Oct. 19, 1954 F. H. INE 2,691,956

AUTOMATIC DIPPING MACHINE

Filed Dec. 15, 1952 2 Sheets-Sheet 1

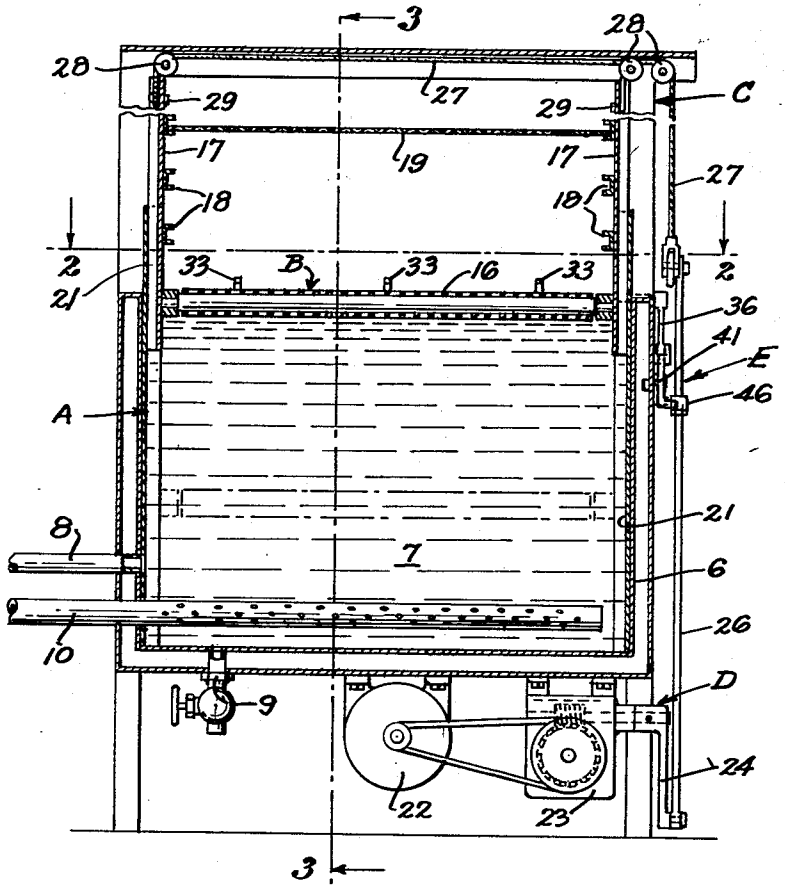


Fig. 1.

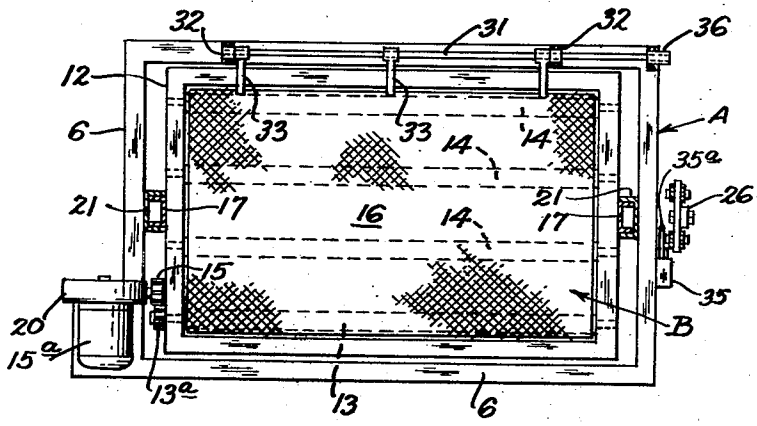


Fig. 2.

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Fig. 3.

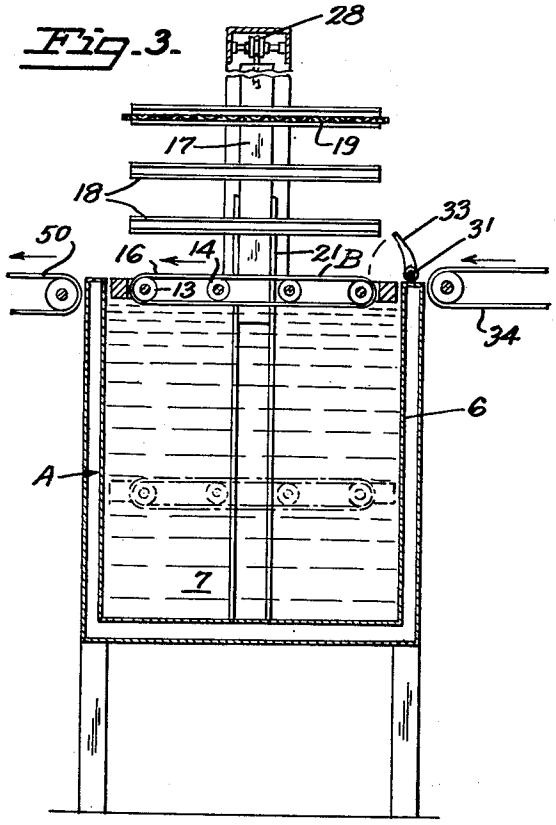


Fig. 4.

