Sept. 11, 1962 F. G. DODD 3,053,066

CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Filed March 17, 1958 6 Sheets-Sheet 1

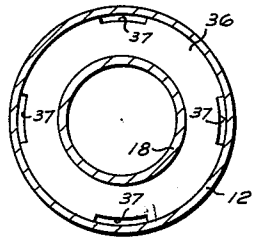


Fig. 5

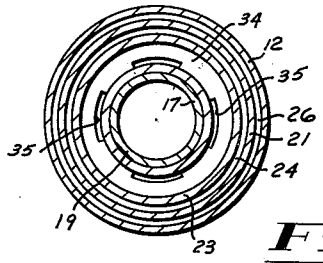


Fig. 4

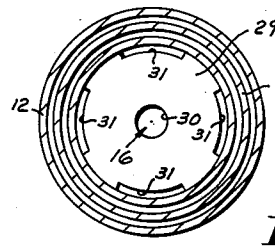


Fig. 3

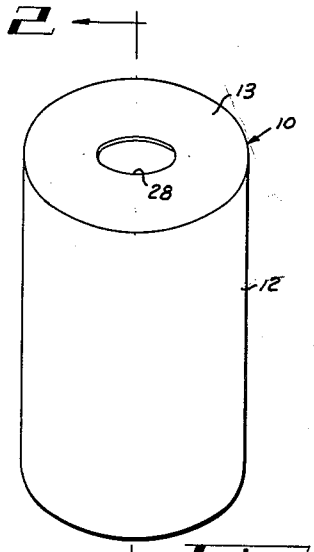


Fig. 1

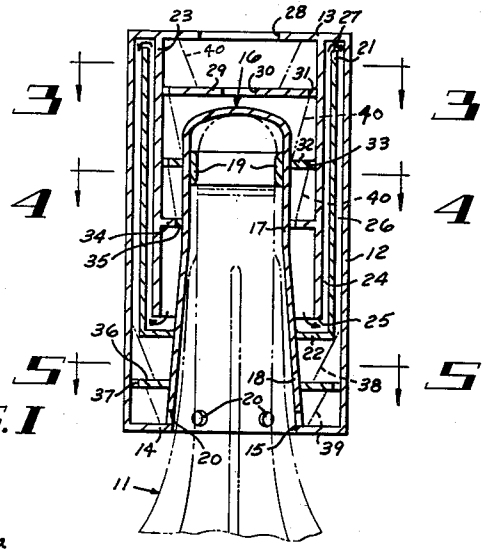


Fig. 2

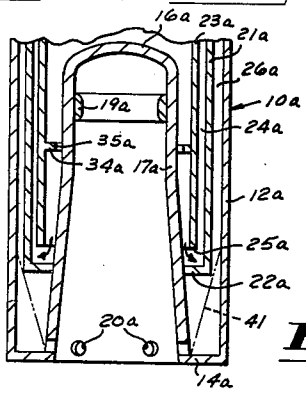


Fig. 6

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CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Filed March 17, 1958 6 Sheets-Sheet 2

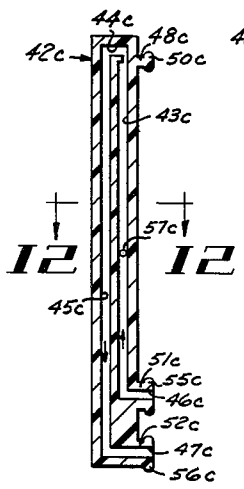


Fig. 11

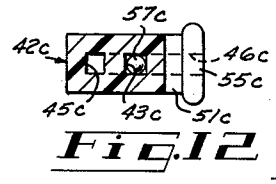


Fig. 12

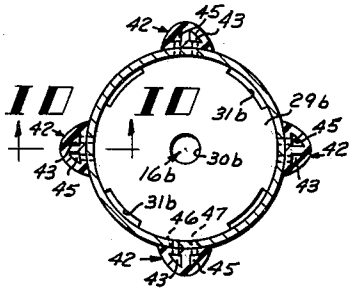


Fig. 9

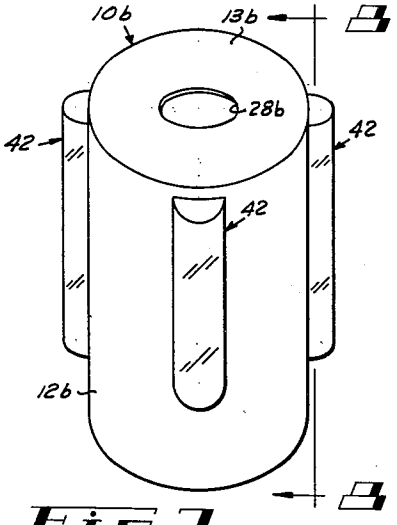


Fig. 7

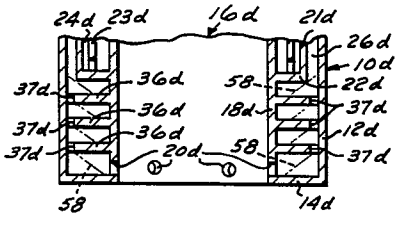


Fig. 13

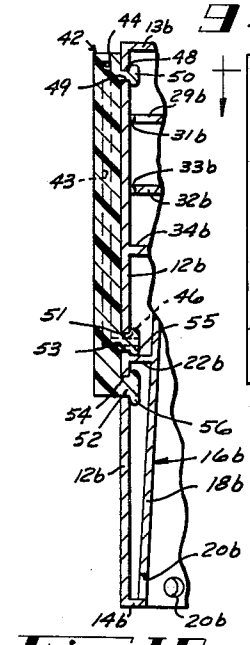


Fig. 10

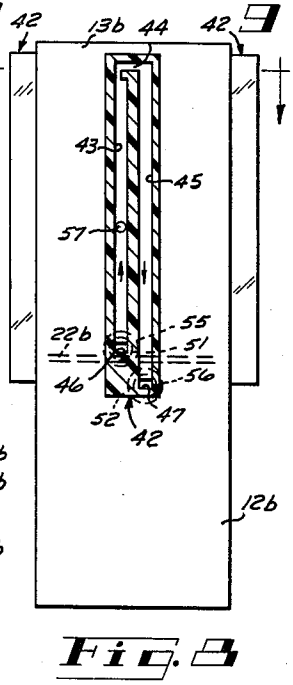


Fig. 8

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CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

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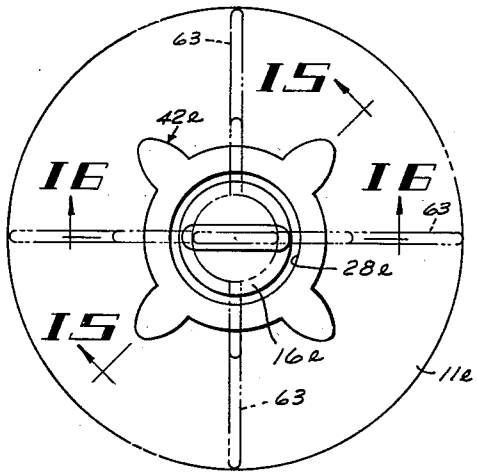


