This invention relates to mechanism for dispensing ingredients, into mixing tanks from individual containers, as for instance, dumping the ingredients used in the water during the various periods of washing operations of a laundry washing machine, where during one washing period the water with the ingredient or ingredients therein is being prepared for the next washing period.

Another object of the invention is the arrangement of the switches and said mechanism, whereby the containers are successively dumped. Another object is a mechanism in which the containers are all dumped by one member, as a core shaft, and the containers selectively or successively coupled to the core shaft to be successively dumped thereby, together with means which is usually controlled by the timer, for shifting the selecting means and controlling the rocking of the shaft.

The invention further includes an arrangement whereby each container is mounted or connected to the core shaft, so that the shaft normally rocks relatively thereto and the container is coupled to the core shaft by the selectively operable coupling means.

It further has for its object the mounting of each container on the core shaft in such a manner that each container can be readily removed from, and replaced on, the core shaft.

The invention further includes an arrangement of the motors or actuating means, whereby one motor first operates the selecting means to select the container to be dumped, and controls, usually by relaying the power, the operation of the second motor which operates the core shaft, the first motor being controlled in its operation, usually by a timer.

The invention further consists in the novel features and the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a fragmentary isometric view of a mixing tank provided with this invention.

Figure 2 is an end view showing the container mounting and couplings.

Figure 3 is a plan view of the dispensing mechanism, partly in section.

Figure 4 is an elevation showing the container aligning mechanism with the cycle indicating device.

Figure 5 is a front view of the containers in position on the tank.

Figure 6 is an end view looking to the right in Figure 1.

Figure 7 is a diagrammatic view illustrating the control of this dispensing mechanism by the cycle timer of a washing machine.

Figure 8 is a diagrammatic view of a laundry washing machine with this tank and dispensing mechanism applied thereto.

1 designates the mixing tank, which is here shown as mounted on or over a laundry washing machine in any suitable manner; 2 designates the tub or vat of a laundry washing machine to which the water mixed with ingredients in the tank 1 is delivered through a valve controlled conduit 3. The flow through this conduit 3, as well as the opening of the dump valve 4 and other parts operated by power, are controlled by a cycle timer in any well known manner.

In Figure 7, 5 designates the rotatable member or drum of a cycle timer actuated usually by a synchronous motor 6 and connected with contacts which control the flow of current to electro-responsive devices which operate valves, etc. The timer includes a program or formula sheet, as will be understood.

This ingredient dispensing mechanism comprises, generally, an actuating member common to a plurality of ingredient containers, which have a dumping movement, selectively operable coupling means for selectively and successively coupling the containers to the actuator, and means for successively operating the selecting means and the means for actuating said member, to dump the container that is coupled to the shaft. 7 designates a series of containers sup-
ported on the outside of the tank, so as to be readily accessible, these being for receiving different ingredients, as different kinds of soap, bleach, sour and other ingredients used during laundry washing operations. It designates the actuator common to all the containers, this being shown as a rock shaft mounted in suitable bearings 16 on the upper edge of the tank 1 and it being shown as tubular with an elongated slot 11 on one side thereof.

It designates a selecting member, which selectively couples the containers 7 to the rock shaft, this being a rod formed with ratcheting devices or a rack shiftable axially in the hollow rock shaft 9 and having ratcheting teeth. As shown here, this rod 12 is round and the ratchet teeth are conveniently provided by forming the rod with peripheral grooves providing annular shoulders 13 and inclined conical ratchet faces 14 in the recess of the shoulders, the rod coacting with a rocking ratchet tooth 15 mounted on a rod 16 to rock thereon against the action of a spring 17, as will be presently described. The ratchet teeth are formed in this manner merely for convenience in using a turning machining operation instead of a tooth cutting operation. The ratchet tooth 15 extends through a slot 8a in the hollow rock shaft 9, this being a comparatively wide slot or cut-out in the tube of sufficient width to permit the rocking of the shaft 5 to dump the container 7, and in so doing rock relatively to the ratchet tooth 15. A single coupling member 18 is mounted on the selecting member or rod 12, this coacting successively with complementary coupling members 19 one at a time on the containers 7. The single coupling member 18 is here shown as formed with a head provided with a lengthwise undercut groove Figure 2, and each member 19 is formed with a button for being received in the groove upon endwise shifting of the rod and interlocking with the undercut sides of the groove. The head of the coupling member 18 has a stem extending through the slot 81 of the tubular rock shaft and fixed to the rock shaft. When the member 18 is engaged with the member 19 of any one container, obviously upon rocking of the shaft 9, the selecting shaft 12 will also be rocked, and so move coupling member 18 rocked and the container 7 rocked therewith. The rocking of the container is about the axis of the shaft 9, and as shown here, each container has a bracket 20 on one side thereof formed with a curved hook-shaped end which hooks over or around the shaft 9, as seen in Figures 2 and 5. The hook-shaped ends merely slidably hook over and around the shaft but do not engage the shaft with any appreciable friction or enough friction to cause the shaft to rock and tip over the buckets. Hence the shaft normally rotates relatively to the brackets except the bracket of the container selected by the coupling member 18, that is, when the single coupling member 18 is interlocked with the button 19 of that container, as seen in Figure 2, the bracket will then rock with the rock shaft. This container is then the container 7 and through its button 19 and the head 20 is on the stem of a rod within the hollow rock shaft. The rod rotates with the rock shaft because the stem of the coupling member 18 extends through a lengthwise slot 11 in the hollow rock shaft. The container is thus prevented from the shaft and also hangs or rests against the side of the tank 1.