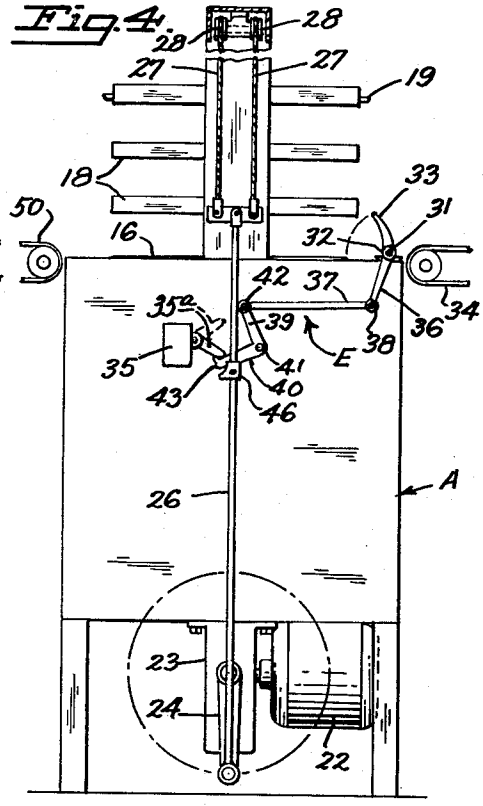


Fig. 5.

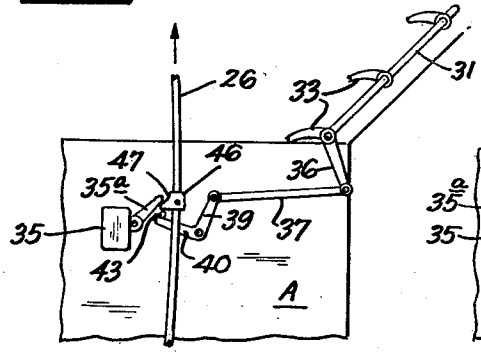
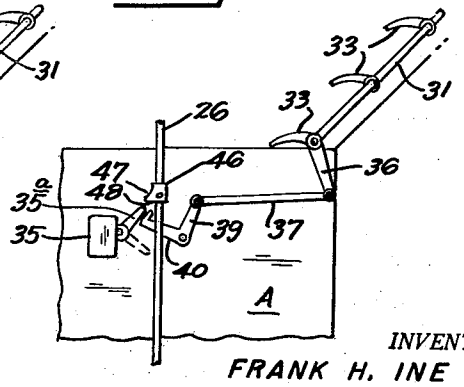


Fig. 6.



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UNITED STATES PATENT OFFICE

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AUTOMATIC DIPPING MACHINE

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Application December 15, 1952, Serial No. 326,121

9 Claims. (Cl. 118—1)

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This invention relates to a new and improved dipping machine.

The present invention has particular utility in providing a dipping machine particularly adaptable for immersing chickens and turkeys which have been wrapped in a shrinkable, plastic material, such as a co-polymer of vinylidene and vinyl chloride, into hot water for the purpose of causing the plastic material to shrink into tight conformity with the bird's carcass. It is understood, however, that the scope of the invention is not limited or confined to any particular use or uses to which the device may be put.

It has become common practice among many processors of chickens and turkeys to enclose the eviscerated birds within a bag made of a plastic material of a type characterized by its tendency to shrink to a pronounced extent when the material is doused with or immersed in hot water. One such type of plastic material frequently used by turkey processors for the above purpose is a co-polymer of vinylidene and vinyl chloride, produced commercially by the Dow Chemical Company and which is sold under the trade description "Saran."

Perhaps the most frequent method employed today in dousing the packaged birds with hot water involves moving the packaged fowl into a spray chamber and past a series of nozzles which spray hot water on the packages. This practice has not been found too satisfactory for several reasons—one being that the streams of hot water upon striking the package disperse into droplets or streams of water over the package causing a consequent varying of water temperature throughout the entire area of the package material and which may result in non-uniform shrinkage of the plastic. Another attendant disadvantage in employing a spray nozzle system is that the hot water which is continuously recirculating through the system picks up sediment and residue from the bags, which, in turn, tend to clog the nozzles or circulating pump with resultant inefficiency in operation of the system.

