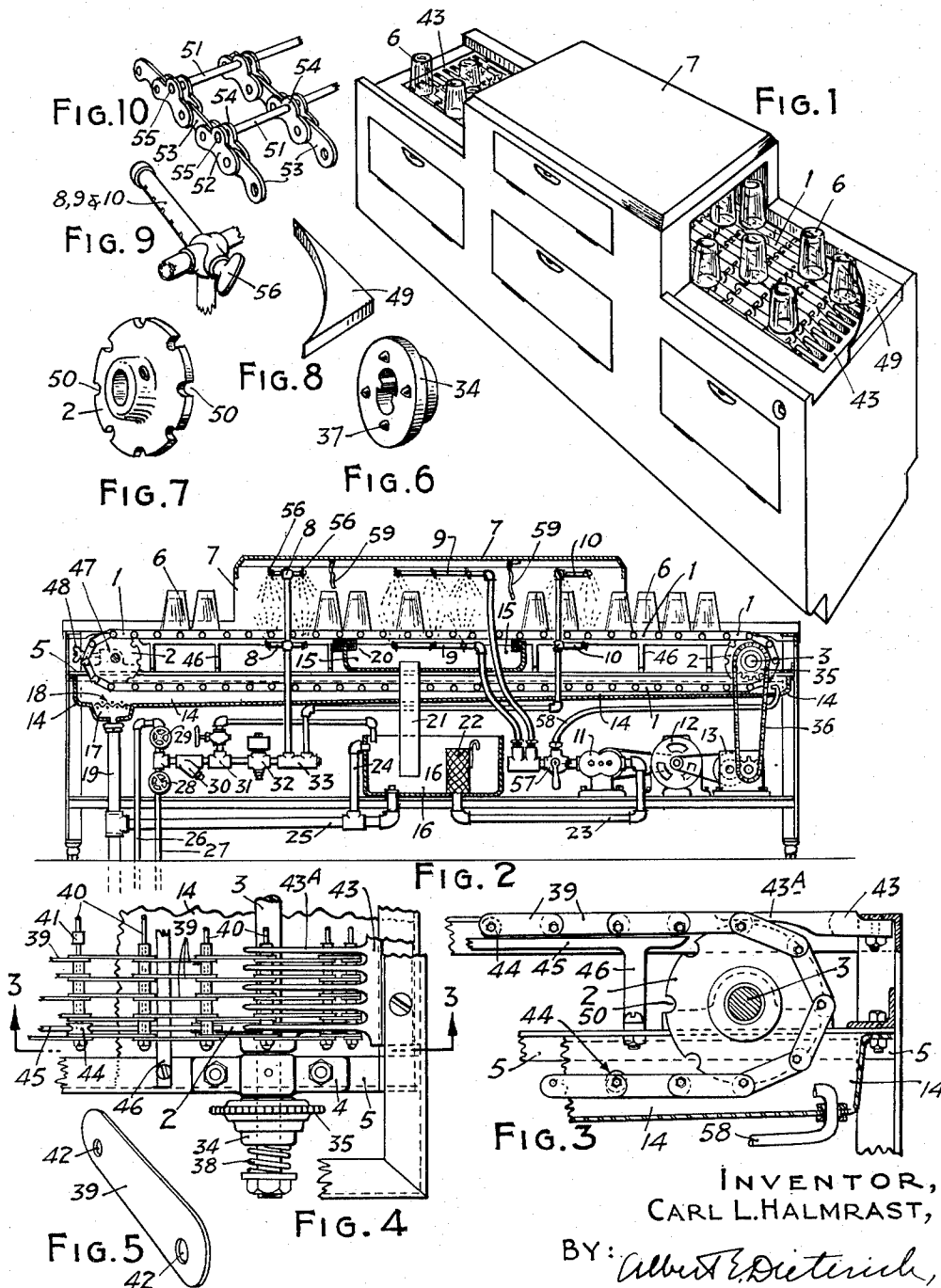


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STERILIZING APPARATUS

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STERILIZING APPARATUS

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This invention relates to new and useful improvements in sterilizing apparatuses, more particularly of a type adapted as means to wash and sterilize drinking glasses and the like and has as its objects; a continuous process of washing, sterilizing, and rinsing which cannot be interfered with by the operator or other attendants; sufficient speed and capacity to eliminate forced feeding or cheating on the part of the operator or other attendants; efficient sterilizing and washing to meet bacteriological standards and generally to provide a novel and economical device of simple construction with all parts readily accessible for inspection and repair.

