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E. G. OLTHUIS
CLOTHES CONDITIONER

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2 Sheets-Sheet 2

FIG. 2

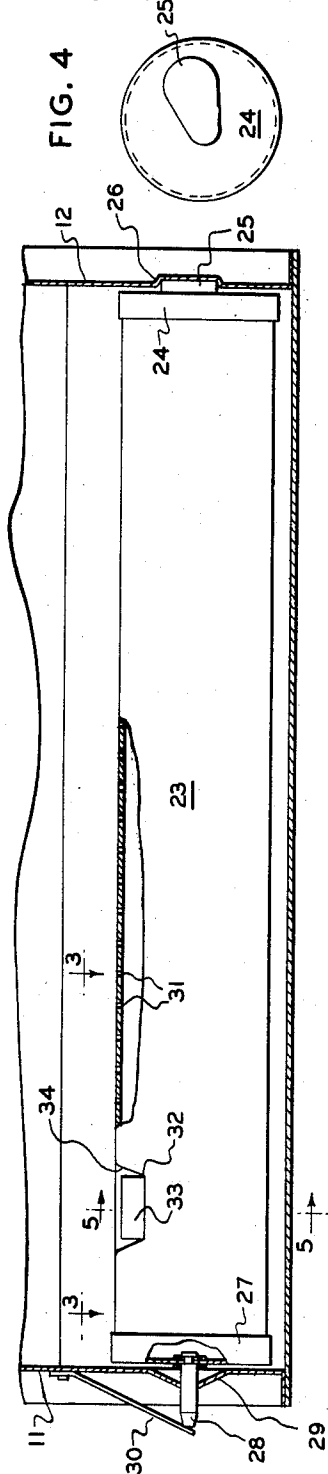


FIG. 4

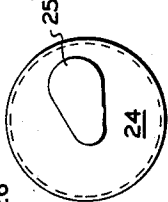


FIG. 3

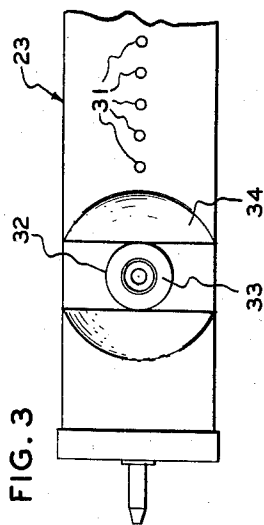
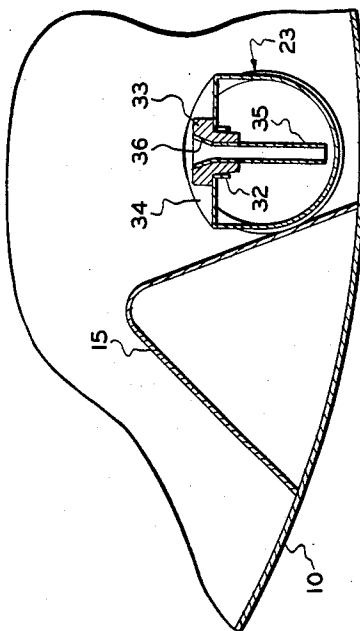


FIG. 5



INVENTOR.
EUGENE G. OLTHUIS
BY *Sheridan & Peri*
HIS ATTORNEY

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2,851,791

CLOTHES CONDITIONER

Eugene G. Olthuis, Louisville, Ky., assignor to General Electric Company, a corporation of New York

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11 Claims. (Cl. 34—90)

This invention relates to clothes laundering appliances, and more particularly to clothes tumbling machines for conditioning articles of clothing.

As well known in the domestic laundry field, the complete operation requires not only washing and drying, but many items also require ironing. As a preparatory step to ironing, the articles must be properly dampened, which operation consists of adding a carefully controlled and limited quantity of water to the articles uniformly.

There are also other instances where it is desirable to add a small quantity of liquid uniformly to a fabric or article of clothing. For example, liquid moth proofing compounds are available for application in limited quantities uniformly to a garment. There may, of course, be other examples where it is desirable to add a limited quantity of a disinfectant, impregnating compound or deodorant to a fabric or article of clothing.

