This invention relates to a washing machine and more particularly to a machine for washing and scrubbing an object having a generally spherical shape such as an egg, an orange, or other article that may be rolled around to expose various areas of its surface.

It is an object of this invention to provide a washing and scrubbing means for cleaning the surface of a spherical object.

It is another object of this invention to provide a machine for washing eggs.

Another object of this invention is to provide an improved brush assembly structure for a washing and scrubbing machine.

Still another object is to provide an improved conveyor structure for delivering the object through the machine.

Referring to the drawing:

Figure 1 is a side elevation of the machine partly broken away;

Figure 2 is a plan view of the machine shown in Figure 1; and

Figure 3 is a section taken on line 3–3 of Figure 1.

In the past it has been proposed to wash generally spherical objects by passing them contiguously through successive stages of washing and scrubbing, spraying, and drying means and the present invention is an improvement on this type of machine. As will be seen below, a tank is provided for submerging the articles in a suitable washing fluid and conveying means continuously drive the articles through the tank which is provided with brushing means disposed in a position to thoroughly scrub the articles. The spherical objects are then lifted, by the conveyor, out of the washing fluid and carried into a spray chamber where the surfaces of the objects are flushed with a rinsing fluid, and after the flushing fluid is drained off, the objects are carried into a suitable drying chamber to remove the fluid remaining on its surface.

In Figure 1, a tank 10 is shown, which is provided to hold any suitable washing fluid and an endless conveyor 11 is mounted within the tank so that during normal operation, substantially the entire length of its upper run passes through the body of washing fluid. The washing fluid may comprise any suitable solution for loosening the type of dirt on the surface of the object being scoured and the conveyor is designed to carry the object at least partially submerged in this fluid so that the objects will soak in the washing fluid and to insure that a large quantity of washing fluid will become entrained with the objects as they progress through the machine. The conveyor 11 may be suitably supported on rollers 12 and 13, the latter of which is mounted at a higher level than the former for a purpose that will appear below.

As the objects progress from the entrance end of the tank 10 toward the exit end adjacent roller 13 they pass under a series of scrubbing brushes 14 which cooperate with the washing fluid to agitate the fluid against the surface of the object whereby all of the adhering dirt particles are removed. The brushes are pivotally mounted at their forward ends about a bearing 15 and a series of laterally disposed brushes may be carried by the bearing which in turn is carried by a wall 16 as best shown in Figure 3. The bearings 15 are mounted in the wall such that the lowermost edge of the brushes may contact the surface of the belt 11 with the brush being disposed at a relatively steep angle and if necessary the brush may be weighted to insure that it will always fall to this position in order to engage an object in passing through the machine. The brushes are individually lifted from their inclined positions to a substantially horizontal position by the objects which pass thereon.

The wall 16 is provided along its lower edge with a pair of skirt members 17 and 18 spaced apart to fit over the side wall of the tank 10 and removably fixed to the inner skirt 17 are brushes 19 which form the side walls of the tunnel through which the objects pass.

The brushes 14 forming the roof of the tunnel, as above explained, are normally disposed with their lower ends engaging the conveyor belt and the lower face 20 of the brush makes an acute angle with respect to the face of the conveyor as it moves forward. At the pivotally mounted end of each of the brushes 14, the bristles forming the under surface 21 are cut away to provide a short planar section disposed at a less acute angle with respect to the conveyor for initially engaging the objects as they are driven through the washing tank 10. With this construction the spherical object passing along through the washing bath on the conveyor, will engage either the brushes 14, or both the side brushes 19 and the brushes 14 to be thoroughly scrubbed. The brush 14 should be mounted, depending on the diameter of the objects such that they will engage the undercut forward surface of the brushes initially whereby the objects are made to lift the individual brushes contacted, and as the conveyor carries the objects along, the brushes will be lifted to substantially a horizontal position. The
brushes 4 are weighted to engage the objects with sufficient pressure to thoroughly scrub their surfaces. The objects pass beneath successive groups of laterally disposed brushes 4 which are carried by the conveyor, and regardless of the relative positions of the objects on the conveyor they will be thoroughly scrubbed during their passage through the washing tank.

As the objects approach the exit end of the washing tank, the conveyor 11 passes from the roller 12 to the last group of brushes 14 to carry the objects upwardly to the roller 13. The uppermost edge of roller 13 is disposed above the water level of the washing fluid maintained in the washing tank and as the objects pass uphill with the conveyor, the excess washing fluid is rapidly drained off.

The objects are then delivered onto a bridge 30 with sufficient inertia that they carry onto a conveyor 31 supported on rollers 32 and 33. The roller 32 is disposed at approximately the same level as the roller 13 so that the objects may pass gently from the bridge 30 onto the conveyor 31.