Heretofore, the usual method of washing and sterilizing drinking glasses and the like has been done by the inadequate process of dipping or immersing the articles by hand in a basin or tank having a detergent solution therein. It very often happens that thousands of glasses in the course of a day or evening are supposedly cleansed in such a basin without benefit of a change in solution, with the result that such articles are actually dipped in a broth of filth. Other methods of washing and sterilizing drinking vessels and the like are by using steam vessels, or a various number of tanks or basins with baskets in which the drinking vessels are placed. All such devices and contrivances, by their involved routine, require so much handling of the articles to be washed and sterilized that eventually the operator or attendant begins to take short-cuts in performing his job by neglecting to leave the soiled articles in the solution long enough or fails to wash and rinse properly, with the result that sterilization has not taken place. Public health officials are cognizant of this source of contamination and realize that an urgent need exists for some novel method or means of washing, sterilizing and rinsing drinking glasses, cups, dishes, et cetera, that cannot be interfered with and which will properly do the job of washing, sterilizing and rinsing.

This invention, by reason of its novel nature, meets all the requirements of washing, sterilization and rinsing. The process of washing, sterilizing and rinsing cannot be interfered with once the operation has commenced. An operator to attend the device is not required, and short-cuts in operation need not be looked for or tried as this device is capable of washing, sterilizing and rinsing over four thousand glasses per hour or as many glasses as two bar-tenders working simultaneously and continuously at two separate sets of taps require.

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In this invention a novel flexible endless conveyor is used and adapted to convey drinking vessels, such as glasses, cups, et cetera, through a short tunnel-like housing wherein such vessels are washed, sterilized and rinsed by means of spraying water, and spraying sterilizing solution sprayed from batteries of spray pipes or nozzles arranged therein, said such tunnel-like housing being located over the central portion of said conveyor with the ends of the conveyor extending beyond each end thereof to provide loading and unloading areas thereon as means to eliminate the employment of a full time attendant; all of which may be more readily understood by having reference to the specification and drawings accompanying, in which:

Figure 1 is a perspective view of the complete device.

Figure 2 is a half-sectional side elevation, showing the general arrangement of the various members comprising the machine.

Figure 3 is a fragmentary side elevation of a portion of the driven end of the endless conveyor on the line 3—3 of Figure 4.

Figure 4 is a part plan view of the portion shown by Figure 3.

Figure 5 is a perspective view of a link of blade-like linkage of the conveyor showing the offset positioning of the hinge holes.

Figure 6 is an oblique view of the conveyor driving splined clutch.

Figure 7 is an oblique view of one of the conveyor sprockets.

Figure 8 is an oblique view of the deflecting element.

Figure 9 is an oblique view of part of one of the spray elements showing a removable wing plug as access means for cleansing the spray ports.

Figure 10 is a perspective of a portion of an alternative type of flexible conveyor showing the essential parts comprising the same.

Like numerals refer to like parts throughout the several views.

In the drawings, the numeral 1 indicates the endless conveyor, which is mounted over a plurality of sprocket-like wheels 2 fixedly secured upon shafts 3 journaled in bearings 4 mounted to a base 5, and operatively actuated by a prime mover 12 through a speed reducing element 13 as means to convey drinking vessels 6 into, through and out of a tunnel-like housing 7, of a length less than the conveyor, wherein are located batteries of spray elements 8, 9 and 10 adapted to spray liquid into and over such vessels for the

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purpose of washing, sterilizing and rinsing the same.

The numeral 14 indicates a drip pan of sufficient width, length and depth to include the entire width and length of the endless conveyor as means to collect all spray draining from the washing and rinsing sprays and all drip from the conveyor, said such pan having a sump 17 with a removable filter 18 located over the opening to a drain pipe 19 as means to collect any solid matter washed from the articles being cleansed.

