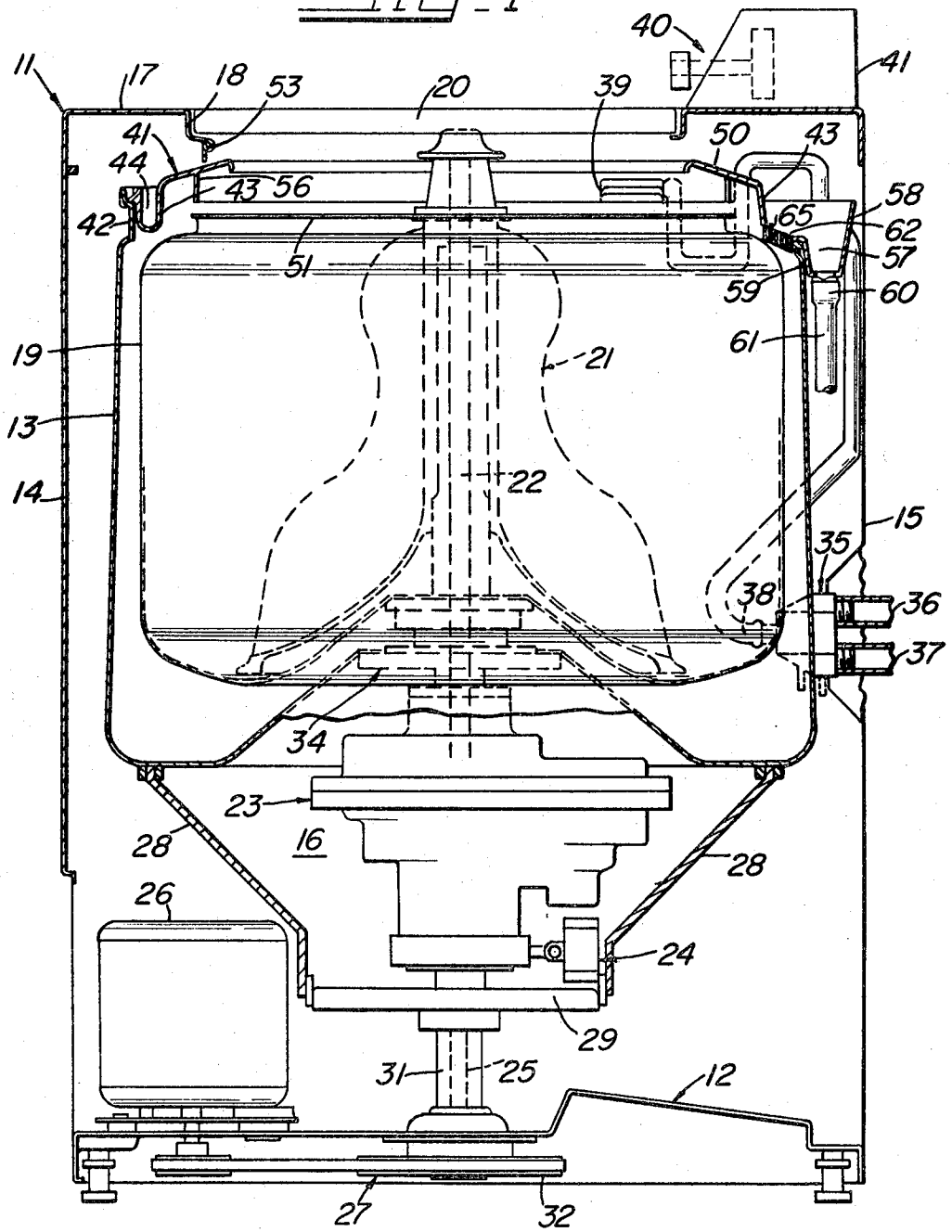
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WASHING MACHINE WITH IMPROVED TUB COVER

