Sept. 5, 1967 J. A. DICKEN, JR 3,339,587

DISCHARGE DEVICE FOR AN AUTOMATIC WASHING MACHINE

Filed April 6, 1964

FIG. 1

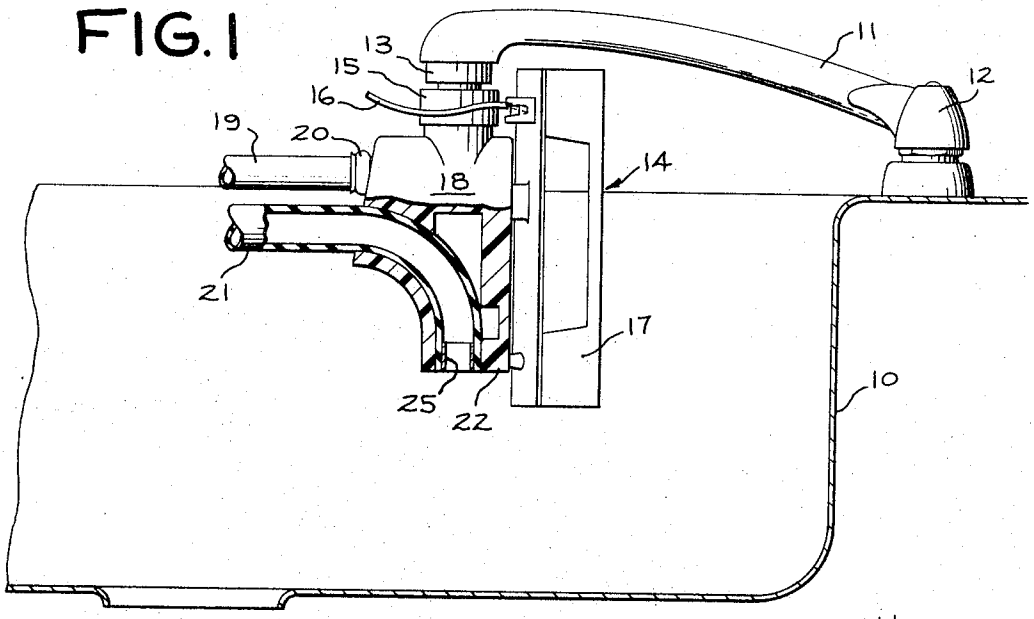


FIG. 2

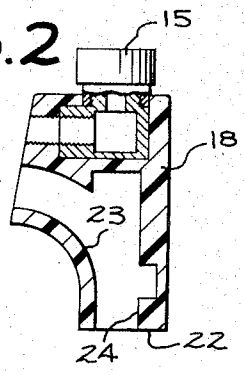


FIG. 4

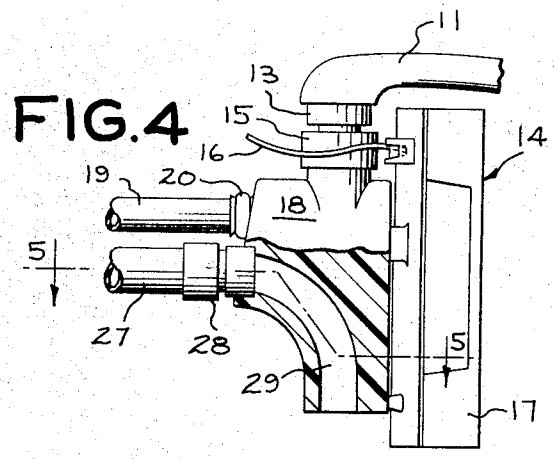
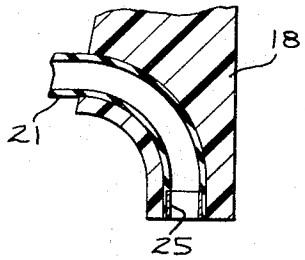


FIG. 3



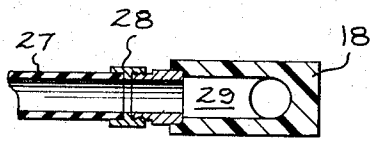


FIG. 5

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DISCHARGE DEVICE FOR AN AUTOMATIC WASHING MACHINE

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4 Claims. (Cl. 137—801)

This invention relates generally to fluid handling devices and, more particularly, to an improved discharge device for an automatic washing machine.

