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WATER TAKEOFF FOR WASHING MACHINE CONNECTOR

Filed April 6, 1964

FIG. 1

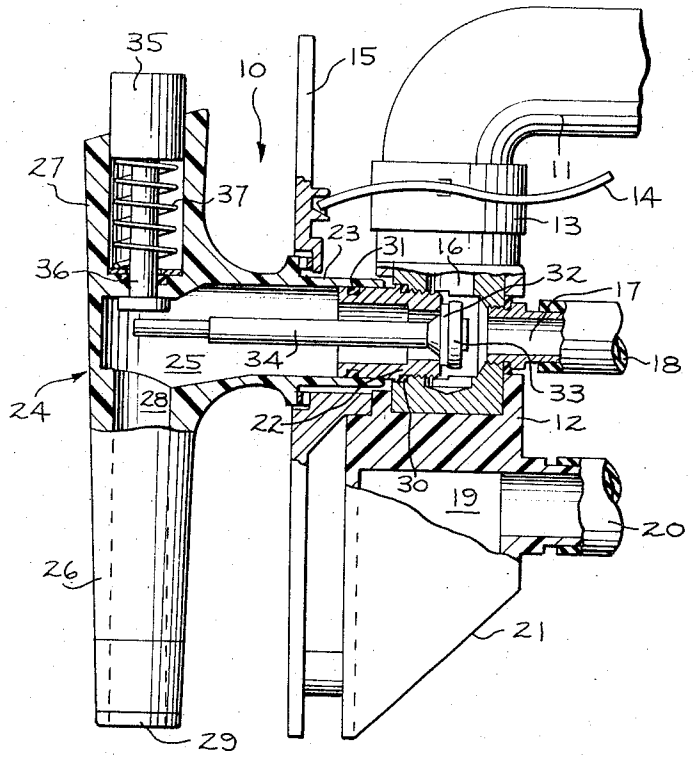
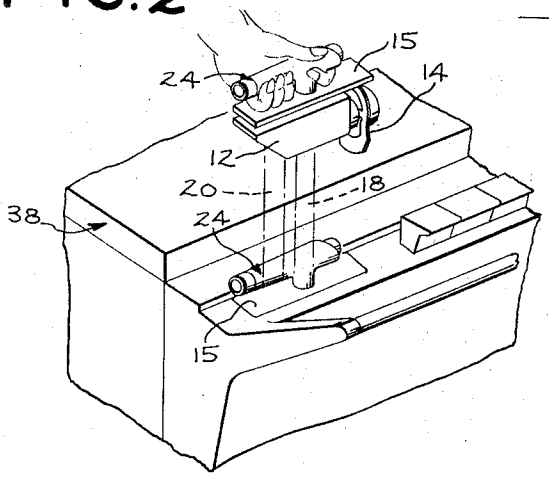


FIG. 2



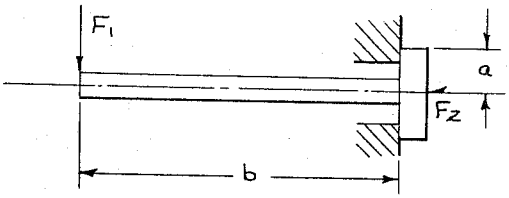


FIG. 3

INVENTORS
NORMAN L. KENDT
& DON E. PAYTON
BY James E Espe
THEIR ATTORNEY

United States Patent Office

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WATER TAKEOFF FOR WASHING MACHINE CONNECTOR

Norman L. Kendt and Don E. Payton, both of Louisville, Ky., assignors to General Electric Company, a corporation of New York

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This invention relates generally to a connector for connecting a washing machine to a source of liquid under pressure and, more particularly, to a water takeoff means associated with the connector to allow one to draw liquid from the connector without detaching the connector.

Many devices are commercially available for use in connecting a washing machine to a source of liquid. These devices range from a threaded hose coupling to a more elaborate combined water source connector and effluent discharge outlet. The latter, a water source connector having an effluent discharge outlet combined therewith, is the type most commonly used with portable automatic dishwashing machines. This type is particularly useful with a portable dishwasher since dishwashers are commonly used in the kitchen and, in the kitchen, a source of liquid (faucet) is almost invariably associated with an effluent discharge receptacle (sink drain). It has therefore become quite common to combine the connector for a portable dishwasher with the effluent discharge outlet so that, with manipulation of a single device, the housewife may set up both the water connection and the effluent discharge connection.