Correspondingly, it is a primary object of my invention to provide clothes conditioning apparatus, especially suitable for domestic use.

Another object of this invention is to provide clothes treating apparatus which may be used alternately and selectively as a clothes dryer for evaporating liquid from the articles being processed, or as a clothes conditioner for uniformly adding a limited quantity of a liquid to articles of clothing.

A still further object of this invention is to provide a removable device for a clothes dryer, which device functions to add a limited quantity of liquid to articles being tumbled within the dryer at a limited rate, whereby such liquid is uniformly deposited on the tumbled articles of clothing.

Briefly stated, in accordance with one aspect of this invention, liquid container means are provided within the rotary tumbling drum or basket having discharge means arranged to distribute the liquid in the container at a relatively slow rate and to distribute it through the clothes as they are tumbled within the rotating drum. Thus, by placing liquid in the drum the machine will function to add liquid gradually to the clothes, whereas if the container be empty the machine may be operated only to evaporate liquid from the articles of clothing.

In another of its aspects, the liquid supply means in accordance with one specific and preferred embodiment of this invention comprises a liquid container arranged to be detachably mounted in the drum; preferably adjacent one of the tumbling ribs or baffles, on the trailing side thereof with respect to the direction of rotation. The container, being removably mounted within the tumbling drum, can be filled with a clothes conditioning liquid. The container, in accordance with this form of the invention, has a plurality of relatively small liquid discharge openings for depositing the liquid at a relatively slow rate upon articles being tumbled within the basket. A relatively large filling opening is provided in the container adapted to be closed by a special filler plug. This plug is provided with an opening extending therethrough and with a small tube secured within the opening and

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extending to a point adjacent the opposite side of the container when the plug is in place. This tube is flared at its mouth located at the outer surface of the filler plug. This particular construction of the filler plug functions to permit entrance of air into the liquid container to facilitate its discharge, while obviating any rapid discharge of the container through the filler plug itself.

My invention will be better understood from the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims. In the drawing, Fig. 1 is a perspective view with portions thereof broken away to illustrate detail of a clothes conditioning machine embodying my invention; Fig. 2 is an enlarged partial cross-sectional view through a portion of the machine illustrated by Fig. 1 to illustrate details of the conditioner container and attachment means; Fig. 3 is a partial view taken on the line 3—3 of Fig. 2 in the direction of the arrows; Fig. 4 is an end view of the liquid container shown by Fig. 2; Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 2; and Fig. 6 is a schematic electrical wiring diagram for the machine illustrated by Fig. 1.

Referring now to a preferred embodiment of my invention as shown by the drawings, a domestic clothes dryer is illustrated in Fig. 1 of the type having a clothes containing drum 1 mounted for rotation on a substantially horizontal axis within a suitable enclosure, including an outer enclosing cabinet structure 2 with a removable top 3. The cabinet is provided with the usual recessed toeboard 4 and with an access opening as defined by an annular flange 5 projecting inwardly toward the basket. This opening is arranged to be closed by a conventional door 6 appropriately hinged to the cabinet structure. Within toeboard 4 is mounted a lint trap 7 of any appropriate construction, and which may include a lint screen 8 and a lint trap door 9 hinged on a horizontal axis along its lower edge as illustrated. Thus, the lint trap door may be moved to a closed position or pivoted about the hinge to an open position as shown.

Tumbling basket or drum 1 may be of the type having a cylindrical outer wall 10 to which is connected a rear wall 11 and front wall 12. Rear wall 11 in a conventional manner includes appropriate means (not shown) for rotatably mounting the drum within the enclosure, which mounting means includes a driven pulley 13 secured to and forming a part of drum or basket assembly 1. Front wall 12 of the basket includes an outwardly extending flange 14 to define a loading opening through which articles of clothing may be placed in the basket. Projecting radially inwardly from cylindrical wall 10 of the basket are one or more tumbling ribs or baffles 15, functioning in the well understood manner upon basket rotation to lift the articles of clothing to an upper position whereupon they fall under the influence of gravity back to the bottom of the basket.

