SHACKLE CLEANING SYSTEM

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ABSTRACT

Shackles are transported by an overhead conveyor through a housing. Elongated pipes are disposed on opposite sides of the housing along the path of travel of the shackles as they are transported through the housing. Additional pipes are disposed on the bottom of the housing for directing a higher pressure fluid spray upwardly against the shackles. Structure is provided to trip automatic shackles open as they are transported through the housing to facilitate cleaning thereof.

5 Claims, 2 Drawing Figures
This invention relates to cleaning systems, and more particularly to systems for cleaning shackles used in animal processing.

THE PRIOR ART

A large number of animal processing plants presently use overhead conveyors for transporting a plurality of shackles along a treating path. Animal carcasses are hung from the shackles and are subjected to a variety of processing steps. For instance, in fowl processing plants, fowl are hung by the feet from shackles and are transported through a killing station, a scalding or steam spray station and then to a feather picking station. The defeathered fowl are then removed from the shackles and the shackles are transported back to receive another fowl. The shackles utilized in such systems normally become covered with blood, feathers, fats and other deposits as a result of such processing steps. For sanitization purposes, it is thus desirable to periodically clean and sanitize the shackles to prevent the buildup of bacterial growth and also to prevent clogging of the moving parts of the conveyor and the shackles.

SUMMARY OF THE INVENTION

In accordance with the present invention, shackles are transported along a prescribed path extending through a housing while the shackles are maintained in a predetermined orientation. Oscillating high pressure streams of fluid are directed against the sides of the shackles while passing through the housing in order to thoroughly clean the shackles. In accordance with another aspect of the invention, shackles are transported through an enclosure, with spray nozzles being mounted within the enclosure along the path of travel of the shackles. The spray nozzles are adapted to be connected to a source of high pressure fluid, and structure is provided to oscillate the spray nozzles such that oscillating high pressure sprays of fluid are directed against the shackles for cleaning thereof. Spray nozzles are also disposed in the lower part of the housing for directing high pressure fluid spray upwardly against the bottoms of the shackles.

In accordance with yet another aspect of the invention, shackles are transported through an enclosure. Spray nozzles are disposed along the enclosure against the sides of the shackles for directing high pressure fluid sprays against the shackles for cleaning thereof. Structure is also disposed within the enclosure for tripping the shackles to an opened position.

DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the invention, and for further objects and advantages thereof, reference may now be made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view, partially broken away, of the cleaning system of the invention; and

FIG. 2 is an end view of the system shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, the present system is identified generally by the numeral 10 and comprises a housing or enclosure 12 through which an overhead conveyor member 14 extends. Shackles 16 are hung from chains 18 attached to rollers 20. The rollers 20 roll along the flange of the member 14 in the conventional manner. The shackle 16 illustrated includes a tripper mechanism 22 for enabling the shackle to be selectively opened to receive a fowl. While only one shackle 16 has been illustrated for ease of description, it will be understood that a plurality of shackles will be distributed along the overhead conveyor member 14 and are transported along the member 14 by action of a chain drive or the like. Such overhead conveyor systems and automatic shackles are conventional and widely used. The present system 10 is adapted to be located in a conventional fowl processing conveyor system by installing the housing 12 in the conveyor "dead section" between the shackle tripping section and the fowl hanging section. The present system may thus be installed without reorientation or change of existing shackle systems.

The housing 12 comprises a generally rectangular housing having sidewalls 24 and 26. Sidewall 24 joins with an outwardly inclined wall 28 and an inwardly inclined wall 30, while sidewall 26 joins with an outwardly inclined wall 32 and an inwardly inclined wall 34. A bottom panel 36 completes the housing and includes a drain portion 38 for removal of collected fluids and debris. The two ends of the housing 12 are open so that shackle 16 may be easily transported therethrough. Guidebars 40 and 42 are rigidly affixed to the housing 12 and disposed on opposed sides of the travel path of the shackles 16. The shackles 16 are maintained by the guidebars 40 and 42 in a predetermined orientation such that the cleaning spray to be later described will be directed upon the side portions of the shackles 16.