The present invention may be employed to automatically lower and raise one or more packaged fowl at a time into and out of a tank of hot water, which insures subjecting all areas of the package material to water of uniform temperature.

Another object of the invention is to provide a dipping tank wherein novel switch and driving means are provided to automatically lower and raise the load supporting dipping carrier into and out of the dipping tank upon loading of packaged

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fowl or other articles to be dipped onto said carrier.

Another object of the invention is to provide a dipping tank having a novel load supporting carrier, comprising an endless belt conveyor, for facilitating the loading and unloading of articles onto and off of the dipping carrier.

Other objects and advantages of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a vertical sectional view of the dipping tank construction.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1, and showing the tank in association with loading and unloading conveyors illustrated fragmentarily.

Fig. 4 is an end elevational view of the dipping tank construction.

Fig. 5 is an enlarged perspective view of the starting switch actuating assembly in one position of operation.

Fig. 6 is an enlarged perspective view of the starting switch actuating assembly in a second position of operation.

Referring now more particularly to the drawings, the embodiment of the invention illustrated comprises, generally, a tank unit A, a load supporting carrier B, a carrier support and suspension assembly C, a driving assembly D, and switch actuating assembly E.

Tank unit A comprises, more specifically, an open top insulated tank 6 adapted to contain a reservoir of hot water 7, or other immersing liquid. The tank is preferably provided with suitable inlet and outlet ports 8 and 9 for filling and emptying the tank with the immersing liquid. Moreover, suitable heating means, such as steam pipe 10, may be provided to heat the liquid to desired temperature. Such filling, draining, and heating means are well-known in the art and do not, per se, constitute a part of the present invention.

Carrier assembly B preferably comprises an endless conveyor belt comprising a rectangular frame 12, to opposite ends of which is journaled in spaced, parallel relationship, a belt drive shaft 13, and a plurality of idler shafts or rollers 14, all of which cooperate to support an endless, flexible, metal mesh or link type conveyor belt 16.

Belt drive shaft 13 is provided with a pinion 13a which is adapted to mesh with a drive pinion 15 rotatably journaled to the tank and adapted to be driven by motor 15a to which said pinion is connected by a suitable conventional gear reduction drive 20. As will appear more fully hereinafter, when the carrier occupies its maximum upward or load receiving position (preferably substantially coplanar with the open top of the tank), the conveyor may be power driven to facilitate loading and unloading of articles to be dipped by virtue of the mesh engagement between pinion 13a and drive pinion 15.

Welded or otherwise rigidly secured to opposite ends of frame 12 are a pair of vertical channels 17 which project above said frame and carry a plurality of horizontal, vertically spaced, parallel shelf supports 18 adapted to slidably retain a wire shelf 19. Wire shelf 19 may be inserted in any one of the pairs of shelf supports 18 in adjustably spaced parallel relationship above the carrier. The purpose of the shelf is to maintain the packaged fowl or other article to be dipped on the carrier when the latter is dipped into the immersing liquid and to prevent said articles from floating off the carrier during dipping operations.

The carrier is supported for vertical reciprocal movement downwardly and upwardly into and out of immersing position within said tank by vertical channel guideways 21 secured to opposite ends of the tank and adapted to slidably receive and guide channels 17 of the carrier.

To lower and raise the carrier into and out of the tank I provide an electric motor 22 which, through suitable reduction gearing 23, is adapted to rotate crank arm 24 at desired speed. The carrier assembly B, in turn, is connected to crank arm 24 by cable means comprising main cable 26 and branch cables 27. More specifically, the lower end of main cable 26 is rotatably secured to crank arm 24 and the upper end of said cable is secured to branch cables 27, which in turn run over suitable guide pulleys 28 provided on the frame support assembly C and are securely connected; as at 29, to channels 17 of said carrier. It is believed evident that as crank arm 24 is rotated by motor 22, the cables suspending the carrier will be reciprocated so as to raise and lower the carrier into and out of the tank. In Fig. 1, for example, it is evident that as the crank arm rotates from its maximum down position, as shown, through 180°, to its maximum up position, cables 26 and 27 will lower the carrier to its immersing position (as shown in broken lines), and continued rotation of said crank arm through 360° back to its down position will raise the carrier back to its original load receiving position.

