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3,540,239

AUTOMATIC WASHER HAVING MEANS TO LAUNDRY DELICATE FABRICS

Filed June 4, 1968

2 Sheets-Sheet 1

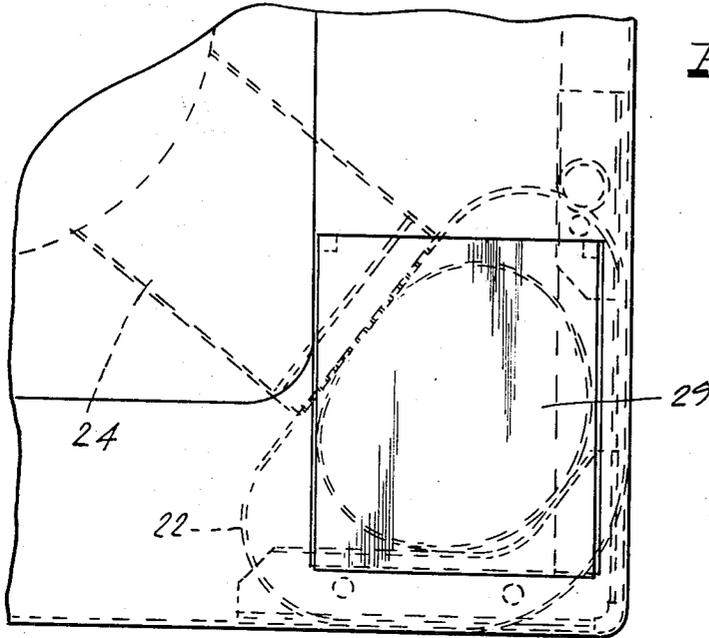


Fig. 4

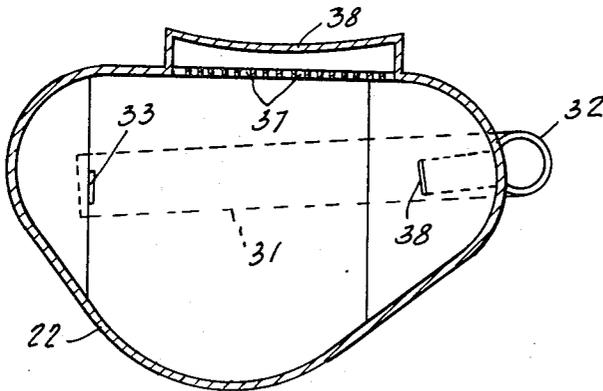
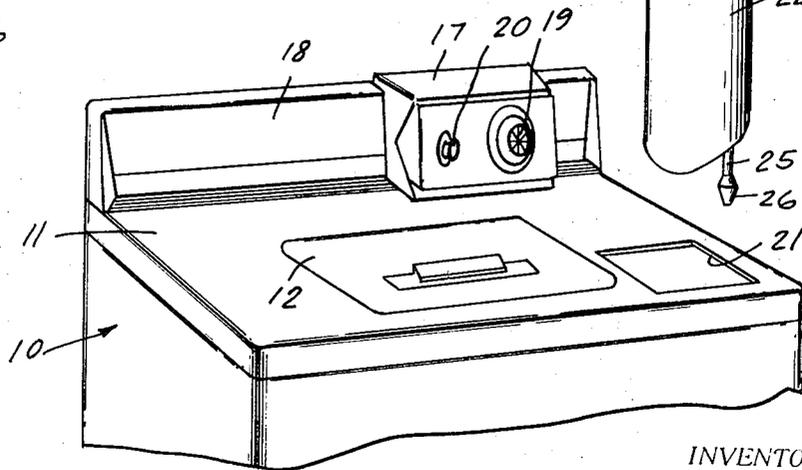
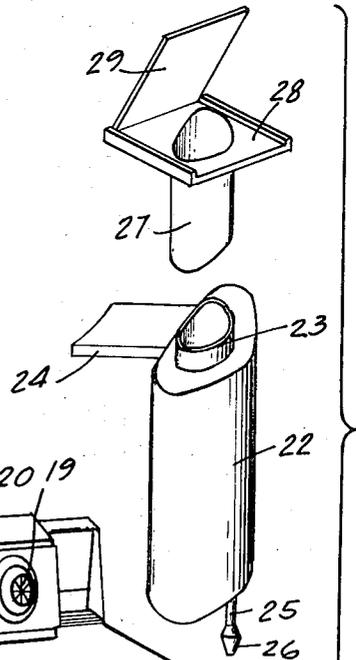