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Fig. 1



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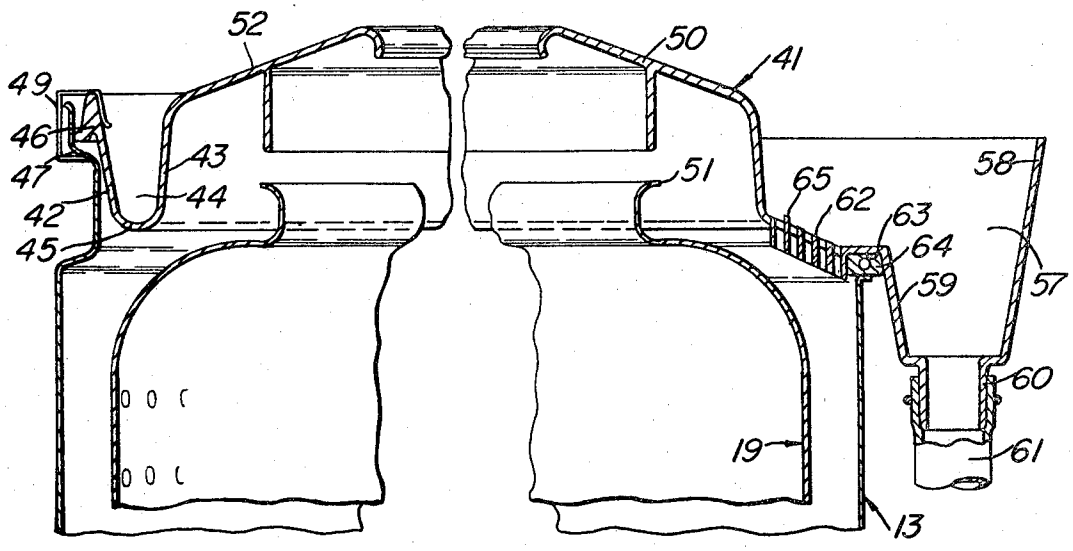
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WASHING MACHINE WITH IMPROVED TUB COVER

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FIG. 2



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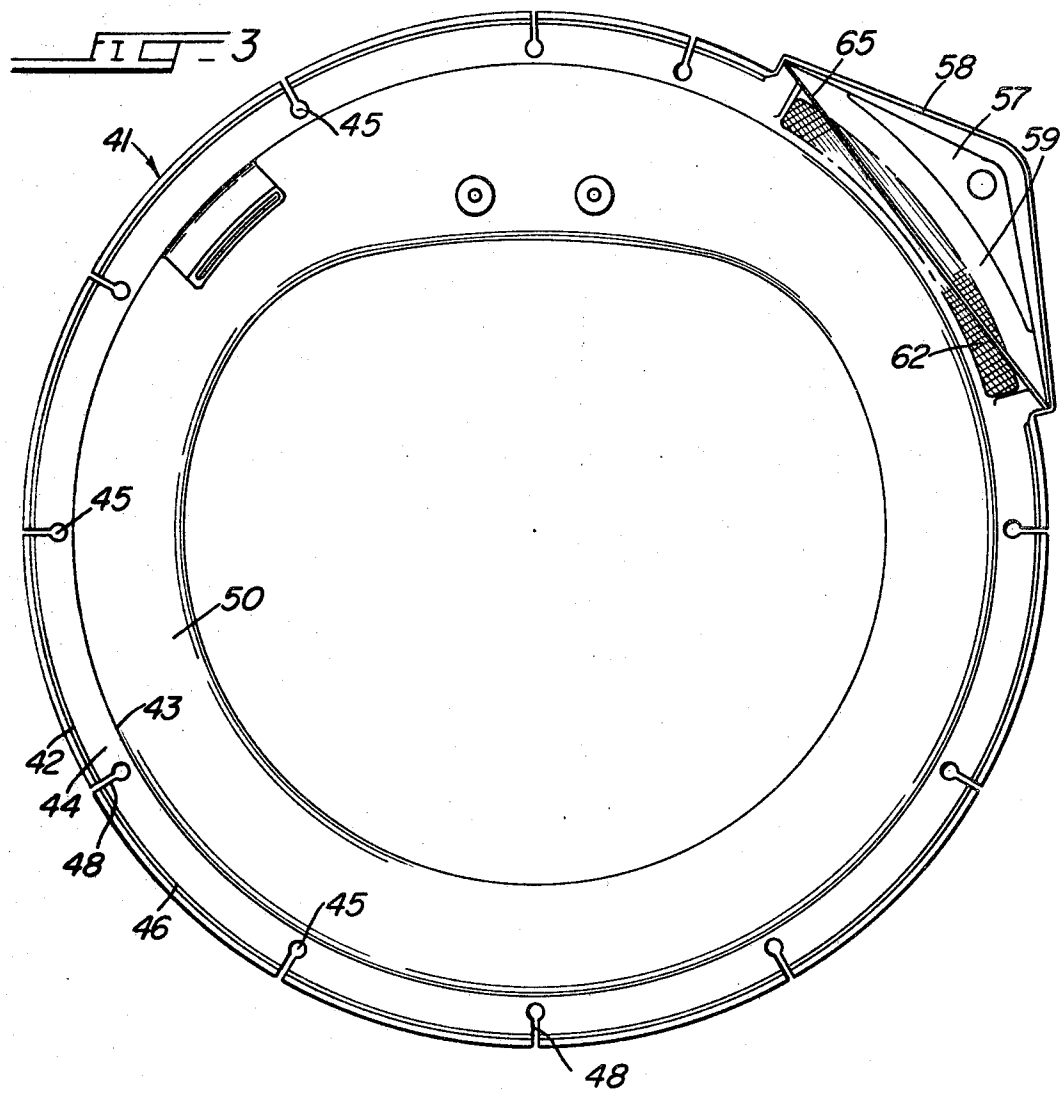
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WASHING MACHINE WITH IMPROVED TUB COVER

