June 8, 1965 M. I. GLASS ETAL 3,187,459

TOY WASHING MACHINE

Filed Dec. 13, 1962 2 Sheets-Sheet 1

Fig. 1

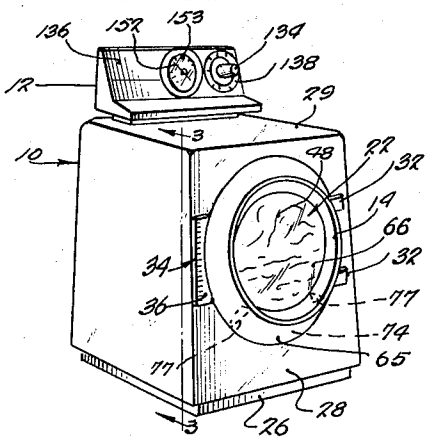


Fig. 4

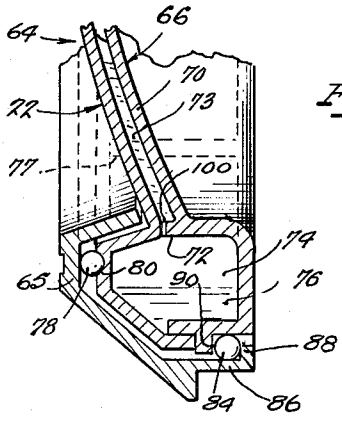


Fig. 3

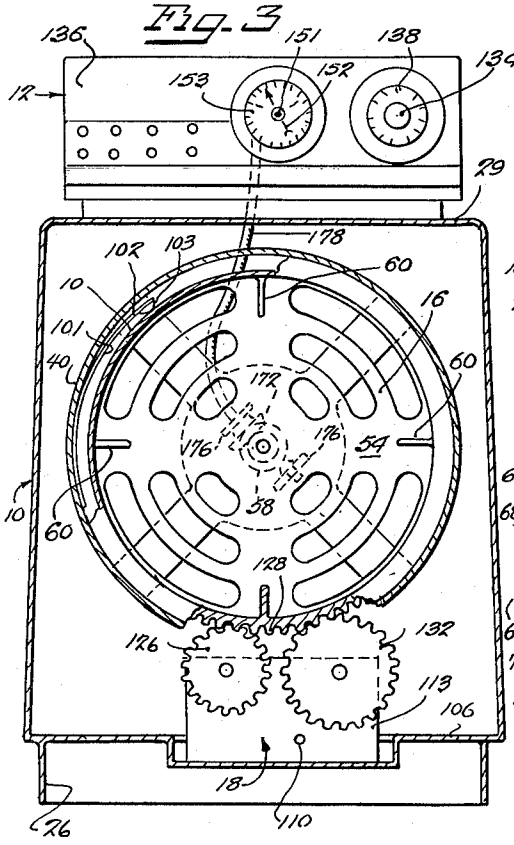
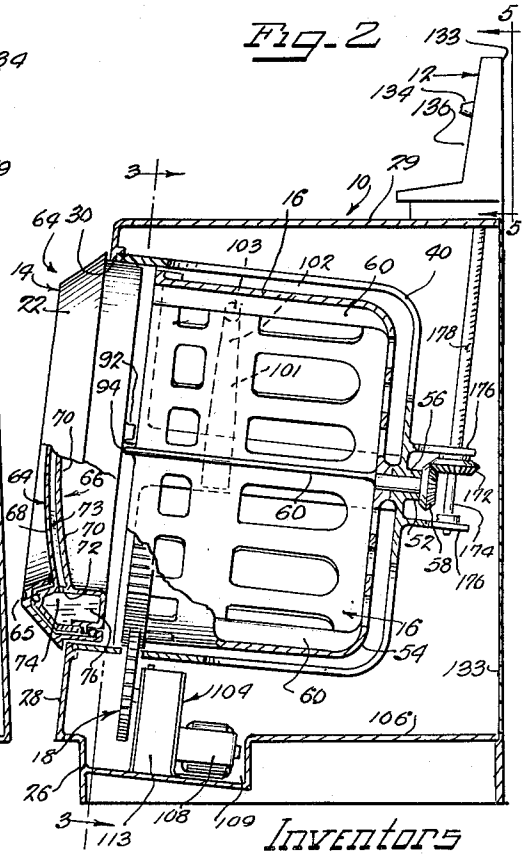