A further drip pan 15 is provided as means to collect the sterilizing and detergent solution and prevent the same from mixing with the washing and rinsing water so that it may be used over again, said pan 15 being located between the loop of the endless conveyor and immediately below the chemical-and-detergent-sterilizing-solution sprays 9 and said pan 15 having wipers 20 located therein and thereon, adapted to engage the endless conveyor and wipe the same free of any excess solution that may be carried over from the washing and rinsing spray elements, said wipers being further supplemented by flexible curtains 59 depending from the ceiling of the housing 7 and contacting and wiping the articles upon the conveyor, as means to prevent dilution of the sterilizing solution.

16 indicates the chemical reservoir which has connection 21 with the pan 15, and connection 23 with a force pump 11 operatively actuated by the prime mover 12 as means to force sterilizing solution through the spray elements 9 and complete the cycle of circulation from sprays 9 to pan 15 to reservoir 16 to pump 11, ad infinitum; with such circulating solution being kept free of suspended matter, such as cigarette butts, et cetera, by means of a removable filter 22 within the pan 15.

A two-way valve 57 is interposed in the flow line between the pump 11 and spray element 9 as means to re-route sterilizing solution through the pipe 58 to the drip-pan 14 for the purpose of cleansing said pan at the end of the day's operation.

The numerals 24 and 25 indicate a safety overflow pipe for the reservoir and a drain pipe, respectively, having connection with the common drain 19.

The numerals 26 and 27 indicate common supply pipes for hot and cold water, having control valves 28 and 29 conveniently located thereon and joining with a flow line having a filter 30, a branch T 31, a solenoid or electro-magnetically actuated valve 32 and a distribution head 33 said head 33 being connected to the washing and rinsing elements 8 and 10 and the branch T 31 providing the means of water supply connection with the chemical reservoir 16. The solenoid valve 32 being adapted as means to start and stop the flow of water coincident with the starting and stopping of the prime mover by a single control switch, and, as a safety measure, to stop the entire operation of the machine as a result of excessive pressure created by inadvertent stoppage or plugging of the washing and rinsing spray elements.

To prevent breakage, in the event that jamming or freezing of the conveyor takes place, a novel slip clutch 34 (Fig. 4 and Fig. 6) is provided; the numeral 35 indicating a common sprocket idly mounted on the drive shaft 3 and having flexible connection 36 with the speed reducing element 13 is adapted to be operatively engaged by the said clutch 34 which is in slidably splined

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engagement with the said drive shaft 3, such engagement being attained by means of acorn-shaped studs 37 integral with said clutch 34 adapted to engage like shaped depressions in the sprocket 35, with any degree of resistance to slippage being attained by means of the compression spring 38 mounted in opposed relation thereto on said shaft 3.

Figures 3 and 4 illustrate in detail the construction of the endless conveyor belt which is characterized by blade-like linkage 39 (Fig. 5), any number of which may be connected together by means of rods 40 and spaced apart by tubular sleeves 41 to form a gang of any width or length desired.

In forming the link 39, the pivot or hinge holes 42 are offset to a point near the bottom of the link in order that sufficient clearance be provided for the positioning of tines 43—A of a feed-fork 43 in the area between the links above the sleeves 41 and flush with the top of the links 39. The fork 43 being adapted as means to feed vessels to the conveyor without fouling the vessels or conveyor at the point where said conveyor disappears around the wheels 2, and likewise to disengage said vessels from the conveyor upon arrival at the end of the conveying process. In order to prevent sag by reason of the length of the endless conveyor between bearings and the weight of articles being conveyed, roller-like wheels 44 mounted at intervals on the rods 40, between the links 39, are provided, and adapted to engage and bear upon blade-like supports 45 mounted by means of integral posts 46 to the frame-work 5.

When slack in the conveyor caused by wear occurs, or when adjustment in tension or alignment of the conveyor is required, correction may be had at the idling end of the conveyor through slidable movement of the bearings 47 mounted on the sills 5 by means of thumb screws or nuts 48 threadedly engaging bolts anchored in said bearings and adapted to pull, in opposition, against brackets, also mounted on said sill or sills.

The device has forks 43 at each end of the conveyor and rotation of the conveyor may be had in either direction with machines located in pairs in tandem, parallel or abreast.