Fig. 6

Fig. 1



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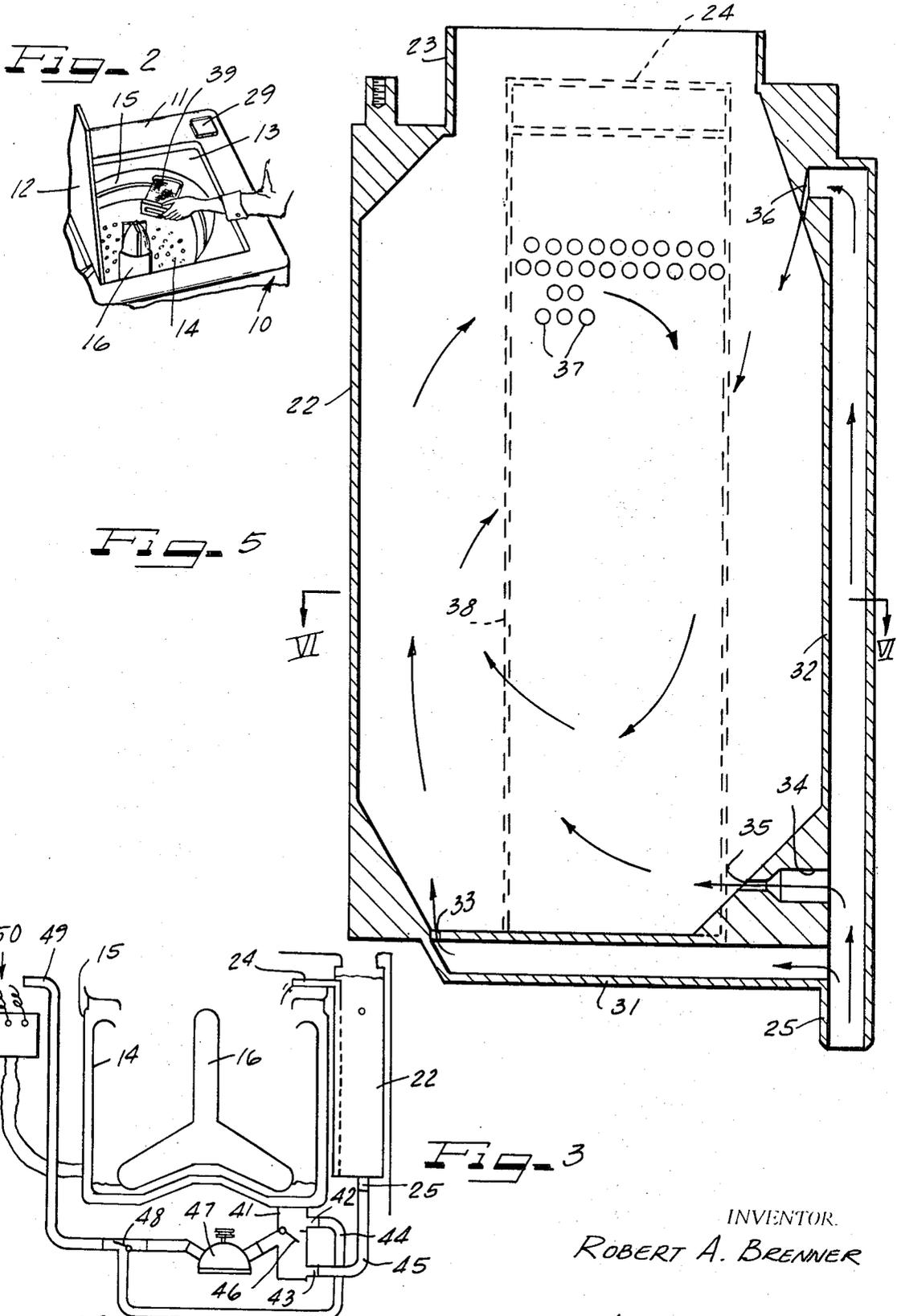
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2 Sheets-Sheet 2



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3,540,239

AUTOMATIC WASHER HAVING MEANS TO LAUNDRER DELICATE FABRICS

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10 Claims

ABSTRACT OF THE DISCLOSURE

Automatic washing machine including separate treatment zones for laundering regular and delicate fabrics separately or simultaneously. The laundry liquid used in the regular fabric treatment zone may be utilized to establish delicate agitation in the delicate fabric treatment zone by establishing a predetermined flow pattern of laundry liquid passing through the separate zone.

BACKGROUND OF THE INVENTION

Field of the invention

This invention is in the field of automatic washing machines employing a separate chamber for the washing of delicate fabrics, either concurrently with or independently of the washing of fabrics in the main washing chamber of the machine.