Fig. 14

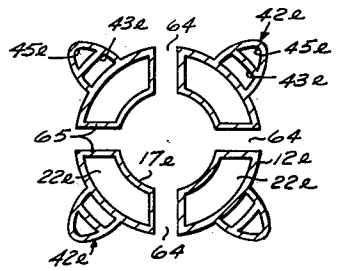


Fig. 18

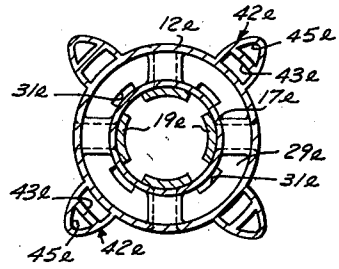


Fig. 17

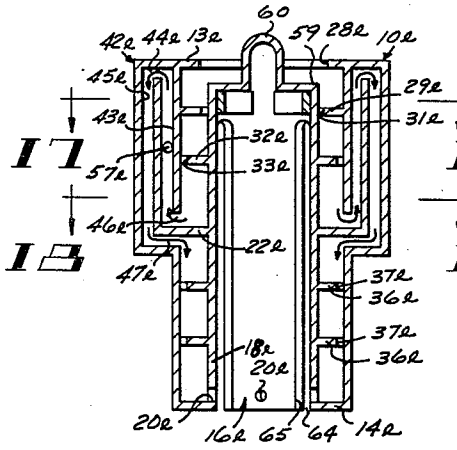


Fig. 15

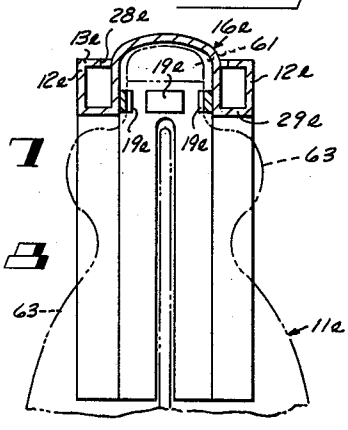


Fig. 16

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CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Filed March 17, 1958 6 Sheets-Sheet 4

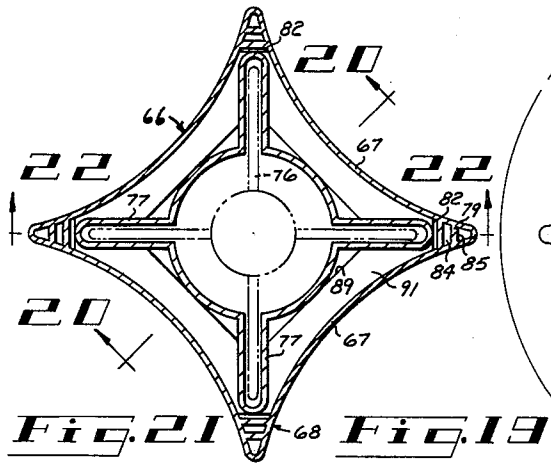


Fig. 21

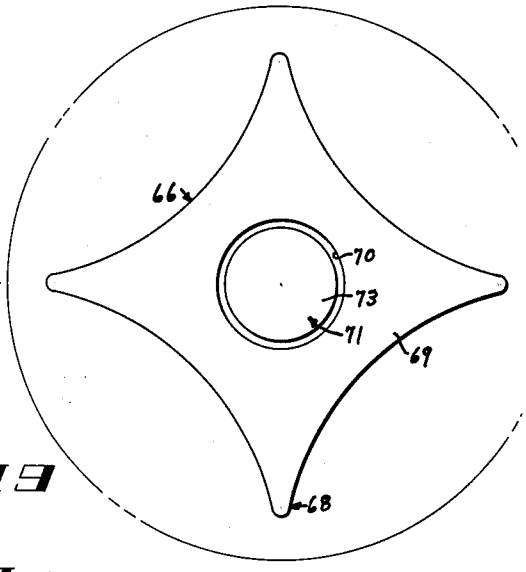


Fig. 19

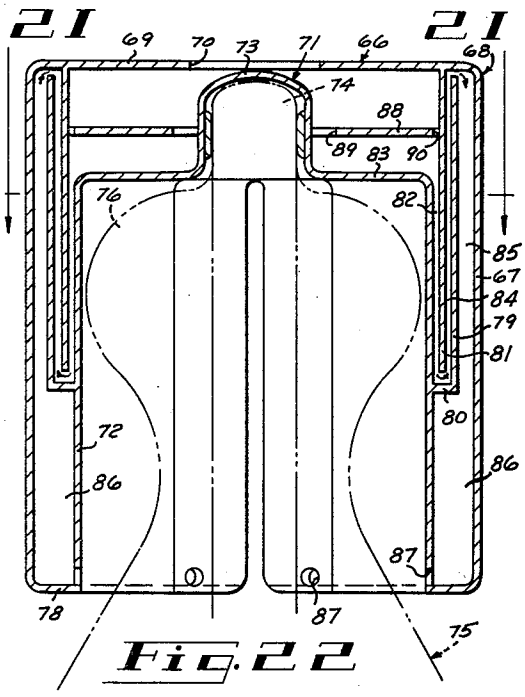


Fig. 22

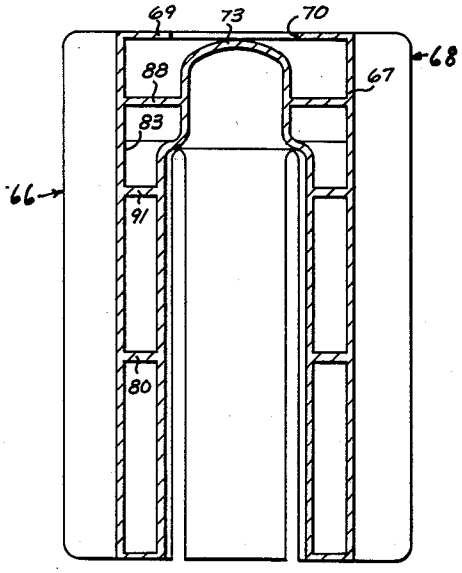


Fig. 20

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CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Filed March 17, 1958 6 Sheets-Sheet 5