The basket is driven at tumbling speed and airflow is provided by use of a suitable driving source, such as an electric motor 16 mounted on an appropriate base bracket 17. Motor 16 drives both a fan blade 18 and a drive pulley 19, with a belt 20 transmitting rotation to the basket through pulley 13. An appropriate heating element, consisting preferably of two sections 21 and 22, is positioned within the dryer whereby fan 18 forces heated air through the basket and the clothes contained therein for evaporation of moisture, which spent air is directed outwardly through the lint trap assembly 7. I have shown the construction of the heating element and air flow arrangement schematically herein since the specific form thereof does not form a part of this invention.

This invention is particularly concerned with an arrangement for adding a liquid to articles of clothing being tumbled within basket 1. In this preferred embodiment,

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such liquid is adapted to be supplied at a relatively slow and uniform rate from a liquid container or cylinder 23 removably mounted within basket 1 adjacent a tumbling rib 15, and preferably on the trailing side thereof as regards the direction of rotation. It is also contemplated that container 23 may be shaped and positioned within the basket to function as a tumbling rib itself, although I prefer the arrangement shown.

The exact nature of this liquid container 23 will be better understood by a reference to Figs. 2 to 5. As shown, the container is in the form of an elongated cylinder having a front end cap 24 welded, pressed, or soldered to the cylinder. The front end cap includes an appropriately shaped locating key 25, a form for which may be as illustrated by Fig. 4. Key 25 is adapted to fit in a correspondingly shaped recess 26 in front wall 12 of the basket. The opposite or rear end of the cylinder is provided with an end cap 27, likewise soldered, pressed, or provided with other sealing connection means to the cylinder. A centrally located projecting pin 28 forms a part of end cap 27. The back wall 11 of the tumbling basket is dimpled as indicated at 29 and apertured to receive locating pin 28. A leaf spring 30 secured to end wall 11 of the basket provides a biasing force retaining key 25 in recess 26 of the front basket wall. Hence, it can be seen that container 23 is insertable in or removable from basket 1, by first moving the cylinder axially toward the rear wall, deflecting leaf spring 30, permitting key member 25 to be disengaged from slot 26, and thereby permitting complete removal of the container from the basket. Container 23 may be returned to the basket at any time by reversing the procedure, that is, inserting pin 28 in the aperture in dimple 29 of the basket rear wall, and then locating the key 25 of the container in recess 26 in the front wall of the basket.

As clearly shown by the Figs. 2 and 3, container 23 is provided with a plurality of liquid discharge openings 31 of relatively small size whereby liquid is discharged from the container during tumbling at a relatively slow and uniform rate. Adjacent one end of container 23 is a liquid filling opening 32 adapted to be closed by a filler plug 33. Since the container 23 may be contacted by the articles of clothing tumbling within the basket, preferably the filler plug 33 is located in a recessed area 34, thereby obviating any projections above the normal cylindrical surface of the container. While this filler plug may be fabricated from any suitable material and might be arranged with a threaded engagement with the filler opening 32, it is preferred to employ a plug of flexible resilient material such as rubber to frictionally engage the flanged walls defining the filling opening into the container.

Filler plug 33 serves the additional function of admitting air into the interior of container 23, while preventing any rapid discharge of water therefrom. This is accomplished in accordance with this invention by providing a small tube 35 extending through filler plug 33 to a point adjacent the opposite wall of the container. When container 23 is in the position shown by Fig. 1, obviously there is no tendency for the liquid therein to flow outwardly through either the filler plug or the apertures 31. However, as basket 1 rotates, the container 23, being keyed in position, reaches an inverted position, whereupon liquid may flow outwardly through apertures 31 for deposition upon the clothes. At this time, the tube 35 will extend slightly above the liquid level within the container providing a passage for air into the interior of the container. This arrangement prevents a vacuum lock, which might otherwise occur and prevent outward flow of liquid through apertures 31. It may also be noted from an examination of Fig. 5 that tube 35 is outwardly flared, as at 36, defining the mouth of the tube and located at the outer surface of plug 33. When using liquid such as water in container 23, the liquid forms a meniscus in tube 35 in the well known manner. With tube diameters such as are appropriate for use in domes-

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tic laundry equipment, the surface tension of the liquid plus the attraction between the liquid and tube walls prevents prompt drainage from the tube during tumbling and thus blocks entry of air into the container. By providing the outwardly flared walls at 36, it is found that this meniscus can be broken whereupon any liquid within tube 35 immediately drains therefrom when the container is in the inverted position. It is found in practice therefore that this particular arrangement of the filler plug and vent tube prevents a vacuum lock within container 23 and thus permits an even and uniform discharge from apertures 31.

