

[54] **FLUID CONTROL MECHANISM FOR APPLIANCES**

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[51] Int. Cl. **B08b 3/00**

[58] Field of Search **137/624.11, 624.18, 360, 137/607; 134/58; 68/207**

[56] **References Cited**

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Primary Examiner—Alan Cohan

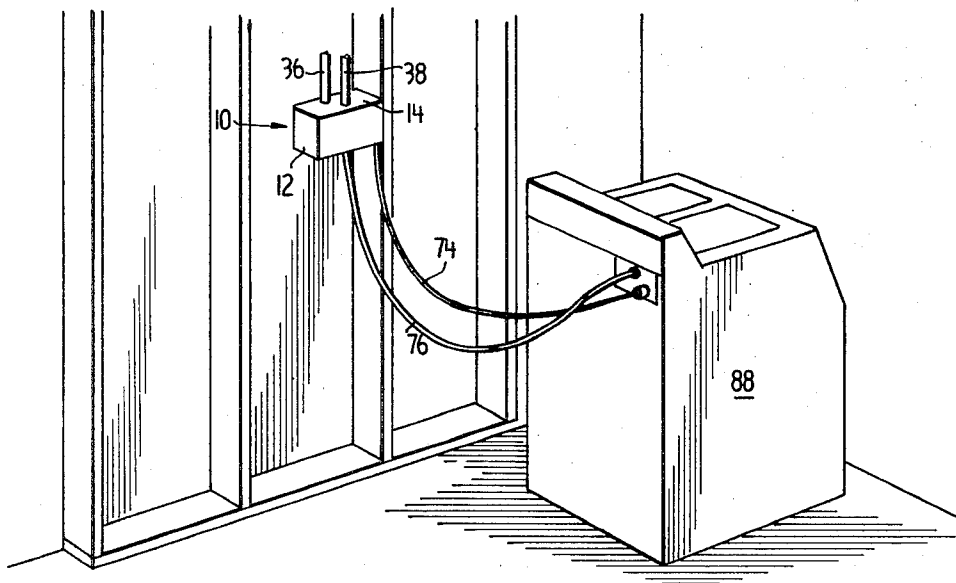
Attorney, Agent, or Firm—Martin J. Spellman, Jr.

