The present invention relates in general to improvements in the art of dispensing fluent substances, and relates more specifically to improvements in the construction and operation of machines for supplying liquid to a succession of receptacles.

Generally defined, an object of the invention is to provide an improved liquid dispensing machine which is simple in construction and efficient in operation.

It has long been common practice in the canning industry, to utilize so-called briners or syrups for delivering liquid to successive empty or partially filled cans as they were advanced through the machines. In these prior machines, the succession of cans were elevated as they advanced along a definite path, and during this elevation, the cans tops were sealed by engaging vertically movable sealing blocks with which the valves for controlling the delivery of liquid were associated. By virtue of the fact that the can top seals of these prior devices were vertically movable by the rising cans, telescopic joints and packings were required between the liquid delivery valves or nozzles and the liquid supply tank, and these joints and packings were a source of constant annoyance due to the fact that they became leaky or necessitated frequent attention in order to avoid undesirable leakage. The relative vertical movement of the seals and cans, is necessary in order to accommodate cans of different height and to prevent damaging the relatively frail upper can edges, especially when sanitary cans are used, and while the prior machines properly cooperated with the can tops, they utilized extremely complicated and non-leak-proof structure for accomplishing the desired results.

It is a more specific object of the present invention to provide an improved briner which will properly coact with the successive cans to which liquid is being supplied, and wherein objectionable leakage and waste of liquid are entirely eliminated.

Another specific object of the invention is to provide a can filling machine in which sealing is effected by elevating the cans against fixed resilient sealing blocks, and wherein differences in can heights are taken care of by utilizing a resilient connection between each can support and the elevating mechanism.

A further specific object of the invention is to provide improved valve mechanism for controlling the delivery of liquid from a source of supply to the successive receptacles as they are transported through a liquid dispensing machine.

Still another specific object of the invention is to provide an improved assemblage especially applicable to receptacle fillers, wherein the commodity handled is delivered from the source of supply only when a receptacle has been properly positioned for reception of a batch of the commodity.

Another specific object of the invention is to provide improved means for venting cans or the like, during filling thereof, and means for preventing undesirable splashing of liquid delivered to the successive cans.

A further specific object of the invention is to provide a sanitary can filling machine which will fill either empty or partially pre-filled successive cans of a series, automatically and in a highly effective manner.

These and other objects and advantages will be apparent from the following detailed description.

A clear conception of embodiments of the several features constituting the present invention, and of the mode of constructing and of operating a liquid dispensing machine built in accordance therewith, may be had by referring to the drawings accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is an approximately central vertical section through one of the improved liquid dispensing machines;

Fig. 2 is a full top view of the liquid dispensing machine of Fig. 1;

Fig. 3 is a horizontal section through the liquid dispensing machine, taken directly above the can hooks in Fig. 1 and looking down upon the can supports;

Fig. 4 is a fragmentary vertical section through one of the can supports and the dispensing mechanism associated therewith, showing the action when no can is in position to receive liquid;

Fig. 5 is a fragmentary side view of one of the can supports, showing the mechanism for positively causing the same to drop after filling of an elevated can has been effected;

Fig. 6 is an enlarged fragmentary section of a portion of the dispensing valve actuating mechanism;

Fig. 7 is a further enlarged part sectional top view of one of the liquid dispensing valves;

Fig. 8 is a similarly enlarged central vertical section through one of the improved dispensing valves, showing the same in closed position; and

Fig. 9 is a likewise enlarged central vertical...
section through the dispensing valve, showing the same in open position.

While the invention will be described herein as being specifically applied to a briner for delivering brine or syrup to successive tin cans, it is not intended to thereby limit the scope, and the several novel features are obviously more generally applicable to liquid dispensing machines for delivering any kind of liquid to receptacles of various types.