Fig. 2



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Fig. 5

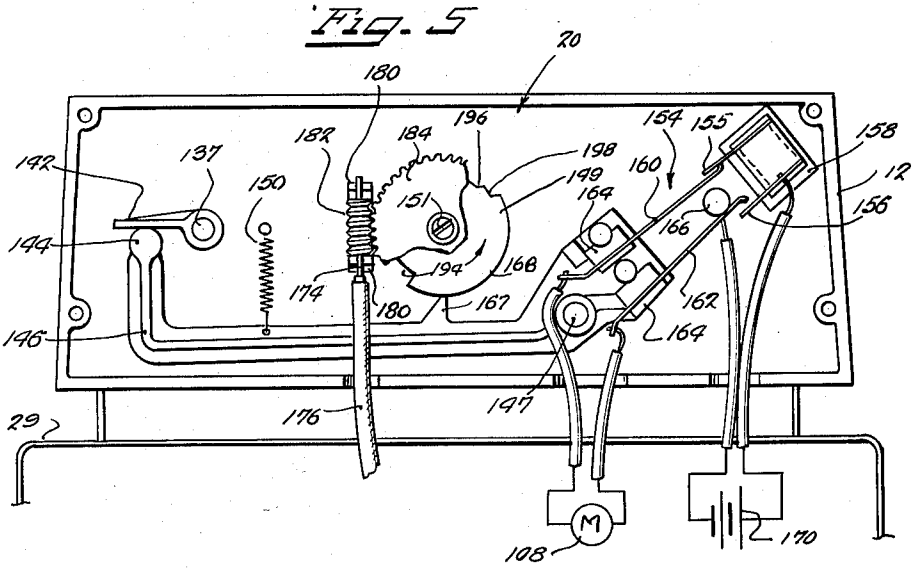


Fig. 7

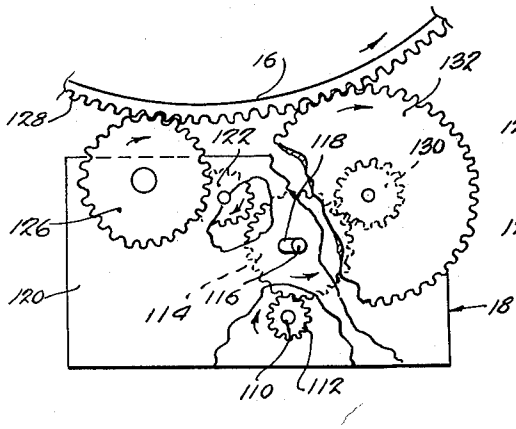


Fig. 6

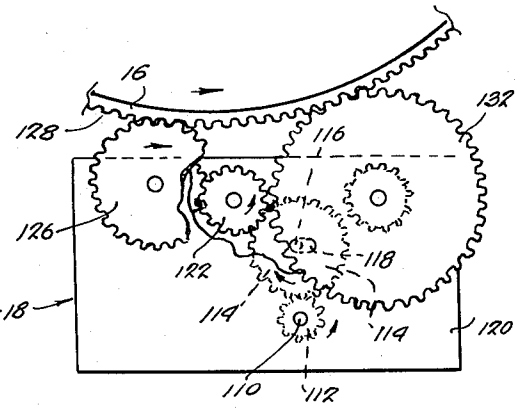
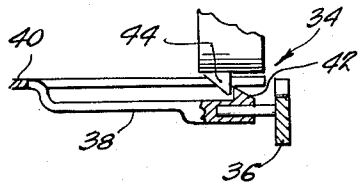


Fig. 8



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TOY WASHING MACHINE

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3 Claims. (Cl. 46—14)

The present invention relates generally to a toy and, more particularly, to a toy washing machine and to components thereof.

Various types of toys modeled after appliances and tools have long been popular for children in that they are both educational and amusing to a child while familiarizing the child with the adult environment about him. Such toy appliances include washing machines, some of which are capable of actually washing a load of articles, such as doll clothes, and thus may cause a mess of spilled water, while others have no facility for receiving a load of articles, and still others give some illusion of washing a load of articles but lack adequate realism.

