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R. N. BALL ET AL

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APPARATUS FOR PROCESSING OLIVES

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Fig. 1

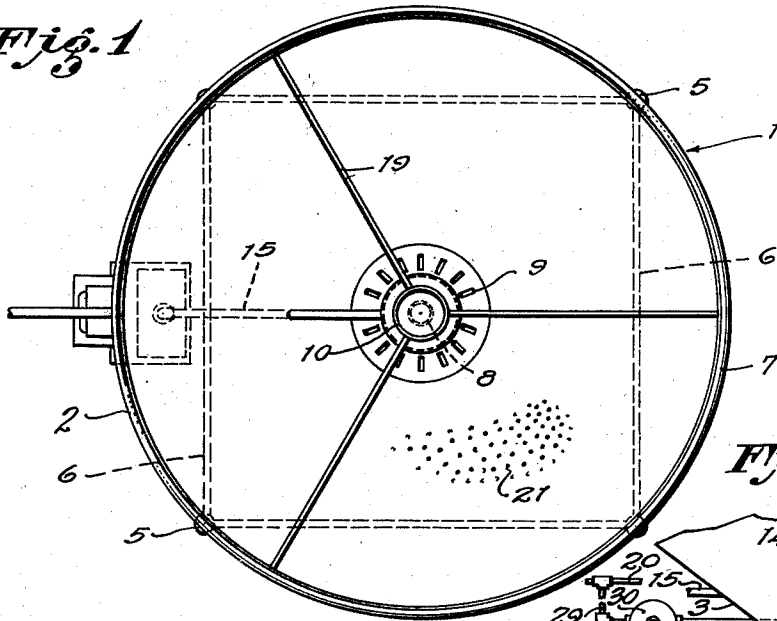


Fig. 2

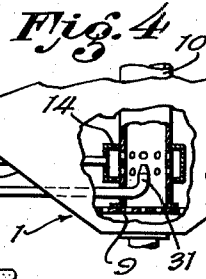
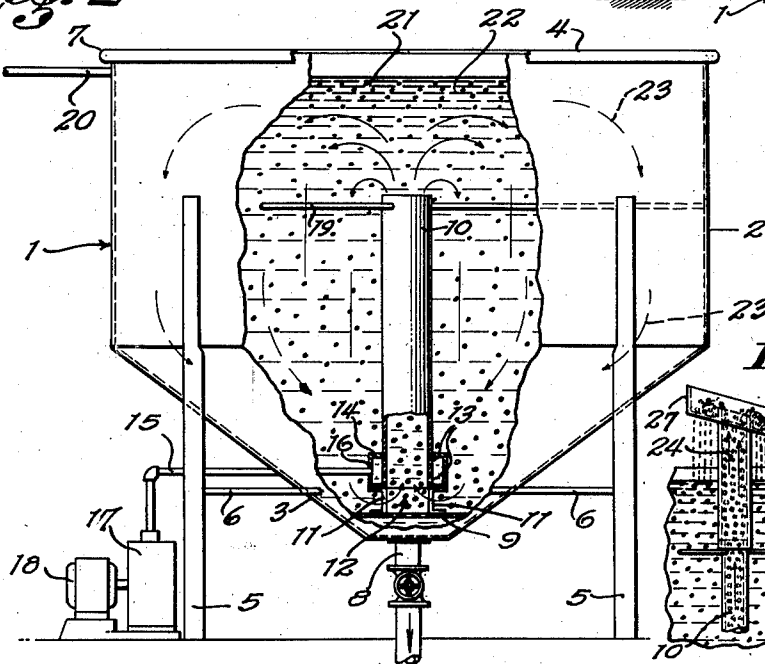
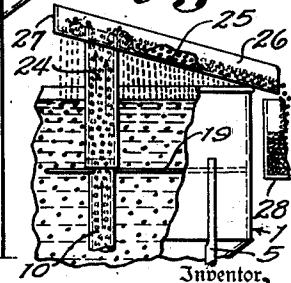


Fig. 3



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APPARATUS FOR PROCESSING OLIVES

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1 Claim. (Cl. 99—240)