A pair of spray pipes 44 and 46 are also disposed on opposed sides of the path of travel of the shackle 16 through housing 12. Each of the pipes 44 and 46 includes a plurality of spray nozzles 48 disposed along the length of the pipes 44 and 46. Certain spray nozzles 48a are offset from the position of the remainder of the nozzles 48, in order to provide cleaning action to the tripper mechanism of the shackles. A rotating union 50 rotatably supports the end of the pipe 44, while a rotating union 52 rotatably supports the end of the pipe 46. A stationary pipe 54 joins with the rotating union 50 and is connected with a supply of fluid from a high pressure pump via a supply inlet 56. Similarly, a pipe 58 is connected to the rotating union 52 and is also connected with the pipe 56 for supply of a high pressure fluid. Additionally connected with the pipe 56 is a narrow conduit 60 which is connected by pipe sections 62 and 64 to a pair of spaced apart nozzles 66 located in the bottom of the housing 12. Fluid, such as water, spray issues upwardly from nozzles 66 against the shackles to clean the tripper mechanism thereof.

Pipe 44 is rotatably mounted in a pair of spaced apart bearings 68a-b while pipe 46 is rotatably mounted in a pair of spaced apart bearings 70a-b. A radially outwardly extending member 72 is attached to the end of pipe 44, and a like member 74 is connected to the end of pipe 46. A rod 76 is pivotally connected at its upper end to member 72, while a rod 78 is pivotally connected at its upper end to member 74. Rods 76 and 78 are pivotally connected to a projection 80 rigidly connected to a disc 82. Projection 80 is eccentrically located on disc 82 and the disc 82 is connected to the output shaft of an electric gear motor 84. Operation of the motor 84 thus causes up and down reciprocation of the rod 76 and 78 to cause oscillation of the pipes 44 and 46 about a prescribed angle.

A pair of shackle tripping rods 85 and 86 are rigidly connected within the housing 12 along the path of travel of the shackle 16. As may be best seen from FIG. 1, the tripping rods 85 and 86 slope gradually downwardly to the vicinity of the middle region of the housing 12 and then slope back upwardly. At the exit of the housing 12, the rods 85 and 86 terminate in outwardly extending curved portions 88 and 90.

Operation of the shackle tripping rods 85 and 86 may be best illustrated by reference to FIG. 2. When the shackle 16 first enters the housing 12, the tripping mechanism 22 is initially disposed in the closed position 94. As the shackle 16 is transported further through the housing 12, the upper part of the tripping mechanism 22 begins to bear against the underside of the tripping rods 85 and 86, until the shackle tripping mechanism 22 is depressed to the position illustrated by numeral 96 in FIG. 2. In this position, the shackle is placed in an open condition for discharging of a fowl or other animal. As the shackle 16 then continues travel through the housing 12, the rods 85 and 86 slope upwardly and the shackle 16 again returns to the closed position 94.
In operation of the system, shackle 16 enters the housing 12 and is maintained with the sides thereof in a predetermined orientation by the guidebars 40 and 42. As the shackle 16 travels through the housing, high pressure fluid, such as water, is supplied through the inlet pipe 56 and through the spray nozzles 48 on the oscillating pipes 44 and 46 in order to direct oscillating sprays of high pressure fluid against the sides of the shackle 16. This high pressure spray removes blood and other accumulated fluids, as well as feathers, from the shackle 16.

As the shackle 16 travels through the housing 12, the trip mechanism 22 is depressed until the shackle 16 is positioned in the open position. At this position, the shackles are subjected to high pressure fluid spray from the nozzles 66. The nozzles 66 direct the stream upwardly from the bottom of the housing 12 to remove debris and the like from the trip mechanism 22 of the shackle 16. Provision of the upward spray from the nozzle 66 has been found to provide substantially improved cleansing results, particularly from automatic shackles which have moving trip parts in the trip mechanism which tend to collect debris and the like. The shackles are continuously subjected with oscillating high pressure fluid sprays throughout their travel of the housing 12, until the shackles exit housing 12, after which they are also returned to their closed position by means of the upward slope of the trippping rods 85 and 86.