It is therefore the primary object of this invention to provide a new and amusing toy washing machine. Another object is the provision of a new and amusing toy washing machine which removably receives a load of articles and simulates washing the load while maintaining it in dry condition. Still another object is the provision of a new and amusing toy washing machine having a drum receiving a load of articles and giving the appearance of wash water gradually rising in the drum while retaining the load in dry condition. A further object is provision of a new and amusing toy washing machine having a drum removably receiving a load of articles and simulating wash water sudsing in the drum while retaining the load in dry condition. A still further object is provision of a new and amusing toy washing machine automatically operable through a plurality of cycles simulating normal operation of an automatic washer. A further object is provision of a new and amusing toy washing machine having a novel drive mechanism and, more particularly, a drive mechanism automatically operating the machine through a plurality of cycles simulating automatic washer cycles.

These and other objects of the invention are more particularly set forth in the following detailed description and in the accompanying drawings of which:

FIGURE 1 is a perspective view of a preferred embodiment of the invention in the form of a toy automatic washer;

FIGURE 2 is an enlarged side elevational view with parts broken away for clearer illustration;

FIGURE 3 is an enlarged, sectional view taken generally along the line 3—3 in FIGURE 2;

FIGURE 4 is an enlarged, fragmentary sectional view of a portion of a door shown in FIGURE 2;

FIGURE 5 is an enlarged, fragmentary rear view of the toy washer with parts removed for clearer illustration of a portion of a control assembly;

FIGURE 6 is an enlarged, fragmentary elevational view of a portion of a drive mechanism in slow speed, wash cycle operating position;

FIGURE 7 is a view similar to FIGURE 6, but showing the drive mechanism in high speed, spin drying cycle operating position; and

FIGURE 8 is an enlarged, fragmentary top view of a door latch, with parts broken away for clearer illustration.

The illustrated embodiment of the invention is, in brief, directed to a toy washing machine which receives a load of articles such as doll clothes, and simulates wash water gradually rising and sudsing about the load, while maintaining the load in dry condition and avoiding the possibility of spilling water, and providing a high degree of realism.

Basically, the toy washing machine includes a cabinet 10 and a control panel 12 surmounted adjacent a rear portion of the cabinet. A hinged door 14 is normally latched closed and is swingable to an open position for inserting and removing a load of articles, such as doll clothes, from a drum 16 mounted within the cabinet 10 for movement simulating normal movement of an automatic washer drum. A drive mechanism 18 is provided for driving the drum 16 through a plurality of cycles simulating normal cycles of an automatic washer and is controlled by a control assembly 20. Means including a container assembly 22 in the door 14 is provided for simulating a gradual rise and sudsing of wash water in the drum during a wash cycle, followed by a spin dry-drying cycle and subsequent draining of the water from the drum when the machine is stopped, all while retaining the load within the drum in dry condition.

More particularly, and with initial reference to FIGURE 1, the toy washing machine has an outward appearance modeled along the lines of a typical automatic washer with a box-like cabinet 10 supported on a inset base 26. A front wall 28 of the cabinet is preferably inclined slightly rearwardly toward a top 29 and has an opening 30 normally closed by the door 14 secured to front wall 28 in any suitable manner as by hinges 32 for swinging movement to an open position. The opening 30 and the door 14 are preferably circular. A latch mechanism 34 releasably retains the door 14 in closed position and has an actuator 36 operable for releasing the door for swinging movement to open position.

As may best be seen in FIGURE 8, the latch mechanism 34 includes a resilient arm 38 preferably integral with a generally cylindrical drum housing 40 which is rigidly secured to the cabinet front wall 28, and having an open end concentric with the front wall opening 30. A keeper 42 on a free end of the arm 38 adjacent the cabinet front wall is beveled to ride over a beveled detent 44 on an edge of the door 14 to latch the door closed. The latch actuator 36 is rigidly secured on the free end of arm 38 for flexing the arm to free keeper 42 from detent 44 when opening the door.

A load of articles 48, for example doll clothes, may be inserted through the cabinet opening 30 and an end of a generally cylindrical basket type washer drum 16, whereupon the door 14 may be closed in the same manner as loading of an automatic washer.