1

The present invention relates to an apparatus for processing olives. It is conventional in the industry, in the processing of ripe olives, to alternately treat the whole olives with a caustic solution followed by exposure to the air. Such a procedure is usually done in several treatments, with the olives allowed to stand dry to a depth of one to two feet, accompanied by a stirring every few hours in water—or, in certain instances, the olives are held under water and air is bubbled through the solution in order to color the olives. Color in ripe olives is developed when the tannin in the olives becomes darkened through exposure to air. This happens in the portion of the flesh which the lye has already penetrated. In order to develop good black color in olives, it is necessary that the olives not be cut too deeply with lye at any one time, but that portion already treated with lye be exposed to air. By this method, the tannin color developed in each exposure becomes insoluble in the following lye.

It is customary in the industry to use from four to eight successive lye treatments, alternated with air exposures. Thus, the intervals of time used vary between 24 to 48 hours, with the lye treatments occupying about four hours each. In order to get uniform coloration of the olives during exposure and avoid the spots which result from contact between olives when they are not properly stirred, it is necessary to do a good, thorough job of stirring the olives, whether they are stirred by hand, with a wooden paddle in water, or stirred by violent agitation under water with air.

The disadvantage of using the dry exposure method is that the olives can only be piled in the vats to a very shallow depth, thus giving a small tonnage per square foot of building space used. The disadvantage of the under-water process is that it requires huge volumes of air to aerate large vats, and even then, many of the olives in the corner of the tanks and on the bottoms of the tanks are moved but slightly and some are not moved at all, thus permitting a contact mark between the olives where the exposure is uneven.

Our invention overcomes many of the objections noted above and contemplates an apparatus, for processing olives, wherein each olive in a tank gets a uniform stirring movement and complete aeration of the lye or the water once the olives are exposed; which obtains a more uniform lye penetration by the olives; a uniform control of the strength of the lye solution; the easy removal of the lye, whether by wash water or through neutralization; as well as sterilization and pasteurization of the olives where desired. The

2

apparatus and method also contemplates a treatment of olives within a minimum space of time and in such a manner as to save labor, obtain uniformity of product and reduce expense.

5 In the drawing, Figure 1 is a top plan view of apparatus which may be utilized in practicing the invention,

Figure 2 is a fragmentary, partially sectional view and elevation of the apparatus shown in Figure 1,

Figure 3 is a fragmentary, partially sectional view, showing a means whereby the olives, after a processing, may be removed from the processing tank, and

Figure 4 is a fragmentary, partially sectional view of a slightly modified means which may be utilized in the processing development.

Referring with particularity to the drawing, we have shown therein apparatus which may be utilized in the practice of the invention, and the same includes a tank 1, having in the present instance a circular side wall 2, and a conical base 3, the tank being open at the top 4. This tank may be of any size desired, depending upon the tonnage of olives to be handled, and it may be remarked in this regard that a tank having an inside diameter of six feet and with a side wall of four-foot depth, not including the conical base, will hold two tons of olives to be processed. The tank is supported by posts designated generally by 5, there being four posts equidistantly spaced apart, which posts in turn may be interconnected by means of braces 6 to stabilize the structure. In fact, the tank may have a turned rim 7 to further strengthen the same. Connected to the conical base at the apex thereof is a valved pipe 8 which may be used as a drain, and immediately above the apex portion of the base and extending in a horizontal plane is a perforated plate 9. Central of the tank is a pipe 10, which pipe is supported by means of spaced feet 11, carried by the perforated plate 9. It is intended that there should be a space between the inlet or bottom end 12 of pipe 10 and the perforated plate. This pipe extends to a certain height within the tank and terminates slightly above the one-half depth mark of the circular wall 2 thereof, as shown in Figure 2.

The wall of the pipe 10, adjacent the inlet end 12, is provided with one or more annular series of spaced perforations 13, and spacedly surrounding the perforations is a jacket 14. A pipe 15 extends through the conical base 3 and communicates with the interior of the jacket or the space included between the jacket and the periphery

3

of the pipe in the zone of the perforations 13, as shown at 16. Pipe 15 leads to a compressor or air pump 17, driven by motor 18.