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FIG. 3



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WASHING MACHINE WITH IMPROVED TUB COVER

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8 Claims. (Cl. 68—23)

ABSTRACT OF THE DISCLOSURE

An annular cover mounted on a clothes washing machine tub and having a splash guard extending over the rim of a clothes basket in the tub, the cover having an annular trough defined by radially spaced walls, and a bottom wall having drain openings, and the radially outer wall providing a well having a bottom drain opening located exteriorly of the tub and also having a dam to confine a predetermined volume of water in the trough while permitting flow of water in excess thereof over the dam into the well drain, and a honeycomb screen portion of the trough being disposed between the splash guard ring and the well drain for breaking suds and for flow of water from the tub into the well drain to control the water level in the tub.

This invention relates to clothes washing machines and more particularly to the provision of an improved tub cover for such machines.

Clothes washing machines, and particularly automatic washer types, employ a cabinet housing a stationary water-retaining receptacle or tub, an inner perforate clothes-containing basket is positioned in the tub, and an oscillatable agitator in the basket is employed for washing the clothes. Such machines are conventionally referred to as top-loaders as the cabinet, tub, and basket have open aligned tops for inserting and removing clothes from the basket. These machines provide for rotation of the basket on a vertical axis for centrifugal extraction of the water in the clothes and from the basket to the tub and an exterior drain. Electrically-operated devices, such as a motor, and solenoids and switches for brakes and clutches controlling agitator-drive and basket-rotation mechanisms are usually located beneath the tub and also switches and solenoids for water supply valves are mounted between the tub and cabinet. Sequential operation of these devices for automatic operation of the washing machine is controlled by a timer located on a back panel of the cabinet and above the tub, the timer being connected to the motor, solenoids and switches by electrical conductors or wires extending between the cabinet and the tub.

During operation of the washing machine, conventional laundering practice requires water-fill wash and rinse periods, and agitation and extraction periods, in a predetermined sequence controlled by the timer. It is important that water in the tub be prevented from overflowing the tub and into the cabinet as the water may contact the motor and electrically-operated devices causing short-circuiting and damage to the same, in the event a timer motor or water-fill valve solenoid should fail so that the valve remains open with consequent overflow of the water from the tub; or, during agitation, splashing or excessive sudsing of the water results in ejection of water over the top of the tub into the cabinet.

It is an object of my invention to provide an improved cover for a tub of an automatic washing machine, and having a novel construction designed to confine water in the tub, and also to control the water in a manner to prevent flow of the water from the tub and into contact with the motor, or electrical control devices, of the machine

as well as to minimize the possibility of clothes passing from the basket into the tub.

In the preferred embodiment of the invention, the improved tub cover for washing machines comprises a unitary molded plastic annular cover having an outer edge formed to tightly fit on the rim of the tub; a radially inwardly extending portion, overlying the basket to provide a splash guard; and a downwardly projecting cylindrical flange located adjacent the basket rim and providing a barrier to the passage of clothes from the basket into the space between the basket and tub. The cover is further characterized by an annular trough for water which may be splashed over the guard, the trough having drain openings to normally return the water to the tub.