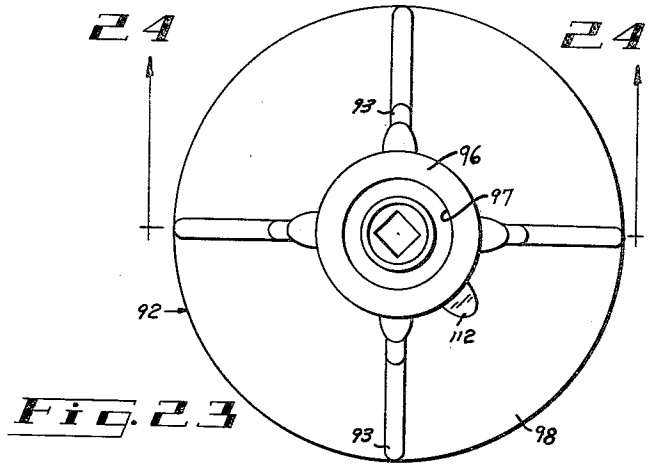


Fig. 23

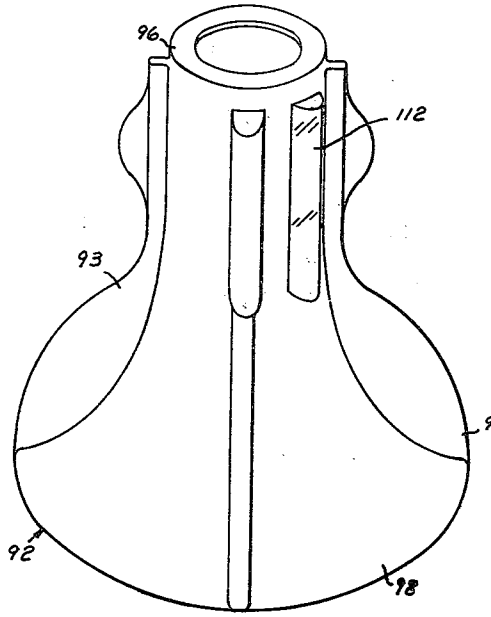


Fig. 25

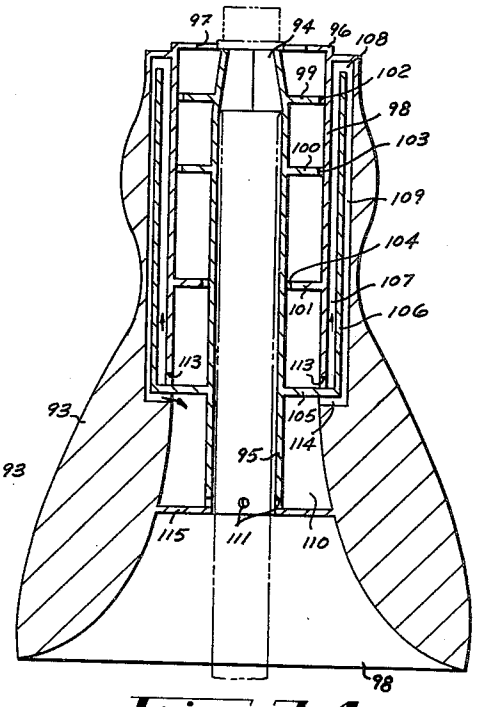


Fig. 24

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CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Filed March 17, 1958 6 Sheets-Sheet 6

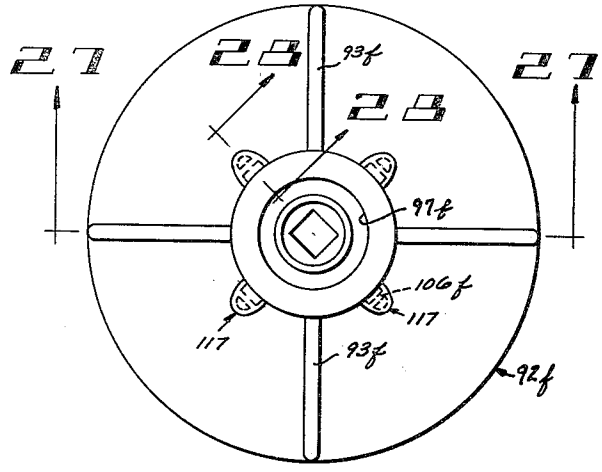


Fig. 26

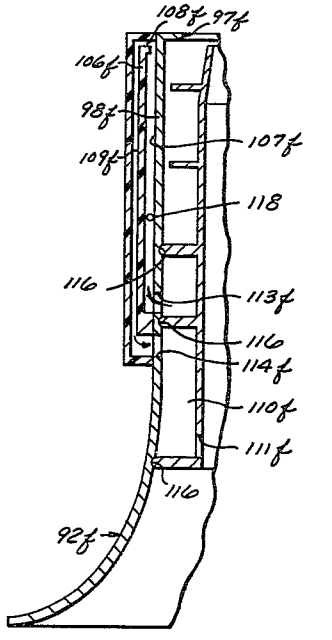


Fig. 28

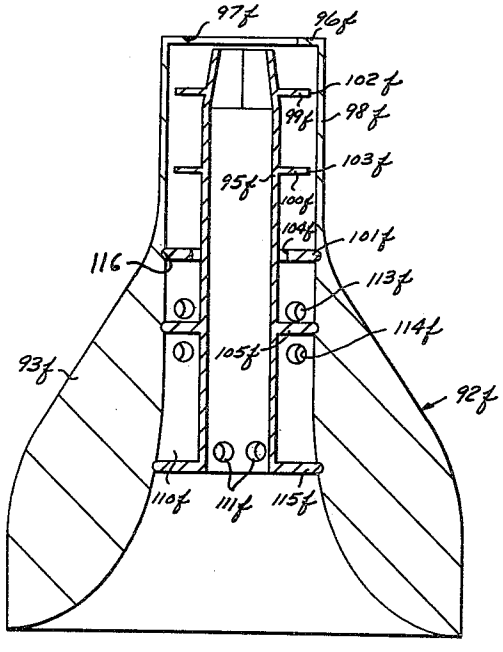


Fig. 27

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United States Patent Office 3,053,066 Patented Sept. 11, 1962

3,053,066

CHEMICAL DISPENSER FOR AUTOMATIC WASHING MACHINES

Frederick G. Dodd, Detroit, Mich., assignor of fifteen percent to Robert G. Mentag, Detroit, Mich.

Filed Mar. 17, 1958, Ser. No. 721,711
14 Claims. (Cl. 68—23)

This invention relates generally to automatic washing machines, and, more particularly, to improvements in water softener solution dispenser apparatus for automatic washing machines.

It is an important object of this invention to provide a water softener solution dispenser for automatic washing machines which is capable of dispensing a first measured amount of water softener solution into the tub of the machine for mixing with the water during the wash cycle, and a second measured amount of water softener into the tub of the machine for mixing with the water during the rinse cycle.