When the container is coupled to the shaft 9, it is dumped into the position shown in dotted lines in Figures 1 and 6, and hence discharges its ingredients into the tank.

The actuating mechanism for the selecting rod or ratchet bar 12 and the rock shaft 9 are here shown as reciprocating motors operated by air, the air to one of these motors being controlled by a valve electrically operated from the timer, and the flow of air to it being by the first motor, so that the motors operate successively. As shown here, the motor for actuating the ratchet rod 12 includes a stationary cylinder 21 having a piston 22 therein, this being connected by a cross-head 23 to the rod 16, which forms a connection between the piston and the ratchet rod 12. The cross-head is also connected to a returning spring 24. Preferably, the piston rod 22 has a plunger 25 at its remote end working in a dash pot cylinder 26, the escape of air from which is controlled by a valve controlled vent 27. Air is admitted from a suitable source through a conduit 28 to the end of the cylinder 21 (Figures 3, 6 and 7) from the main line 29 through a valve 30, which is electrically operated, as by a solenoid 31, connected into an electric circuit controlled by the timer. The combined intake and exhaust type with a normally closed, spring pressed, intake valve head 32, and a normally open, exhaust valve head 33, these being connected together, so that they act as a unit. When the solenoid 31 is energized, the intake valve head 32 is opened and the exhaust valve head 33 closed, so that air enters the cylinder 21. The flow of current to energize the solenoid 31 is as follows: From feed wire 34, wire 35 to timer brush 36, through the conductor 37 of the timer, hence through contact 38, which, when it is registered with a slot, as 39, in a formula sheet 40, closes the circuit to the solenoid through wires 41 and 42, to the return service wire 43. There are other slots and contacts co-acting therewith, as before intimated, to close circuits to solenoids which control the flow of air to a cylinder, as 44, which operates the valve in the water pipe 3 to the cylinder, as 45, which operates the dump valve 4 or to control the flow of air to other instrumentality of a laundry washer or its supply tank. For instance, the valves 46, 47 in the mechanism coupled to a cylinder 48 opening to the tank 2 are controlled from the timer. 48 designates the cylinder and 49 the piston therein for operating the rock shaft 5 in sequence with the operation of the selecting rod 12. The flow of air to the cylinder 48 is controlled by movement of the piston 22 in the cylinder 21. As here shown, the piston 22 uncovers a port 50 in the cylinder 21, when the piston has traveled a predetermined distance or has merely completed its throw, so that the air is released through pipe 51 to the cylinder 48. The pipe 51 has a check valve 52 therein, this having a bleed opening on the side toward the cylinder 48 to retard the exhaust of air from the cylinder 48, when the air is cut off, and thus avoid violent return of the rock shaft by its returning spring 53 to start to the rock shaft 9 and a resetting of the containers from their tipped-over position. Thus, after the selecting operation of the rod 12 has been completed, the air flows to the cylinder 48 to rock the shaft 9. The motion of the piston 45 may be transferred to the rock shaft in any manner, and as here shown, the piston rod has a cross-head 53 extending therefrom, it extending from a plunger head 54 on the piston rod, this cross-head being connected to a chain 55 running over a pulley 56
on the rock shaft 9. The movement of the pulley and the shaft is against the action of a returning spring 51. If desired, the position of the index or ratchet rod 12 may be utilized to indicate the washing operation being performed, and therefore, as here shown, the rod 12 may be formed with an indicator 18 movable in a channel 59 with suitable spaces showing the start of the washing operation and subsequent operations, as sudsing, rinsing, bleaching, etc. The first container to be dumped contains soap for the first sudsing operation, and when this container is dumped, the index 58 will move to point out on the chart the first sudsing operation, etc., through the entire washing period. At the end of the washing period, the index or ratchet rod 12 is returned to its normal starting position by suitable means, as by a pull chain 60, extending axially into the shaft 9 and coupled to the ratchet rod 12.