Description of the prior art

Conventionally, when delicate fabrics are washed in the main washing chamber of an automatic washing machine, the operation is adjusted to a separate cycle where-in is varied the duration of cycle periods and speed and frequency of centrifugation and agitation. Batch operation precludes simultaneous handling of both regular and delicate fabrics.

The present invention provides a compartment or treatment zone separate from the main washing chamber or treatment zone in which delicate fabrics can be laundered independently of or concurrently with a regular wash. Means are provided to induce a gentle agitation of the delicate fabrics during their washing. In one form of the invention the separate zone is provided in the laundry liquid recirculation circuit of the machine. A plurality of nozzles for introducing the laundry liquid into the chamber are disposed in such a fashion as to provide a rotating flow pattern for the liquid, causing the fabrics to be rolled over and hence thoroughly agitated in the presence of a laundry liquid within the delicate goods treatment zone.

The inclusion of a separate treating chamber of a sort in a washing machine has been shown in U.S. Pat. No. 3,209,560. However, this patent is addressed to the pretreatment of clothes having excessively soiled portions. The patent discloses a pretreatment receptacle which is removably supported in the charging opening of top loading automatic washers. A nozzle directs wash water being recirculated into the receptacle, whereupon it fills to a level determined by an overflow opening.

SUMMARY OF THE INVENTION

The automatic washing machine of the present invention employs a delicate fabric washing chamber which is separate from the main laundry chamber and may be formed as part of the laundry liquid recirculation circuit by means of which laundry liquid is recirculated to the main washing chamber. Preferably, this recirculation laundry liquid is introduced into the delicate fabric chamber through a plurality of spaced nozzles whereby a sub-

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stantially circular rotating flow pattern is set up, causing the fabrics contained in the chamber to roll over and thus be gently agitated during their washing cycle. Liquid from the delicate fabric chamber is directed into the main washing chamber of the machine. Control means may also be provided in conjunction with the usual liquid level control means in the main washing chamber to permit operation of the pump at a liquid level lower than would ordinarily exist, in the event the delicate fabrics are to be laundered at a time when there is no load in the main washing chamber, thereby permitting a delicate goods cycle to be accomplished wholly independently and with a greatly reduced quantity of laundry liquid.

With the delicate fabric laundering chamber of the present invention, it is thus possible to provide simultaneous washing of ordinary fabrics and delicate fabrics. The manner of introducing a laundry liquid into the delicate fabric laundering chamber assures that there will be complete and effective laundering of fabrics with a high degree of washability, regardless of the type of goods being laundered.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary, partly exploded view illustrating an automatic washing machine embodying one form of the present invention;

FIG. 2 is a view in perspective of the washing machine assembly with the door open illustrating the manner in which a filter can be employed in conjunction with the delicate fabric washing assembly;

FIG. 3 is a schematic view of the washing machine assembly illustrating the liquid circulating system;

FIG. 4 is a fragmentary plan view of the corner of the washing machine in which the delicate fabric washing assembly is included;

FIG. 5 is a cross-sectional view of the chamber for washing delicate fabrics; and

FIG. 6 is a cross-sectional view taken substantially along the line VI—VI of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIGS. 1 and 2, reference numeral 10 indicates generally a washing machine cabinet for an automatic washing machine, the machine having a top 11 in which there is provided a hinged access door 12 which, in the closed position, overlies a well 13. A perforate basket 14 is supported in spaced relation to a tub 15, and a vertical axis agitator 16 is disposed centrally of the basket 14 in the usual manner. A control console 17 projects from a splashboard 18 and is provided with a plurality of controls including a program selecting switch 19 and a pressure switch 20, the function of which will become apparent from a succeeding portion of this description.

In accordance with the present invention, a delicate fabric washing assembly as shown in FIGS. 1, 4, 5 and 6 is provided as a part of a recirculation circuit of a laundry appliance. More specifically, a vertical axis upright washer having a main treatment zone formed by a top loading spin basket is characterized by an elongated upright tank which is disposed in one corner between a generally rectangular outer casing and a generally cylindrical tub and which forms a supplemental treatment zone wholly independent of the main treatment zone. This washing assembly is arranged to be received into the interior of the cabinet 10 through an opening 21 provided for that purpose. The washing assembly includes a shell 22 having an upstanding collar 23 of reduced width formed thereon and having an overflow outlet 24 formed therein. The inlet for the shell 22 is provided by

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an inlet conduit 25 having a fitting 26 on the end thereof enabling it to be tightly engaged with suitable piping from the liquid recirculating portion of the automatic washing machine. A tube 27 having a slightly smaller periphery than the collar 23 is received within the collar 23 in telescoping engagement. The tube 27 carries a tray 28 which is proportioned to be received within the opening 21 and has a hinged door 29 providing access to the interior of the washing chamber for introducing the delicate fabrics therein.