It is another object of this invention to provide a water softener solution dispenser for automatic washing machines which is capable of storing a quantity of water softener solution and which is also capable of dispensing such solution in successive measured amounts into the tub of an automatic washing machine for mixing with the water therein for both the rinse and wash cycles.

It is a further object of this invention to provide a water softener solution dispenser for automatic washing machines which may be constructed in one form as a detachable dispenser and in another form as an integrated part of the agitator of an automatic washing machine.

It is still another object of this invention to provide a water softener solution dispenser for automatic washing machines which is constructed and arranged so as to provide sufficient clearance between the dispenser and the tub opening to permit wash to be loaded into a machine while the dispenser is mounted on the machine.

It is still a further object of this invention to provide a water softener solution dispenser for automatic washing machines which is provided with a storage reservoir and a discharge reservoir, and which storage reservoir is constructed and arranged so as to permit a measured amount of the solution to be forced therefrom by centrifugal force into the discharge reservoir during a spin period or cycle of a machine from where it will be discharged by gravity into the tub of the machine for mixing with the next load of water admitted to the tub, while retaining the rest of the solution in the storage reservoir.

It is still another object of this invention to provide a water softener solution dispenser for automatic washing machines which will be economical of manufacture, simple and compact in construction, and efficient in operation.

Other objects, features and advantages of this invention will be apparent from the following detailed description and appended claims, reference being had to the accompanying drawings forming a part of the specification wherein like reference numerals designate corresponding parts of the several views.

In the drawings:

FIG. 1 is a perspective view of a detachable dispenser embodying the principles of the invention;

FIG. 2 is an elevational sectional view of the structure illustrated in FIG. 1, taken along the line **2—2** thereof, and showing the dispenser mounted on an automatic washing machine agitator which is shown in broken lines;

FIG. 3 is a horizontal sectional view of the structure illustrated in FIG. 2, taken along the line **3—3** thereof, and looking in the direction of the arrows;

FIG. 4 is a horizontal sectional view of the structure

illustrated in FIG. 2, taken along the line **4—4** thereof, and looking in the direction of the arrows;

FIG. 5 is a horizontal sectional view of the structure illustrated in FIG. 2, taken along the line **5—5** thereof, and looking in the direction of the arrows;

FIG. 6 is a fragmentary central elevational sectional view of a slightly modified detachable dispenser similar to the embodiment of FIGS. 1 through 5;

FIG. 7 is a perspective view of a second detachable dispenser embodying the principles of the invention and which is provided with detachable passageways;

FIG. 8 is a side elevational view, partly in section, of the structure illustrated in FIG. 7, taken along the line **8—8** thereof, and looking in the direction of the arrows;

FIG. 9 is a horizontal sectional view of the structure illustrated in FIG. 8, taken along the line **9—9** thereof, and looking in the direction of the arrows;

FIG. 10 is a fragmentary elevational sectional view of the structure illustrated in FIG. 9, taken along the line **10—10** thereof, and looking in the direction of the arrows;

FIG. 11 is an elevational sectional view of a modified detachable passageway adapted for use on the embodiment of FIGS. 7 through 10;

FIG. 12 is an enlarged horizontal sectional view of the structure illustrated in FIG. 11, taken along the line **12—12** thereof, and looking in the direction of the arrows;

FIG. 13 is a fragmentary central elevational sectional view of a modified dispenser structure adapted for use in a dispenser embodying the invention;

FIG. 14 is a top plan view of a third detachable dispenser embodying the principles of the invention and which is adapted to straddle the agitator vanes of an automatic washing machine;

FIG. 15 is an elevational sectional view of the structure illustrated in FIG. 14, taken along the line **15—15** thereof, and looking in the direction of the arrows;

FIG. 16 is an elevational sectional view of the structure illustrated in FIG. 14, taken along the line **16—16** thereof, and looking in the direction of the arrows;

FIG. 17 is a horizontal sectional view of the structure illustrated in FIG. 15, taken along the line **17—17** thereof, and looking in the direction of the arrows;

FIG. 18 is a horizontal sectional view of the structure illustrated in FIG. 15, taken along the line **18—18** thereof, and looking in the direction of the arrows;

FIG. 19 is a top plan view of a fourth detachable dispenser embodying the principles of the invention and which is adapted to straddle the agitator vanes of an automatic washing machine;

FIG. 20 is an elevational sectional view of the embodiment of FIG. 19, taken along the line **20—20** thereof of FIG. 21, and looking in the direction of the arrows;

FIG. 21 is a horizontal sectional view of the embodiment of FIG. 19, taken along the line **21—21** of FIG. 22, and looking in the direction of the arrows;

FIG. 22 is an elevational sectional view of the structure illustrated in FIG. 21, taken along the line **22—22** thereof, and looking in the direction of the arrows;

FIG. 23 is a top plan view of a dispenser agitator made in accordance with the principles of the invention and which is provided with a level gauge;

FIG. 24 is an elevational sectional view of the structure illustrated in FIG. 23, taken along the line **24—24** thereof, and looking in the direction of the arrows;

FIG. 25 is a perspective view of the dispenser agitator illustrated in FIGS. 23 and 24;

FIG. 26 is a top plan view of a second dispenser agitator made in accordance with the principles of the invention and which is provided with detachable passageways and employs a two-piece dispenser agitator construction;

FIG. 27 is an elevational sectional view of the structure illustrated in FIG. 26, taken along the line 27—27 thereof, and looking in the direction of the arrows; and,

FIG. 28 is a fragmentary elevational sectional view of the structure illustrated in FIG. 26, taken along the line 28—28, and looking in the direction of the arrows.

Referring now to the drawings, and more particularly to FIGS. 1 through 5, wherein is illustrated a first embodiment of a detachable dispenser embodying the principles of the invention, the numeral 10 generally designates the dispenser which is adapted to be releasably mounted on the upper end of an automatic washing machine agitator generally designated by the numeral 11. The dispenser 10 may be made from any suitable lightweight material, such as a lightweight metal, or a suitable plastic. If the dispenser 10 is made from a plastic material it is desirable to make it from a suitable transparent plastic material such as the transparent plastic material commonly known as "Plexiglas (trademark)." The various parts of the dispenser may be made separately and assembled into a fabricated one-piece or integral unit or the dispenser could be cast or molded as a one-piece construction.

The dispenser 10 includes the outer cylindrical or tubular body 12 which is provided with a fixedly mounted upper end wall 13 and a fixedly mounted lower end wall 14. The lower end wall 14 is provided with a centrally or axially disposed opening therethrough as 15 for the reception of the agitator 11 to permit the mounting of the dispenser 10 thereon. The agitator 11 is received in the tubular supporting sleeve or socket member generally designated by the numeral 16. The socket member 16 is closed on the upper end thereof and open on the lower end thereof. The upper end portion of the socket member 16 is provided with a vertical cylindrical wall formation as indicated by the numeral 17 and the lower end portion of the socket member 16 is formed with an outwardly and downwardly tapered or diverging wall formation as indicated by the numeral 18. The lower tapered end portion 18 of the socket member 16 is disposed around the opening 15 in the lower end wall 14 and is fixedly connected thereto to form a fluid tight construction at this point.