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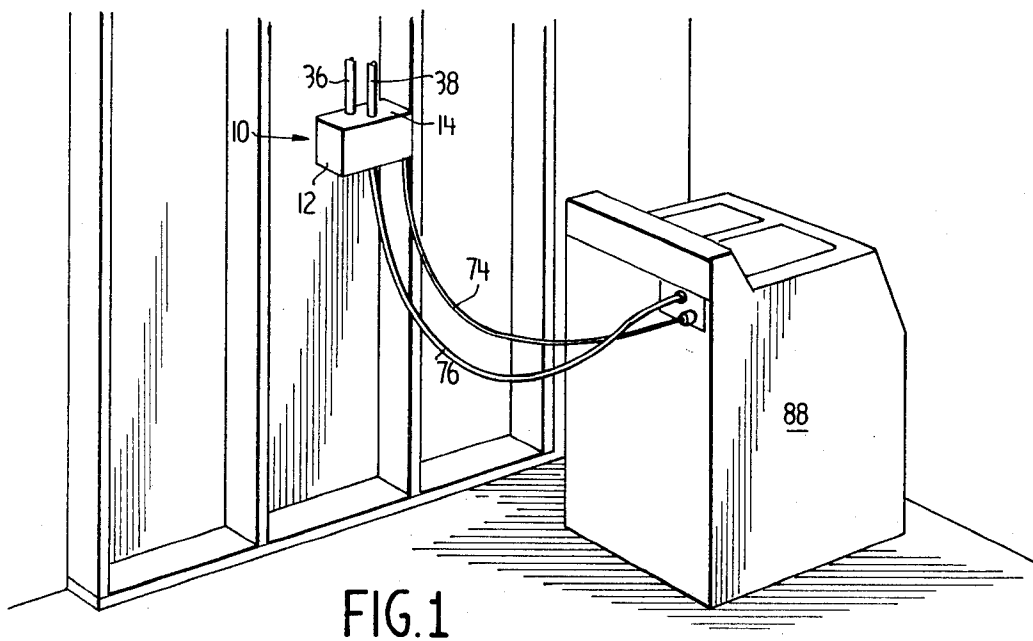
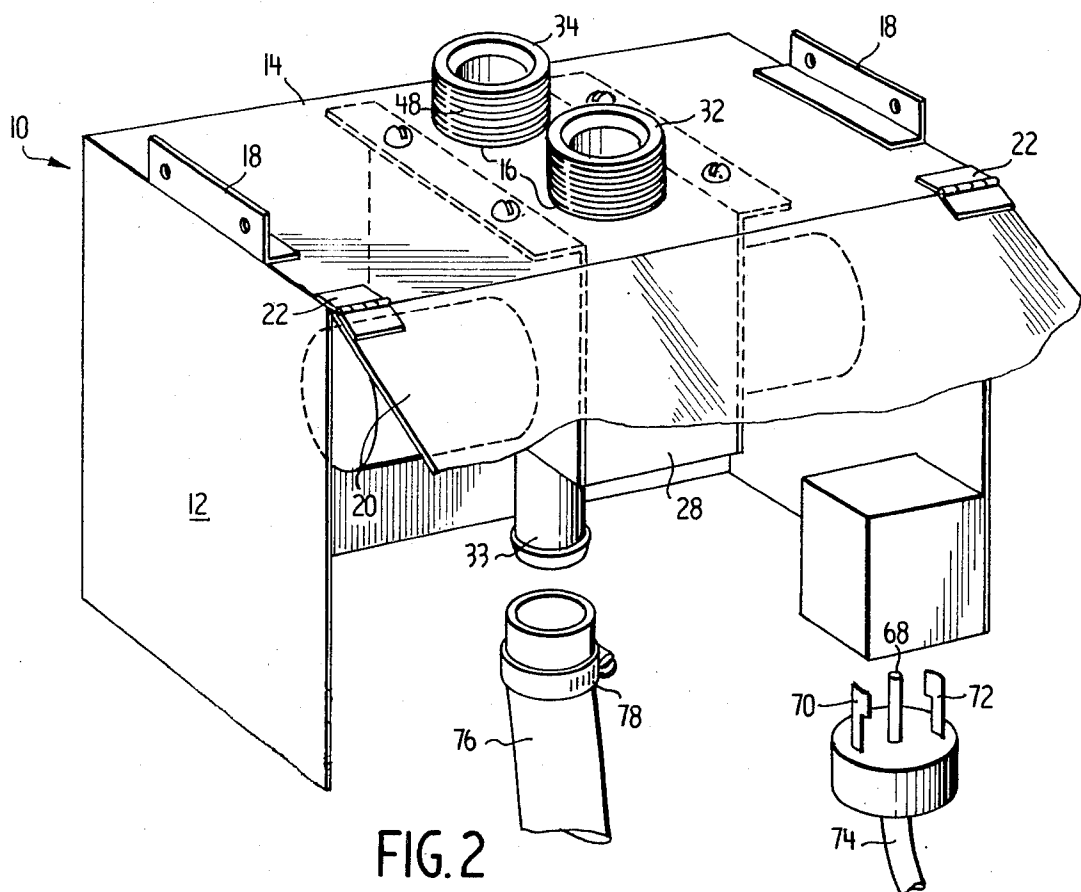
ABSTRACT

A valve mechanism is disclosed which selectively controls the flow of water from hot and cold water pipes to a remotely located appliance. Actuation of the valve mechanism is controlled by a timer that is generally mounted within the appliance. The valve mechanism has a pair of inlet ports and one exit port. The inlet ports are connected to the hot and cold pipes. A single section of flexible tubing is detachably mounted between the exit port of the valve mechanism and the remotely located appliance. A housing which is attached to a wall or another suitable surface and having a pivoted front door is provided to enclose the valve mechanism. Preferably the housing is flush mounted in the wall.

