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J. W. ENGHOLM

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WASHING AND SCRUBBING APPARATUS FOR CASES AND BOXES

Filed April 12, 1930 2 Sheets-Sheet 1

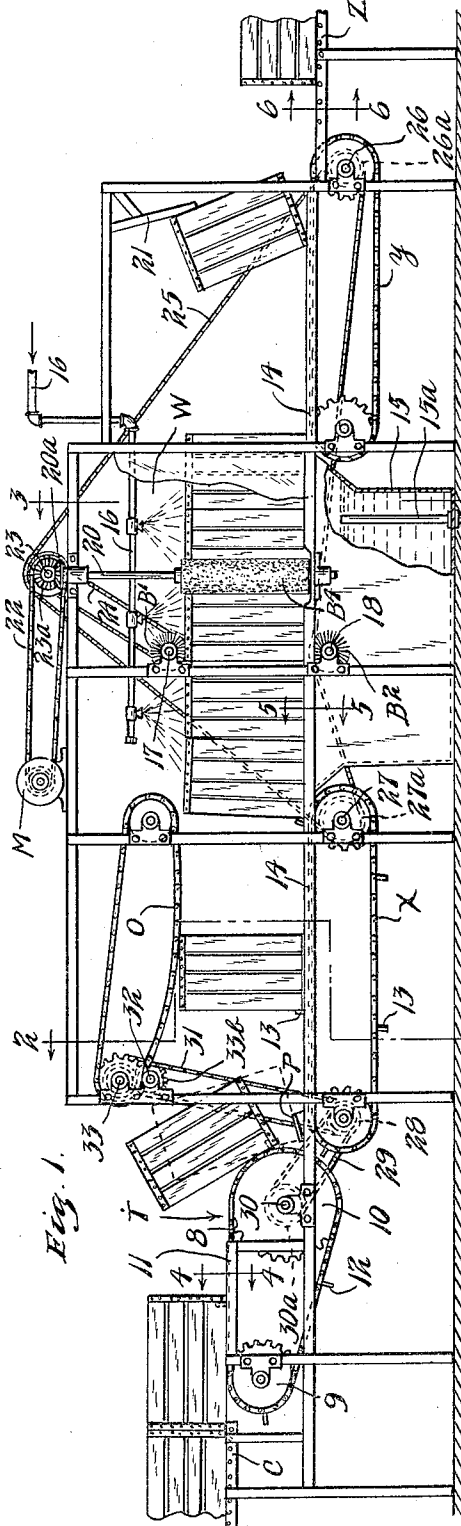


Fig. 1.

Fig. 6.

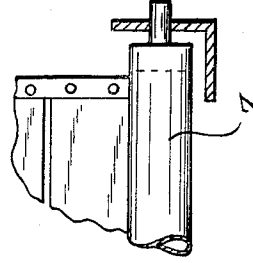


Fig. 5.

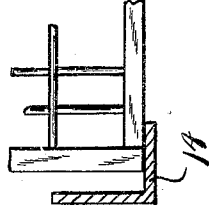
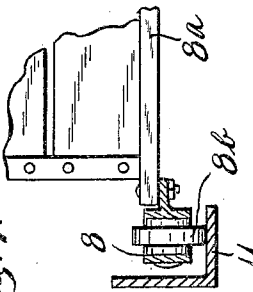


Fig. 4.