In the general operation, the washing machine is started, the timer takes control. After a predetermined period, a contact, as 38, makes contact as through a slot 39, thus before described, opening a valve, as 30, to permit air to flow to the cylinder 21 actuating the piston thereon and the piston through the ratchet teeth 15 moves the index rod one step to the right, thus moving the coupling 18 into engagement with the button 19 of the first container 7 of the series. The movement of the piston 22 in the cylinder 21 uncovers the port 50, permitting air to pass through the pipe 51, valve 52 to the cylinder 43 and actuate the piston 45 therein to rock the shaft 9 through the chain 55. When the timer moves far enough so that the slot 39 moves out of engagement with the contact 38, the solenoid 31 is de-energized, the valve 30 returns to its normal position and air exhausts from its cylinder 21, permitting the piston 22 to return to normal position under the influence of its spring 24. Also, the air exhausts back through the pipe 51 out through the port 50, as the rock shaft 8 returns to starting position under the influence of the spring 57. After the piston passes the port 50 on its return stroke, the air can continue to exhaust from the cylinder 43 through, as before described, the port 50 and open end of the cylinder 21 behind the piston 22. When another slot, as 35, comes into register with the contact 38, this operation is repeated and the coupling member 18 moves out of engagement with the coupling member 19 of the first container 7 and moves into coupling engagement with the coupling member 19 of the second container of the series. This operation repeats throughout the entire series, dependent upon the arrangement of the slots 39.

The containers are guided in their tip-over movement by suitable guide strips 51 between them.

What I claim is:
1. In an ingredient dispensing mechanism, the combination of a rock shaft, means for rocking the shaft, a plurality of ingredient containers mounted side by side adjacent the shaft to have a dumping action, a coupling member on each container, a single coupling member for cooperating successively with the coupling members on the containers, the coupling member being rotatable with said shaft and also shiftable along the same to successively coat with the coupling members on the containers, means operable to successively shift the single coupling member, rock the shaft to dump the selected container and return the shaft and the dumped container to their normal positions.

3. In an ingredient dispensing mechanism, the combination of a rock shaft, a plurality of ingredient containers mounted in series adjacent the shaft, the rock shaft being tubular, selecting means sliding axially in the rock shaft and having a coupling member operable to successively couple the containers to the rock shaft, whereby a container, when coupled to the rock shaft, rocks therewith to dump its contents, and means operable upon each operation to operate the sliding selecting means one step and rock the shaft to dump the selected container.

4. In an ingredient dispensing mechanism, the combination of a rock shaft, means for rocking the shaft, a plurality of ingredient containers mounted in series adjacent the shaft, selecting means operable to successively couple the containers one by one to the rock shaft, whereby a container, when coupled to the rock shaft rocks therewith to dump its contents, means operable on each operation to operate the selecting means and rock the rock shaft to dump the selected container, and means operable to return the rock shaft and containers to their starting positions, said means comprising a motor having a reciprocating member and connections operable thereby having a ratcheting device coating with the selecting means during each reciprocation, a second motor connected to the rock shaft to rock the same and controlled and timed in its operation by the former motor, and means for controlling the energizing of the motors.

5. In an ingredient dispensing mechanism, the combination of a plurality of ingredient containers arranged in series, means for supporting the containers independently of each other, whereby the containers are operable to dump independently of each other, an actuator common to all the containers to dump the same independently of each other, means for coupling the containers one by one to the actuator, and means for operating and timing the operation of the coupling means and the actuator.

6. In an ingredient dispensing mechanism, the combination of a plurality of ingredient containers arranged in series and operable to dump, an actuator common to all the containers, means for coupling the containers one by one to the actuator, and means for operating and timing the operation of the coupling means and the actuator, the actuator being a rock shaft and the coupling means being movable step by step lengthwise of the rock shaft and being rockable therewith and having a coupling member movable successively into and out of coupling engagement with supplementary coupling members on the containers.

7. In an ingredient dispensing mechanism, the combination of a plurality of ingredient contain-
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7. An ingredient dispensing mechanism for mixing tanks, the combination of a plurality of ingredient containers arranged in series and operable to dump, an actuator common to all the containers, means for coupling the containers one by one to the actuator, and means for operating and timing the operation of the coupling means and the actuator, the actuator being a rock shaft and the coupling means being movable step by step lengthwise of the rock shaft and being rockable therewith and having a coupling member movable successively into and out of coupling engagement with complemen tal coupling members on the containers, the containers having brackets shaped to form open hook-shaped bearings slidably mounted on the rock shaft, whereby the rock shaft is normally free to rotate in and relatively to the brackets, whereby the containers dump about the axis of the rock shaft and are readily unhooked from the rock shaft.

8. In an ingredient dispensing mechanism for mixing tanks, the combination of a plurality of ingredient containers mounted in series along the rock shaft and operable to rock about the axis of the shaft, and coupling means operable to successively couple the containers, one by one, to the rock shaft, so that the container coupled to the rock shaft rocks therewith to dump its contents, and means operable to operate the coupling means to successively couple the containers thereto and to rock the shaft and the container coupled thereto.

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