7 Claims, 6 Drawing Figures



SHEET 1 OF 3



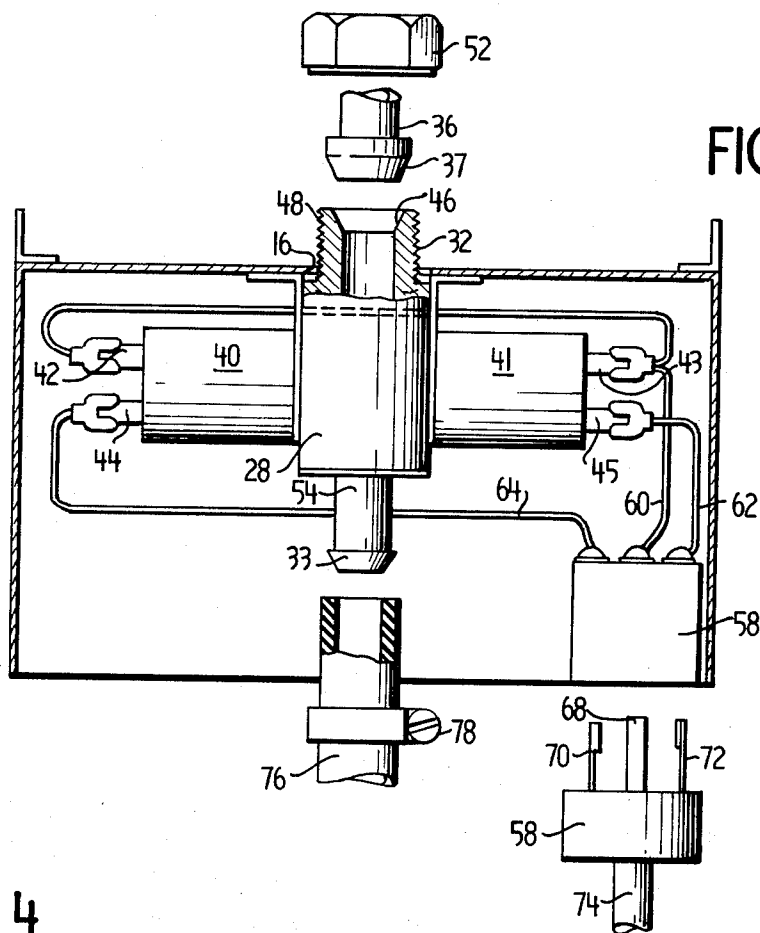


FIG. 3

FIG. 4

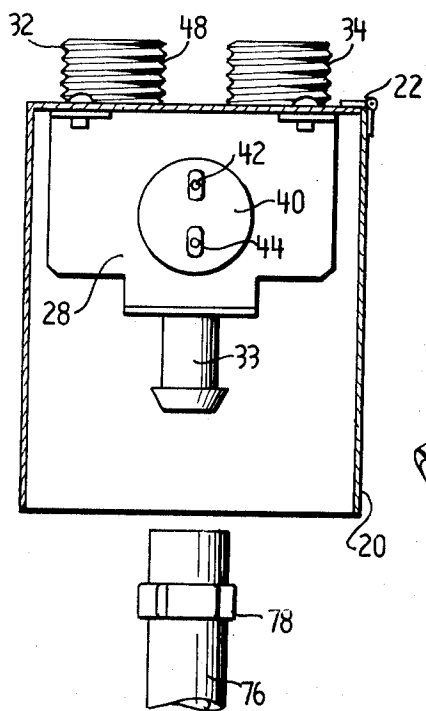
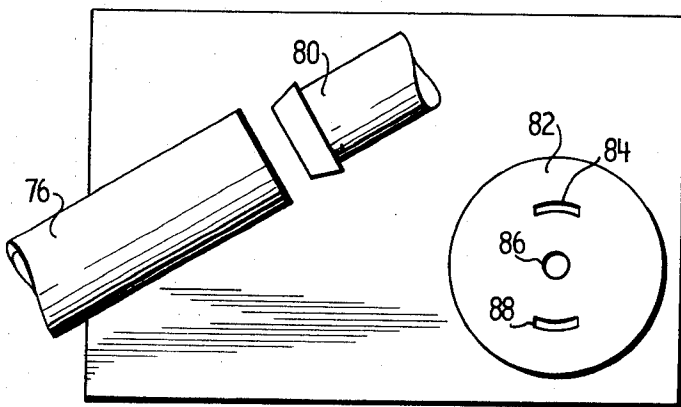