To illustrate more clearly the operational nature of this invention, reference is now made to Fig. 6 of a schematic wiring diagram of a form useful for carrying this invention into practice. Electrical power may be supplied to the machine at a conventional terminal block 37 providing connection points for lines L1 and L2 and an electrical neutral N. A fusible link 38 may be employed in the usual manner. Lines L1 and L2 are connected to an electrical sequence controller indicated generally at 39 and comprising a pair of cams 40 and 41 for actuating switches 42 and 43 respectively. These cams may be rotated by a manual control knob 44 or by an electrical timing motor 45, motor 45 being of the type commonly used for electric clocks. An electrical door actuated switch is indicated schematically at 46, which switch is in its closed or circuit making position when dryer door 6 is closed; and is opened to break the circuit when the door 6 is opened.

One or more thermostats may be employed within the machine for control of temperature. In the present instance I have shown a thermostat 47 in series with a second thermostat 48. One of these thermostats, for example 48, may be a cycling thermostat normally operative to limit maximum temperature in the machine and to thereafter cycle between on and off positions to hold substantially this same temperature throughout operation. The second thermostat 47 is known as the safety thermostat and is set to open the circuit at a higher temperature in the event of failure of any other part of the device. Thermostat 47 is of the so-called wide differential type and does not reclose its contacts until the temperature within the machine has dropped to a point well below normal operating temperature.

Motor 16 is illustrated as including a main or run winding 49 and a start winding 50, the motor herein represented being of the split-phase induction type. Included within motor 16 is a centrifugal actuating mechanism 51 for controlling a switch having a normally closed position 52, when the motor is at rest, and an open position, as shown in dotted lines at 53, when the motor is running.

Typical operation of the machine may occur as follows. The tumbling basket 1 is loaded, for example with a load of damp clothes to be dried. Door 6 is closed thereby closing switch 46. Manual control knob 44 is rotated in a clockwise direction and set for the desired drying time. This rotation of knob 44 rotates cams 40 and 41, whereby these cams through their respective switches 42 and 43, close circuits for machine operation. Switch 42 may be referred to as the motor control switch, since its closure controls operation of motor 16 commencing with line L1, switch 42, motor terminal 54, main winding 49, motor terminal 55, switch 46, fuse 38, to the electrical neutral. Appropriate voltage for example 120 volts is thereby supplied to the motor for its operation. When the motor is at rest, start winding 50 is in the electrical circuit from motor terminal 54 through the normally closed centrifugal switch 52, start winding 50, to motor terminal 55. In the usual manner, as soon as the motor has come up to operating speed, the centrifugal mechanism opens the normally closed switch 52 and closes switch 53. The motor start winding is therefore removed from the circuit.

Cam actuated switch 43 is the so-called heater switch, and a circuit to the heating elements may be traced from

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line L2 through switch 43, the thermostats 47 and 48, heating elements 21 and 22, the normally open centrifugal switch 53 (closed only when the motor is operating), motor terminal 54, switch 42, to line L1. A manually operable switch 56 may be included in the circuit for temperature selection. When switch 56 is closed, both sections of the heating elements 21 and 22 are effective; while if switch 56 is open, then only heater section 22 is operative.

Continuing with the cycle of operations, if a sufficiently long time has been set by control knob 44, the temperature within the dryer will rise to the desired maximum temperature, whereupon thermostat 48 will cycle between on and off positions to hold this temperature within a relatively narrow range. This operation continues with the basket rotating and the heaters being cycled until such time as cam 41 has been driven by timing motor 45 to the position where switch 43 is opened. As shown in Fig. 6 this will occur at cam step 57. Motor 16 continues to run for a short period of time however until the cam drop 58 is reached. This period of operation of the motor without heater, commonly referred to as the cool-down period, continues for approximately five minutes whereupon switch 42 likewise is opened shutting the machine down. Whenever door operated switch 46 is opened, motor operation is terminated, and because of the centrifugal switch in the heater circuit, the heater operation likewise is terminated.

