April 15, 1958 E. J. VAGIM 2,830,603

RAISIN WASHING MACHINE

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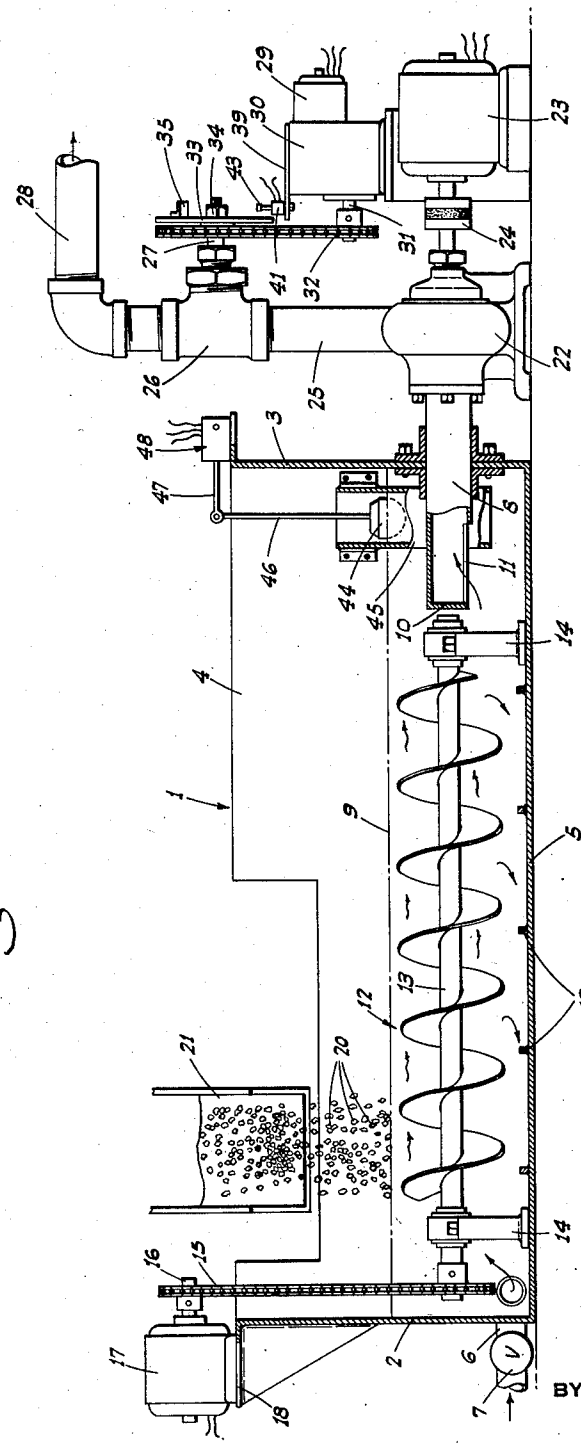