As hereinabove suggested, it is a principal object of the invention to provide means for automatically lowering and raising the carrier into and out of immersing position within the tank upon a load being moved onto the carrier. It is a further object to provide means for automatically stopping movement of the carrier after it has moved, through one revolution of crank arm 24, from its load receiving position downwardly to its immersing position and back to its load receiving position.

To fulfill these desired ends and objects there is provided a switch actuating assembly, heretofore designated generally at E. More specifically, said assembly comprises a shaft 31 supported rotatably in bearings 32 provided on said tank and carrying one or more upwardly projecting fingers 33. This latter described assembly is mounted on a top edge of the tank and positioned adjacent a suitable loading structure or mechanism, shown in the drawings as comprising a conventional loading conveyor belt unit 34. Articles to be dipped, such as packaged fowl (not shown), moving along conveyor 34 and onto carrier B, will strike against and move downwardly the fingers 33 causing shaft 31 to rotate counter-clockwise within its bearings 32. Shaft 31, in turn, is connected by suitable link means to switch 35 in circuit with motor 22.

The aforementioned link means is shown as comprising a first link arm 36 rigidly affixed to shaft 31 and depending downwardly therefrom; a second link arm 37 connected pivotally, as at 38 to arm 35; a bell crank comprising arms 39 and 40 centrally pivotally supported as at 41 to the tank and pivotally connected to arm 37 as at 42; and a switch lever actuating cam 43. In operation the movement of fingers 33 downwardly upon a load moving thereagainst and thereover from conveyor 34 to carrier B will rotate shaft 31 counter-clockwise and cause arm 36 to swing to the right, as viewed in Figs. 4, 5 and 6. This latter movement will, by virtue of link connections 37, 38, and 42, cause cam 43 carried by bell crank arm 39 to move upwardly into cam engagement against switch lever 35a when the latter is in its down and off position. In short, movement of fingers 33 downwardly upon a load moving thereover from loading conveyor 34 onto carrier B will, through the above described link means, automatically cam the switch lever 35a of switch 35 upwardly and close the circuit to electric motor 22. As above mentioned, actuation of the motor will cause crank arm 24 to rotate and the consequent lowering and raising of the carrier into and out of the tank.

In order to automatically stop movement of the carrier after a complete dipping cycle, as aforesaid, there is provided a switch cam 46, adapted to move upwardly and downwardly with cable 26, to which said cam is affixed. The upper inside face of cam 46 is concave to permit the cam to by-pass switch lever 35a at the commencement of a dipping cycle. More specifically, when the machine is at rest and the carrier occupies its normal load receiving position, switch lever 35a will occupy its down position, fingers 33 will occupy their upward projecting position, and cam 46 will occupy a position slightly below switch lever 35a, as shown in Fig. 4, for example. When a load is moved against the fingers 33, as aforesaid, switch cam 43 will instantly cam switch lever 35a into its up position, and as crank arm 24 commences to rotate, the arcuate face 47 of cam 46 carried by cable 26 will move upwardly into contact with said switch lever. As this upward cable movement progresses the concave face 47 of the cam will cam itself outwardly permitting said cam to by-pass said switch lever—this being possible because of the flexibility of the cable permitting the cam to move out of a vertical straight line path of movement.

After the carrier has moved downward to its immersing position and during its last inch or two of travel back up to its load receiving position, the underside or cam face 48 of cam 46 will move downwardly against the switch lever 35a and cam it to its down or off position, thereby opening the circuit and shutting off the motor at approximately the moment the carrier returns to its load receiving position. It is further

pointed out that as cam 48 moves switch lever 35a downwardly, the latter, in turn, will bear downwardly against cam 43 carried by bell crank 39—42 and, through aforementioned link elements 37, 36, and 31, cause fingers 33 to move back to their upwardly projecting position. In short, movement of cam 48 against switch lever 35a will not only automatically cause shutting off of the motor, but will retract the starting switch actuating means, including load contact fingers 33, and place the same in condition for commencement of a new loading and dipping cycle.

It has heretofore explained how pinion 13 is adapted to mesh with drive pinion 15 connected to prime mover 28 when the carrier occupies its load receiving position. When these pinions are in mesh, the endless conveyor can be operated simply by switching on motor 15a through any conveniently located switch (not shown) in circuit with the motor. The advantages of this arrangement may be readily understood by having reference to Fig. 3 in the drawings wherein it is seen that continuous movement of a load from load conveyor 24 may be continued on to any desired location upon the carrier itself by operating the carrier conveyor belt. Similarly, after completion of a dipping cycle and prior to movement of a new load onto the carrier, the load which had been dipped may be conveyed off of the carrier onto an unloading conveyor 59, or like structure, by operating the carrier conveyor belt. Such an arrangement greatly minimizes or entirely eliminates the need for manual loading or unloading of articles onto or off of the dipping machine.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

