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[54] **APPARATUS FOR WASHING PACKING CASES**


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[51] **Int. Cl.** ..... **B24b 31/00**

[58] **Field of Search** ..... 51/5, 7, 16, 17, 51/18, 163, 317, 323



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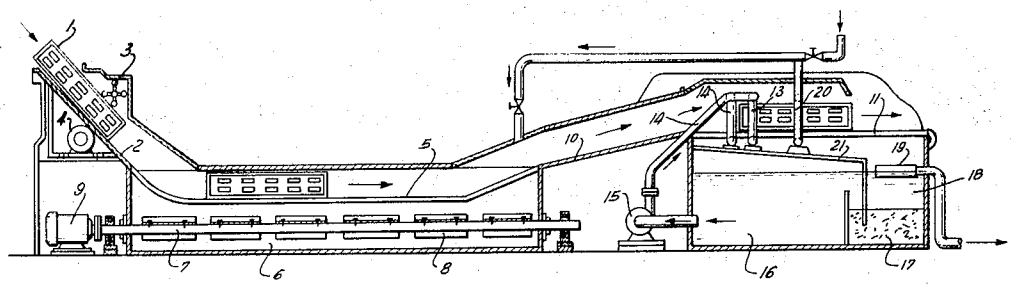
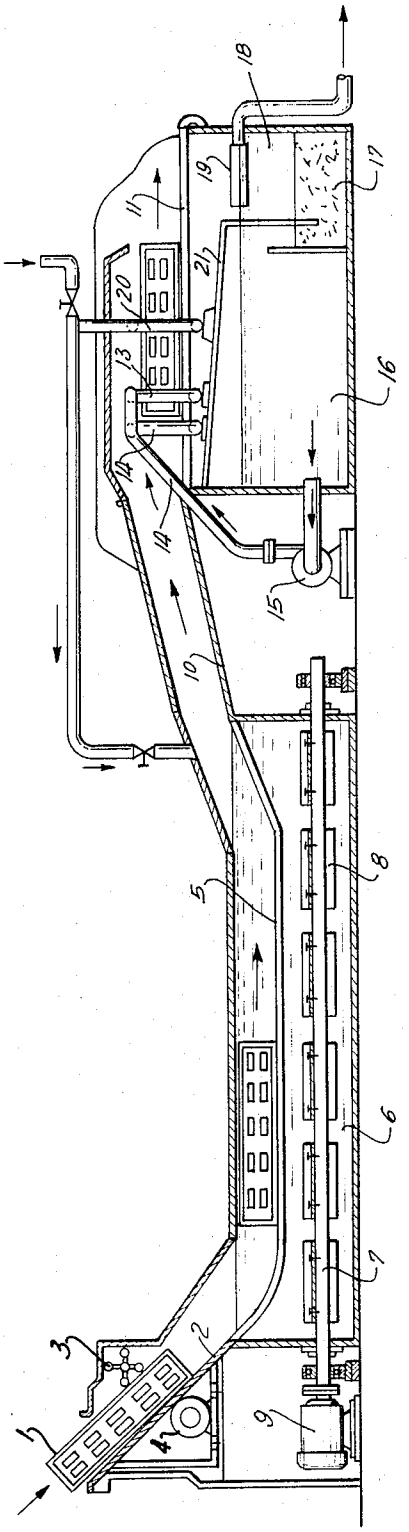
[57] **ABSTRACT**

An apparatus for washing packing cases and delivery trays, e.g., for baked goods has a downwardly sloping trough leading onto a grate in a receptacle filled with a detergent solution in which sand is suspended. A rotating shaft carrying a plurality of axially-spaced blades is provided in the receptacle below the grate for agitating the solution and cleaning the cases which are immersed therein. From the grate each case is pushed by the following case up a second chute and onto a second grate above which a plurality of nozzles are provided which spray the washed crate with recycled rinse water from which the sand has been separated, with the further upstream spray ejecting clean fresh water.


**5 Claims, 1 Drawing Figure**

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# APPARATUS FOR WASHING PACKING CASES

## FIELD OF THE INVENTION

The present invention relates to an apparatus for continuously washing packing cases, especially those of plastic or synthetic-resin material used for stocking and carrying bakery products.

## BACKGROUND OF THE INVENTION

For washing such cases, apparatus is known into which the cases are transported by belt conveyors and the washing as such is carried out by flushing with an aqueous solution containing detergents and sprayed from diffuser-equipped pipes. To conserve the washing water, below the diffuser pipe there are reservoirs from which the liquid may be recycled by pumping. In most cases, the last diffuser pipe discharges fresh water for rinsing.

The known devices have the disadvantages of washing incompletely, since the liquid is not sprayed on the whole surface of the case, mechanical means for detaching the insoluble impurities are lacking, and they are of a relatively complicated structure since conveyor belts and many diffuser pipes and pumps for spraying the liquid are needed.

## OBJECTS OF THE INVENTION

It is, therefore, an object of the present invention to provide an improved apparatus for washing packing cases or similar reusable containers.

Another object is the provision of such an apparatus which carries out complete cleaning while having a minimum number of trouble-prone parts.