Fig. 1

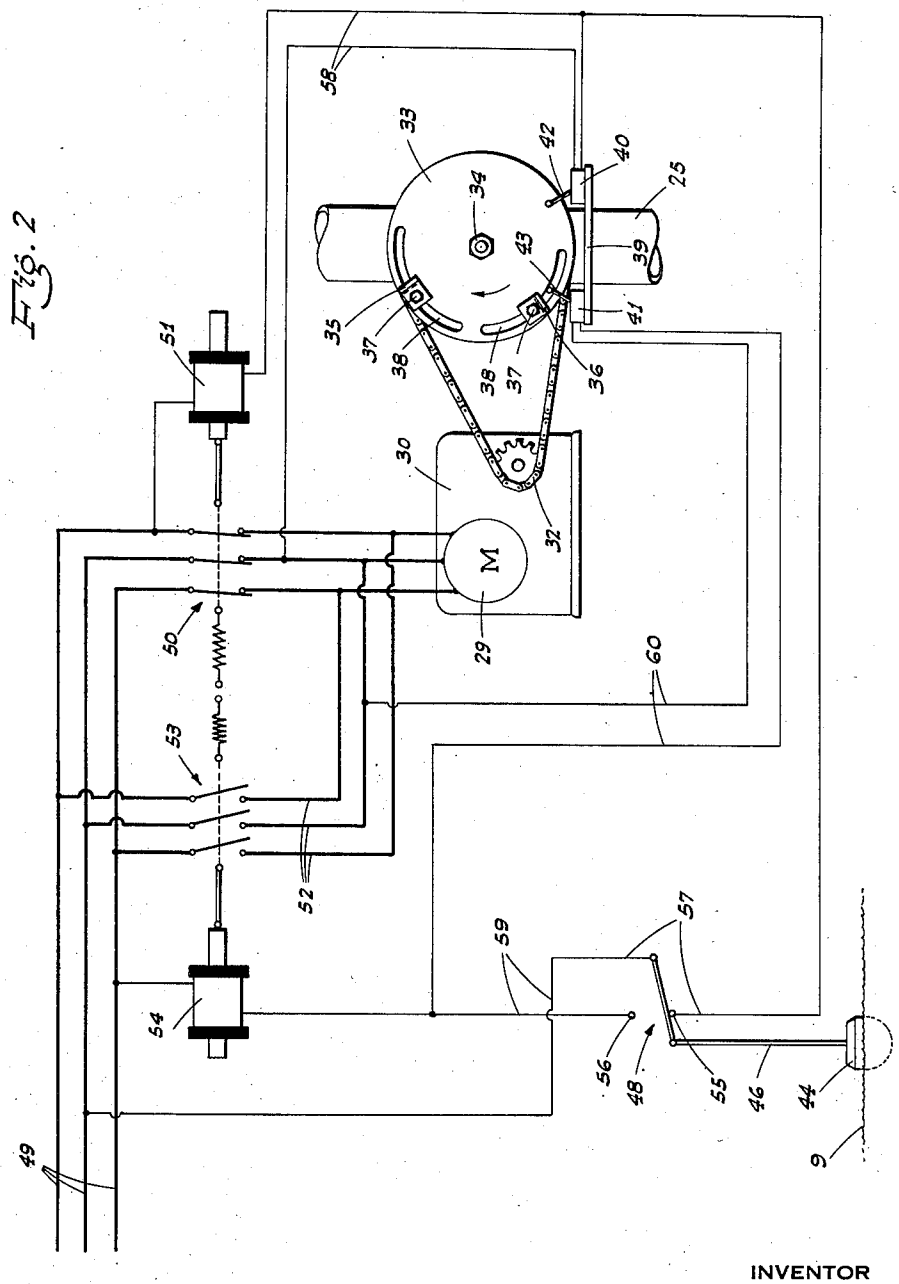
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Fig. 2




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# RAISIN WASHING MACHINE

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9 Claims. (Cl. 134—57)

This invention is directed to, and it is a major object to provide, a novel produce washing machine; such machine being especially designed—but not limited—for washing raisins.

Another important object of the present invention is to provide a raisin washing machine which includes a tank into which water is continuously fed and withdrawn, the raisins being deposited in the water in the tank, and a power actuated mechanism in the tank operative to agitate the water and raisins whereby to cleanse the latter; the raisins as washed being carried from the tank by the water withdrawn therefrom.

An additional object of the invention is to provide a raisin washing machine, as in the preceding paragraph, in which said power actuated mechanism in the tank not only agitates the water and raisins to accomplish cleansing of the latter, but also causes a back-flow of the water along the bottom of the tank in a direction away from the point at which the water and washed raisins are withdrawn; the result being that foreign matter—such as stones, sand, nails, etc.—gravitate to the bottom of the tank and are diverted away from said point for subsequent removal from the tank.

A further object of the invention is to provide a raisin washing machine which includes an outlet pipe for withdrawing the water and washed raisins from the tank; said pipe extending substantially horizontally into the tank, and the power actuated agitating mechanism being an auger disposed lengthwise in the tank above the bottom thereof and in end to end relation to such pipe.

A still further object of the invention is to provide a raisin washing machine, as in the preceding paragraph, including a suction pump and valve assembly connected in communication with such outlet pipe; there being one electric motor connected in driving relation to the pump and another electric motor connected to the valve in a manner so that the latter may be power-adjusted to maintain the water in the tank within predetermined maximum and minimum levels, said separate motor being reversible, and a novel float controlled switching circuit operative to cause reversible operation of said separate motor.

It is also an object of the invention to provide a raisin washing machine which is designed for ease and economy of manufacture, and positive operation, with a minimum of servicing and maintenance being required.

A separate object of the invention is to provide a practical and reliable raisin washing machine, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the raisin washing machine, with the tank in section.

Fig. 2 is a diagrammatic view of the float controlled switching circuit, together with an elevation of the switch actuating disc associated with the valve.