An annular projection or rest pad 19 is mounted inside the socket member 16 adjacent the upper end thereof. When the dispenser 10 is mounted on an agitator as 11, as shown in FIG. 2, the rest pad 19 abuts the outer surface of the upper end of the agitator spindle and the upper end of the agitator spindle rests against the closed upper end of the socket member 16. The rest pad 19 is preferably made from a resilient material as rubber and provides a tight driving fit between the agitator and the dispenser 10. The socket member 16 is provided with a plurality of peripherally disposed holes or openings therethrough, as 20, at the lower end thereof to permit fluid to pass out therethrough from the inside of the dispenser 10 and down into the tub of the automatic washing machine, as more fully described hereinafter. It will be seen, that the upper end of the socket member 16 is formed or constructed to seat around the upper cylindrical end portion of the agitator 11 and that the lower end of the socket member 16 is constructed to seat around the upper ends of the agitator vanes. The dispenser 10 is thus capable of being mounted on all automatic washing machines having agitators shaped or formed like the agitator 11.

The interior of the dispenser 10, that is, the space between the tubular body wall 12 and the socket member 16 is partitioned as described hereinafter to form an upper and lower container or what may be termed a primary or storage reservoir, and a secondary or discharge reservoir, respectively.

The storage reservoir is formed in the upper portion of the dispenser 10 by means of the first vertical cylindrical wall or tubular member 21 which is closed at the lower end thereof by the lower end wall 22. The wall 22 is fixedly connected to the socket member lower tapered wall 18 by any suitable means to form a fluid-tight connection therebetween. A second vertical cylindrical wall or tubular member 23 is fixedly mounted on the inner side of the dispenser top wall 13 by any suitable means to form a fluid-tight connection therebetween and depends therefrom to a point adjacent the horizontal storage reservoir lower end wall 22. The wall 23 is preferably spaced apart, laterally from the reservoir vertical wall 21, a distance of approximately 3/32 of an inch and this space is indicated by the numeral 24. The lower end 25 of the inner wall 23 is preferably terminated at a point approximately 3/32 of an inch from the reservoir lower end wall 22. The outer wall 12 of the dispenser is preferably spaced apart laterally from the intermediate wall 21 a distance of approximately 3/32 of an inch and this space is indicated by the numeral 26. The upper end 27 of the intermediate wall 21 terminates below the upper dispenser wall 13 and is spaced therefrom approximately 3/32 of an inch.

The upper dispenser wall 13 is provided with the opening 28 therethrough. The chemical or water softening ingredients are poured into the upper or storage reservoir through the opening 28. The storage reservoir is provided with a plurality of horizontal vertically spaced apart baffle plates as 29, 32 and 34 which are fixedly connected to the inner surface of the vertical wall 23 by any suitable means, and which are provided with the arcuately shaped holes or openings 31, 33, and 35, respectively. The upper baffle plate 29 is further provided with the central hole 30. The holes 31 and 33 are disposed around the outer periphery of their respective baffle plates and the holes 35 are disposed around the inner periphery of the plate 34. The intermediate plate 32 and the lower plate 34 are disposed around the socket member 16 and are fixedly connected thereto by any suitable means.

The lower or discharge reservoir is provided with a horizontal baffle plate 36 which is vertically spaced between the lower end wall 22 of the storage reservoir and the lower wall 14 of the discharge reservoir. The plate 36 surrounds the tapered wall 18 of the socket member 16 and is fixedly secured thereto and to the inner side of the outer wall 12 by any suitable means. The plate 36 is provided with a plurality of arcuately shaped holes therethrough as 37 around the outer periphery thereof.

The overall diameter of the dispenser 10 is preferably held to a size whereby it is only approximately 1½ inches larger in diameter than the agitator 11 on which it is to be mounted. The overall compactness of the dispenser 10 is achieved by maintaining the overall diameter to a minimum and extending the height to achieve capacity. The various walls and baffle plates are preferably made from material of approximately .040" thickness. Therefore, it may remain on the agitator during the loading and unloading of the wash from the machine.

In use, the chemical water softening ingredients may be inserted into the dispenser in amounts equal to the size of the dispenser, that is, in amounts equal to one charge or several. The aforementioned water softening ingredients are inserted in the desired amount to provide the desired strength and these ingredients may be in the form of a fluid chemical concentrate or in a chemical powder form after which the desired amount of water is inserted equal to the desired number of charges to make what will be hereinafter referred to as the chemical solution. Any of the many available chemical water softening ingredients now on the market may be used. If the dispenser is made large enough in capacity, it will insert a first charge of the chemical solution into the tub during the rinse cycle and a second charge during the load period preparatory for the next wash cycle. For example, during the spin or drying cycle a charge or measured amount of the chemical solution will be forced by centrifugal force up the feed passageway or conduit formed by the space

24 and then it will flow by gravity down into the discharge reservoir through the discharge passageway or conduit formed by the space 26. The chemical solution flowing into the discharge reservoir will be held by centrifugal force in the upper and lower compartments in this reservoir formed by the plate 36, and the dotted lines 38 and 39 generally indicate the outline of the chemical solution as it is disposed by centrifugal force during the drying cycle. The chemical solution will flow from the lower compartment in the storage reservoir formed between the lower end wall 22 and the baffle plate 34 during the drying cycle. However the chemical solution in the compartments above will not flow down into the lower compartment in the storage reservoir because of centrifugal force and the fact that the holes 35 are disposed along the inner side or periphery of the plate 34. The chemical solution above the plates 29, 32 and 34 will be thrown outwardly by the centrifugal force and the dotted lines 40 generally indicate the outline of the chemical solution as it is disposed by centrifugal force during the drying cycle.

After the spin or drying cycle, the chemical solution in the discharge reservoir will flow by gravity out of this reservoir through the exit holes or discharge ports 20 and down into the tub of the machine where it will mix with the next load of new water for the next washing cycle. The chemical solution in the storage reservoir will flow downwardly through the holes 35, 33, 30 and 31 and into the lower compartment of the storage reservoir, between the wall 22 and plate 34, to fill the lower compartment, whereby, the dispenser is ready for the next spin or dry cycle.