INVENTOR.
JOHN W. ENGHOLM.
BY HIS ATTORNEYS.
Williamson & Poff

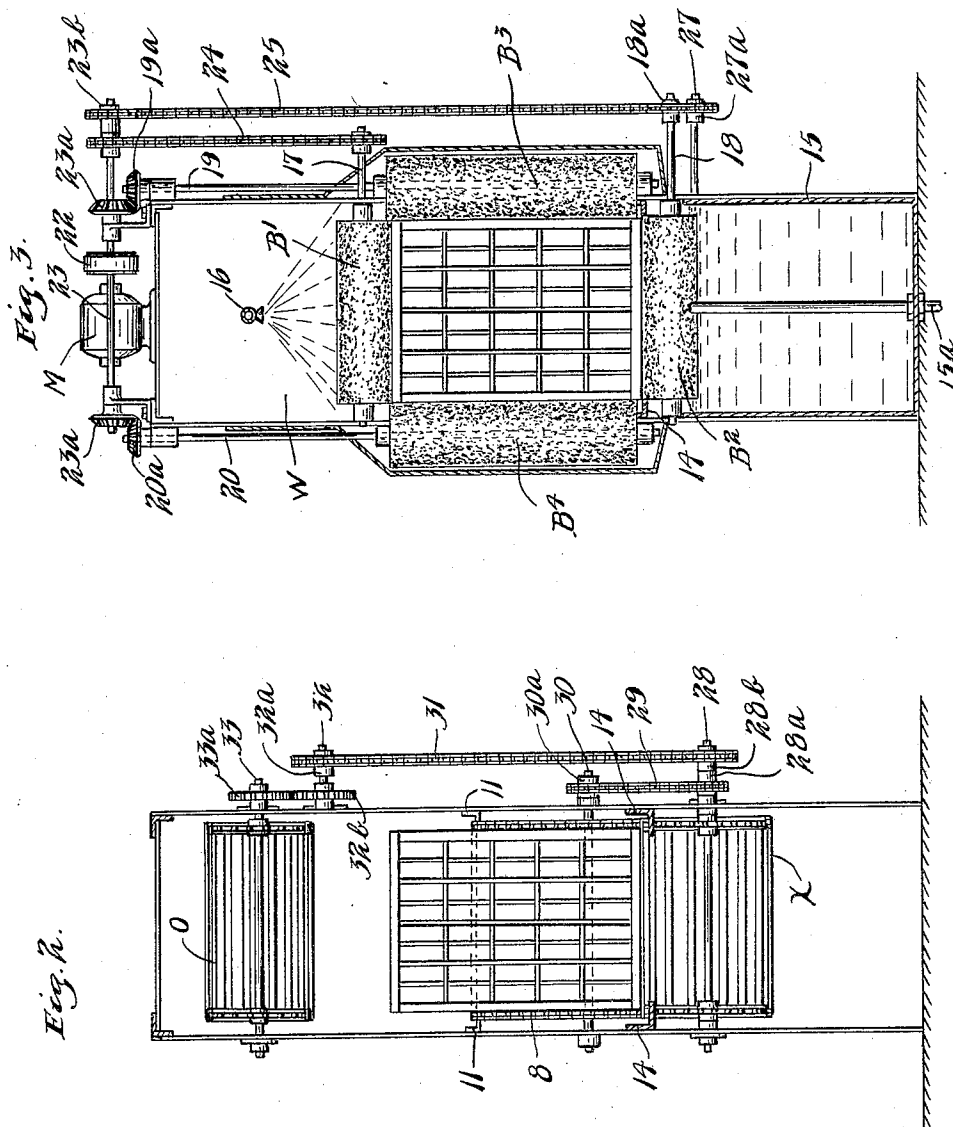
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WASHING AND SCRUBBING APPARATUS FOR CASES AND BOXES

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INVENTOR.
JOHN W. ENGHOLM.
BY HIS ATTORNEYS.

Williamson, Ralph Williamson

UNITED STATES PATENT OFFICE

JOHN W. ENGHOLM, OF MINNEAPOLIS, MINNESOTA

WASHING AND SCRUBBING APPARATUS FOR CASES AND BOXES

Application filed April 12, 1930. Serial No. 443,868.

This invention relates to apparatus for automatically washing and handling cases and boxes and while capable of wide general application, is especially adapted for use for bottling plants, such as creameries, breweries and the like, where the bottles are packed, delivered and returned in cases and where it is desirable to wash the cases before again utilizing the same.

The returned cases containing empty bottles are usually placed upon an endless conveyor with their top sides up by the deliverymen and attendants in the plant remove the bottles and sterilize and refill the same. The said conveyor usually encircles the bottle sterilizing device and filling and capping machines in order that the re-filled bottles may be continuously placed in the empty cases without necessitating stacking or rehandling of the cases.

It is an object of my present invention to provide improved and highly efficient apparatus for washing and scrubbing the cases or boxes while the same are being conveyed to the outgoing or delivery side of the bottling plant.

It is a further object to provide automatic apparatus for washing cases and boxes, wherein at least four walls of the case will be scrubbed as they are moved through the apparatus.