Referring to the drawings, the improved briner comprises in general an annular series of six vertically movable can supports 10 slidably associated with a rotor 11 which is rotatable about a fixed central shaft 12 secured to a main frame 13; an annular series of six integrally connected can hooks 14 secured to and revoluble by the rotor 11 in unison with the supports 10; a rotary horizontal can feed disk 15 and stationary guides 16 cooperable therewith to feed the entering cans 17 upon the successive supports 10 and into the path of travel of the hooks 14; a rotary horizontal can discharge disk 18 and stationary guides 19 cooperable therewith to deliver the successive filled cans 17 from the machine; a brine supply tank 20 rotatably suspended from the fixed shaft 12 by means of a carrier 21 which is drivingly connected to the rotor 11 by propelling rods 22; a series of six dispensing valves 23 revoluble with the tank 20 and having actuating mechanism operable by the can supporting and elevating devices; and mechanism for driving the rotor 11, the carrier 21, and the disks 15, 18.

The can supports 10 have plungers like upper ends which lie flush with the upper surface of the rotor 11 and against adjustable stop screws 23' when the cans 17 are being received by and delivered from the can hooks 14, and which are elevated above the rotor 11 and away from the stop screws 23' during the filling or dispensing operation. The supports 10 are also provided with hollow hubs or stems 24 which slidably engage openings in the driving portion 25 of the rotor 11 and within which elevating rods 36 are located. The elevating rods 36 are disposed centrally within their corresponding support stems 24 and are splined to the stems 24 by keys 27 so as to prevent relative rotation while permitting relative sliding of these parts. The lower ends of the elevating rods 36 carry rollers 28 which ride upon an annular rail 29 secured to the main frame 13, and the lower ends of the can support stems 24 contact with the upper extremities of coil springs 30 which embrace the rods 26 and react at their lower extremities against nuts 31 coacting with the lower threaded portions of the rods 26, see Figs. 1, 3, 4 and 5. The rail 28 has an elevated portion 32 of greater height than the remainder of the rail, the high and lower rail portions being connected by inclined portions 33 one of which is provided with a secondary track 34 adapted to engage the nuts at the inner end of the shafts which support the rollers 28, in order to maintain these rollers in contact with the adjacent rail portion 32 while they are approaching the can delivery side of the machine. The rods 26 are slidable within the stems 24 when the cans 17 are brought into filling position by the rollers 28 coacting with the rail 28, and the medial portions of the stems 24 and rods 26 are provided with aligned slots through which the levers 35 extend, the levers 35 being disposed radially relative to the fixed shaft 12 and having their outer ends pivotally attached to the stems 24 and slidably associated with guides 36 secured to the lower portion 25 of the rotor 11. The levers 35 are adapted to pivot about their supporting pivots, when the rods 26 are moved relative to their confining stems 24, and the inner swinging ends of the levers 35 are provided with lateral projections 37' which are adapted to actuate the control valves 23 in a manner to be later explained.

The can hooks 14 are supported from the upper portion of the rotor 11, being revoluble by the rotor concentrically of the fixed shaft 12, and the rotor 11 is supported upon the main frame 13 through a thrust bearing 37'. The rotary horizontal can feed disk 15 is mounted upon the upper end of a shaft 38 which is journaled in a part of the main frame 13, and which has a gear 39 attached thereto. The rotary can discharge disk 18 is likewise mounted upon the upper end of a shaft 40 journaled in a part of the main frame 13, and having a gear 41 attached thereto in the horizontal plane of the gear 39. The gears 39, 41 mesh with a pinion 42 secured to a vertically adjustable counter-shaft 43 journaled in the main frame 13, and the gear 39 also meshes with gear teeth 44 formed integral with the lower driving portion 23 of the rotor 11. The direction of rotation of the rotor 11 is such that the parts 15, 18 is as indicated in Figs. 2 and 3, and the stationary can guides 16, 19 are supported from the main frame 13 so as not to interfere with the rotation of the disks 15, 18.