Referring now more particularly to the drawings and to the characters of reference marked thereon, the raisin washing machine comprises an elongated trough-like tank 1 which includes ends 2 and 3; sides, one of which is indicated at 4; and a bottom 5.

A water feed pipe 6, having an adjustable valve 7 therein, delivers water continuously into the tank 1 through the side 4 adjacent the end 2 and bottom 5. A water outlet pipe 8 projects horizontally into the tank 1 through the end 3 a distance above the bottom 5 but below the water level 9; such outlet pipe 8 having a closed inner end 10. The bottom part of the portion of the pipe 8 which projects into the tank 1 is formed with an intake slot 11.

An elongated auger 12, which includes a central shaft 13, is disposed horizontally in the tank 1 in end to end relation to the water outlet pipe 8; such auger being supported for rotation by standards 14 in which opposite end portions of the shaft 13 are journaled. The diameter of the auger 12 is such that the low points of the flights are spaced above the bottom 5, while the high points of such flights are normally below the water level 9.

The auger 12 is driven, so that it runs forward toward the water outlet pipe 8, by means of an endless chain and sprocket unit 15 connected between the shaft 13 and the drive shaft 16 of an electric motor 17 supported by a platform 18 on end 2 of the tank. Transverse baffles 19 upstanding from the bottom 5 of the tank 1 are provided at spaced points in the length thereof.

The raisins 20 to be washed are fed into the tank by suitable means, such as a chute 21. Exteriorly of the tank 1 and beyond the end 3 the water outlet pipe 8 is connected to a suction pump 22 of centrifugal type, which pump is driven by an electric motor 23; the shafts of the pump 22 and motor 23 being connected by a suitable coupling 24.

A discharge pipe 25 leads upwardly from the suction pump 22 to communication with a gate valve 26 which is normally adjusted to a substantially half-open position; such gate valve being adapted to be adjusted toward full closed or full open position by means of a projecting rotary shaft 27. A carry-off pipe 28 leads from the discharge side of the gate valve 26.

The shaft 27 is adapted to be reversibly actuated, to adjust the gate valve 26, by means of a reversible electric motor 29 which drives a pedestal supported, reduction gear box 30; the output or drive shaft 31 of said gear box being connected by an endless chain and sprocket unit 32 to the shaft 27.

Additionally, said shaft 27 is fitted—outwardly of the endless chain and sprocket unit 32—with a disc 33 adjustably secured to said shaft by means including a nut 34.

Adjacent the periphery thereof the disc 33 is provided with a pair of circumferentially spaced, laterally outwardly projecting lugs 35 and 36. The lugs 35 and 36 are adjustable in their circumferential spacing by reason of the fact that the securing bolts 37 project through arcuate slots 38 in said disc.

A horizontal mounting plate 39 is secured atop the gear box 30 and projects to a point directly below the disc 33; such plate supporting a pair of normally closed, transversely spaced switches 40 and 41 having upstanding fingers 42 and 43, respectively.

When the disc 33 is rotated in a valve closing direction, as shown by the arrow in Fig. 2, the lug 35 engages and moves the finger 42, which opens the switch 40. Contrariwise, when the disc 33 is rotated in a valve opening direction the lug 36 engages and moves the finger 43, which opens the switch 41.

The purpose of the control of the switches 40 and 41 from the disc 33 will hereinafter appear; such switches

being included in a float controlled switching circuit for the reversible electric motor **29**, which circuit is shown diagrammatically in Fig. 2.

A float **44** rides the water in tank **1** at a point adjacent the end **3**, and such float is disposed within a water motion baffle tube **45** fixed to the tank; such tube being open at both ends, with the lower end disposed below the water level **9**, so that such level likewise occurs within said tube but below its upper end.

A link **46** is fixed to the float **44** and extends upwardly to pivotal connection with a vertically swingable switch arm **47** of a two-way switch **48** mounted on the tank at the top of the end **3**.

A three-wire energizing circuit **49** leads to the reversible electric motor **29**, and a normally open relay switch **50** is interposed in such circuit; the relay switch **50** including a solenoid **51** which—when energized—closes said switch.

A three-wire reversing circuit **52** connects between the circuit **39** at points ahead of and beyond the switch **50**; such reversing circuit including a normally open relay switch **53** therein. The relay switch **53** has a solenoid **54** which—when energized—closes said relay switch **53**.