FIG. 5



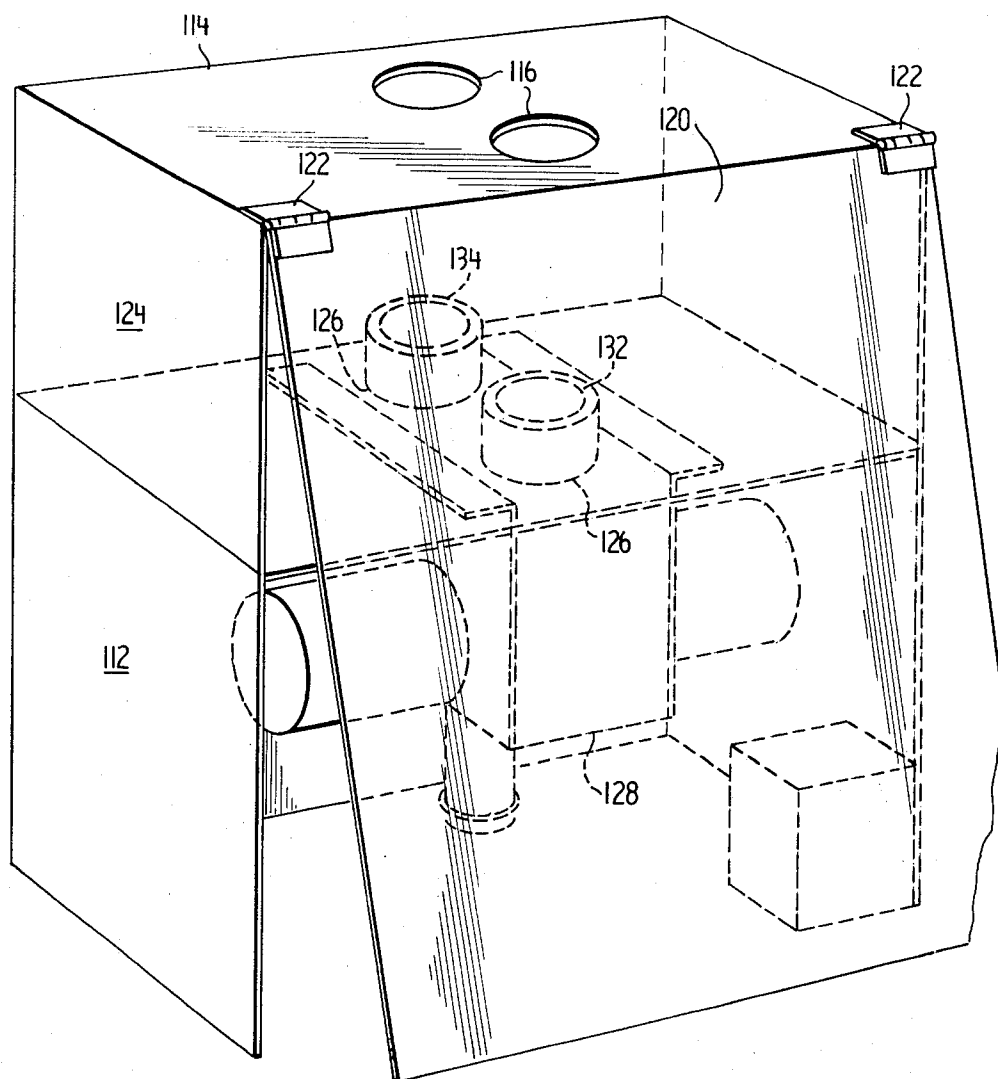


FIG. 6

FLUID CONTROL MECHANISM FOR APPLIANCES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to an apparatus which selectively controls the flow of a plurality of sources of fluid to an appliance in response to the operation cycle of a timer associated with the appliance.

Description of the Prior Art

Mentnech U.S. Pat. No. 3,417,782 discloses a remotely located valve which selectively regulates the flow of water between a household faucet and a connecting hose of an appliance under the control of a timer mounted within the appliance. While Mentnech discloses the concept of remotely locating the control valves that regulate the flow of water to an appliance under the control of the electrical timer mounted within the appliance, he does not suggest the use of a valve mechanism of the type which combines two inlet streams of fluid selectively into a single exit stream of fluid that is connected to a remotely located appliance via a single detachably mounted section of flexible tubing.

Commercially available washing machines contain a solenoid controlled valve mechanism of the type described above that selectively combines hot and cold water sources into a single exit source of water under the control of a timer mounted within the washing machine. This valve mechanism is also mounted within the washing machine.