FIG. 6 illustrates a dispenser 10*a* which is similar to the dispenser 10 and the corresponding parts have been marked with corresponding reference numerals followed by the small letter "*a*." It will be seen that the dispenser 10*a* of FIG. 6 is constructed the same as the dispenser 10 with the exception that there is no baffle plate in the discharge chamber or reservoir. During the spin or drying cycle the chemical solution flowing into the discharge reservoir will thus be thrown outwardly by the centrifugal force and the dotted line 41 generally indicates the disposition outline of the chemical solution during the drying cycle. The structure of FIG. 6 is preferably used when the dispenser is formed greater in length than the dispenser shown in FIG. 2, whereby the longer discharge reservoir will hold as much chemical solution during the spin cycle as the shorter discharge reservoir of the dispenser 10 will, because of the baffle plate 36. The dispenser 10*a* functions the same as the dispenser 10.

FIGS. 7, 8, 9 and 10 illustrate a second detachable dispenser 10*b* which is constructed similarly to the dispenser 10 and the corresponding parts are marked with corresponding reference numerals followed by the small letter "*b*." In the dispenser 10*b* the built-in passageways 24 and 26 have been replaced with detachable passageways or conduit means generally indicated by the numeral 42. The inner and intermediate walls 21 and 23 as employed in the dispenser 10 are thus not used in the dispenser 10*b* and the lower end wall 22*b* of the storage reservoir extends to the socket member 16*b* which is fixedly connected to the outer wall 12*b*. The baffle plates 29*b*, 32*b* and 34*b* also extend outwardly from the socket member 16*b* to the outer wall 12*b* to which they are fixedly connected.

The passageway means or members 42 are preferably evenly disposed around the outer wall 12*b* and are preferably formed from a suitable transparent plastic material. The number of passageways 42 used may vary from one to any desired number. The members 42 are each provided with a feed conduit or passageway 43 which is connected at the upper end thereof by the connecting passageway 44 to the discharge passageway 45. As shown in FIGS. 8 and 10, the lower end of the feed conduit 43 is connected to the lower end of the storage reservoir by means of the inlet passageway 46 and the lower end of the discharge passageway 45 is connected to the upper end of the discharge reservoir by means of the exit passageway 47.

The detachable passageways means or members 42 may each be secured to the outer wall 12*b* by any suitable means. As shown in FIGS. 8 and 10, each of the members 42 is provided on the inner curved side thereof, adjacent the upper end thereof, with an inwardly extended fixed arm 48 which is adapted to be inserted through the hole 49 in the outer wall 12*b*. The outer end of the arm 48 is peened over as at 50 after the arm 48 has been inserted through the hole 49 to hold the arm 48 in place. The lower end of each of the members 42 is similarly secured in place. As shown in FIG. 8, the passageways 46 and 47 are formed in the inwardly extended arms 51 and 52, respectively, which are inserted through the holes 53 and 54, respectively, formed in the outer wall 12*b*. The outer ends of the arms 51 and 52 are also peened over as at 55 and 56, respectively, similarly to the peened over portion 50 of the arm 48. The arms 48, 51 and 52 will, of course, be formed to provide a tight fit with the holes 49, 53 and 54, respectively, to provide a fluid-tight fit therebetween. If the arms 48, 51 and 52 are made from a pliable plastic material they may be formed with the heads 50, 55 and 56, respectively, thereon and then merely snapped into place in their respective holes in the wall 12*b*.

In use, the dispenser 10*b* functions the same as the aforedescribed dispenser 10. As shown in FIG. 8, a float level gauge 57, in the form of a buoyant ball shaped member, may be employed in the feed conduit 43, whereby, the level of the chemical solution in the storage reservoir may be observed.

FIGS. 11 and 12 illustrate a slightly modified detachable passageway means or member 42*c* which is similar in construction and function to the passageway members 42. Accordingly, the corresponding parts of the member 42*c* have been marked with corresponding reference numerals followed by the small letter "*c*." The passageway member 42*c* differs from the passageway member 42 in that the passageways 43*c* and 45*c* are disposed in inward and outward relative positions, respectively, rather than in a side by side position as in member 42. The passageway 42*c* may be substituted for the members 42 in the dispenser 10*b*.

FIG. 13 is a fragmentary central elevational sectional view of a modified dispenser 10*d* which is constructed similar to the dispenser 10 and which functions similarly. Accordingly, the corresponding parts have been marked with corresponding reference numerals followed by the small letter "*d*." The difference between the dispenser 10 and the dispenser 10*d* is that the socket member lower end wall portion 18*d* is straight, instead of tapered as is wall 18 in dispenser 10. Dispenser 10*d* is thus constructed to be mounted on agitators which have a cylindrical upper end portion whereby the agitator vanes do not extend upwardly far enough to interfere with the mounting of the dispenser on the agitator.

A further structural difference is that the dispenser 10*d* is provided with a plurality of baffle plates 36*d* in the discharge reservoir instead of one such baffle plate. The use of a plurality of baffle plates 36*d* is desirable in a dispenser in which the storage chamber or reservoir is of less height than the storage chambers of the dispensers 10 and 10*a*. That is, the distance between the walls 14*d* and 22*d* is less than the distance between the walls 14 and 22, and, the distance between the wall 18*d* and the wall 12*d* is greater than the distance between the wall 18 and the wall 12 of the dispenser 10. In the dispenser 10*d* the chemical solution in the storage reservoir during the spin or drying cycle would be thrown outwardly by the centrifugal force and the dotted lines 58 generally indicate the dispositions outline of the solution during the drying cycle in each compartment formed in the storage reservoir by the plates 36*d*.

FIGS. 14 through 18 illustrate a further dispenser **10***e* which is adapted for use on an agitator **11***e* provided with agitator vanes **63** which extend upwardly to the upper end of the agitator shaft. The dispenser **10***e* is constructed similarly to the dispenser **10***b* illustrated in FIGS. 7 through 10, in that the passageways connecting the storage reservoir and the discharge reservoir are located externally of the outer wall **12***e*. These passageways are formed in the portions marked **42***e* which are constructed similarly to the members **42**, but the portions **42***e* are fixedly connected to the wall **12***e* and are not detachable. The portions **42***e* may be formed integral with the walls **12***e* or they may be formed separately and be fixedly connected to the wall **12***e* by any suitable means.

The dispenser **10***e* functions similarly to the other aforedescribed dispensers and the corresponding parts are marked with similar reference numerals followed by the small letter "*e*." The socket members **16***e* is provided with a flat upper end wall **59** from which extends upwardly the elongated dome portion **60**. The upper end of the socket member **16***e* is so formed so that it will seat on the upper end **61** of the agitator assembly. The rest pads **19***e* are formed as a plurality of arcuately shaped pads instead of a complete annular member as the rest pad **19** in the dispenser **10**.