A further feature of the novel cover is a combination water level control and suds-break including a honeycomb structure of the cover disposed at a lower level than the trough and within the tub, the structure having vertical passages to permit an excess volume of water in the tub to flow through the passages and into a well of the cover for disposition to a floor drain. A dam intersects the upper ends of the passages and assists the trough draing openings in returning splashed water to the tub, any excessive flow of splashed water in the trough overflowing the dam and being directed to the well. The honeycomb structure is effective, during the washing operation, to break down suds in the tub thereby preventing suds flowing over the cover and tub and into the cabinet.

Further objects and advantages of the invention will be apparent from the following description, reference being had to the accompanying drawings in which a preferred embodiment of the invention is clearly shown.

In the drawings:

FIG. 1 is a side sectional view of a clothes washing machine including the improved tub cover.

FIG. 2 is an enlarged sectional view illustrating, in greater detail, the tub, basket, and tub cover.

FIG. 3 is a top plan view of the tub cover.

Referring to FIG. 1, the clothes washing machine comprises a cabinet **11**, and a base frame **12** for supporting an imperforate liquid-containing tub **13**. The cabinet includes front and rear walls **14** and **15**, and side walls, one of which is shown at **16**, and a top wall **17** having an access opening **18** for insertion of clothes through the aligned open tops of the tub and a perforate clothes-receiving receptacle or basket **19**. The access opening **18** in the cabinet top wall is closed by a cover **20** hinged to the side wall **16**. An agitator **21** is disposed within the basket **19** and is oscillatable by a shaft **22** connected to a drive mechanism generally indicated at **23**. The drive mechanism is also controllable to rotate the basket upon release of brake mechanism **24**. The drive mechanism **22** is operably connected to a drive shaft **25** rotatable in opposite directions by a reversible electric motor **26** mounted on the base frame **12** of the cabinet and connected to the shaft **25** by a belt and pulley arrangement **27**.

The tub **13** is supported on braces **28** secured at their upper ends to the tub and connected at their lower ends to a mounting plate **29** having a bearing assembly (not shown) for a cylindrical support tube **31** splined to drive shaft **25** driven by a pulley **32** rotatably supported on the base **12**. The tub has its bottom wall provided with a bearing and seal housing **34** rotatably supporting the basket **19**. For a more complete disclosure of the tub and basket support, and agitator and basket drive structure, reference can be made to copending application, Ser. No. 566,449, filed July 18, 1966.

Cold and hot water is supplied to the machine by operation of a valve **35** mounted on the cabinet wall **15** and connected to hot and cold water sources (not shown) by conduits **36** and **37**. The valve is provided with two solenoids operated respectively to control the

valve to permit the flow of hot water or cold water, or to permit the simultaneous flow of hot and cold water to provide passage of warm water through the valve and to and through an outlet conduit **38** connected to the valve and extending upwardly between the cabinet and tub to a water inlet flume **39** formed in the tub cover.

The level to which water rises in the basket may be controlled by any of several conventional water fill controls, such as a timer **40** located in the back panel **41** of the machine, and operative to provide various time-fill periods of the tub by controlling energization of the solenoid-operated water valve **35** in a manner disclosed in copending application, Ser. No. 519,236, filed Jan. 7, 1966.

It will be apparent from an inspection of FIG. 1 that several electrically-operated devices, such as a solenoid-operated valve **35**, motor **26**, and solenoid-operated brake **24**, are located in the cabinet externally of the tub. It is important to prevent water overflowing the tub and contacting these electrically-operated devices with consequent short-circuiting and damage of the devices. Such overflow conditions can occur, for example, by failure of the electric timer motor when its control switches are closed to establish circuits energizing the water valve solenoids causing the water valve to remain open. Another example, accountable for water flowing from the tub, is splashing of water, or excessive sudsing conditions, during the agitation period.