This arrangement has created a problem with regard to drawing water from the kitchen faucet while the connector was attached thereto. An entire wash cycle of an automatic dishwasher includes several separate admissions of water so that the connector must remain connected to the faucet throughout substantially all of the wash cycle, with the exception of the terminal portion of the cycle at which time the dishes are being dried and no water is required. It is a nuisance to the housewife to be unable to draw water from the kitchen faucet during this time that the dishwasher is connected. Solutions have been suggested to this problem but in most cases, the suggested solutions have created new problems. For example, auxiliary valve arrangements have been provided in conjunction with the connector; however, since these connectors must be limited in size to be compatible with both the kitchen faucet and sink as well as the connector storage means associated with the washing machine, the auxiliary valves are usually of such a small size that they are very difficult to operate. For example, many of the designs include a common push valve wherein the housewife must push the valve stem longitudinally to unseat the valve head from the valve seat to thereby draw water through the auxiliary valve. In actual practice, the water pressures present at the valve head create such a force that it is virtually impossible for a woman of only normal strength to operate the valve with any degree of ease. To reduce the force required to operate a common push valve, the valve is usually made very small which results in a discharge rate so low that the valve is actually impractical if one wishes to draw a full glass of water.

Accordingly, it is an object of this invention to provide an improved means to connect an automatic washing machine to a source of liquid under pressure.

It is also an object of this invention to provide an improved connector means for an automatic washing machine which will allow one to draw liquid from the connection without necessitating disconnection.

It is a further object of this invention to provide a water takeoff means for a washing machine connector which, due to its inherent mechanical advantage, may be operated with relative ease.

Briefly stated, in accordance with one aspect of the invention, we provide a coupling to connect an automatic washing machine to a source of water such as, for example, a water faucet. The coupling comprises a generally elongated body portion having means at one end to secure the coupling to the faucet. A fresh water passageway extends from the aforementioned means through the body portion to terminate at an outlet in a side wall of the body portion. The outlet communicates with the washing machine. A handle member is secured to the body portion and is hollow to form a liquid conduit therein. A valve seat is provided in the body portion at the point where the handle is secured thereto and a valve cooperates with the valve seat to allow or prevent fresh water from entering the handle. The valve includes a valve stem extending into the handle. The handle member houses a valve operator which includes a manually operable button, a shaft extending into the handle from the button, the shaft being adapted to engage and move the free end of the valve stem laterally and spring means to bias the shaft away from engagement with the valve stem. The valve is arranged such that it is opened when the shaft moves the valve stem laterally and is closed when the valve stem is in general alignment with the longitudinal axis of the conduit within which it is situated.

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 the coupling of the present invention;

FIGURE 2 is a perspective view showing the relationship of the present invention with an automatic washing machine; and

FIGURE 3 is a schematic illustration showing the relationship of the forces necessary to operate the valve of the present invention.

Referring now to the drawings, and particularly to FIGURE 1, there is illustrated a coupling **10** for connecting an automatic washing machine to a water faucet **11**. Coupling **10** includes a generally elongated body portion **12** which has beans **13** at one end to secure the body portion **12** to the faucet **11**. A lever **14**, pivotally associated with a plate **15** is provided to facilitate operation of means **13** during the connection and disconnection of coupling **10** with faucet **11**.

The upper part of body portion **12** is provided with a fresh water passageway **16** which includes an inlet (not shown) in supply relation with facuet **11**, and an outlet **17** in a side wall of body portion **12**. A hose **18**, or other suitable tubing, interconnects outlet **17** with the fresh water inlet at the automatic washing machine. In the lower part of body portion **12** there is a vitiated water passageway **19** which receives vitiated liquid from the washing machine through conduit **20** and discharges it downwardly through outlet **21** into a suitable receptacle such as, for example, a common kitchen sink (not shown).

In accordance with the present invention, means are provided to allow one to draw fresh water from the faucet **11** without necessitating disconnection of coupling **10**. To achieve this desideratum the present invention proposes the addition of fitting **22** which has one end extending into passageway **16** and the other end extending out through one side wall of body portion **12**. The part of fitting **22** which extends out of body portion **12** is adapted to receive one leg **23** of a handle member **24**. As can be seen from FIGURE 1, leg **23** is hollow to form a passageway **25** therein for the conduction of liquid therethrough. Handle member **24** also includes additional legs **26** and **27**. Legs **26** and **27** are in generally longitudinal alignment

with each other and are each generally perpendicular to leg **23**. Leg **26** is hollow to form a passageway **28**. It therefore becomes quite obvious that liquid may pass from passageway **16** through passageway **25** and passageway **28** to be dispensed through an outlet **29** at the lower end of leg **26**.