I claim:

1. A dipping tank construction for use in association with a loading structure located adjacent thereto, comprising; an open top reservoir tank adapted to contain an immersing liquid, a load supporting and dipping carrier supported for reciprocal vertical movement from a load receiving position adjacent the open top of said tank downwardly to an immersing position within said tank and back to said load receiving position, driving means including electrical means for reciprocally moving said carrier from its load receiving position to its immersion position and back to its load receiving position, a switch for activating said driving means, switch actuating means located adjacent said carrier and in the plane of said load receiving position of said carrier, said switch actuating means sensitive to physical contact of a load moving thereagainst for automatically actuating said switch and activating said driving means upon a load being moved from an adjacent loading structure against said switch and onto said carrier.

2. A dipping tank construction according to claim 1 and wherein said driving means including electrical means comprises an electric motor in circuit with said switch, a pulley cable suspending said carrier for reciprocal movement into and out of said tank, and means comprising a crank arm driven by said motor and connected to said pulley cable for imparting downward and upward reciprocating motion to said pulley cable and carrier supported thereby upon rotation of said crank arm.

3. A dipping tank construction according to claim 1 and wherein said carrier comprises an endless conveyor, and means for driving said conveyor when said carrier occupies its load receiving position.

4. A dipping tank construction according to claim 1 and wherein said carrier comprises an endless conveyor, a driving source located in relatively fixed position with respect to said conveyor, and coupling means comprising mutually engageable and disengageable first and second coupling elements for connecting said driving source to said conveyor when the carrier occupies its load receiving position, said first coupling element carried by said conveyor, and said second coupling element connected to said driving source and located in relatively fixed position with respect to said carrier for coupling engagement with said first coupling element when said carrier occupies its load receiving position.

5. A dipping tank construction according to claim 1 and wherein said carrier comprises an endless conveyor including a drive shaft and a pinion mounted on said shaft, a drive gear mounted rotatably in fixed position relative to said carrier for mesh engagement with said pinion when said carrier occupies its load receiving position, and a prime mover connected to said driving gear for driving said conveyor via said drive gear, said pinion, and said shaft when said carrier occupies its load receiving position.

6. A dipping tank construction for use in association with a loading structure located adjacent thereto, comprising; an open top reservoir tank adapted to contain an immersing liquid, a load supporting and dipping carrier supported for reciprocal vertical movement from a load receiving position adjacent the open top of said tank downwardly to an immersing position within said tank and back to said load receiving position, driving means for reciprocally lowering and raising said carrier from its load receiving position to its immersion position and back to its load receiving position, said carrier comprising an endless conveyor to facilitate loading and unloading of a load adapted to be supported by said carrier, and means for driving said conveyor when the carrier occupies its load receiving position.

7. A dipping tank construction according to claim 6 and wherein said means for driving said endless conveyor comprises a prime mover located in relatively fixed position with respect to said conveyor and coupling means comprising mutually engageable and disengageable first and second coupling elements for connecting said prime mover to said conveyor when the carrier occupies its load receiving position, said first coupling element carried by said conveyor, and said second coupling element connected to said prime mover and located in relatively fixed position with respect to said carrier for coupling engagement with said first coupling element when said carrier occupies its load receiving position.

8. A dipping tank construction according to claim 6 and wherein said endless conveyor includes a drive shaft and a pinion mounted on said shaft, and wherein said means for driving said endless conveyor comprises a drive gear mounted rotatably in fixed position relative to said carrier for mesh engagement with said pinion provided on said conveyor drive shaft when said carrier occupies its load receiving position, and a prime mover connected to said driving gear for driving said conveyor via said drive gear, said pinion,

and said shaft when said carrier occupies its load receiving position.

9. A dipping tank construction according to claim 6 and wherein said driving means comprises a switch and an electric motor in circuit with said switch, a pulley cable suspending said carrier for lowering and raising movement into and out of said tank, and means comprising a crank arm driven by said motor and connected to said pulley cable for imparting downward and upward reciprocating motion to said pulley cable and carrier supported thereby upon rotation of said crank arm, said switch incorporating a switch actuating lever movable from a first position to a second position for opening and closing said switch in said circuit, said switch and associated lever located proximate said pulley cable, a switch lever actuating cam carried by said cable shaped and proportioned to cam said lever arm to its first position and open said circuit as the cable moves said carrier into its load receiving position for automatically stopping the driving means and stopping movement of the carrier when the latter has moved to its load receiving position.

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