The conveyor 31 carries the objects through a showering chamber 34 and a flushing fluid is there sprayed onto the objects to remove any washing fluid carried over from the washing tank. The spray means are operated under pressure and serve also to flush off any foreign particles adhering to the surface of the object. As the objects are carried along by conveyor 31 the flushing fluid is drained rapidly off the article and the catch basin disposed around the conveyor 31 is arranged so that the fluid is carried there by the conveyor 31. The objects are driven forwardly from the spraying chamber through a drying means and preferably, a chamber 35 is provided through which warmed air is circulated. A baffle 36 may be disposed horizontally within the chamber 35 and heating and circulating means 37 may be disposed within the air passage thus provided to circulate warm air as indicated by the arrows. The chamber 35 shall be of such length that the objects will be completely dried and issue from the end of this chamber. Suitable collecting means may be provided at the end of the conveyor 31 to receive the cleaned objects.

The operation of this machine has been fully described above and it will be seen that objects pass from the inlet end of the machine successively through a washing bath having scrubbing means cooperating with a soaking bath to thoroughly wash and scrub the objects. The brushes are arranged above the conveyor to keep the objects submerged sufficiently to be continuously soaking and to pick up the washing fluid. The objects engaging under the brushes and bearing against the upper run of the conveyor control the position of the conveyor belt such that only at the exit end of the washing tank, can the conveyor belt be raised above the level of the fluid to permit a draining of the washing liquid from the objects. It will be remembered that the conveyor 11 is supported from the two rollers 12 and 13, the latter of which lifts the conveyor above the level of the liquid in the tank. Therefore, in order to force the objects under the fluid to effect a soaking thereof, this construction has been provided. The conveyor thus runs under the fluid for most of its length and emerges only at the end of its forward run. The conveyor then flows upwardly to carry the eggs or other objects being washed up to the bridge 30 over which they pass to the conveyor 31. The objects are then showered and dried in the chambers 34 and 35 respectively.

The present construction provides a unitary mounting means for all of the brushing means and this structure is particularly useful in the washing of products such as eggs. Due to the character of this kind of product, a type of dirt, including feathers and whatnot, is carried on its surface which tends to clog up the surface of the brushing brushes. It is necessary to frequently remove and clean the brushes and this unitary mounting means for all the brushes has been provided to permit a ready removal of the entire brush assembly for cleaning. When a given set of brushes have been used to scour the gummy dirt from the surface thereof, a conveyor to carry the objects through a fluid disposed in the tank in such a manner that the objects are made to contact the brushes, said tank having side walls extending above the plane of the upper surface of the conveyor, the unitary mounting means for all of the brushes, said mounting means having side wall members provided with skirt means at their lower edges, and said walls of the mounting means being adapted to be interfitted with the side walls of the tank by having the skirts of the latter straddle upper edges of each of the side walls of the tank, whereby the unitary mounting means may be quickly removed from the tank when the brushes become filled with the gummy dirt and a clean set of brushes affixed to the tank walls in operative position.

2. A washing machine for objects having a generally cylindrical shape and carrying a type of dirt which becomes relatively gummy upon being loosened from the object, said machine including scrubbing means and a tank for containing a washing fluid, said scrubbing means taking the form of a plurality of rows of brushes for engaging the objects to scour the gummy dirt from the surface thereof, a conveyor to carry the objects through a fluid disposed in the tank in such a manner that the objects are made to contact the brushes, said tank having side walls extending above the plane of the upper surface of the conveyor, unitary mounting means for all of the brushes, said mounting means having side wall members provided with skirt means at their lower edges, and said walls of the mounting means being adapted to be interfitted with the side walls of the tank by having the skirts of the latter straddle upper edges of each of the side walls of the tank, thereby the unitary mounting means may be quickly removed from the tank when the brushes become filled with the gummy dirt and a clean set of brushes affixed to the tank walls in operative position.
and said walls of the mounting means being adapted to be interfitted with the side walls of the tank by having the skirt means straddle upper edges of each of the side walls of the tank, whereby the unitary mounting means may be quickly removed from the tank when the brushes become filled with the gummy dirt and a clean set of brushes affixed to the tank walls in operative position.

3. A washing machine for objects having a generally cylindrical shape and carrying a type of dirt which becomes relatively gummy upon being loosened from the object, said machine including scrubbing means and a tank for containing a washing fluid, said scrubbing means taking the form of a plurality of rows of brushes for engaging the objects to scour the gummy dirt from the surface thereof, a conveyor to carry the objects through a fluid disposed in the tank in such a manner that the objects are made to contact the brushes, said tank having side walls extending above the plane of the upper surface of the conveyor, unitary mounting means for all of the brushes, said mounting means having side wall members provided with skirt means at their lower edges, said brushes being pivotally hung from cross-members fixed between said walls of the mounting means to extend into the tank to engage and ride over the objects passing through the machine, and said walls of the mounting means being adapted to be interfitted with the side walls of the tank by having the skirt means straddle upper edges of each of the side walls of the tank, whereby the unitary mounting means may be quickly removed from the tank when the brushes become filled with the gummy dirt and a clean set of brushes affixed to the tank walls in operative position.

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