To enhance realism in operating the toy washer, the drum 16 is mounted in the cabinet 10 for movement simulating movement of an automatic washer drum, and herein a shaft 52 is fixedly mounted in the center of a rear wall 54 of the drum and is journaled in a bearing portion 56 in the center of the drum housing 40 so that the drum rotates concentrically of the housing. The shaft 52 is retained in the bearing portion 56 by a pinion 58 fixedly secured to an outer end of the shaft for operating the control assembly 20, as will be fully described hereafter. As the drum rotates, ribs 60 extending inwardly from the drum wall tumble the load within the drum.

The wash water simulating means 22, in non-wetting association with the interior of the drum 16 and the load therein, simulates a gradually rising and sudsing of wash water in the drum 16, and herein includes a container assembly 64 rotatably mounted in a frame 65 of the door 14 for rotation with the drum 16. More particularly, the container assembly 64 includes a transparent container 66 similar in outward appearance to a typical transparent glass in an automatic washer door so that the load and washing action within the washer drum may be readily observed. The container 66 includes an outer shallow dish shaped transparent member 68 and spaced slightly in-

wardly therefrom a similar inner transparent shallow dish shaped member **70** connected by an annular peripheral wall **72** to define a narrow dish shaped chamber **73**.

A reservoir **74** normally contains a wash water simulating liquid **76**. With particular reference to FIGURES 1, 2 and 4 of the illustrated embodiment, the reservoir **74** is an annular segment and extends approximately 120° about the peripheral wall **72**, being in lowermost position when stopped. It should be noted that the outer transparent member **68** (FIGURE 4) is integral with an annular outer wall defining part of the reservoir **74**, and the inner transparent member **70** is integral with an inner wall defining part of the reservoir, with these walls suitably secured to each other by an annular outer wall defining an outer periphery of the reservoir. Opposite ends of the reservoir are closed by end walls **77**. Means is provided mounting the container assembly **64** for rotation in door frame **65** and herein bearings, such as ball bearings **78** are received in circular race **80** in the front wall and are seated on a front inner surface of the door frame **65**, and a second set of ball bearings **84** are received in an annular race **86** in the outer peripheral wall and ride on the inner surface of a cylindrical outer peripheral portion of door frame **65**. An inwardly extending annular flange **88** on the rear edge of the door frame **65** cooperates with an outwardly extending angular flange **90** on the rear wall in defining the bearing race **86** and for retaining the container assembly **66** in the door frame.

Thus, the container assembly **64** is rotatably mounted in the door frame **65** and is releasably connected for rotation with drum **16** by means of a rearwardly extending lug **92** on the rear wall of the reservoir **74** which freely abuts a forwardly extending lug **94** on the front end of drum **16**.

The wash water simulating liquid **76** is normally retained in the reservoir **74** when the container assembly is at rest. Responsive to rotation of the container assembly **64** at a relatively slow speed during a wash cycle of about 1½ minutes and at about 15 r.p.m., the liquid **76** in the reservoir **74** is carried upwardly in the reservoir, and transfer means in the form of the reservoir and openings **100** in the peripheral wall **72** is provided for the flow of the liquid into the container **73**. Preferably, three such openings **100** are provided, two adjacent the opposite end walls **77** of the reservoir, and one equally spaced therebetween. The liquid **76** passes through the openings when they are in elevated position, and into the chamber **73** between the transparent members **68** and **70** giving the appearance of wash water gradually rising in drum **16** as viewed through the transparent portion of door **14**. At the same time the load of articles **48** within the interior of the drum **16** is being tumbled about by ribs **60**, thus giving the illusion of wash water gradually rising over the load as in a typical automatic washer.

Responsive to more rapid rotation of the container assembly **64** during a spin drying cycle of about ½ minute at about 60 r.p.m., the liquid **76** in the chamber **73** between the transparent members **68** and **70** is swirled outwardly against the peripheral wall **72** as in a spin drying cycle of an automatic washer. As the liquid is swirled against the peripheral wall, at least part of the water passes back through the openings and into the reservoir. On stopping rotation of the container assembly **64**, any liquid **76** in the chamber **73** drains through the openings **100** and back into the reservoir.

With reference to FIGURE 2, brake means is provided for smoothing out rotation and preventing free wheeling of the drum **16**, and herein this means is in the form of a spring arm **101** extending inwardly from the drum housing **40** and urged against the outer cylindrical periphery of the drum **16** to provide a drag on the drum.