Another object is to provide improved washing apparatus adapted to be associated with the receiving conveyors for boxes and cases, wherein the case, which usually has an open upper end, and an openwork or reticulated bottom is first automatically delivered and disposed on end and is then caused to travel through a heavy spray of water and simultaneously scrubbed on its four walls.

Still a further object is to provide in apparatus of the class described, means for again delivering the cases or boxes subsequent to the washing and scrubbing step to cause the boxes to be positioned and delivered to the conveyor with their open sides up for convenient refilling.

Another object is to provide in apparatus of the class described, automatic means for scrubbing wooden cases or boxes transversely

of the grain of the wood to thoroughly clean the same.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and wherein,

Fig. 1 is a side elevation of an embodiment of my invention, some portions of the casing of the washing chamber and the tank being broken away;

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1;

Fig. 3 is a cross section taken on the line 3—3 of Fig. 1, showing the washing chamber and scrubbing mechanism;

Fig. 4 is a cross section taken on the line 4—4 of Fig. 1, showing the short roller chain conveyor for delivering the cases;

Fig. 5 is a cross section taken on the line 5—5 of Fig. 1; and

Fig. 6 is a cross section taken on the line 6—6 of Fig. 1.

My invention is especially applicable for washing cases or boxes of the type having an upper end and open work bottom and having vertical walls defined by horizontal slats which are spaced apart, but my apparatus may be efficiently utilized for washing most types of rectangular boxes.

In the embodiment of the invention illustrated in the drawings, my washing and scrubbing apparatus is shown associated with a conveyor C of any suitable type for delivering the dirty cases with their top sides up.

A tilting conveyor T having its upper run disposed horizontally, receives the crates from conveyor C and, as shown, comprises a pair of endless roller chains 8, each trained over a rear sprocket 9 and a relatively large forward sprocket 10, said chains being connected together by a series of spaced slats 8a. The rollers 8b mounted in the links of chains 8 travel on suitable horizontal supporting tracks 11, which may be supported from the framework of my device. Certain of the slats 8a carry outwardly projecting plates or lugs 12, which are adapted to engage the edges of the boxes to push the same forwardly

and the several series of plates or lugs space the cases apart as they are successively delivered from conveyor C. At the delivery end of tilting conveyor T a transverse case-engaging plate P is mounted, inclined slightly from the horizontal and adapted to receive and support momentarily a case as it is tilted in passing over the forward, downwardly curved portion of conveyor T. The dotted lines indicate the position of the casing while so supported. The case remains in that position until the next successive case strikes the upper end thereof sliding it forwardly off of the supporting plate onto a horizontal conveyor X, which may be constructed in the manner of conveyor T and which also is provided with several spaced series of plates 13 adapted to engage the rear edges of the cases after they have been tilted into end up position. It will be seen that the upper run of conveyor X is disposed considerably below the upper run of the tilting conveyor. The roller-equipped chains of conveyor X may travel in horizontal tracks 14, which extend longitudinally of my apparatus and through the washing chamber W.

An overhead conveyor O is adapted to cooperate with conveyor X to prevent the cases from tipping over or tilting out of end-up position, while being conveyed to the washing chamber. Conveyor O may be constructed in similar manner to the conveyors T and X and the lower run thereof is disposed to just touch the top of the cases when the cases are traveling on conveyor X in end-up position.

The washing chamber W has a tank 15 in the bottom thereof and disposed below tracks 14 and the tank preferably is equipped with an overflow pipe 15a by which the level of the water therein may be maintained at a predetermined height. A spray pipe 16 is extended longitudinally of and in the upper portion of the washing chamber at some distance above the upper ends of the cases and this pipe may be provided with a series of (as shown, three) spray nozzles directed downwardly against the cases. The pipe 16 may be connected with a suitable source of water supply.

Within the washing chamber are mounted a series of rotary scrubbing brushes, two of which have their axes disposed horizontally, in order that they may operate upon the upper and lower ends of the cases. The upper brush B¹ is fixed to a shaft 17, which is journaled in suitable bearings provided in the framework of my device and which projects beyond one of the walls of the washing chamber. The lower brush B² is mounted on a shaft 18 and is of a length to nicely fit between the tracks 14 and the lower surface of said brush is constantly immersed in the water within tank 15. Vertically disposed brushes B³ and B⁴ are mounted on opposite sides of the washing

chamber and are fixed to vertical shafts 19 and 20 respectively, said shafts projecting upwardly above the washing chamber and terminating adjacent the top of the frame. Brushes B³ and B⁴ are adapted to engage the sides of the cases and in the embodiment illustrated are disposed somewhat forwardly of the horizontal brushes B¹ and B².