In the preferred embodiment, the pipes 44 and 46 oscillate about an approximate 90° arc at a rate of approximately 60 cycles per minute. The pipes receive high pressure water through a pump rated at approximately 20 gallons at 600 p.s.i. The offset spray nozzles 48 also tend to spray vertically during the reciprocation to thereby clean the underside of the tripper plate and the tripper spring of the shackles.

The present system may be manually operated by actuation of the motor 84 and turning on a valve in the inlet 56 to initiate high pressure water sprays through the spray nozzles 48. Alternatively, microswitches may be disposed on the overhead conveyor 14 in order to sense the presence of shackles for automatic operation of the spray mechanism. If desired, a control panel may be provided to provide preprogrammed wash cycles to the system at selected time intervals.

In the preferred embodiment, when a cleaning operation is desired, the shackle washer is turned on and a complete cycle of the shackles is transported through the housing 12. The shackles are sprayed with high pressure streams of cold water to remove blood and to also remove a major portion of the feathers on the shackles. After a complete cycle of the shackles through the housing 12, a microswitch is actuated to change solenoid valving (not shown) in the inlet pipe 56 to supply warm water to the spray nozzles. The warm water is then sprayed upon the shackles for a complete cycle of travel of the shackles. After washing with warm water, detergent may be injected into the system and a third cycle of the shackles may be transported through the housing 12. Additional cycles of either hot or cold water, with or without detergents, may be provided for the shackles, dependent upon the particular conditions involved. If a plurality of shackle lines are involved, a single pump may supply a high pressure fluid to a number of housings 12 for washing of more than one shackle line.

It will thus be seen that the present invention provides means for quickly and easily providing permanent washing facilities to existing shackle systems. Particularly in the poultry processing industry, such cleaning operation has been found to provide extremely advantageous results when used in conjunction with a rotating brush cleaning system as disclosed in applicant's copending patent application Serial Number filed.

Whereas the present invention has been described with respect to specific embodiments thereof, it will be understood that various changes and modifications will be suggested to one skilled in the art, and it is intended to encompass such changes and modifications as fall within the scope of the appended claims.

What is claimed is:
1. In a cleaning system for shackles being transported by an overhead conveyor and being movable between a closed position for carrying an animal carcass and an open position for releasing the animal carcass, the combination comprising:
   a housing open at opposite ends through which said shackles are transported, said shackles entering said housing in the closed position, elongated pipes disposed on opposite sides of said housing along the path of travel of the shackles and including spray nozzles positioned along the lengths thereof, a source of pressurized fluid connected to each of said pipes, means for oscillating each of said pipes for a prescribed angle about the longitudinal axes thereof such that oscillating sprays of high pressure fluid are directed against the shackles being transported through said housing, the spray means being disposed on the bottom of said housing for directing high pressure fluid spray upward against said shackles for cleaning thereof, a pair of spaced apart guide bars disposed along said housing for maintaining said shackles in a predetermined orientation while passing through said housing, and downwardly curved bar means disposed along said housing for engaging said shackles and moving said shackles from said closed position to said open position to facilitate cleaning thereof.
2. The combination of claim 1 and further comprising:
   motor means eccentrically connected to rods, each of said rods being connected to oscillate one of said pipes.
3. The combination of claim 1 wherein said source of pressurized fluid comprises a cold water source.
4. The combination of claim 1 wherein said source of pressurized fluid comprises a hot water source.
5. In a cleaning system for fowl shackles depending from rollers moved along an overhead conveyor, the combination comprising:
   a housing open at opposite ends through which said shackles are transported, elongated pipes pivotally mounted on opposite sides of said housing along the path of travel of said shackles and including a plurality of spray nozzles spaced therealong, a source of pressurized fluid connected to each of said pipes through a rotary union, each said pipe including an extension radially extending from an end portion thereof, a motor connected below said housing and having an output shaft extending outwardly from below the end of said housing, linkages connected at the lower ends eccentrically of said motor shaft and at the upper ends to said extensions, whereby said motor is operable to oscillate said pipes about the longitudinal axis thereof such that oscillating sprays of high pressure fluid are directed against said shackles, a spray aperture located at the bottom of said housing for directing high pressure fluid spray upwardly against said shackles, and a drain located in the bottom of said housing for draining fluid and debris therefrom.

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