In order to install a washing machine employing a solenoid controlled valve mechanism, it is necessary to connect two flexible hoses with the inlet ports of the valve mechanism and to separate sources of hot and cold water which are remotely located from the appliance. The mounting of the solenoid controlled valve assembly within the appliance has the following disadvantages which increase the cost of installation or make the servicing and disconnection of the appliance more difficult:

1. Two flexible hoses are required to connect the sources of hot and cold water with the respective inlet ports of the valve control mechanism;

2. The chances of rupturing of one or both of the water supply hoses are substantially enhanced by the fact that these hoses are continually subjected to the water line pressure of the water supply which is connected to the washing machine;

3. To cut off the supply of water, it is necessary to reach behind the washing machine to a location which is located in close proximity to a wall;

4. The prior art system required more time for installation because of the need to make two connections between the hot and cold water lines and the shutoff valves mounted in the washing machine; and

5. Because of the use of two connections by the prior art system, often it was impossible to place the appliance substantially flush against a wall.

SUMMARY OF THE INVENTION

The invention comprises a permanently mounted valve mechanism which selectively controls the flow of a fluid from fluid supply pipes to remotely located appliance via a single section of detachable flexible tubing. A solenoid actuated valve mechanism having an inlet port or ports and an exit port is mounted remote

from the appliance and is controlled by a timer for the appliance. A plurality of pipe sections are permanently connected between the inlet ports of the valve mechanism and a corresponding plurality of fluid supply pipes. The single section of detachable flexible tubing is attached to a fitting connected to the exit port of the valve mechanism and to a point in the appliance where a single conduit supplies the appliance with all of the fluid used therein. A housing that encloses the solenoid actuated valve mechanism is mounted remote from the appliance on a wall or other suitable surface and is preferably flush mounted. The valve mechanism is provided with a plurality of control terminals that are electrically coupled to a socket mounted within the housing. A corresponding socket is mounted in the remotely located appliance and is coupled to the source of signals produced by the timer that controls the actuation of the valve mechanism. An electrical cable connects the socket in the housing of the electrically actuated control mechanism with the socket of the timing mechanism of the appliance.

The novel features which are considered to be characteristic of this invention are set forth in the appended claims. The invention itself, however, both to its organization and method of operation as well as additional objects and advantages thereof will be best understood from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a perspective view showing the connection of the valve mechanism and the remote appliance;

FIG. 2 is a front perspective view showing the general construction of the invention without the inclusion of any of the detail of the interconnection with the remote appliance;

FIG. 3 is a view showing the valve mechanism and the associated control circuitry;

FIG. 4 is a side view of the valve mechanism including a portion of the detachable flexible conduit which connects the exterior port of the valve mechanism to the remote appliance;

FIG. 5 is a view showing the connection of the detachable flexible conduit which connects the valve mechanism to the appliance and the electrical socket that is connected to the timing mechanism of the appliance; and

FIG. 6 is a perspective view illustrating an alternative embodiment of the housing of the valve control mechanism.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows the details of the location of the valve mechanism with respect to the remote appliance. Specifically the valve mechanism (not shown) is enclosed in housing 10 and is connected to remote appliance 88 by means of detachable flexible conduit 76 and electrical cable 74.

Referring to FIG. 2, housing 10 consists of a box-like structure which is mounted on, or flush with, a wall or other similar surface. The housing 10 consists of a pair of upright support panels 12 which are connected to a top panel 14. Attached to the back of top panel 14 are a pair of upright standing brackets 18 which permit attachment of the housing 10 to a wall or other similar surface. A pair of apertures 16 are drilled through the top panel 14. A door 20 is attached to the front of top panel 14 by means of hinges 22. Disposed below panel 14 is valve mechanism 28. The hot and cold water sup-

ply pipes 36 and 38 respectively are connected to exteriorly threaded inlet ports 32 and 34 of the valve mechanism 28 which project through the apertures 16 in the top panel 14. In FIG. 3, the inlet port 32 for hot water pipe 36 is shown in section. The inlet port 32 has a conical seat 46 corresponding to the tapered shoulder 37 at the end of the supply pipe 36. An internally threaded nut 52 screws on to the threaded portion 48 of the port 32 thereby securing the pipe 36 to the port 32, forcing the shoulder 37 on to the seat 46. The exit port 54 of the valve mechanism 28 leads to a pipe section 33 to which the flexible tubing 76 is secured by means of a clamp 78. The construction of the electrically actuated valve assembly 28 per se forms no part of the instant invention as it is commercially available and is included in commercially available washing machines.