Thus, the liquid **76** is confined in non-wetting association with the interior of the drum **16** and the load therein, thereby avoiding any possible spiliage of the liquid as a child plays with the toy washing machine.

In order to simulate sudsing of the liquid **76** as it flows into the transparent container **66**, a liquid such as water may contain a suitable sudsing agent such as a weak soap solution producing suds bubbles which are easily dissipated. Thus, when the toy washer moves from its wash cycle to its spin drying cycle, the additional speed and agitation of the liquid within the transparent container **66** breaks the suds bubbles permitting the liquid to flow back into the reservoir **74** upon stopping operation of the drum **16** and the container **66**.

Drive means for rotating the drum **16** and the container assembly **64** at slow and high speeds simulating wash and spin drying cycles of an automatic washer is provided and includes a system of rotors in the form of gear trains within a casing **104** mounted on a bottom wall **106** of the cabinet **10**, as may be seen in FIGURES 2, 3, 6 and 7. In the illustrated embodiment, a reversable electric motor **108** is mounted on the cabinet bottom wall **106** and has a drive shaft **110** on which is fixedly mounted a driving pinion **112** of a gear train for the driving drum **16**. More particularly, the pinion **112** is drivingly meshed with an idler gear **114** on a shaft **116** which is rotatably received in a slot **118** in a mounting plate **120** of the casing **104**, thus mounting the idler gear **114** for movement transversely of its axis of rotation defined by the shaft **116**. As shown in FIGURE 6, during slow speed wash cycle operation, the motor shaft pinion **112** is driven counterclockwise, thus moving the idler gear **114** transversely of its axis of rotation and along the slot **118**, to a position at the left of the slot, as viewed in FIGURE 6, in which position the idler gear **114** is meshed in driving engagement with an idler pinion **122** journaled on the mounting member **120** and having a larger gear **126** meshed in driving engagement with an outwardly extending angular ring gear **128** on the front end of the drum **16**.

High speed spin drying cycle operation of the drum **16** and container assembly **64** occurs responsive to reversing the direction of rotation of the motor **108**. In the illustrated embodiment, upon reversing the motor **108** the driving pinion **112** is rotated clockwise, as seen in FIGURE 7, thus moving the idler gear **114** transversely of the axis of its shaft **116** and to an opposite end of the slot **118**. In this position the idler gear **114** is out of engagement with the idler pinion **122** and moves into meshed driving engagement with a pinion **130** of a gear cluster rotatably mounted on the mounting member **120** and having a large gear **132** in meshed driving with the ring gear **128** on drum **16**. The gears **126** and **132** rotatably support the front end of the drum **16**.

Actuating means for starting operation of the toy washing machine and controlling the drive means to operate the toy through a plurality of cycles simulating automatic washer cycles, and then stopping operation of the toy washing machine with the reservoir **74** in lowermost position is provided in the preferred embodiment in the form of the control mechanism **20** contained within the control panel **12**. More particularly, as illustrated in FIGURE 5 wherein a rear panel **133** is removed for clearer illustration, a knob **134** is rotatably mounted on a front wall **136** of the control panel by means of a shaft **137** fixedly secured to the knob. The knob may be suitably associated with a dial **138** carrying appropriate indicia simulating that of a typical automatic washer. A finger **142** within the control panel is fixedly mounted on the shaft **137**, and upon operating knob **134** to rotate the finger counter-clockwie to the position seen in FIGURE 5, the finger depresses an upstanding end **144** of a lever **146** journaled at an opposite end by means of a shaft **147** mounted on the control panel. This lever is urged upwardly, into engagement with a cam **149**, by means of a tension spring **150** anchored at one end to an intermediate portion of the lever and at an opposite end to the control panel. The cam **149** makes one revolution during a complete operating cycle, and is fixedly mounted on a shaft **151** journaled in and extending through the front wall of the control panel and carrying an indicator **152**

at its outer end. This indicator cooperates with a suitable dial 153 on the control panel for indicating the operating condition of the toy washer, as in an automatic washer.