A seal **30** is provided to prevent leakage of fluids in the area where fitting **22** interconnects with body portion **12**. Also, a seal **31** is provided to prevent leakage at the connection between leg **23** of handle **24** and fitting **22**.

In order to control the flow of liquid from passageway **16** out through outlet **29**, the end of fitting **22** which adjoins passageway **16** is provided with a valve seat. The valve seat cooperates with a gasket **32** and a valve head **33** to close off passageway **25** from passageway **16**. A valve stem **34** extends from valve head **33** along the longitudinal axis of passageway **25** and terminates generally at the intersection of leg **27** with leg **23**.

Carried within leg **27** is a valve operator including a manually operable button **35** which extends beyond the end of leg **27** to be conveniently operated by one's thumb. The valve operator further includes a shaft **36** extending downwardly into passageway **25**. A spring **37** is provided to normally bias button **35** and shaft **36** upwardly. As can be sen from FIGURE 1, when button **35** is depressed, spring **37** is compressed and the end of shaft **36** engages the end of stem **34** and, as the button **35** is depressed further, stem **34** is moved laterally of passageway **25**. This lateral movement of stem **34** results in valve head **33** and gasket **32** pivoting about a point near their upper extremity where this extremity engages the end of fitting **22**. As valve head **33** and gasket **32** pivots, the lower portion of gasket **32** separates from the end of fitting **22** thereby allowing fluid within passageway **16** to enter passageway **25**.

In actual practice, using coupling **10** in combination with a domestic automatic dishwasher wherein the water faucet **11** is a standard kitchen hot water tap, the pressures within passageway **16** may vary from approximately 10 p.s.i. to 200 p.s.i. The normal pressure for a household water system is approximately 75 p.s.i. Taking into account the fact that in order to obtain any appreciable amount of flow at outlet **29**, passageway **25** adjacent the gasket **32** must have a cross sectional area of about .2 square inch. This is the approximate cross sectional area of a .5 inch diameter conduit. As mentioned above, many of the devices existing today are designed so that the operator pushes a button in axial alignment with a member similar to stem **34**. In other words, the operator is required to move the entire valve directly against the pressure exerted by the liquid. To point out what this involves, with the maximum of 200 p.s.i. a force of 40 pounds would be required to unseat the valve. Of course, it would be necessary to provide a closing spring to seat the valve after it was opened and the force of this spring would have to be added to the aforementioned 40 pounds required to unseat the valve. Similarly, at 10 p.s.i. water pressure a force of 2 pounds plus the closing spring force would be required and, at 75 p.s.i., the normal water pressure, a force of 15 pounds plus the force of the closing spring would be required.

In contrast, the present invention, since it does not require the operator to directly apply a longitudinal force upon valve stem **34**, requires a significantly lower operating force. The reason that a smaller force is required with the present invention is demonstrated in FIGURE 3 wherein the valve head of the present invention is shown schematically with the effective lengths of the valve stem represented by *b* and the radius of the valve head represented by *a*. Since, during opening of the valve, the valve head pivots about its upper extremity, *a* represents the distance from the pivot point of F_2, the force applied to the valve head by the water pressure, while *b* further represents the distance from the pivot point of force F_1 which is the force applied to the valve stem by the valve

operator. The mechanical advantage afforded by this arrangement can be expressed as follows:

$$M.A.=\frac{b}{a}$$

Since in actual practice, the dimension *b* is approximately 2.25 inches and dimension *a* is approximately .25 inch:

$$M.A.=\frac{b}{a}=\frac{2.25}{.25}=9$$

Applying this mechanical advantage to the forces listed above as required with a longitudinal movement of the valve stem, it can be seen that the force required with the present invention to open the valve when the liquid pressure within passageway **16** is 200 p.s.i., is approximately 4½ pounds; with 10 p.s.i. the force required is approximately .22 pound; and, under average conditions with the pressure at 75 p.s.i., the force required is about 1.7 pounds. Of course, in each of these conditions it is necessary to add the force required to compress spring **37**. This force, in the preferred form of applicants' invention, is approximately 2 pounds.

Another salient feature of the present invention is that, due to the fact that a tilting or pivoting movement is involved in the opening of the valve, there is no need to employ biasing means to reclose the valve. Once pressure is established in passageway **16**, this pressure seals valve head **33** and gasket **32** against the valve seat. Since valve head **33** is tilted away from the valve seat only at the bottom, and remains in contact with the valve seat at the top, when shaft **36** is withdrawn from engagement with valve stem **34**, the pressure in passageway **16** will readily reclose valve head **33** and gasket **32** against the valve seat.