As best seen in FIGS. 5 and 6, the inlet conduit 25 which delivers the washing liquid to the assembly directs liquid into a duct 31 and into a conduit 32 positioned on one side of the shell 22. The liquid flowing through the duct 31 passes through a slot 33 with an upward component of velocity. A portion of the liquid passing up the conduit 32 is directed through a port 34 and into a slot 35 having a reduced cross-sectional area to form a nozzle providing a jet effect and delivering the fluid into the stream with a generally horizontal component. The remainder of the stream passing through the conduit 32 is delivered through a slot 36 of reduced cross-sectional area providing a nozzle which directs the fluid in a jet having a generally downward direction. The result is the establishment of a flow pattern for the laundry liquid of a generally circular configuration, whereby efficient washing action is obtained since the clothes contained in the chamber are subjected to "roll over," a mild form of agitation which is not destructive to the clothes, but which insures adequate fiber flexure in the presence of a washing agent.

As best seen in FIG. 6, one wall of the washing chamber has apertures 37 extending substantially the full length thereof, whereby the fluid in the washing chamber can pass into an overflow or discharge chamber 38. The chamber 38, when full, discharges through the peripheral outlet 24 into the tub 15 of the main washing compartment.

As illustrated in FIG. 2, the overflow outlet 24 may be provided with a removable filter element 39 to remove lint and the like from the recirculating liquid. Removable filters of that type are described in detail in Glendening U.S. Pat. No. 2,936,604.

Turning now to FIG. 3, it will be seen that the tub 15 is provided with a sump manifold 41 into which its liquid contents are drained. The sump manifold 41 has a pair of spaced outlets 42 and 43, the outlet 42 being connected to a conduit 44 and the outlet 43 being connected to a conduit 45. The latter is connected to the inlet 25 of the delicate fabric washing chamber. A check valve 46 is disposed between the outlet 42 and the outlet 43.

In accordance with this invention, a reversible water pump 47 begins drawing water with only a minimum amount of liquid available. The liquid from the tub is directed through the outlet 42, the conduit 44, past a check valve 8 through the pump 47, into the outlet 43, and into the conduit 45 to the delicate fabric washing chamber. The water is then distributed by the slots 33, 35 and 36 with a flow pattern substantially as shown by the arrows appearing in FIG. 5. When the liquid level rises to the overflow outlet 24, the liquid is dumped back into the main tub. During the washing cycle, the check valve 46 prevents liquid from being pumped back into the main tub.

When the chamber is to be drained, the flow of the pump 47 is reversed and liquid is drained out through the conduit 45, into the pump 47 and discharged therefrom through a drain conduit 49 which connects to a suitable exterior drain. A check valve 48 in this instance prevents the drain water from being pumped back into the tub 15.

With the arrangement provided, the delicate fabric washing operation can be carried on simultaneously with, or independently of a regular wash in the main treatment zone. Further, such versatility may be achieved by preselection for the fabrics contained in the basket 14 by

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operation of the selector switch 19. To launder delicate fabrics independently of laundering in the main tub, the assembly includes a sensing device generally indicated at reference numeral 50 in FIG. 3 and consisting of a liquid level sensor which operates to turn on the pump 47 at a relatively low level of liquid in the tub. The sensing device 50 is under the control of the switch 20 on the console. Consequently, the user may initiate recirculation of the laundry liquid through the delicate fabric washing chamber by operation of the switch 20 at a substantially lower liquid level than would be required for energization of the pump 47 during normal washing cycles, thereby effecting a substantial saving in the amount of water and detergent.