A switch mechanism 154 is mounted within the control panel 12 and includes a pair of integral, spaced apart spring finger contacts 155 and 156 anchored on an insulating member 158 secured to the control panel. These contacts cooperate with a pair of movable resilient spring arm contacts 160 and 162 fixedly mounted on insulating blocks 164 firmly secured to the end of the lever 146 adjacent its shaft 147, and connected in circuit with opposite terminals of the motor 108. An intermediate fixed contact 166 is mounted on and insulated from the contact panel 12 in a location between the spring arm contacts 160 and 162. As illustrated in FIGURE 5, the lever 146 has been pivoted about its shaft 147 to a wash cycle position in which a follower 167 engages a high portion 168 of the cam 149, so that the spring arm contact 160 is in engagement with the fixed finger contact 155, and the fixed intermediate contact 166 is in engagement with the spring arm contact 162, thus closing a circuit between a suitable source of electrical power, such as a battery 170 having one terminal connected with fixed intermediate contact 166 and a second terminal connected with fixed leaf contacts 155 and 156, for driving the motor in a first direction. In this position, the drum 16 and the container assembly 64 is driven through a wash cycle by the drive mechanism which is in the position shown in FIGURE 6.

With reference to FIGURES 2 and 3, the control assembly includes the pinion 58 fixedly mounted on the drum shaft 51 and this pinion is drivingly meshed with a pinion 172 fixedly mounted on the end of a flexible rotating cable 174 carried within a tubular casing 176 which is firmly anchored at a lower end in a flange 176 extending outwardly from the drum housing 58 and at an upper end in flanges 180 on control panel 12. Between the flanges 180 is a worm 182 fixedly secured to the upper end of cable 174 and drivingly meshed with a gear 184 on the shaft 151. The gear 184 is fixedly secured to the cam 149 for rotating the cam 149 in a counter-clockwise direction as indicated by the arrow in FIGURE 5. As the cam 149 is driven in a counter-clockwise direction, and with its high portion 168 in engagement with the follower 167 on the lever 146, the drive mechanism is positioned for wash cycle operation. Continued rotation of the drum 16 drives the cable 174 to rotate the cam until the follower 167 moves off of the cam high portion 168 and on to a cam low portion 194, thus moving lever 146 clockwise so that the spring arm contact 166 is out of engagement with the fixed finger contact 155, and the fixed intermediate contact 166 is out of engagement with the spring arm contact 162 and moves into engagement with the spring arm contact 160 as the spring arm contact 162 engages the fixed finger contact 156. Thus the current flow to the motor 108 and the direction of rotation of the motor is reversed, moving the idler gear 114 to an opposite position, as shown in FIGURE 7, for spin drying operation of the toy washing machine, as previously described. The toy washing machine now remains in spin drying operation until the cam 149 rotates counter-clockwise sufficiently so that the follower 167 moves up an inclined portion 196 of the cam and on to an immediate step 198 thus stopping operation of the motor and rotation of drum 16 and container assembly 64 by positioning the fixed intermediate contact 166 out of engagement with either of the spring arm contacts 160 or 162, thus breaking the electrical circuit to motor 108. Thus, the cam 149 stops in a predetermined position and because of a positive drive between the drum 16 and the cam, the drum stops so that the reservoir 74 is in lowermost position.

To summarize the operation of the toy washing machine, when the toy is in off position, a child operates the latch actuator 36 and swings the door 14 open to insert a load of doll clothes or other articles into the drum 16. The door 14 is now latched closed and the operating knob 134 is rotated to depress the finger 142 and move the lever 146 counter-clockwise thus moving switch assembly 154 from open position to the wash cycle position as shown in FIGURE 5, starting the motor 108 operating in a direction for engaging the gear train as shown in FIGURE 6 and rotating the drum 16 and the container assembly 64 at a slow wash cycle speed. Such rotation of the container assembly 64 causes the liquid 46 in the reservoir 74 to move upwardly and flow through the openings 100 in the peripheral wall and into chamber 73 so that the level of the liquid between transparent members 68 and 70 gradually rises to give the appearance of gradual filling of the drum 16 and sudsing within the drum while maintaining the interior of the drum and the load therein in dry condition. Rotation of the drum 16 drives the cable 174 to rotate the cam 149, causing the motor 108 to reverse direction. On reversing motor 108 the gear train is shifted to the position shown in FIGURE 7 for high speed spin drying rotation of the drum 16 and container assembly 64 in the same direction as during wash cycle operation. Further rotation of the cam stops the motor and drum.