As shown in FIGS. 15, 16 and 18, the outer wall **12***e* and the socket member wall portions **17***e* and **18***e* are slotted to permit the dispenser to be seated over the agitator vanes **63**. These slots are indicated by the numeral **64** and they are bounded by the walls **65** which are fixedly connected between the outer wall **12***e* and the socket member walls and which extend upwardly to the baffle plate **29***e* to which they are fixedly connected. The walls **65** also extend downwardly to the lower end wall **14***e* to which they are also fixedly connected. It will be seen that the slots **64** thus cut the lower portion of the storage reservoir below the baffle plate **29***e* into a plurality of sections. These slots also cut the discharge reservoir into a plurality of separate sections. The chemical solution will flow downwardly from the storage reservoir section above the baffle plate **29***e* through the openings **31***e* into the separate lower sections of the storage reservoir. The passageway members **42***e* then convey the solution from each separate lower storage reservoir section to the adjacent discharge reservoir section in the usual manner during operation of the dispenser **10***e* during a spin or drying cycle. A further difference between the dispenser **10***b* and the dispenser **10***e* is that the lower wall portion **18***e* of the socket member is vertically disposed.

FIGS. 19 through 22 illustrate a further embodiment of a detachable dispenser **66** made in accordance with the invention and adapted for use with an automatic washing machine having agitator vanes extending upwardly and terminating adjacent the upper end of the agitator shaft. The embodiment **66** includes the outer wall **67** which is generally rectangularly shaped with the four sides thereof curved inwardly or convexly to permit additional room for the insertion of wash past the dispenser. The four portions of the wall **67** are joined so as to form a substantially triangularly shaped corner as generally indicated by the numeral **68**. The upper end of the wall **67** is enclosed by the end wall **69** which is provided with an opening therethrough as **70** for the insertion of the chemical solution. The socket member generally indicated by the numeral **71** is provided with a dome-like head or top end portion **73** which is adapted to seat on the similarly shaped top end portion **74** of the agitator assembly **75**. The socket member includes the main body portion thereof as the wall **72** which is cylindrical in shape as shown, in FIG. 21. The socket member **71** is also provided with the U-shaped laterally extended portions **77** into which are received the agitator vanes **76**. These portions **77** extend toward the triangular corners **68**. The lower ends of the socket member and the outer wall **67** are joined by the lower end wall **78**.

Each of the triangularly shaped portions **68** is provided with a vertical wall **79** which extends upwardly to a point adjacent the upper wall **69** and which is enclosed at the lower end thereof by the bottom wall **80** which is connected to the socket member wall **72**. Centrally mounted inwardly from the wall **79** is the vertical wall **81** which depends or extends from the upper end wall **69** downwardly to a point adjacent the wall **80**. The space **82** between the wall **81** and the socket member wall **72** communicates with the storage reservoir. The numeral **83** indicates the upper end wall of the socket member **71**. The space **84** between walls **79** and **81** forms the feed conduit in each of the triangularly shaped corners and is connected at the upper end thereof with the discharge conduit **85** which leads downwardly to the discharge reservoir **86**. The discharge reservoir **86**, in the lower end of the dispenser, is provided with a plurality of exit holes or discharge ports as **87**.

The storage reservoir is provided with the usual baffle plates **88** and **91** which are each provided with openings as **89** and **90** to permit the solution to flow downwardly. The dispenser **66** functions the same way as the previously described dispensers during a spin or drying cycle. In FIG. 19, the broken line circle indicates the washing machine tub opening and it is apparent from FIG. 19 that the dispenser **66** is formed to permit insertion of wash into the tub without removing the dispenser.

FIGS. 23 through 25 illustrate a dispenser agitator, that is, an agitator in which a dispenser in accordance with the invention is integrally formed therein. The agitator is generally indicated by the numeral **92** and is provided with the usual vanes as **93** in which are formed the passageways for feeding the water softener solution from the storage reservoir to the discharge reservoir in the same manner as described hereinafter for the detachable dispensers. The dispenser agitator is adapted to be mounted on the agitator shaft **94** of an automatic washing machine in the usual manner. The dispenser agitator **92** is provided with an inner sleeve-like wall or tubular socket member **95** which is fixedly connected by means of the horizontal wall **115** to the outer wall structure **98**. The upper end of the outer wall **98** is provided with the end wall **96** having the opening **97** formed therethrough. A plurality of baffle plates as **99**, **100** and **101** are mounted between the circular walls **98** and **95** and are provided with openings therethrough as **102**, **103**, and **104**, respectively, similar to the openings in the baffle plates of the previously described detachable dispensers.

A horizontal wall **105** is fixedly mounted between the outer wall **98** and the wall **95** at a point below the baffle plate **101** to form the lower end wall of the storage reservoir. The upper ends of the agitator vanes are hollowed out to provide passageways as **107** and **109** and these passageways are divided by the wall **106** which extends from the storage reservoir lower end wall **105** upwardly to a point adjacent the upper end of the vanes. The passageways **107** and **109** are connected at their upper ends by the connecting passageway **108**. The storage reservoir is connected to each of the passageways **107** by means of the inlet ports **113**. The passageways **109** are connected at their lower ends by means of the exit ports **114** to the circularly shaped discharge reservoir **110**. The discharge reservoir is discharged by means of the discharge ports or exit holes **111** formed in the wall **95** at the lower end thereof. The dispenser agitator may be provided with a transparent level gauge as **112** which may be fixedly attached thereto by any suitable means.

In operation, the dispenser built into the agitator **92** functions in the same manner as the previously described detachable dispensers.

FIGS. 26 through 28 illustrate a second dispenser agitator **92***f* similar to the dispenser agitator **92**. The

main structural differences between them being that the dispenser agitator **92***f* is formed in parts which may be fixed together, and that the passageways between the storage reservoir and the discharge reservoir are formed in a separate structure which is fixedly attached to the other structure of the dispenser agitator. The corresponding parts are marked with the corresponding reference numerals followed by the small letter "*f*." It will be seen that in this embodiment the inner sleeve wall **95***f* and the baffle plates **99***f*, **100***f*, **101***f*, and, the walls **105***f* and **115***f* are integrally formed. The outer wall **98***f* carrying the agitator vanes **93***f* is integrally separately formed and is adapted to be mounted around the inner wall assembly. As shown, the outer wall **98***f* would be provided with grooves as **116** into which the baffle plate **101***f*, and the walls **105***f* and **115***f* would be snap seated in place to provide a fluid tight seal. The outer assembly is thus seated and held escurely in place on the inner assembly.

The storage reservoir and the discharge reservoir are interconnected by a separately formed passageway member as **117** at a plurality of circumferentially spaced points. The passageway members **117** are similar to the detachable members **42** used in some of the previously described dispensers. As shown, the members **117** are elongated hollow members which are semi-circular in cross-section and closed at the ends thereof. The inner structure is similar to the passageway structure formed in the vanes of the dispenser agitator **92** and corresponding reference numerals are used followed by the small letter "*f*." The members **117** are preferably made from a suitable transparent plastic material and a level float gauge as **118** may be mounted in the feed conduit **107***f*. The members **117** may be fixedly attached to the outer wall **98***f* by any suitable means.