Referring briefly to FIGURE 2, one can see the relationship of coupling **10** to an automatic washing machine such as, for example, dishwasher **38**. Plate **15** serves as a support means for the coupling **10** when the coupling is in its storage position. Plate **15** also serves as a closure member for the opening in the washing machine cabinet which receives hose **18** and conduit **20**. Of special importance, is the fact that the particular configuration of the handle member **24**, i.e., having substantially longitudinally aligned legs **26** and **27** spaced from, but in substantial parallelism with, body portion **12**, affords easy withdrawal of the coupling from the dishwasher cabinet.

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

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

1. A coupling to connect an automatic washing machine to a water faucet comprising:

(a) a generally elongated body portion adapted to be secured to the faucet in liquid receiving relationship thereto,

(b) a passageway within said body portion adapted to receive liquid from the faucet and transmit it toward the washing machine,

(c) a handle member having a first leg secured to said body portion,

(d) said handle member having a second leg generally parallel with the longitudinal axis of said body portion,

(e) said first and second legs of said handle member being hollow to form a liquid conduit therein,

(f) a valve seat in said body portion at the point where said first leg is secured thereto, and

(g) a valve adapted to cooperate with said valve seat to allow or prevent fresh water from entering said leg,

(h) said valve including a valve stem extending into said first leg,

(i) said handle member having a third leg in generally longitudinal alignment with said second leg,

(j) said third leg housing a valve operator including a shaft extending into said third leg and being adapted to engage and move said valve stem laterally of said first leg,

(k) said valve being open when said shaft moves said valve stem laterally of said first leg and said valve being closed when said valve stem is generally aligned with longitudinal axis of said first leg.

2. A coupling to connect an automatic washing machine to a water faucet comprising:

(a) a generally elongated body portion,

(b) means at one end of said body portion to secure the coupling to the faucet,

(c) a fresh water passageway extending from said first end through said body portion to terminate at an outlet,

(d) said outlet being adapted to communicate with the washing machine,

(e) a handle member having a first leg secured to said body portion,

(f) said handle member having the second leg generally parallel with the longitudinal axis of said body portion,

(g) said first and second legs of said handle member being hollow to form a liquid conduit therein,

(h) a valve seat in said body portion at the point where said first leg is secured thereto, and

(i) a valve adapted to cooperate with said valve seat to allow or prevent fresh water from entering said first leg,

(j) said valve including a valve stem extending into said first leg,

(k) said handle member having a third leg in generally longitudinal alignment with said second leg,

(l) said third leg housing a valve operator including a shaft extending into said third leg and being adapted to engage and move the free end of said valve stem laterally of said first leg,

(m) said valve being opened when said shaft moves said valve stem laterally of said first leg and said valve being closed when said valve stem is generally aligned with the longitudinal axis of said first leg.

3. A coupling to connect an automatic washing machine to a water faucet comprising:

(a) a generally elongated body portion having a first end, a second end, a first side wall and a second side wall,

(b) means at said first end of said body portion to secure the coupling to the faucet,

(c) a fresh water passageway extending from said first end through said body portion to terminate at an outlet in said first side wall of said body portion,

(d) said outlet being adapted to communicate with the washing machine,

(e) a vitiated water passageway within said body portion and extending from an inlet in said first side wall to an outlet in said second end of said body portion,

(f) a handle member having a first leg secured to said body portion at said second side wall,

(g) said handle member having a second leg generally parallel with the longitudinal axis of said body portion,

(h) said first and second legs of said handle member being hollow to form a liquid conduit therein,

(i) a valve seat in said body portion at the point where said first leg is secured thereto,

(j) a valve adapted to cooperate with said valve seat to allow or prevent fresh water from entering said first leg,

(k) said valve including a valve stem extending into said first leg,

(l) said handle member having a third leg in generally longitudinal alignment with said second leg,

(m) said third leg housing a valve operator comprising:

(aa) a manually operable button,

(bb) a shaft extending into said third leg from said button,

(cc) said shaft being adapted to engage and move the free end of said valve stem laterally of said first leg, and

(dd) spring means to bias said shaft away from engagement with said valve stem,

(n) said valve being opened when said shaft moves said valve stem laterally of said first leg and said valve being closed when said valve stem is generally aligned with the longitudinal axis of said first leg.

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M. CARY NELSON, *Primary Examiner.*

E. K. FEIN, *Assistant Examiner.*