A discharge device of the general type herein described is particularly adapted, though not necessarily limited thereto, for use in combination with a kitchen sink. Such discharge devices are usually supported from a water faucet disposed above the sink and the device usually is combined with means to connect the washing machine to the faucet so that water is transmitted from the faucet to the washing machine. One problem often created with a discharge device supported above a sink, as just described, is that the discharge fluid splashes as it strikes the sink since the rate of flow from the device must be moderately high in order to drain the washing machine within a reasonable length of time. Various devices have been proposed heretofore to minimize splashing and these have generally included screen-like aerator devices to reduce the energy level of the fluid as it leaves the discharge device. These arrangements have one obvious drawback when employed with a washing machine which discharges a fluid having soil particles entrained therein; namely, the screen-like elements tends to become clogged by the soil particles. The present invention is directed toward overcoming the aforementioned splash problem without giving rise to a secondary problem in the form of a screen susceptible to clogging.

It is an object of this invention to provide an improved discharge device for an automatic washing machine.

It is another object of this invention to provide a discharge device for an automatic washing machine which minimizes splash as the fluid strikes the receptacle.

It is a further object of this invention to provide a non-clogging discharge device.

It is a further object of this invention to provide a non-clogging discharge device adapted to be supported above a sink and which minimizes splash as the fluids being discharged strike the sink.

Briefly stated, in accordance with one aspect of the invention, I provide a discharge device for an automatic washing machine including a housing or body and means to support the housing above a receptacle such as, for example, a sink. The housing is adapted to receive a portion of the discharge conduit interconnecting the discharge device with the automatic washing machine. The housing has internal surfaces to form at least a part of the portion of the conduit which is received by the housing, into a smooth curve whereby the terminal end of a conduit is directed toward the receptacle. In a specific embodiment of the present invention, the radius of curvature of the smooth curve is large enough to maintain substantially laminar flow within the conduit.

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention, it is believed the invention will be better understood from the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is an elevational view, partially cut away to show details, of one embodiment of the present invention;

FIGURE 2 is a detail view of the present invention with some parts removed for clarity;

FIGURE 3 is a partial view of the present invention

showing a slight modification of the embodiment of FIGURE 1;

FIGURE 4 is a view similar to FIGURE 1 but showing a second embodiment of the present invention; and

FIGURE 5 is a view taken along line 5—5 of FIGURE 4.

Referring now to the drawings, and particularly to FIGURE 1, the invention is shown, for purposes of illustration, in connection with a kitchen sink **10** equipped with a faucet **11**. The faucet **11** is provided with a conventional valve operator **12**. Faucet **11** terminates at a generally downwardly extending outlet **13**. An assembly **14**, with which the present invention may be employed, is provided with a connecting means **15** which is adapted to slip over and become secured to the faucet outlet **13**. A manually operable lever **16** is associated with connecting means **15** to facilitate the connection and disconnection of assembly **14** with outlet **13**. Connecting means **15** secures assembly **14** to faucet outlet **13** in liquid-receiving relation thereto so that when valve operator **12** is opened water will be introduced into assembly **14** through a substantially liquid-tight seal between outlet **13** and assembly **14**.

Assembly **14** includes a handle **17** which facilitates handling of the assembly during connection or disconnection of assembly **14** from outlet **13**, as well as at other times. Assembly **14** further includes a housing or body portion **18**. The upper portion of body **18**, attached to the connecting means **15**, has an internal liquid passageway to convey the water received from outlet **13** to a conduit **19**. Conduit **19**, which extends to the water inlet of an automatic washing machine (not shown), is secured to housing **18** by means of a coupling **20**.

The structure thus far described, and its cooperation with the faucet and sink, is for all practical purposes conventional and forms no significant part of the present invention. The present invention, which will be particularly described hereinafter, may be employed with arrangements significantly different from that thus far described.

As mentioned earlier, the present invention is particularly concerned with the handling of effluent discharge from an automatic washing machine. More particularly, the present invention is concerned with a discharge device to discharge the effluent into a receptacle such as, for example, a kitchen sink with a minimum of splash. Moreover, apart from minimizing splash the present invention is also intended to provide a discharge device which will pass fluid containing soil particles without becoming clogged or without having the soil particles trapped within the device.

In accordance with the present invention, an effluent discharge conduit **21** extends from the outlet of the automatic washing machine (not shown) into housing **18** through the same side wall to which conduit **19** is secured. Conduit **21** terminates at or near the lower end **22** of body **18**. Body **18** has at least one internal surface **23** which forms conduit **21** into a smooth curve as it is received by body **18**. As best shown in FIGURE 2, the lower portion of body **18**, in the preferred form of the present invention, has a curved surface **23** at only the inner arc of the curve through which conduit **21** is formed. At the lowermost portion of body **18** immediately adjacent the lower end **22**, surface **24** projects so as to grasp the end of conduit **21**. Cooperation between surfaces **23** and **24** secure the conduit in the desired curved form.

