioned by a roller 55 which is adapted to bear against the rear of the same and which is carried by one end of an arm 56 which is pivoted, as indicated at 57, at its other end to a bracket 58 carried by the frame 38. A spring 59 interconnects the upper end of the arm 56 and the inner end of the bracket 58.

A blade 69 is carried by an upright 60 affixed to the platform 10 and is so arranged that its cutting edge 61 lies adjacent to the plane of the edges of the belts 46 at the passage 50; A trough 62 is mounted upon an upright 53 and attached, as indicated at 64, to the upright 60 and a second trough 65 is provided immediately below the belts 46.

A belt 71 interconnects a drive pulley 66 connected with the roller 15 and a pulley 69 connected with the roller 32. A belt 70 interconnects a pulley 71 also connected with the roller 32, and a pulley 72 carried in the outer end of a shaft 73 of a motor 14 mounted upon a bracket 75 attached to an arm 76 which is pivotally connected to a dog 77, as indicated at 78. The upper end of the arm 76 carries the roller 32 and its associated mechanisms.

A vertically extending shield 93 is carried by the frame 38 centrally thereof and is provided with rearwardly extending arms 81 to which is pivoted a backstop 82 provided with a spring 83 which is adapted to urge the same in a rearward direction.

In operation, it will be seen that shrimps are first placed in the hopper 12 from which they will be fed by gravity one at a time through the opening 13 to the belt 14 and that thereupon they will be forced to assume a position parallel to the belt by means of the guide arms 28 and 29 which will prevent them from sticking to the guide arms by the metallic linin 21. Thereafter they will be forced to assume a position centrally upon the belt 18 as they pass through the opening 23 whereupon they will drop downwardly from the forward end of the belt 14 to the rear end of the belt 31. During their passage from one belt to the other they will be subjected to a blast of air from the impeller 27 which will cause them to fall in a head foremost position due to the fact that the head of a shrimp contains many air intercepting parts. The guide arms 34 will then cause the shrimps to assume a head foremost position parallel to the direction of movement of the belt 31 and, due to the narrow opening 37 they will assume such position centrally upon said belt. The belt 31 is adapted to be moved at a rather rapid rate thus causing the shrimps such as indicated, for example, at 84, to be ejected forcefully from the end of the belt 31 against the backstop 82. It will be seen that the heavier the shrimp the greater distance the backstop will be moved forwardly by the impact of the particular shrimp. At this time the shrimps will be grasped by the inner sides of the belts 46 and carried downwardly thereby until portions of such shrimps which project rearwardly will be severed from the remainder of the shrimp's body and will fall by gravity downwardly into the trough 62 while the head and remainder of the shrimp's body will be delivered to the trough 65.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A shrimp deheading apparatus including, in combination, a hopper, an endless receiving belt horizontally disposed below said hopper and adapted to receive shrimps from said hopper, means for centrally aligning shrimps upon the receiving belt, an endless projecting belt mounted below the receiving belt and adapted to receive shrimps therefrom by gravity, means interposed between said belts for aligning the shrimps head foremost upon the projecting belt, a pair of vertically disposed coacting conveyor belts mounted adjacent the projecting end of the projecting belt and adapted to receive therebetween shrimps projected from the projecting belt, means for automatically positioning the shrimps between the conveyor belts, a fixed blade mounted adjacent the conveyor belts for severing the heads from the bodies of the shrimps carried by said conveyor belts and means for separately receiving said heads and bodies.

2. A shrimp deheading apparatus including, in combination, a hopper, an endless receiving belt horizontally disposed below said hopper and adapted to receive shrimps from said hopper, means for centrally aligning shrimps upon the receiving belt, an endless projecting belt mounted below the receiving belt and adapted to receive shrimps therefrom by gravity, means interposed between said belts for aligning the shrimps head foremost upon the projecting belt, a pair of vertically disposed coacting conveyor belts mounted adjacent the projecting end of the projecting belt and adapted to receive therebetween shrimps projected from the projecting belt, means for automatically positioning the shrimps between the conveyor belts, a fixed blade mounted adjacent the conveyor belts for severing the heads from the bodies of the shrimps carried by said conveyor belts and means for separately receiving said heads and bodies, said means for aligning the shrimps upon the receiving belt comprising a pair of guide arms mounted in close alignment over said receiving belt and shaped to provide a narrow opening therebetween.

3. A shrimp deheading apparatus including, in combination, a hopper, and endless receiving belt horizontally disposed below said hopper and adapted to receive shrimps from said hopper, means for centrally aligning shrimps upon the receiving belt, an endless projecting belt mounted below the receiving belt and adapted to receive shrimps therefrom by gravity, means interposed between said belts for aligning the shrimps head foremost upon the projecting belt, a pair of vertically disposed coacting conveyor belts mounted adjacent the projecting end of the projecting belt and adapted to receive therebetween shrimps projected from the projecting belt, means for automatically positioning the shrimps between the conveyor belts, a fixed blade mounted adjacent the conveyor belts for severing the heads from the bodies of the shrimps carried by said conveyor belts and means for separately receiving said heads and bodies, said means for aligning the shrimps upon the receiving belt comprising a pair of guide arms mounted in close alignment over said receiving belt and shaped to provide a narrow opening therebetween.
b) A shrimp deheading apparatus including, in combination, a hopper, an endless receiving belt horizontally disposed below said hopper and adapted to receive shrimps from said hopper, means for centrally aligning shrimps upon the receiving belt, an endless projecting belt mounted below the receiving belt and adapted to receive shrimps therefrom by gravity, means interposed between said belts for aligning the shrimps head foremost upon the projecting belt, a pair of vertically disposed coacting conveyor belts mounted adjacent the projecting end of the projecting belt and adapted to receive therebetween shrimps projected from the projecting belt, means for automatically positioning the shrimps between the conveyor belts, a fixed blade mounted adjacent the conveyor belts for severing the heads from the bodies of the shrimps carried by said conveyor belts and means for separately receiving said heads and bodies, said means for centrally aligning the shrimps upon the receiving belt, an endless projecting belt mounted below the receiving belt and adapted to receive shrimps therefrom by gravity, means interposed between said belts for aligning the shrimps head foremost upon the projecting belt, a pair of vertically disposed coacting conveyor belts mounted adjacent the projecting end of the projecting belt and adapted to receive therebetween shrimps projected from the projecting belt, means for automatically positioning the shrimps between the conveyor belts, a fixed blade mounted adjacent the conveyor belts for severing the heads from the bodies of the shrimps carried by said conveyor belts and means for separately receiving said heads and bodies.

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