Control knob 44, in addition to two off positions and a timed dry arc, includes a sprinkle arc. When the control knob is rotated into the sprinkle arc, cam actuated switch 42 is closed as shown, while switch 43 remains open. Therefore, motor 16 can be operated for an appreciable period of time, as determined by the setting of knob 44, to tumble clothes within the basket, blow air through the basket, but without heater operation. If container 23, filled with an appropriate liquid, has been placed within the tumbling drum as previously described, the articles of clothing can be dampened preparatory to ironing, or otherwise treated or impregnated within the basket. Rotation of cams 40 and 41 in the sprinkle arc is likewise provided automatically by timing motor 45 and therefore it is possible with this control arrangement to set an adjustable sprinkle period, thereby controlling the amount of liquid added to the articles being tumbled. Alternatively, a measured quantity of liquid may be placed within container 23 to control the quantity of liquid supplied to the articles. In either event, the clothes are gently tumbled within the basket and upon each revolution, a small amount of liquid from container 23 is deposited upon the articles uniformly. If desired, the exhaust passage through the lint trap may be closed by hinged door 9. This of course may not be essential when dampening with water, but is advantageous when adding certain other liquids. The fan may continue to operate as an aid in the complete dispersion of the impregnating liquid throughout the articles being tumbled.

While the present invention has been described by reference to a particular embodiment thereof, it is to be understood that numerous modifications may be made by those skilled in the art without actually departing from the invention. I, therefore, aim in the appended claims to cover all such equivalent variations as come within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In clothes conditioning apparatus, a tumbling basket mounted for rotation on a non-vertical axis, means rotating said basket at a clothes tumbling speed, a clothes tumbling baffle projecting inwardly within said basket, means including heaters for extracting moisture from the clothes being tumbled thereby to dry said clothes, and means for optionally sprinkling the dry clothes thereby to prepare said clothes for ironing, said sprinkling means

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comprising a liquid container removably mounted on said basket adjacent said tumbling baffle for containing a quantity of liquid and having discharge means for slowly discharging liquid therefrom responsive to basket rotation, said liquid container being filled prior to the sprinkling operation and said discharge means discharging only a small portion of the contents of said container upon each revolution of said basket.

2. Clothes conditioning apparatus comprising a tumbling basket mounted for rotation on a non-vertical axis, means for rotating said basket at a tumbling speed, means including heaters for extracting moisture from the clothes being tumbled thereby to dry said clothes, and means for optionally sprinkling the dry clothes, said sprinkling means comprising a liquid container secured to said basket therewithin, said container having a liquid filling opening, and also liquid discharge openings arranged so that liquid contained in said container may be discharged slowly therefrom responsive to basket rotation, said liquid container being filled prior to the sprinkling operation and said discharge openings discharging only a small portion of the contents of said container upon each revolution of said basket.

3. In a clothes conditioning machine of the type having a tumbling basket including means for driving said basket at tumbling speed, that improvement for adding liquid to articles being tumbled within said basket comprising a liquid container, means mounting said container within said basket, means defining a plurality of relatively small liquid discharge openings in said container, a filling opening in said container, a filler plug for said opening having a tubular member extending through said plug from the outer surface thereof to a point adjacent the opposite wall of said container, and said tubular member having an outwardly flared mouth portion extending toward the outer surface of said filler plug.

4. In clothes conditioning apparatus, a tumbling basket mounted for rotation on a non-vertical axis, means rotating said basket at a clothes tumbling speed, a clothes tumbling baffle projecting inwardly within said basket, means including heaters for extracting moisture from the clothes being tumbled thereby to dry said clothes and means for optionally sprinkling the dry clothes, said means comprising liquid container means removably mounted on said basket adjacent said tumbling baffle for containing a quantity of liquid and having discharge means for slowly discharging the liquid therefrom responsive to basket rotation, said liquid container being filled prior to the sprinkling operation and said discharge means discharging only a small portion of the contents of said container upon each revolution of said basket, and means providing air circulation through said basket during said liquid discharge.