It will be understood, that in a single charge dispenser, made in accordance with any of the aforesaid embodiments, no baffle plates, as **29**, **32** and **34** of FIG. 2, will be used in the storage reservoir, whereby, the entire single charge will flow during the spin cycle into the discharge reservoir. In a single charge dispenser of this type the discharge reservoir may have anywhere from zero to a plurality of baffle plates depending on the height of the discharge reservoir.

The number of baffle plates employed in the discharge reservoir of any of the aforedescribed embodiments depends on the ratio of the vertical depth to the horizontal distance from the inner discharge openings to the outer wall of the discharge reservoir. The spin r.p.m. would also have to be considered since the slope of the dotted lines as **38** and **39** of FIG. 2, which indicate the position of the chemical solution during a spin cycle, would become more vertical with an increased r.p.m. However, the spin r.p.m. of most automatic washing machines is approximately the same and so usually the aforementioned ratio must only be considered. That is, if the vertical depth and horizontal distance of the discharge reservoir are large enough to prevent the charge from flowing out of the discharge openings, as **20** in FIG. 2, during the spin cycle, no baffle plates are needed in the discharge reservoir. However, if the opposite is true, one or more baffle plates will be needed in the discharge reservoir.

In a multiple charge dispenser, as that shown in FIG. 2, the space between the lower end wall **22** and the lowermost baffle plate **34** may be called the charge measuring chamber or section and the rest of the space above the baffle plate **34** may be called the retaining chamber or section. The number of baffle plates as **29** and **32** employed in such a multiple charge dispenser would depend on the ratio of the vertical depth of the retaining section, as from plate **34** to the upper end wall **13** of FIG. 2, to the horizontal distance from the inwardly disposed openings **35** to the inner wall **23** of FIG. 2, in the same manner as described hereinbefore for the discharge reservoir.

What I claim is:

1. In an automatic washing machine, the combination of, an agitator and a water softener solution dispenser carried by said agitator which is mounted in a tub for rotation with the tub about the vertical axis of the tub and which tub is rotated at a high speed during a drying spin cycle, said dispenser including a solution storage reservoir and an annular solution discharge reservoir having an inner side disposed below the storage reservoir; passageways connecting said reservoirs and extending from the lower end of said storage reservoir upwardly to the top end of the dispenser and then downwardly to the upper end of the discharge reservoir; baffle means in said storage reservoir, whereby, when the storage reservoir is fully loaded with solution the flow of the solution out of the storage reservoir through said passageways extending from the lower end of the storage reservoir upwardly to the top end of the dispenser and then downwardly to the upper end of said discharge reservoir by means of centrifugal force during each drying spin cycle thereafter will be limited to a measured amount of solution; and, said discharge reservoir being provided with exit ports extended through said inner side thereof and adjacent the lower end thereof, whereby the solution forced into said discharge reservoir during a drying spin cycle will flow by gravity through said ports and into the machine tub when the drying spin cycle ends.

2. The invention as defined in claim 1, wherein: said dispenser is formed in said agitator.

3. The invention as defined in claim 1, wherein: said dispenser is separately formed and is detachably mounted on said agitator.

4. A water softener solution dispenser for use on an automatic washing machine having an agitator mounted in a tub for rotation with the tub about the vertical axis of the tub and which tub is spun at a high speed during a drying cycle comprising: an annular tubular body; a socket member mounted in said body for detachably mounting the dispenser on the agitator for rotation therewith; said tubular body including a storage reservoir formed in the upper end thereof and a discharge reservoir having an inner side formed in the lower end thereof and disposed below the storage reservoir; passageway means interconnecting said reservoirs and extending from the lower end of said storage reservoir upwardly to the top end of the dispenser and then downwardly to the upper end of the discharge reservoir, whereby when said tub is spun during a drying cycle, a charge of the solution in the storage reservoir will be forced from the lower end thereof and through the passageway means upwardly to the top end of the dispenser and then downwardly into the discharge reservoir and retained therein by centrifugal force; and, said discharge reservoir being provided with exit ports extended through said inner side thereof and adjacent the lower end thereof, whereby the solution forced into said discharge reservoir during a drying spin cycle will flow by gravity through said ports and into the machine tub when the drying spin cycle ends.

5. The structure as defined in claim 4, wherein: said storage reservoir is provided with baffle means, whereby when the tub is spun during a drying cycle, the charge of solution forced from the storage reservoir will be limited to a measured amount thereof.

6. The structure as defined in claim 5, wherein: said passageway means includes at least one feed conduit connected at its lower end to the lower end of the storage reservoir and with the upper end thereof extending upwardly to the upper end of the dispenser, and at least one discharge conduit connected at its upper end to the upper end of the feed conduit and connected at its lower end to the upper end of the discharge reservoir.

7. The structure as defined in claim 5, including: baffle means mounted in said discharge reservoir for restraining the charge of solution forced thereinto during a drying cycle from flowing out through said exit ports until the drying spin cycle is ended.

8. The structure as defined in claim 5, wherein: at least the outer wall of the tubular body is made from a transparent material.

9. The structure as defined in claim 5, wherein: said passageway means is formed interiorly of the tubular body.

10. The structure as defined in claim 5, wherein: said passageway means includes at least one separately formed formed unit which is fixedly secured to the outer side of the tubular body and which is formed from a transparent material.

11. The structure as defined in claim 5, wherein: said tubular body is formed circular in cross section.

12. A dispenser agitator for use on an automatic washing machine having a tub which is spun at a high speed during a drying cycle comprising: an inner assembly including a socket member for detachably mounting the agitator on the agitator shaft of an automatic washing machine; an outer assembly carrying the agitator vanes surrounding the inner assembly; means connecting said inner and outer assemblies to form a storage reservoir and an annular discharge reservoir having an inner side located below the storage reservoir; passageway means interconnecting said reservoirs and extending from the lower end of said storage reservoir upwardly to the top end of the dispenser agitator and then downwardly to the upper end of the discharge reservoir; baffle means in said storage

reservoir, whereby when the tub is spun during a drying cycle, a charge of water softening solution in said storage reservoir will be forced from the lower end thereof and through the passageway means and into the discharge reservoir and retained therein by centrifugal force; and, said discharge reservoir being provided with a plurality of exit ports extended through said inner side thereof and adjacent the lower end thereof, whereby the solution forced into said discharge reservoir during a drying spin cycle will flow by gravity through said ports and into the tub when the drying cycle is ended.

13. The structure as defined in claim 12, wherein: said assemblies and passageway means are formed as a one-piece construction.

14. The structure as defined in claim 12, wherein: said assemblies are separately formed with the outer assembly being detachably mounted on said inner assembly, and said passageway means is separately formed and mounted on the outer sides of said outer assembly.

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