Usually the machine unloads at the driving end of the device, and the beer taps are generally located at the front and immediately to the right. In order that the bartender may more conveniently reach the cleansed glasses, a curved element 49 (Fig. 1 and Fig. 8) anchored to the frame over a portion of the endless conveyor and fork is adapted to deflect and ease said glasses towards the front of the machine.

Figure 7 illustrates the conveyor wheels 2 having a plurality of peripheral bites 50 adapted to engagement with said conveyor as means to give traction thereto.

Figure 10 illustrates an alternative method of constructing an endless conveyor, wherein transversely mounted rods 51 are used as the principal vessel supporting means instead of the blade-like linkage 39.

Linkage 52 having upwardly projecting lugs 54 formed thereon with holes 55 passing therethrough are adapted to support said rods 51 when mounted abreast in pairs and connected in tandem by connector links 53.

In the event that the sprays become clogged with suspended matter, they may be quickly cleared and cleansed by removal of wing plugs 56 and caps 59 (Fig. 2 and Fig. 9) and insertion

therein of a cleansing brush adapted for that purpose.

In describing the operation of the device it may be borne in mind that the operation is taking place in a public beer tavern or parlor. The device constitutes the greater part of the serving bar with the refreshment taps at the right hand end or both ends, as desired in the installation. Waiters or stewards are serving patrons from small trays upon which they carry the glasses or drinking vessels, and, in the normal course of their routine, they retrieve soiled glasses and carry them back to the bar for cleansing and recharging.

Formerly; they would deposit them on top of the bar to be individually washed or dipped in a wash basin by an attendant washer, and generally handled several times before recharging.

Whereas; they would now, with this novel device having an extended conveyor to provide loading area therefor, simply deposit the soiled vessels thereon, whereupon the articles would be automatically conveyed to the tunnel-like housing and through the process of washing, sterilizing and rinsing and continuing on to a position convenient to the bartender's hand, all without intermediate handling and consequent contamination.

The chemical solution used may be as strong as required to meet any degree or standard of sterilization found necessary without fear of poisoning, as washing and rinsing is thorough and reaction of the electro-magnetic valve to any stoppage in the sprays automatically cuts off all operation until correction has been made.

Having now fully described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In a sterilizing apparatus having a flexible endless conveyor; a drip collecting pan extending the full length of the loop of said endless conveyor and of a width not less than the width of said conveyor and having a depth of approximately one half the depth of the loop of said conveyor when the same is mounted over and about the respective rotating elements provided for the purpose of imparting rotatable movement to said flexible endless conveyor, filtering means within said pan and means to semi-automatically flush and sterilize the same, a secondary drip collecting pan within and above the first as means to collect and prevent intermixing of the sterilizing solution with the washing and rinsing solution; a side outlet draining conduit in said secondary pan passing over the side of the first drip pan and discharging to a reservoir tank positioned below the same, and means to con-

tinuously circulate sterilizing solution apart from and free of washing and rinsing solution.

2. The combination in a sterilizing apparatus of an endless conveyor mounted in a drip collecting pan extending the full length thereof of said conveyor; a secondary drip collecting pan mounted within and above the first at the mid-portion thereof between the loops of said endless conveyor, means to wipe the conveyor passing over said secondary drip pan, said means mounted adjacent the lips or edges thereof of said secondary pan and adapted to engage and wipe the underside of said endless conveyor passing thereover, flexible curtains depending from the ceiling of a tunnel-like housing located above and over said secondary drip pan and cooperating therewith to wipe articles being conveyed on said conveyor free of excess solution adhering thereto as added means to further prevent intermixing of chemically different solutions spraying from separately located spray elements constituting part of the device.

3. In a sterilizing apparatus embodying a frame for supporting an endless conveyor composed of blade-like linkage, a closure member supported on said frame and extending over a portion of said conveyor to define a tunnel like housing, a plurality of spray elements disposed within the tunnel like housing and positioned beneath and above said conveyor, a drip pan supported on said frame beneath the spray elements and the entire length of said conveyor, a second drip pan supported on said frame superjacent said first mentioned drip pan and beneath one of said spray elements, means for delivering fluid to said spray elements and means for preventing the intermixing of different fluids delivered to said spray elements and filtering means for said fluids.

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