The tub cover **42**, shown in its preferred embodiment, is secured to the top of tub **13**. The cover is a unitary annular member formed of any suitable molded plastic, such as polypropylene having an appropriate filler. The cover comprises generally cylindrical walls **42** and **43** converging downwardly and merging at their lower ends to provide an annular trough **44**, the bottom of the trough having circumferentially spaced drainage openings **45**. As seen in FIGS. 1 and 2, the trough of the cover is located within the open top of the tub, and the radially outer wall **42** of the cover has its upper end formed with a laterally extending annular bead **46** received within and engaging the offset circular rim **47** of the tub. The wall **42** is provided with circumferentially spaced slots **48**, as shown in FIG. 2, extending into the drain openings **45** of the cover so that, when the cover is positioned on the tub and pushed downwardly to engage the cover wall bead **46** with the tub rim **47**, the cover wall **42** may flex and move radially inwardly to tightly engage its bead **46** with the tub rim **47**. It will be apparent that the formation of the plastic cover to provide the trough-defining walls **42** and **43** is also effective to impart a spring-like characteristic to the cover for this purpose. Retention of the cover on the tub may be further assured by a plurality of spring clips **49** circumferentially spaced about the tub rim and gripping the tub rim and cover bead **46**, as shown in FIGS. 1 and 2. A further feature of the cover construction is that the slots **48** in the cylindrical cover wall **42** permit the cover to be flexed to permit satisfactory tight engagement with tub rims having slightly oval shapes, thereby compensating for variations in manufacturing tolerances.

Inclined upwardly and radially inwardly of the cover wall **43** is an annular water-retaining guard **50** extending over and inwardly of the rim **51** of the basket to intercept water flung upwardly from the tub during operation of the agitator in the washing and rinsing operations and during rotation of the basket in the water-extracting operation. In the event any water should be propelled, for example, by splashing, onto the exterior of the cover, the water will flow downwardly along its upper inclined surface **52** and into the trough **44** and through drain openings **45** into the tub. A splash guard ring **53** may be positioned in an annular groove in a depending flange of the top wall **17** of the cabinet, defining the clothes receiving opening thereof, to direct the splashed water toward the surface **52**.

A clothes guard also forms a portion of the tub cover by the provision of a cylindrical collar **56** located radially inwardly of the inner periphery of the cover and positioned above and in alignment with the basket rim **51** in close proximity thereto to thereby minimize the area through which any article can escape into the tub from the basket.

The cover is also formed with an enlarged section receivable within a cut-out U-shaped portion of the tub rim and having a well **57**, which, as shown in FIG. 3 comprises a V-shaped wall **58**, formed as a continuation and merging with the wall **42**, and an arcuate wall **59**, the walls **58** and **59** converging downwardly exteriorly of the tub and terminating in a tubular bottom **60** for connection to a hose **61** leading to a floor drain.

Radially inwardly of the well **51**, the cover is formed with an integral screen **62** of arcuate shape as seen in FIG. 3 and merging at its opposite ends with, and forms a continuation of, the trough **44**. The screen is located inwardly of the tub rim **47** and is inclined radially outwardly thereof extending from the wall **43** to the wall **59** of the well. The screen is in the form of a honeycomb with its radially outer edge and the wall **59** of the well defining a groove **63** for receiving a gasket **64** in sealing engagement with the cut-out U-shaped portion of the tub rim to prevent water flow between the tub rim and cover. The screen has its upper surface provided with a dam **65** slightly projecting above the surface, linearly intersecting the arcuate screen, and connected to the merging ends of the outer wall **42** of the trough and the wall **58** of the well. The dam **56** is effective to direct water through the screen to the tub thereby preventing water in the trough from entering the well. However, in the event excessive water splashing or sudsing occurs, it will be noted the height of the dam permits water to overflow the dam, a substantial portion of this water being returned to the tub by the screen area radially outwardly of the dam. However, should there be any substantial flow, the water will be directed into the well to prevent water flowing from the tub into the space between the tub and cabinet.

An important feature of the screen **62** is in providing a water level control in the event the tub should be filled with water to a level above the screen, for example, if the timer fails during water-fill and the valve remains in open position. In such event, water will rise upwardly in the tub and flow through the screen to the well and floor drain.

A further important functional feature of the screen is its ability to act as a sudsbreaker during operation of the washer. In this respect, it may be noted that the screen honeycomb structure provides a plurality of vertical passages having such depth that, during the washing operation, the screen has proven to be very effective to break down suds rising upwardly between the tub and basket. It will be apparent that, while the screen permits water to freely flow upwardly therethrough from the tub to the well to control the water level in the tub, the screen further serves to break down suds in a manner to control excessive sudsing conditions thus minimizing the possibility of suds flowing over and beyond the cover into the space between the tub and cabinet and contacting electrical components of the washing machine.