The cases slide on the tracks 14 while passing through the washing chamber and are propelled by the action of the cases delivered to the washing chamber when thrust forwardly by the conveyor X. At the delivery end of the washing chamber a horizontal conveyor Y is mounted and this conveyor may be constructed in the manner of conveyors X, O and T and trained over suitable sprockets. Mounted above the delivery end of conveyor Y is a depending striker bar 21, which is adapted to engage the upper ends of the cases as they are moved forwardly by conveyor Y, upsetting or tilting the cases into open side up position for refilling.

The conveyor Y delivers to a roller chute or conveyor Z which may extend to the delivery side of the bottling plant if desired.

The various conveyors and brushes may be driven by any suitable means, and, as shown, are connected for driving with a motor M which may be conveniently mounted on the top of the framework and which, as shown, is connected by a belt 22 for driving a shaft 23, said shaft traversing the frame and being disposed above the upper ends of brush shafts 19 and 20. The ends of shaft 23 are provided with beveled gears 23a which mesh with beveled gears 19a and 20a of the said vertical brush shafts. The upper brush B¹ is driven by means of an endless chain 24 trained about suitable sprockets fixed to shaft 23 and shaft 17 respectively. As shown, the lower brush B³ and also conveyors X and Y are driven by an elongated endless chain 25, which is extended in the form of a triangle and which is trained about a sprocket 23b fixed to one extremity of shaft 23 and about a sprocket 26a fixed to one end of the forward shaft 26 of conveyor Y and about sprocket 18 and also about a sprocket 27 which is fixed to the forward shaft 27a of conveyor X. The overhead conveyor O and the tilting conveyor T are driven from the rear shaft 28 of conveyor X, said shaft being projected at one side of the machine, as shown in Fig. 2, and having fixed thereto a pair of sprockets 28a and 28b. The smaller and inner sprocket 28a is connected by an endless chain 29 to a sprocket 30a fixed to the forward shaft 30 of tilting conveyor T. The larger and outer sprocket 28b is connected by an endless chain 31 with a sprocket 32a which is fixed to a stub shaft 32 suitably journaled on one of the sides of the frame. Stub shaft 32 carries a reversing gear 32b, which is meshed with a gear 33a fixed to the rear shaft 33 of the overhead conveyor O.

Operation

In operation, the cases or boxes are delivered by conveyor C to the rear portion of the tilting conveyor T in open side up position, and the projecting plates or lugs 12 of the tilting conveyor engage the edges of the boxes or cases and pull the same forwardly. At the forward end of the conveyor, the cases drop and tilt into substantially end up position, striking supporting plate P and momentarily resting thereon. The next case in traveling with conveyor T strikes the rear edge of the tilted case ahead of it and pushes it off of the plate onto the conveyor X.

Conveyor X and the cooperating overhead conveyor O are driven at somewhat higher speed than the tilting conveyor and carry the cases to the washing chamber. If a case starts to tip over beyond end up position after it drops upon conveyor X, overhead conveyor O engages the upper end, and being driven at the same speed as conveyor X prevents the tipping and assists in conveying the cases to the washing chamber. The chains of conveyor X pass through suitable apertures in tracks 14 at the forward end of the conveyor and the cases are thus delivered to the angle tracks at the receiving end of the washing chamber. The successive delivery of cases by carrier X causes the cases to be abutted, sliding frictionally on the tracks 14 and since these tracks are constantly covered with water from the spray pipe 16 the friction will be slight and the successive abutment of cases carried by conveyor X will push the cases through the washing chamber.

In the washing chamber, the top end and sides of the cases are covered with water from the several nozzles of the spray pipes and the water also passes through the slatted ends and sides of the case, cleaning the interior. The brushes B¹ and B³ and B⁴ are supplied with requisite water and are driven at comparatively high speed by the shaft 23, thoroughly scrubbing the upper end and sides of the cases. The lower brush B² is constantly immersed in the water within tank 15 and scrubs the lower end of the box. The washing chamber is of such length that the cases will be thoroughly scrubbed and washed before being delivered to conveyor Y.