The carrier 21 which supports the brine supply tank 20 is rotatably suspended from a vertically adjustable two-piece bearing block 45 coaxing with the threaded upper end 46 of the fixed shaft 12, and is held against lateral displacement by this fixed central shaft. The driving rods 32 of the carrier 21, slidably engage holes in the rotor 11, so that the carrier 21 may be adjusted vertically with the aid of the block 45 without interrupting the driving connection with the rotor 11. The upper and lower sections of the block 45 are provided with projections 47' for facilitating rotation thereof, and the foot 48 of a bracket arm 49 also engages the threaded rod end 46 above the upper locking section of the block 45. The outer end of the arm 49 supports a brine supply pipe 50 having a float controlled inlet valve 51 therein and having a discharge end directed into the supply tank 20. The opening and closing of the valve 51 is controlled by a float 52 which rides upon the liquid in the tank 20, the float 52 being normally held fixed while the tank 20 is normally revolving. The tank 20 is circular in horizontal cross-section, and has an annular series of six pockets 53 extending downwardly from its bottom, the dispensing valves 23 being located directly beneath these pockets 53.

The liquid dispensing valves 23 are constructed as shown in detail in Figs. 7, 8, and 9, each of these valves having a rubber seating ring 54 cooperable with a metal seat 55 secured in the corresponding pocket 53. Each valve 23 is hollow and is suspended from the lower end of a vent pipe 55' the upper end of which is pivotally attached to the outer end of a lever arm 56. The lower hollow cylindrical end 57 of each valve 23 is guided in the central bore of a splash plate 58 disposed beneath the valve discharge orifice, and a screen 59 is held within each of these hollow cylindrical ends 57 by means of a snap ring 60. The splash plates are attached to the nodes 55 by means of local ribs 61, and the valves 23 have vanes 62 for guiding them within
the tubular portions of the seats 55. The tubular portions of the seats 55 are embraced by rubber seats 53 which are securely in containers 64 secured to the carrier 21 at the lower ends of the pockets 53, and these blocks 63 are formed of soft rubber adapted to engage and to tightly seal the marginal upper edges of the cans 17. The inner end portions of the lever arms 56 are constructed as shown in detail in Fig. 6, being provided with hollow hubs 25 loosely embrac- ing the valve actuating rods 66 which are vertically slightly supported in the carrier 21 and rotor 11. A coil spring 67 is disposed between the upper end of each hub 65 and the lower flange of a sleeve 68 which is vertically adjustably attached to the adjacent rod 66 by a pin 69, these springs 67 constituting resilient connections between the lever arms 56 and their corresponding actuating rods 66. Adjustable stop screws 70 are mounted in brackets 71 secured to a plate 72 attached to the inner upper edge of the tank 20, and these screws 70 are adapted to engage the inner ends of the lever arms 56 to limit the upward movement thereof by the rods 66. The lower extremities of the rods 66 are engageable with the projections 35 of the levers 35, so that the valves 23 are opened when the corresponding levers 35 are displaced by the movement of the rods 66, and the length of each actuating rod 66 is adjust- able by means of a turn-buckle 72. At the places where the rods 66 pass through the tank 20, this tank is provided with risers 73 for prevent- ing escape of liquid.

The rotor 11, carrier 21, and disks 15, 18, are rotatable by a pinion 74 which is carried by a vertical shaft 75 and meshes with the teeth 44 formed on the lower rotor portion 25. The shaft 75 is journaled in the main frame 13 and also carries a bevel gear 76 which meshes with an- other bevel gear 77 secured to the inner end of the horizontal power shaft 78. The power shaft 78 is mounted in bearings carried by the main frame 13, and carries a pulley 79 which may be drivenly connected to this shaft by a clutch 80 operable by a control lever 81, see Figs. 1, 2 and 3, is thereby caused to rotate, as shown in Fig. 4, without start and stop the entire machine and the suc- cessive cans 17 may be delivered to and from the disks 15, 18 respectively in any convenient man- ner. The float 52 normally controls the valve 51 to maintain a predetermined level of brine in the tank 20.

During normal operation of the improved briner, and assuming that the machine is in nor- mal operating condition as above indicated, the successive cans 17 are delivered onto the sup- ports 10 and into the path of the corresponding can hooks 14, by the feed disk 15 and the guides 16 cooperating therewith. As the supports 10 advance around the fixed central axis of the shaft 12, and the rollers 28 associated with the rod 26 proceed along the rail 29, the cans 17 are elevated by the inclined track portion 33 nearest the disk 15 and are brought into engage- ment with the adjacent sealing blocks 63. As each can 17 engages the corresponding sealing block 63 its upper edge is driven slightly into the soft block whereupon the upward movement of the corresponding support 10 is arrested and a corresponding movement of the rod 26 is accomplished by compression of the spring 30. This relative movement between the rod 26 and the corresponding support 10, causes the lever 35 to be tilted upwardly about its supporting pivot on the stem 24, thereby pro-
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all portions of the mechanism are readily accessible for inspection and cleaning. All of the moving parts are operable from a common drive shaft so that when the lever 31 is thrown in either direction the machine is either stopped or started.