The electrically actuated valve mechanism is constructed as follows. The valve mechanism 28 has a pair of solenoids 40 and 41, each of which have a pair of control terminals 42 and terminals 44 and 45 respectively. The electrical connection of the solenoids of the electrically actuable valve assembly may be summarized as follows. Terminals 42 are connected to electrical ground via lead 60, if grounding is necessary. In the case where the invention is being used to control the selective flow of hot and cold water to an appliance, terminal 44 of the cold water solenoid is coupled to the signal source in the timer of the appliance which controls the flow of cold water. This connection is made via lead 64, prong 70 and cable 74, etc. Terminal 45 of the other solenoid 41 is coupled to the signal source in the timer of the appliance which controls the flow of hot water. This connection is made via lead 62, prong 72, cable 74, etc. To facilitate the connection of the appropriate control leads to the circuitry in the timer of the appliance, socket 58 having three recesses (not shown) is provided to accept a plug having three prongs 68, 70 and 72 which respectively connect to leads 60, 64 and 62 when inserted. Prongs 68, 70 and 72 are connected to separate electrical wires within cable 74. This cable must be connected to the remotely located appliance when the appliance is ready for operation.

FIG. 4 shows a side view of the electrically actuated valve assembly of the instant invention. It should be noted that fitting 34 is of a type which readily permits a detachable connection to flexible tubing 76 by means of a clamp 78.

FIG. 5 shows schematically the details of the fluid and electrical connections that are made at the remotely located appliance. Specifically, flexible conduit 76 is non-permanently connected to fitting 80 by means of hose clamp 79. As has been pointed out in the preceding parts of the specification, the point of connection within the appliance 80 is where a single conduit carries all of the fluid flowing to the appliance. In commercially available washing machines, the point of connection is at the exit port of the electrically actuable valve assembly similar to the one used in the instant invention. A socket 82 having three recesses 84, 86 and 88 is mounted within the appliance in a spot where the three pronged plug may be readily inserted.

An alternative embodiment of the arrangement of the valve mechanism 28 within the housing is shown in FIG. 6 and is particularly suitable for flush mounted installations. In this embodiment, the valve mechanism is indicated at 128 and is secured to the underside of a

shelf 124 running horizontally between side panels 112 of the housing. Shelf 124 has apertures 126 through which the inlet ports 132 and 134 project. The sides of the housing extend upward from the shelf 124 a sufficient height to permit access to couple the supply pipes to the inlets 132 and 134 as in the previous embodiment. The top panel 114 is provided with apertures 116 through which the supply pipes enter. Access to the interior of the housing is provided by way of the door 120 which is hinged to the front of the top panel 114 by means of hinges 122.

The operation of the invention may be summarized as follows. The electrically actuable valve assembly including the housing is mounted on a wall or a similar surface which is located in close proximity to a source of hot and cold water or other fluid which are to be selectively controlled by the timer of the appliance. In the case of an appliance using hot and cold water, sections of pipe 36 and 38 are connected between the respective hot and cold water sources and the hot and cold water intake ports of the electrically actuable valve assembly. It should be noted that this entire assembly is remotely located from its associated appliance. If it is desired to attach an automatic washing machine to the instant invention, it is only necessary to attach a single flexible piece of conduit 76 to fitting 34 which is attached to the exit port 54 of the electrically actuable valve assembly 28 and to a fitting in the washing machine 80 which is coupled to the conduit which controls the flow of both hot and cold water to the washing machine. Electrical interconnection is made simply by inserting the previously described three pronged plugs into the corresponding sockets located in the housing of the instant invention and in the associated appliance.

The present invention provides a simple, economical and convenient way of controlling the flow of fluids to a household appliance such as a washing machine in a manner which eliminates several conventionally required parts for routine operation. By means of the present invention, the number of flexible conduits for fluids supplied to the appliance is reduced, manually controlled valves are eliminated, and pressure is eliminated from the flexible conduits between the wall and the appliance both when the appliance is operated and when it is not in use.

While the instant invention has been described in terms of preferred embodiments, it should be noted that numerous modifications can be made without departing from the scope and spirit thereof. For instance, it should be noted that the invention may be used to control the selective flow of fluids from two pipes to an appliance without regard to the type of fluid being carried by each of the pipes. Accordingly, while most appliances use hot and cold water, it should be noted that the invention could be used to control the flow of fluids other than water.