Although various modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent warranted hereon all such modifications as reasonably and properly come within the scope of my contribution to the art.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a washing machine including a cabinet, a main washing tub disposed within said cabinet, and a pump arranged to recirculate laundry liquid from the bottom of said tub to the top thereof, the improvement which comprises a delicate fabric chamber in said cabinet separate from said tub, presettable control means for selectively diverting the output of said pump into said chamber at two different levels in said tub, and overflow means directing the laundry liquid overflowing from said chamber back into said tub, whereby a delicate fabric operation can be carried on simultaneously with or independent of a regular wash in the main washing tub.
2. In a washing machine including a cabinet, a tub disposed within said cabinet, and a pump arranged to recirculate laundry liquid from the bottom of said tub to the top thereof, the improvement which comprises a chamber in said cabinet separate from said tub, means for selectively diverting the output of said pump into said chamber, and overflow means directing the laundry liquid overflowing from said chamber back into said tub, nozzle means in said chamber establishing a flow pattern of liquid therein sufficient to agitate the fabrics being washed in said chamber, at least one nozzle positioned in a generally downward direction and at least one other nozzle positioned in a generally horizontal direction to thereby provide a flow pattern in said chamber which causes the fabrics therein to roll over during the washing operation.
3. In a washing machine including a cabinet, a tub disposed within said cabinet, and a pump arranged to recirculate laundry liquid from the bottom of said tub to the top thereof, the improvement which comprises a chamber in said cabinet separate from said tub, means for selectively diverting the output of said pump into said chamber, and overflow means directing the laundry liquid overflowing from said chamber back into said tub, said overflow means including a removable filter.
4. The machine of claim 3 which includes nozzle means in said chamber disposed to establish a flow pattern of liquid therein to roll over the fabrics being washed in said chamber.
5. In a washing machine including

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a cabinet,
 a tub disposed within said cabinet, and
 a pump arranged to recirculate laundry liquid from the
 bottom of said tub to the top thereof,
 the improvement which comprises
 a chamber in said cabinet separate from said tub,
 means for selectively diverting the output of said pump
 into said chamber,
 overflow means directing the laundry liquid overflow-
 ing from said chamber back into said tub,
 a sump manifold receiving the laundry liquid from said
 tub,
 a conduit connecting said sump manifold with said
 pump,
 drain means in said sump manifold for discharging the
 contents thereof to a drain,
 a discharge means in said sump manifold for directing
 the contents thereof to the inlet of said chamber, and
 a check valve in said manifold between said discharge
 means and said drain means.
 6. In a washing machine including
 a cabinet,
 a tub disposed within said cabinet, and
 a pump arranged to recirculate laundry liquid from the
 bottom of said tub to the top thereof,
 the improvement which comprises
 a chamber in said cabinet separate from said tub,
 means for selectively diverting the output of said pump
 into said chamber, and
 overflow means directing the laundry liquid overflow-
 ing from said chamber back into said tub,
 said chamber having a perforate wall dividing said
 chamber into a washing chamber and an overflow
 chamber communicating with said overflow means.
 7. A washer comprising:
 means forming a main treatment zone into which a
 batch of materials to be laundered together with a
 quantity of laundry liquid may be charged,
 means including said main treatment zone forming a
 closed hydraulic circuit,
 a pump at one point in said circuit having an inlet com-
 municating with a lower portion of said main treat-
 ment zone for recirculating the laundry liquid in the
 circuit in the form of a stream,
 and means forming a second treatment zone at a sec-
 ond point in said circuit between said first point and
 said main treatment zone,
 and nozzle means receiving the liquid discharged by
 said pump and forming jets directed into said second
 treatment zone for swirling and agitating the con-
 tents thereof,

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said second treatment zone having a separate access
 opening through which a separate batch of materials
 may be placed for laundering independently of the
 materials in said main treatment zone.
 8. A washer as defined in claim 7 and further charac-
 terized by filter means receiving liquid from said second
 treatment zone and discharging filtered laundry liquid
 into said main treatment zone.
 9. The washer of claim 7 and further characterized by
 liquid level means in said main treatment zone and se-
 quency control means for said washer cooperative with
 said liquid level means and being pre-settable to initiate
 selectively
 a simultaneous washing program in both treatment
 zones,
 an independent washing program in said second treat-
 ment zone with a reduced amount of liquid.
 10. In a laundry machine, means forming a closed re-
 circulation circuit comprising
 a recirculation system,
 recirculating means at one point in said circuit
 including a pump having an outlet from and an
 outlet to said circuit for driving liquid in said
 circuit in the form of a stream at increased
 pressure,
 a main tub at a second point in said circuit for re-
 ceiving and accumulating a pool of liquid in
 which articles to be washed away may be placed
 for laundering,
 agitation means in said tub for agitating the arti-
 cles in the presence of the liquid for effecting a
 regular wash of normal articles,
 means forming a delicate fabrics tub at a third
 point in said circuit between said outlet of said
 pump and said main tub, and
 nozzle means receiving liquid discharged from said
 pump and directing jets into said delicate fabrics
 tub to effect a gentle washing of delicate fabrics
 therein.

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WILLIAM I. PRICE, Primary Examiner

U.S. Cl. X.R.

68-13, 18, 27, 184