machine according to the exemplary embodiment in supplying softener liquid.

FIG. 9 is a sectional view of a pump unit of the washing machine according to the exemplary embodiment.

FIG. 10 is a sectional view of a main portion of a detergent tank of the washing machine according to the exemplary embodiment.

FIG. 11 is a schematic configuration diagram of the automatic liquid-agent feeding device of the washing machine according to the exemplary embodiment.

FIG. 12 is an exploded perspective view of the detergent tank of the washing machine according to the exemplary embodiment.

FIG. 13 is a perspective view of a lower surface of a detergent tank lid equipped with a float of the washing machine according to the exemplary embodiment.

FIG. 14A is a schematic sectional side view of a remaining amount detector of the washing machine according to the exemplary embodiment.

FIG. 14B is a schematic view of the lower surface of the detergent tank lid equipped with the float of the washing machine according to the exemplary embodiment.

FIG. 15 is a schematic sectional side view of the remaining amount detector of the washing machine according to the exemplary embodiment in a state in which the detergent tank is filled with detergent liquid.

FIG. 16 is a view showing a relationship between a magnetic force sensed by a linear Hall element and an output voltage of the linear Hall element.

FIG. 17 is a view showing a relationship between frequency of feeding detergent and an output voltage of the linear Hall element of the washing machine according to the exemplary

same description can be applied to a method of detecting the amount of softener liquid remaining in softener tank 126, and thus the description thereof will be omitted.

FIG. 17 is a view showing a relationship between feeding frequency of detergent and an output voltage of the linear Hall element of the washing machine according to the exemplary embodiment. In FIG. 17, the horizontal axis represents feeding frequency of detergent liquid into water tub 105, and the vertical axis represents output voltage of linear Hall element 136. In FIG. 17, solid line a represents changes in output voltage when a magnetic body with the north magnetic polarity approaches linear Hall element 136, and broken line b represents changes in output voltage when a magnetic body with the south magnetic polarity approaches linear Hall element 136.

In the following description, the upper limit of the output voltage of linear Hall element 136 is 5 V, the lower limit of the output voltage thereof is 0 V, and the output voltage of linear Hall element 136 is 2.5 V when the magnetic flux density is substantially 0 Wb/m^2, for example. The upper limit of linear Hall element 136 may be, for example, 10 V, or may be set arbitrarily without hindrance to detection accuracy.

Firstly, linear Hall element 136 and magnet 134 are distant from each other as shown in FIG. 15 when detergent tank 117 is filled with sufficient detergent liquid. Thus, magnetic field lines from magnet 134 do not reach linear Hall element 136. Thus, linear Hall element 136 outputs a voltage of 2.5 V, which corresponds to a case where the magnetic flux density is substantially 0 Wb/m^2 as shown by section K in FIG. 17.

After that, detergent liquid is repeatedly fed to water tub 105 from detergent tank 117 according to the washing operation. This reduces the

119a prevents a liquid agent attached to the lower surface of detergent tank lid 119 from flowing to rotation shaft 131. This configuration prevents occurrence of a malfunction in rotation movement of rotation shaft 131 caused by fixing of detergent liquid. As a result, degradation of accuracy in measuring the remaining amount of detergent liquid is suppressed, and a high degree of measuring accuracy can be maintained stably for a long period of time.

In addition, the inner bottom surface of detergent tank 117 includes magnet stopper 137 that comes in contact with magnet box 135 when detergent liquid is in the amount where the remaining amount of detergent liquid is determined to be insufficient. Thus, even when a liquid agent is further discharged in a state in which the remaining amount of detergent liquid is insufficient, further downward rotation of float 130a is prevented. With this configuration, an output voltage of linear Hall element 136 does not change in a state in which the remaining amount of detergent liquid is insufficient. As a result, linear Hall element 136 is prevented from erroneously detecting that the remaining amount of detergent liquid is not insufficient.

[1-3. Effects and others]

As described above, in the washing machine of the present exemplary embodiment, liquid discharged from pump unit 111 flows vertically downward through discharge channel 112g disposed perpendicularly downward from cylinder 112d, and is supplied to water tub 105. This configuration prevents a liquid agent from remaining in and fixing to liquid channels from pump unit 111 to water tub 105. Discharge channel 112g is merged with coupling hose 129 in which a large amount of water flows. This configuration suppresses detergent from remaining in the liquid channels to water tub 105. In addition, after feeding detergent liquid, first water supply valve 110a is opened to supply

water. This configuration suppresses detergent from remaining in pump unit