It has been found in practice that when a conduit such as conduit **21** is formed into the curve illustrated in the drawings, the terminal end of the conduit tends to flatten or depart from its normal circular cross section. To overcome this tendency, a ring **25** of suitably rigid material is inserted into the terminal end of conduit **21**. It is

necessary that ring **25** be sufficiently rigid to maintain the conduit in a substantially circular cross section, and, at the same time, be constructed of sufficiently thin material to avoid catching soil particles as they pass through the conduit and to prevent turbulent flow which will cause splashing. If desired, the conduit may be provided with an indentation as shown in FIGURE 3 to receive the metal ring **25** thereby to provide a substantially continuously smooth internal surface for the conduit.

FIGURES 4 and 5 illustrate a second embodiment of the present invention wherein the effluent conduit **27** terminates adjacent body **18** and is secured thereto by a coupling **28** in a manner similar to the connection of conduit **19** by means of coupling **20**. In this embodiment, body **18** is provided with a passageway **29** therein which extends from coupling **28** through a smooth curve to terminate at the lower extremity of body **18**.

Passageway **29** has a curvature essentially identical to that created by conduit **21** in the embodiment of FIGURE 1. In other words, the internal surfaces of passageway **29** provide a configuration substantially identical to the internal surfaces of the portion of conduit **21** received by body **18** in FIGURE 1.

It can be seen that either of the above-described embodiments of the present invention provides an improved discharge device for an automatic washing machine which is substantially non-clogging in view of the fact that no abrupt changes in direction of liquid flow occur and, moreover, only a smooth conduit is presented to the fluid with no indentations or protrusions to trap soil particles.

The embodiment of FIGURE 1 further provides an essentially trouble free device of very low cost construction. Since body member **18** may be a two-piece molding of economical material and no coupling is necessary to connect conduit **21** to body **18**.

One important aspect of the present invention is that the design of either of the above-described embodiments minimizes splash as the fluid leaving assembly **14** strikes the bottom wall of sink **10**. Minimizing of splash is achieved because each of the designs maintains laminar flow at the outlet. Fluid leaving a discharge device to be discharged into a receptacle creates more splash if it leaves the device under turbulent conditions rather than laminar. Discharge devices having an abrupt, substantially 90° change of direction therein create turbulent conditions in the fluids passing therethrough.

The maintenance of laminar flow of the fluid passing through the discharge device is a function of at least four variables: viscosity of the fluid, velocity of the fluid, diameter of the conduit, and the radius of curvature of the bend in the conduit through which the fluid passes. It has been found in practice that with ordinary vitiated wash water having a viscosity of 0.47×10^{-2} poises and being pumped through the device at a velocity of 6 feet per second, with the diameter of the conduit or passageway being ½ inch, a radius of curvature of 1½ inches or greater will maintain laminar flow at the outlet of the discharge device.

Thus, it can be seen that the present invention provides an improved discharge device for an automatic washing machine which is substantially non-clogging and which minimizes splash as the fluid being discharged strikes the receptacle into which it is being discharged.

As will be evident from the foregoing description, certain aspects of the invention are not limited to the particular details of construction of the examples illustrated, and it is contemplated that various and other modifications or applications will occur to those skilled in the art. It is therefore intended that the appended claims cover such modifications and applications as do not depart from the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A device to direct the flow from the discharge conduit of an automatic washing machine into a receptacle comprising:

(a) a housing,

(b) means to support said housing above the receptacle,

(c) said housing adapted to receive therein a portion of the discharge conduit,

(d) said housing having an internal surface to form at least a part of said portion into a smooth curve whereby the terminal end of the conduit is directed toward the receptacle.

2. Effluent discharge means for an automatic washing machine comprising:

(a) a housing,

(b) means to support said housing above a receptacle,

(c) a flexible conduit extending from the effluent outlet of the washing macine,

(d) said housing receiving therein a portion of said conduit immediately adjacent the terminal end of said conduit,

(e) said housing having an internal surface to form at least a part of said portion into a smooth curve whereby the terminal end of said conduit is directed toward the receptacle,

(f) the radius of curvature of the smooth curve being sufficiently large to maintain substantially laminar flow of the fluid within said conduit.

3. Effluent discharge means for an automatic washing machine comprising:

(a) a housing,

(b) means to support said housing above a receptacle,

(c) a flexible conduit extending from the effluent outlet of the washing machine,

(d) said housing receiving therein a portion of said conduit,

(e) said housing having an internal surface to form at least a part of said portion into a smooth curve whereby the terminal end of said conduit is directed toward the receptacle.

4. The invention of claim **2** further comprising a thin rigid ring disposed within said terminal end of said conduit to prevent flattening of said conduit.

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