The invention is not particularly concerned with the precise construction of the automatic washing machine hereinbefore described generally, but is equally applicable to any type of washing machine embodying an inner clothes-receiving tube and an outer water-collecting tub and, accordingly, the invention is not to be limited to the construction of the washing machine elements as set forth above, except where such construction particularly concerns the invention contemplated.

While a preferred embodiment of the invention has been illustrated and described, many modifications can be made without departing from the spirit of the invention, and the invention is not to be limited to the precise

details of construction set forth, but to all changes coming within the scope of the appended claims.

What is claimed is:

1. In a clothes washing machine having a cabinet, a stationary outer open-top water-containing tub in said cabinet, an open-top perforate clothes basket movably mounted in said tub, and an oscillatable agitator in said basket; the improvement residing in an annular cover positioned on the rim of said tub and comprising means defining an annular trough within said tub, the bottom wall of said trough being provided with drain openings and also having a screen portion for breaking suds rising upwardly between said tub and said basket, and a splash guard ring extending radially inwardly of said trough and over the rim of said basket and operative to direct water, splashed onto the interior surface of said ring, toward said tub, said ring having an exterior surface inclined toward said trough for flow of water, splashed onto said exterior surface, into said trough.

2. In a clothes washing machine as defined in claim 1 wherein said cover is a unitary flexible plastic member having an outer edge resiliently engaging the rim of said tub for securing said cover on said tub.

3. In a clothes washing machine as defined in claim 1 wherein said means defining said trough are radially spaced walls, the radially outer wall being flexible and resiliently engaging the rim of said tub to secure said cover member to said tub rim.

4. In a clothes washing machine having a cabinet, a stationary outer open-top water-containing tub in said cabinet, an open-top perforate clothes basket movably mounted in said tub, and an oscillatable agitator in said basket, the improvement residing in an annular cover positioned on the rim of said tub and comprising: a splash guard ring extending radially inwardly of said tub rim and over the rim of said basket, means defining a drain located exteriorly of said tub, and means in the form of a honeycomb in said tub and disposed between said splash guard ring and said rain-defining means for breaking suds and for providing passages for flow of water in said tub from said tub and into said drain to control the water level in said tub.

5. In a clothes washing machine as defined in claim 4 wherein said cover includes an annular trough between said splash guard ring and the rim of said tub and extending into said tub and provided with openings in the bottom thereof to drain water, splashed onto the top of said guard and flowing into said trough, into said tub.

6. In a clothes washing machine as defined in claim 5 wherein said honeycomb forms a portion of said trough, and a dam extends upwardly of and across said honeycomb to confine a predetermined volume of water in said trough while permitting flow of water, in excess thereof, into said drain.

7. In a clothes washing machine having a cabinet, a stationary outer open-top water-containing tub in said cabinet, an open-top perforate clothes basket movably mounted in said tub, and an oscillatable agitator in said basket; the improvement residing in an annular cover positioned on the rim of said tub and comprising means defining an annular trough within said tub and provided with bottom drain openings, and including radially spaced walls with the radially outer wall being flexible and resiliently engaging the rim of said tub to secure said cover member to said tub rim, said outer wall having a plurality of circumferentially spaced vertical slots, and a splash guard ring extending radially inwardly of said trough and over the rim of said basket and operative to direct water, splashed onto the interior surface of said ring, toward said tub, said ring having an exterior surface inclined toward said trough for flow of water, splashed onto said exterior surface, into said trough.

8. In a clothes washing machine having a cabinet, a stationary outer open-top water-containing tub in said cabinet, an open-top perforate clothes basket movably mounted in said tub, and an oscillatable agitator in said basket; the improvement residing in an annular cover positioned on the rim of said tub and comprising means defining an annular trough within said tub and provided with bottom drain openings, said means defining said trough including radially spaced walls, the radially outer wall having a portion thereof disposed outwardly of said tub and providing a well having a bottom drain opening lower than said trough, and a dam between said wall portion and said radially inner wall and operative to confine a predetermined volume of water in said trough while permitting flow of water in excess thereof into said well, and a splash guard ring extending radially inwardly of said trough and over the rim of said basket and operative to direct water, splashed onto the interior surface of said ring, toward said tub, said ring having an exterior surface inclined toward said trough for flow of water, splashed onto said exterior surface, into said trough.

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WILLIAM I. PRICE, *Primary Examiner.*