5. In clothes conditioning apparatus, a tumbling basket mounted for rotation on a non-vertical axis, means rotating said basket at a clothes tumbling speed, a clothes tumbling rib projecting inwardly within said basket, means including heaters for extracting moisture from the clothes being tumbled thereby to dry said clothes, and means for optionally sprinkling the dry clothes, said sprinkling means comprising a removable liquid container mounted on said basket therewithin for containing a quantity of liquid and having a filling opening, and also a plurality of discharge openings through which liquid may be discharged onto articles tumbling within said basket.

6. In a clothes dryer, a tumbling basket, means driving said basket at tumbling speed including means enforcing air flow through said basket, a plurality of clothes tumbling ribs projecting inwardly within said basket, heating means evaporating moisture from articles being tumbled within said basket, control means for selectively operating said driving means with and without heater operation, and a liquid container arranged in cooperation with said

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basket to be removably positioned therein adjacent one of said ribs on the trailing side thereof as regards the direction of rotation, and having liquid discharge means arranged so that liquid within said container is added to articles being tumbled within said basket.

7. In a clothes dryer, a tumbling basket, means driving said basket at tumbling speed including means enforcing air flow therethrough, electrical heating means for heating the air flow through said basket whereby said air flow dries the clothes being tumbled, and means for optionally sprinkling the dry clothes, said means comprising a liquid container removably mounted on said basket, said container having a relatively large filling opening and a plurality of relatively small discharge openings, a filler plug for said filling opening and having a central opening therein, and a tubular member extending through the central opening in said plug to approximately the full depth of said container.

8. In a clothes dryer, a tumbling basket, means driving said basket at tumbling speed including means enforcing air flow therethrough, a plurality of clothes tumbling baffles projecting inwardly within said basket, electrical heating means for heating the air flow through said basket whereby said air flow dries the clothes being tumbled, and means for optionally sprinkling the dry clothes, said means comprising a liquid container arranged in cooperation with said basket to be removably positioned therein adjacent one of said baffles on the trailing side thereof as regards the direction of rotation, said container having a relatively large filling opening and a plurality of relatively small discharge openings, a filler plug for said filling opening having a central opening therein, and a tubular member extending through the central opening in said plug to approximately the full depth of said container, said tubular member having a diverging mouth portion in said plug.

9. In a clothes conditioning machine of the type having a tumbling basket including means for driving said basket at tumbling speed, that improvement for adding liquid to articles being tumbled within said basket, comprising a liquid container, means defining a plurality of relatively small liquid discharge openings in said container, a filling opening in said container, a filler plug for said opening having a tubular member extending through said plug from the outer surface thereof to a

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point adjacent the opposite wall of said container, and means for removably securing said container on said tumbling drum for rotation therewith.

10. In a clothes conditioning machine of the type having a tumbling basket including means for driving said basket at tumbling speed, that improvement for adding liquid to articles being tumbled within said basket comprising a liquid container, means defining a plurality of relatively small liquid discharge openings in said container, a filling opening in said container, a filler plug for said opening having a tubular member extending through said plug from the outer surface thereof to a point adjacent the opposite wall of said container, and means for removably securing said container on said tumbling drum for rotation therewith, said tubular member having an outwardly flared mouth portion extending toward the outer surface of said plug.

11. A liquid sprinkling container adapted to be positioned within the tumbling basket of a clothes dryer or the like, comprising wall means defining said liquid container for retaining a quantity of liquid therein, means defining a plurality of relatively small liquid discharge openings in said container through said wall means, a filling opening into said container, a filler plug for said opening having an air vent opening therein, a tubular member extending from said air vent opening to a point adjacent the opposite wall of said container, said tubular member having a diverging mouth portion extending to the outer surface of said filler plug to keep said tubular member free of liquid during flow of liquid through said discharge openings thereby permitting entrance of air into said container.

References Cited in the file of this patent

UNITED STATES PATENTS

683,306	Lichten	Sept. 24, 1901
791,541	Danforth	June 6, 1905
1,799,649	Schenck	Apr. 7, 1931
2,079,280	Couch	May 4, 1937
2,187,671	Suddarth	Jan. 16, 1940
2,193,495	Rolkern	Mar. 12, 1940
2,584,070	Walker	Jan. 9, 1952
2,657,951	North	Nov. 3, 1953