When the relay switch **50** is closed, the electric motor **29** runs in a direction to cause valve closing rotation of the shaft **27**, whereas when the relay switch **53** is closed the motor **29** runs in a reverse direction to cause valve opening rotation of said shaft **27**.

When the water in the tank is to a predetermined normal level **9**, the switch **48** is in an open position; i. e., clear of the contacts **55** and **56** of said switch **48**. At this time both of the relay switches **50** and **53** are open, and the gate valve **26** is positioned so that it is substantially half way between open and closed positions.

*Operation*

When the raisin washing machine is in operation, water constantly delivers into the tank from pipe **6** and is withdrawn from the tank through pipe **8**, being discharged by the pump **22**—then driven by motor **23**—through the gate valve **26** and carry-off pipe **28**; the raisins **20** to be washed being fed by the chute **21** into the water in the tank.

The auger **12** is constantly driven by the motor **17** so that such auger turns or advances in the direction of the water outlet pipe **8**; the action of such auger causing continuous agitation of the water and raisins in the tank, whereby to effectively wash such raisins.

In addition to agitating the water and raisins for the purpose of cleansing the latter, the auger tends to feed such raisins in the direction of the water outlet pipe **8**, whence the water—together with the washed raisins—are withdrawn from the tank through said pipe **8** by pump **22**, thence being discharged through pipe **25**, gate valve **26**, and carry-off pipe **28**. From the pipe **28** the water and entrained washed raisins deliver to a screening device (not shown) by means of which the raisins are separated from the water for subsequent processing.

In addition to the above described action of the auger **12**, it tends—as it rotates—to cause a back-flow on the bottom **5** of the tank, as indicated by the lowermost arrows in Fig. 1.

As the raisins are being washed, any heavy foreign matter—such as stones, nails, sand, etc.—gravitate toward the bottom of the tank, and—by reason of such back-flow—tend to be directed toward the end **2**, i. e. away from the water outlet pipe **8**; all to the end that such foreign matter is effectively separated from the washed raisins and retained in the tank for subsequent removal.

The transverse baffles **19** on the bottom **5** also assure against movement of such foreign matter along the bottom **5** in the direction of the water outlet pipe **8**.

In the event that the water level **9** in the tank lowers to a certain extent, corresponding lowering of the float **44** engages switch **48** with the contact **55** closing an initial energizing circuit **57** for the solenoid **51**, and said solenoid in turn closes the relay switch **50**.



With such closing of the relay switch **50**, the motor **29** is actuated in a direction to cause slow adjustment of the gate valve **26** toward closed position. During this occurrence the amount of water withdrawn from the tank becomes less, so that the water level begins to rise, whereupon the float **44** breaks switch **48** from contact **55**. However, the electric motor **29** continues to run in such direction, by reason of a solenoid holding circuit **58** energized upon closing of relay switch **50** and which holding circuit includes the normally closed switch **40**, until the lug **35** engages and moves the finger **42** of switch **40**, opening the latter and breaking the holding circuit **58**, deenergizing solenoid **51** so that relay switch opens, and motor **29** stops. At this time the valve **26**, while not fully closed, is adjusted to permit of a lesser flow therethrough, compensating for the lowering of the water level in the tank, and resulting in the float **44** returning the switch **48** to an intermediate or neutral position.

Conversely, if the water travel **9** in the tank rises to a certain extent, the float **44** will rise and swing the arm **47** of switch **48** upwardly until it engages contact **56**, establishing an initial energizing circuit **59** for the solenoid **54**; the latter as so energized closing relay switch **53** in the reversing circuit **52**.

This results in the electric motor **29** running in a reverse direction; i. e., in a direction which causes slow adjustment of the gate valve **26** toward open position. With such adjustment of the gate valve **26** the amount of water withdrawn from the tank becomes greater and the water level therein begins to fall, with float **44** breaking switch **48** from contact **56**.

However, the motor **29** continues to run in such direction by reason of a solenoid holding circuit **60** energized upon closing of a relay switch **53**; the normally closed switch **41** being included in said holding circuit **60**.

After predetermined operation of the motor **29** in such direction to cause adjustment of the gate valve **26** toward open position, the lug **36** engages and moves finger **43** of switch **41**, opening the latter. This breaks the holding circuit **60** and deenergizes solenoid **54** so that relay switch **53** opens and the motor stops. At this time the valve **26**, while not fully open, is adjusted to permit a greater flow therethrough, compensating for the raising of the water level in the tank, and resulting in the float **44** returning the switch **48** again to an intermediate or neutral position.