Extreme realism closely simulating normal operation of a modern automatic washer is provided by the toy washing machine described herein. Both gradual filling of the toy washer drum 16 with a liquid simulating wash water, and sudsing of the liquid, is provided while maintaining the load in the drum in dry condition and avoiding any possible spillage of the liquid. The cabinet door 14 may be opened and closed for loading the drum, and a transparent portion of the door, defined by container 66, permits viewing operation of the drum and tumbling of the load therein as the washer operates through a plurality of cycles simulating normal automatic washer cycles. The drum drive provides a dependable transmission for rotating the drum through the washer cycles.

While this invention has been described with reference to specific structure in a particular environment, various changes may be apparent to one skilled in the art and the invention is not to be limited to the specific structure and environment. Various of the features are set forth in the following claims.

What is claimed is:

1. A toy washing machine comprising a cabinet having an opening in the front wall thereof, a drum rotatably mounted in said cabinet and having the open end thereof aligned with the front wall opening, a door mounted on said cabinet for swinging movement to and from a closed position across said front wall opening, said door comprising a frame hingedly connected at one side to said cabinet front wall, a circular transparent housing mounted in said door frame for rotation relative thereto with the peripheral portion of said housing concealed within the frame, a liquid normally disposed within the concealed peripheral portion of said transparent housing, drive means connected with said drum and operable to effect rotation of the drum at different speeds, means on said drum and on said transparent housing in position for engagement when said door is closed and operative to cause rotation of said housing in response to rotation of said drum, and liquid transfer means in said housing effective to cause the liquid in said peripheral portion to gradually rise in said housing at the slower speed of rotation of said drum and housing and reach a liquid level viewable through the transparent housing, and said transfer means being effective to cause the liquid to return to said peripheral portion and thus disappear from view at a faster speed of rotation of said housing.

2. A toy washing machine comprising a cabinet having an opening in the front wall thereof, a drum rotatably mounted in said cabinet and having the open end thereof aligned with the front wall opening, a door mounted on said cabinet for swinging movement to and from a closed position across said front wall opening, said door comprising a frame hingedly connected at one side to said

cabinet front wall, a circular transparent housing mounted in said frame for rotation relative thereto and including a peripheral portion concealed within the frame, a liquid normally disposed within the concealed peripheral portion of said transparent housing, a passageway in one wall of said peripheral portion providing fluid communication between said peripheral portion and the exposed central portion of said transparent housing, drive means connected with said drum and operable to effect rotation of the drum at two different speeds, means on said drum and on said transparent housing in position for engagement with each other when said door is closed and operative to cause rotation of said housing relative to said door frame in response to rotation of said drum, said passageway providing a liquid transfer means which is effective to cause the liquid in said peripheral portion to flow into the central portion of said transparent housing and gradually rise in said housing at the slower speed of rotation of said housing and thereby reach a liquid level viewable through the transparent housing and said passageway being effective to cause the liquid to return to said peripheral portion and thus disappear at a faster speed of rotation of said housing.

3. A toy washing machine comprising a cabinet having an opening in the front wall thereof, a drum rotatably mounted in said cabinet and having the open end thereof aligned with the front wall opening, a door mounted on said cabinet for swinging movement to and from a closed position across said front wall opening, said door comprising a frame hingedly connected at one side to said

cabinet front wall, a circular transparent housing mounted in said door frame for rotation relative thereto with the peripheral portion of said housing concealed within the frame, a liquid normally disposed within the concealed peripheral portion of said transparent housing, drive means connected with said drum and operable to effect rotation of the drum at different speeds, means on said drum and on said transparent housing in position for engagement when said door is closed and operative to cause rotation of said housing in response to rotation of said drum, liquid transfer means in said housing effective to cause the liquid in said peripheral portion to gradually rise in said housing at the slower speed rotation of said drum and housing and reach a liquid level viewable through the transparent housing, and said transfer means being effective to cause the liquid to return to said peripheral portion and thus disappear at a faster speed of rotation of said housing, and control means for said drive means including a manually operable member for starting the drive means and means for changing the speed of said drive means after a predetermined period of time of operation and for stopping said drive means after another predetermined period of time.

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