What is claimed is:

1. A fluid control mechanism for selectively controlling the flow of a fluid from a supply pipe to a remotely located appliance using said fluid, said fluid control mechanism comprising in combination a supply pipe with only one exit port, an electrically actuable valve assembly having an inlet port and an exit port, said inlet port of said electrically actuable valve assembly being connected to said exit port of said supply pipe, said exit port of said electrically actuable valve assembly being coupled to a pipe fitting which permits the detachable

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connection of said exit port of said valve assembly at a point in said appliance where a single conduit supplies the appliance with all of the fluid used therein and there are no controllable valves within said appliance which control the flow of fluid to said appliance, said electrically actuatable valve assembly comprising an electrically activated valve mounted within said electrically actuatable valve assembly for selectively controlling the flow of fluid from said inlet ports to said exit port of said electrically actuatable valve assembly, said electrically operated valve having control terminals adapted to be coupled to control terminals of a timer for said remotely located appliance which produce electrical control signals to selectively operate said valve.

2. A fluid control mechanism for selectively controlling the flow of a fluid from a plurality of fluid supply pipes to a remotely located appliance using said fluid, said fluid control mechanism comprising in combination at least two supply pipes with exit ports, an electrically actuatable valve assembly having at least a pair of inlet ports and only one exit port, said inlet ports of said electrically actuatable valve assembly being connected to said exit ports of said supply pipes, said exit port of said electrically actuatable valve assembly being coupled to a pipe fitting which permits the detachable connection of said exit port of said valve assembly at a point in said appliance where a single conduit supplies the appliance with all of the fluid used therein and there are no controllable valves within said appliance which control the flow of fluid to said appliance, said electrically actuatable valve assembly comprising at least a pair of electrically activated valves mounted within said electrically actuatable valve assembly for selectively controlling the flow of fluid from said inlet ports to said only one exit port of said electrically actuatable valve assembly, said electrically operated valves having control terminals which are adapted to be coupled to control terminals of a timer for said remotely located appliance which produces electrical control signals to selectively operate said valves.

3. A fluid control mechanism as recited in claim 2 wherein one of said fluid supply pipes is a hot water pipe and another of said fluid supply pipes is a cold water pipe, said appliance being a washing machine, said fluid control mechanism further comprising a single piece of flexible conduit having inlet and exit ports, said inlet port of said piece of flexible conduit being non-permanently connected to said pipe fitting of said electrically actuated valve assembly, and to said washing machine at a fitting located within said washing machine at a point where a single water line supplies the washing machine with both hot and cold water, said fluid supply mechanism further comprising an electrical

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circuit coupling said control terminals of said electrically activated valves respectively to the terminals of said timer which control the hot and cold water cycles in said washing machine.

4. A fluid control mechanism as recited in claim 2 further comprising in combination a housing enclosing said fluid control mechanism, said housing comprising a box-like structure with a front door permitting access to said fluid control mechanism.

5. A fluid control mechanism as recited in claim 4 wherein said housing and the enclosed fluid supply mechanism are mounted on a wall in a location which is remote from and not disposed within said appliance.

6. A fluid control mechanism as recited in claim 5 wherein one of said fluid supply pipes is a hot water pipe and another of said fluid supply pipes is a cold water pipe, said appliance being a washing machine, the fluid supply mechanism further comprising a single piece of flexible conduit having inlet and exit ports, said inlet port of said piece of flexible conduit being non-permanently connected to said pipe fitting of said electrically actuated valve assembly and to said washing machine at a fitting located within said washing machine at a point where a single water line supplies the washing machine with both hot and cold water, said fluid supply mechanism further comprising an electrical circuit coupling said control terminals of said electrically activated valves which control the flow of hot and cold water respectively to the terminals of said timer which control the hot and cold water cycles in said washing machine.

7. A fluid control mechanism as recited in claim 3 wherein said electrical circuit comprises an electrical conduit having three separate electrical leads disposed therein, each end of said electrical conduit having a three pronged plug wherein each prong is connected to a different one of said electrical leads and further comprising a pair of electrical sockets having three recesses to accept said three pronged plugs, one of said sockets being mounted on said housing and the other socket being mounted on the washing machine, each of said sockets having three terminals, the terminals of said socket mounted in said housing being coupled respectively to electrical ground, the terminal of the electrically activated valve which controls the flow of cold water and the terminal of the electrically activated valve which controls the hot water, the corresponding terminals of said socket mounted in said washing machine being respectively coupled to electrical ground, the terminal in said timer which controls the cold water cycle in said washing machine and the terminal in said timer which controls the hot water cycle in said washing machine.

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