## SUMMARY OF THE INVENTION

The apparatus according to the invention avoids these disadvantages in that, in order to more vigorously wash the cases and to simplify the structure, it includes a device to guide the cases comprising a downwardly sloping chute or trough above which there is a bladed shaft perpendicular to the transport direction and belt-driven by an electric motor. The guiding device also has a horizontal grate immersed in a vessel or receptacle containing an aqueous detergent solution and a sand suspension. Below the grate there is a bladed shaft driven by an electric motor for agitating the solution. The guiding device further includes a second sloping trough or chute directed upwardly, and a second grate above which there are two pipes formed with nozzles as diffusers and connected by means of a pipe and a pump to a second reservoir. A third pipe fed with fresh water is provided at the very end of the transport path and below the grate there is a downwardly sloping trough emptying the rinse water into a third reservoir connected at the bottom with the second one by means of a sand separator and having at its upper part a slit for removal of the foam resulting from washing and the liquid excess.

## DESCRIPTION OF THE DRAWING

An example of an apparatus in accordance with the invention is explained below with reference to the enclosed drawing whose sole FIGURE shows a longitudinal section through the washing apparatus according to the present invention.



## SPECIFIC DESCRIPTION

The apparatus according to the invention comprises a guiding device for the cases **1** including a downwardly sloping trough **2** above which there is a bladed shaft **3** belt-driven by an electric motor. The downwardly sloping trough **2** runs onto a grate **5** which is below theliquid level of a reservoir **6** containing a 2 percent aqueous solution of trisodium phosphate and 5 percent suspended sand.

At the bottom of the reservoir **6**, a shaft **7** is parallel to the grate **5** and has radial axially spaced blades **8** so that when they are rotated by the electric motor the sand abrasively cleans the containers **1**. Without the rotating shaft **7** and its radially extending vanes **8**, the sand would quickly settle to the bottom of the elongated receptacle **6** under the grate **5** and will not serve to clean the cases **1**.

The cases or containers **1** are made of a light synthetic-resin material such as polystyrene so that they tend to float. The guide path is enclosed, especially above the grate **5**, which extends substantially the full length of the receptacle **6**, to force the cases **1** under the level of the solution and retain then thus immersed as the following cases push them along the guide path.

The grate is continued as a second upwardly extending trough or chute **10** and a second horizontal grate **11**. Above the grate **11** two pipes **12** and **13** are provided with diffuser nozzles and are connected by pipe and pump to the reservoir **16** which is in communication through a sand separator with another reservoir **17** provided at its upper part **18** with an overflow opening or slit **19** for the removal of the foam resulting from washing and the liquid excess. Above the grate is a third pipe **20**, also provided with inwardly directed diffuser nozzles and fed with fresh water and below it is a trough **21** directed into the reservoir.

For washing, the cases are laid on the downwardly extending trough **2** whence they are moved in the transport direction A along the guiding device **2,5,10,11** gravitationally and also owing to the blade action of blades on the shaft **3**. While passing through the reserovir **6**, the cases **1** come into contact with the liquid stirred by the blades **8** of the shaft **7** so that the soluble impurities are dissolved by the water and detergent and the insoluble impurities are removed by the abrasive action of the suspended sand particles. Above the grate **11** the cases **1** are sprayed with the recycled water from pipes **12** and **13** and the fresh water from pipe **20**. After rinsing the cases **1**, the water flows along the trough and into the reservoir **18** where the liquid excess and the impurities containing foam pass out through the slit and the water filtered in the sand separator passes into the reservoir **16** whence it is pumped by pump **15** through pipe **14** and into diffuser pipes **12** and **13**.

In comparison with other known apparatus for case washing, the apparatus according to this invention has the advantage of carrying out a more vigorous washing owing to the immersion and the association of the effects of dissolving by detergent solution and of the mechanical activity of the suspended sand particles; moreover, the apparatus has a simple structure since there are no conveyor belts and only a few diffuser pipes.

We claim:

**1.** An apparatus for washing a succession of floatable containers comprising:

an elongated receptacle containing sand suspended in an aqueous detergent solution;

a first chute extending downwardly into said receptacle at one side thereof;

a grate below the level of said solution and extending across said receptacle from said first chute to the other side of said receptacle;

a second chute extending upwardly out of said receptacle from said grate at said other side of said receptacle;

a member spaced about said grate in said receptacle for holding said containers below said level of said solution while said containers travel across said grate, said containers then passing up said second chute;

means including a shaft underlying said grate in said receptacle and provided for agitating said solution upon rotation of said shaft and thereby bringing said sand into abrasive contact with said container on said grate; and

rinsing means downstream of said receptacle and having a plurality of inwardly directed fluid jets surrounding said second chute for spraying said container with rinse water and rinsing the detergent solution and sand from said container.



**2.** The apparatus defined in claim **1** wherein said second chute includes a second horizontal grate externally of said receptacle, said rinsing means including a plurality of diffuser pipes arranged above said second grate.

**3.** The apparatus defined in claim **2,** further comprising a reservoir below said second grate and pump means connected between said reservoir and said diffuser pipes for recycling rinse water.

**4.** The apparatus defined in claim **3,** further comprising a sloping trough under said second grate, a second reservoir under said trough, and a sand separator between said reservoirs and forming a fluid communication path therebetween, said trough emptying into said second reservoir.

**5.** The apparatus defined in claim **4,** further comprising a fresh-water-fed diffuser upstream of said diffuser pipes and spraying fresh water on said container on said second grate.

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