The upper end of pipe 10 is braced by means of one or more equidistantly spaced radial arms 19, which connect with the interior of the circular side wall 2. Situated beneath the rim or top of the tank and leading therefrom is an overflow pipe 20.

It will be noted that the diameter of pipe 10 is small in comparison to the diameter of the tank, and by way of example, in a tank of eight-foot diameter, the pipe 10 is eight inches in diameter. This pipe, as will appear from the statement of operation, functions as a pump or air-lift device.

The operations, uses and advantages of the invention are as follows:

The valve in pipe 8 is closed, and the olives to be processed are put in a lye solution in the tank. The water level will be at some point in the tank, dependent upon the tonnage of olives in solution, such as, for instance, shown in Figure 2, olives being indicated as 21 and the solution by 22. The motor 18 is driving the pump 17 and air under pressure is then forced into the jacket 14 through the perforations 13 and into the pipe 10. The air bubbles through the liquid within the pipe and induces movement of the liquid by a so-called "air lift." This air lift causes circulatory movement of the solution external the pipe together with the olives contained therein, so that the olives are fed with the solution into the intake end of the pipe and upwardly of the pipe and outwardly thereof, as indicated by the arrows 23. Such movement is continuous as long as the air bubbles through the liquid within the pipe 10. In this manner, each olive in the tank is constantly moved at a given rate and the lye liquid is thoroughly aerated, which helps to add color to the olives during the lye-treatment part of the process.

The conical base of the tank assures that the olives 21 will at all times be directed downwardly toward the inlet end of the pipe 10 for passage upwardly through the pipe. There are no zones in the tank into which the olives may settle and thereby not be properly aerated.

We are aware that certain systems and apparatus utilize tanks in which olives are aerated in a bath of liquid, but such devices to the inventors' knowledge require huge volumes of air to aerate the olives, while many of the olives in corners of the tank or on the bottom of the tank are moved but slightly and some are not moved at all, thus permitting a contact mark between the olives where the exposure is uneven. In these processes and apparatus, it is customary to frequently use a jet of very high pressure air to dislodge the banks of olives in the corners and bottoms of the vats, or to use a wooden paddle to stir between the forks which introduce the air on the bottom. Our method of processing overcomes the disadvantages of the devices just mentioned.

Thus, the olives 21 in the lye solution, with the use of the air-lift pump and the passage thereof through the pump pipe 10 results in a uniform stirring movement of the olives. The olives which have been elevated through the pipe 10 settle on top of the olive layer which is already there, thus forcing this layer downward toward the conical base, which in turn directs the olives into the inlet 12 of the pipe 10. The complete aeration of the lye, or the water in which the

4

olives are exposed between lye solutions, is achieved through the introduction of a large volume of air into the pipe 10, with resultant spraying of the lye solution above the surface of the olives, thus permitting the lye or water to absorb all the air possible before falling back upon the olives. It is important to observe that by forcing air through pump pipe 10 in a large volume, violent agitation is obtained over a small area of the tank. Movement of all of the olives is achieved by aeration of a small percentage of the total area of the tank. Thus, by using only a fraction of the air which is required in the usual underwater process, where the whole area of a tank is aerated, a much better aeration is achieved, and a more uniform lye penetration of the olives is possible. Uniform control of the strength of the lye solution is obtained since the lye solution is violently circulated in pipe 10 at all times. If it becomes necessary to increase or decrease the lye strength, it is simple of accomplishment because added lye or water at the zone of the air lift becomes mixed in the fraction of a minute and a test can be readily obtained. On the other hand, introduction of lye or salt into a large tank, where air is coming to the surface over the entire area, will form liquid currents and it is almost impossible to get a uniform mixture in a tank by this method.