Conveyor Y moves at higher speed than the travel of the boxes through the washing chamber and the cases, still positioned on end, are thus spaced apart as they are received by conveyor Y and are tilted and tipped by the depending striker bar 21 into normal open side up position. Conveyor Y delivers to the conveyor or roller chute Z which may conveniently extend past the delivery end of the bottling plant in order that the cases may be filled with bottles as they are traveling over the roller chute.

From the foregoing description, it will be

seen that with my apparatus the returned cases or boxes may be automatically washed and scrubbed after the empty bottles are removed. No handling or stacking of the cases is required. The cases are tilted into end up position in order that the four exterior walls may be scrubbed as the case is passed through the washing chamber and the cases are thereafter tilted or tipped to normal open side up position in order that the bottles or other articles may be conveniently disposed therein as the cases travel over conveyor Z.

It will be noted that where my apparatus is used for washing cases of the type having horizontally slatted wooden walls, the slats will be scrubbed by the brushes B¹, B², B³ and B⁴ transversely of the grain of the wood. This thoroughly cleans the wooden walls and is found much more efficient than scrubbing the slats longitudinally of the grain.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, such as shown and described and defined in the appended claims.

What is claimed is:

1. In washing apparatus for cases, means for receiving cases in open side up position, means for tilting said cases into end up position, a washing chamber, means for moving said cases through the washing chamber, and means at the delivery end of the washing chamber for tilting said cases into top up position.

2. In washing apparatus for cases, a conveyor for receiving cases disposed open side up, means associated with said conveyor for tilting said cases into end up position with their sides disposed vertically and parallel to the line of travel of said conveyor, a washing chamber, means for moving said cases through said washing chamber, scrubbing brushes in said chamber for operating upon the walls of said cases, and means for driving said scrubbing brushes.

3. In washing apparatus for cases, means for receiving cases disposed open side up, means for tilting said cases into end up position, a washing chamber having a source of water supply therein, means for moving said cases through said washing chamber, means associated with said washing chamber for scrubbing the walls of said cases and means at the delivery end of said washing chamber for tilting said cases into top side up position.

4. In washing apparatus for cases, means for receiving cases in open side up position, a conveyor disposed forwardly of said receiving means, means for tilting said cases to dispose the same end up upon said conveyor, an overhead conveyor spaced above said first mentioned conveyor, the lower run of which

is adapted to engage the up-ended cases to prevent said cases from tilting past end up position, a washing chamber, and means for moving said cases through said washing chamber.

5 5. In washing apparatus for cases, a washing chamber means for delivering cases in end-up position to said washing chamber, means for moving said cases through said
10 washing chamber, a conveyor receiving said cases in end-up position from the delivery end of said washing chamber, and means associated with said conveyor for tilting said cases into top-side-up position, wherein said
15 tilting means comprises a depending striker bar positioned to engage the upper ends of said cases as they travel on said conveyor.

6. In washing apparatus for cases, means for receiving cases in open-side-up position,
20 a conveyor disposed forwardly of said receiving means, a conveyor disposed forwardly of said first mentioned conveyor and disposed at a lower level, a narrow supporting plate disposed forwardly of said first mentioned conveyor and slightly above the receiving
25 end of said last mentioned conveyor whereby a case will drop from said first mentioned conveyor and tilt into substantially end-up position, the next case moved by said
30 first mentioned conveyor striking said first case and pushing the same onto said second mentioned conveyor and a washing chamber into which said second mentioned conveyor delivers the cases.

35 7. In washing apparatus for cases, a washing chamber, means for moving cases through said washing chamber in end-up position, scrubbing brushes in said chamber for operating upon the walls of said cases, a conveyor receiving from said washing chamber
40 and a striker member disposed above said conveyor for engaging the upper ends of said cases in their travel and tipping the same into open-side-up position.

45 8. The structure set forth in claim 7 wherein the said conveyor is driven at greater speed than said means and moving said cases through the washing chamber to provide sufficient clearance to enable said cases to be
50 tipped by said striker member.

In testimony whereof I affix my signature.
JOHN W. ENGHOLM.

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