It should be understood that it is not desired to limit the invention to the exact details of construction herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:

1. In combination, a series of can supports movable about an axis, a liquid supply tank disposed above said supports, a valve for controlling delivery of liquid from said tank toward each of said supports, a sealing block disposed adjacent to each of said valves, means for elevating said supports to bring the cans carried thereby into contact with said blocks, means for permitting relative displacement of said supports and said elevating means when said cans are seated against said blocks, and means for utilizing said relative displacement to actuate said valves.

2. In combination, a series of can supports movable about an axis, a liquid supply tank disposed above said supports, a valve for controlling delivery of liquid from said tank toward each of said supports, a sealing block disposed adjacent to each of said valves, means for elevating said supports to bring the cans carried thereby into contact with said blocks, a resilient connection between each of said supports and its elevating means for permitting relative displacement between these elements when a can carried by said support engages the corresponding seal block, and means for utilizing said relative displacement to actuate said valves.

3. In combination, an annular series of vertically movable can supports revolvable about an axis, a liquid supply tank disposed above and revolvable about said axis with said supports, a valve for controlling delivery of liquid from said tank toward each of said supports, a resilient can top sealing block disposed adjacent to each of said valves, means for elevating said supports in succession to bring the cans carried thereby into sealing engagement with the corresponding blocks, means for permitting relative displacement of said elevating means and said supports when sealing engagement has been effected, and means for utilizing said relative displacement to actuate said valves.

4. In combination, an annular series of vertically movable can supports revolvable about an axis, a liquid supply tank disposed above and revolvable about said axis with said supports, a valve for controlling delivery of liquid from said tank toward each of said supports, a resilient can top sealing block disposed adjacent to each of said valves, means for elevating said supports in succession to bring the cans carried thereby into sealing engagement with the corresponding blocks, means for permitting relative displacement of said elevating means and said supports when sealing engagement has been effected, and means for utilizing said relative displacement to actuate said valves.

5. In combination, a liquid supply tank having dispensing orifices and sealing pads adjacent thereto, a can support located in proximity to each of said orifices, a track having a raised portion, a rod slidably engaging each of said supports and having a roller coacting with said track, said rollers cooperating with said raised track portion to move said supports toward said orifices, a spring connection between each of said rods and the corresponding can support for permitting relative displacement of these elements when a can carried by the support engages the corresponding pad, a lever movable by each of said rods during said relative displacements, and means operable by each of said levers for effecting delivery of liquid from said tank through said orifices.

6. In combination, a liquid supply tank having dispensing orifices and sealing pads adjacent thereto, a can support located in proximity to each of said orifices, a track having a raised portion, a rod slidably engaging each of said supports and having a roller coacting with said track, said rollers cooperating with said raised track portion to move said supports toward said orifices, a spring connection between each of said rods and the corresponding can support for permitting relative displacement of these elements when a can carried by the support engages the corresponding pad, and means for utilizing said relative displacement to effect delivery of liquid from said tank through said orifices.

7. In combination, a tank having a liquid dispensing valve, a can support located adjacent to said valve, a rod cooperate with said support through a spring to move said support toward said valve, a lever movable directly by said rod after the movement of said support has been arrested by said tank, and means for transmitting motion from said lever to said valve to open the latter.

8. In combination, a tank having a liquid dispensing valve, a can support located adjacent to said valve, a rod cooperate with said support through a spring to move said support toward said valve, a lever movable directly by said rod after the movement of said support has been arrested by said tank, means for transmitting motion from said lever to said valve to open the latter, and means for adjusting said motion transmitting means to vary the degree of opening of said valve.

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