After the lye process is complete, the removal of lye by wash water is simple of accomplishment because it is possible to introduce a small stream of fresh water into the center of the tank and thereby achieve a rapid removal of lye without using a large volume of water. It is also possible to remove the lye by continuous neutralization with phosphoric or other fruit acids introduced into the air lift. A glass electrode inserted at this point may be used to register the pH of the wash water which can be kept at the neutral point or between pH 7 and pH 8, thus insuring more rapid removal of the lye than would be possible by frequent changes of water or the introduction of a small portion of fresh water. Thus, when the lye has been removed and it is necessary to brine the olives, this is accomplished by adding concentrated brine at the pump discharge and measuring the resultant brine until the proper strength is obtained. The olives may be rendered sterile or the solution sterile by use of any of the well-known lamps for this purpose which may be suspended above the open top of the tank. It is evident that as each olive must make its cycle of movement, the contents of the tank are exposed to this lamp regularly. Pasteurization of the olives may be accomplished by introducing steam in place of air through pipe 15, which will cause an even flow of heat into the tank to bring the temperature up to 175 degrees without local heating or damage to the olives.

It is assumed that ordinary olive treatment is known to those skilled in the art, and accordingly we have not set forth, except in the statement of objects, any particular treatment for olives. However, and briefly stated, to develop good black color in olives, it is necessary that the olives not be cut too deeply with lye at any one time, and that the portion already treated with lye be exposed to air. Thus, the lye treatment usually occupies a period of four hours with intervals of 24 to 48 hours of air treatment. Hence, in ordinary processes, the lye treatment occurs every other day, whereas in the practice of the present invention, part of the aeration takes place during the lye treatment and it is therefore possible to treat the

5

olives with lye every day instead of every other day. Since the cutting or lye treatment is much more uniform in the olive, fewer lye treatments are used to secure a uniform darker color. This affords a saving of time, and allows the olives to be processed at a faster rate per square foot of floor space used. Except for the man who supervises the application of the different solutions used in processing, our process is completely without labor usually associated with olive processing.

Assuming that the olives have been processed and it is desired to remove the olives from the tank, this may be accomplished in the manner illustrated in Figure 3 by adding a length of pipe 24 to the pump pipe 10. In other words, the lower end of the pipe 24 telescopes or acts as a sleeve on the upper end of the pump pipe 10, the base of pipe 24 resting upon the braces 19. A grating of perforated plate 25, provided with two spaced side walls 26 and an end wall 27, is then positioned above the tank at an inclination, with the upper end of the pipe 24 communicating thereabove as shown. When fresh water with air or even lye-bearing liquid is passed through the pump pipe 10, and through the pipe 24, the olives and the liquid are lifted and deposited on the grating or perforated plate 25, the olives moving downwardly due to inclination of the plate into a receiving hopper 28, the liquid passing through the grating or the perforations and back into the tank. Thus, the tank is easily emptied of olives, and by a method which is extremely simple and far superior to methods and means now generally employed in the industry. After the tank has been emptied of olives, the pipe 24 with the grating may be removed and a fresh batch of olives to be processed placed in the tank.

In Figure 4, we have illustrated a method which may be utilized in the practice of the invention and wherein the overflow of pipe 20 may be connected by suitable piping 29 to a pump 30, the eduction port of the pump communicating with a jet 31 positioned at the lower end of pipe 10. As before, the jacket 14 surrounds the pipe and particularly that portion of pipe 10 having the perforations 13, and pipe 15 communicating with pump 17 for air. Thus, for the purpose of circulating the olives within the solution 22, we draw the solution from the overflow of the tank, that

6

is, the overflow through 20, back into the tank by directing such solution through jet 31. This method will keep the olives circulating by the same method as accomplished by the air lift previously described for Figure 2. However, to aerate the solution, a small amount of air is directed from the air pump 17 into the pipe 10. The result accomplished is the same in that the solution is circulated, the olives are lifted under fluid pressure through the pipe 10, and the solution is aerated.

We claim:

A device for processing ripe olives, including a tank having a circular side wall open at the top and provided with an inverted conical base, a perforated plate extending transversely of the conical base and spaced inwardly from the apex of said base; a pipe central of the tank, means for supporting said pipe above the perforated plate to provide an inlet at the lower end of said pipe, said pipe provided with perforations adjacent the inlet thereof, a jacket surrounding the pipe at the zone of the perforations, an inclined grating in communication with the outlet of the pipe and means for directing air under pressure within said pipe for the purpose of elevating liquid and olives contained therein onto the grating, the olives being directed in one path by said grating and the liquid passing through said grating and back into the tank.

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