Thus, with the described float controlled switching circuit the motor **29** is automatically operated in one direction or the other, whereby to adjust the gate valve **26** in the direction necessary to maintain the water level in the tank within certain predetermined maximum and minimum limits so that the machine may constantly function to effectively wash and discharge raisins.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A produce washing machine comprising a tank, means to feed water into the tank, the produce being deposited in the tank-contained water, the tank having a bottom and end walls, means including a pipe adapted to withdraw water, together with produce carried thereby, from the tank at a point above said bottom, the pipe projecting through one of said walls and extending gen-

erally horizontally to a closed-end termination in the tank in spaced relation to the opposite end wall, the portion of said pipe within the tank having an intake opening in the lower part thereof, and power actuated mechanism in the tank operative to agitate the water and produce therein; said mechanism including an auger journaled in the tank above the bottom thereof and extending lengthwise toward and to a point adjacent the closed end of the portion of the pipe in the tank; the auger running toward said closed end of the pipe.

2. A produce washing machine comprising a horizontal tank, means to feed water into the tank, the produce being deposited in the tank-contained water, power actuated mechanism in the tank operative to agitate the water and produce therein, a pipe assembly connected to the tank to withdraw water, together with produce carried thereby, from said tank, a driven pump and an adjustable valve interposed in the pipe assembly, and means operable to cause opening and closing movement of the valve with rising and falling, respectively, of the level of the water in the tank relative to a predetermined level.

3. A produce washing machine comprising a tank, means to feed water into the tank, the produce being deposited in the tank-contained water, power actuated mechanism in the tank operative to agitate the water and produce therein, a pipe assembly connected to the tank to withdraw water, together with produce carried thereby, from said tank, and a driven pump and an adjustable valve interposed in the pipe assembly; there being a float in the tank, and means responsive to rise and fall of the float operative to cause adjustment of the valve in a closing and opening direction, respectively.

4. A produce washing machine comprising a tank, means to feed water into the tank, the produce being deposited in the tank-contained water, power actuated mechanism in the tank operative to agitate the water and produce therein, a pipe assembly connected to the tank to withdraw water, together with produce carried thereby from said tank, a driven pump and an adjustable valve interposed in the pipe assembly, there being a reversible electric motor connected to the valve to adjust the same in an opening or closing direction, a reversible energizing circuit for said motor, said circuit including a reversing switch, and a float in the tank connected to the switch; said switch when closed by the float one way or another in response to raising or lowering of said float, causing said circuit to energize the reversible motor in one direction or the other whereby to adjust the valve toward open or closed position, respectively.

5. A produce washing machine, as in claim 4, including separate and corresponding holding circuits arranged to continue such energization of the motor in said one direction or the other after the float controlled switch is opened, a normally closed switch in each holding circuit,



and means to open the corresponding holding circuit switch in response to predetermined adjustment of the valve toward said open or closed position.

6. A produce washing machine comprising a trough-like tank including ends and a bottom, means to feed water into the tank adjacent one end thereof, means to deposit the produce in the tank-contained water adjacent said one end, an outlet pipe in communication with the tank adjacent its other end and above the bottom, an elongated auger journaled in the tank and extending lengthwise thereof in the water, the auger being spaced above the bottom of the tank, means to drive the auger, the auger running in the direction of said other end of the tank, and a pump and adjustable valve assembly in communication with said pipe outside the tank operative to withdraw water and washed produce therefrom in regulated quantity.

7. A produce washing machine comprising a trough-like tank including ends and a bottom, means to feed water into the tank adjacent one end thereof, means to deposit the produce in the tank-contained water adjacent said one end, an outlet pipe in communication with the tank adjacent the other end and above the bottom, said pipe projecting horizontally into the tank through said other end, an elongated auger journaled in the tank and extending lengthwise thereof in the water, the auger being spaced above the bottom of the tank, the forward end of the auger being adjacent and in end to end relation to the portion of the pipe which projects into the tank, means to drive the auger, the auger running in the direction of said other end of the tank, and a pump and adjustable valve assembly in communication with said pipe outside the tank operative to withdraw water and washed produce therefrom in regulated quantity.

8. A produce washing machine, as in claim 7, in which the inner end of said portion of the pipe is closed, and said portion having an intake opening in the lower part thereof.

9. A produce washing machine, as in claim 8, including longitudinally spaced, transverse baffles on the bottom of the tank below the auger.

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