



US 20080142056A1

(19) **United States**

(12) **Patent Application Publication**
Dries et al.

(10) **Pub. No.: US 2008/0142056 A1**

(43) **Pub. Date: Jun. 19, 2008**

(54) **FLUID COUPLING ASSEMBLY FOR A DISHWASHER**

Publication Classification

(51) **Int. Cl.**
A47L 15/14 (2006.01)
A47L 15/42 (2006.01)
(52) **U.S. Cl.** **134/177; 134/172**
(57) **ABSTRACT**

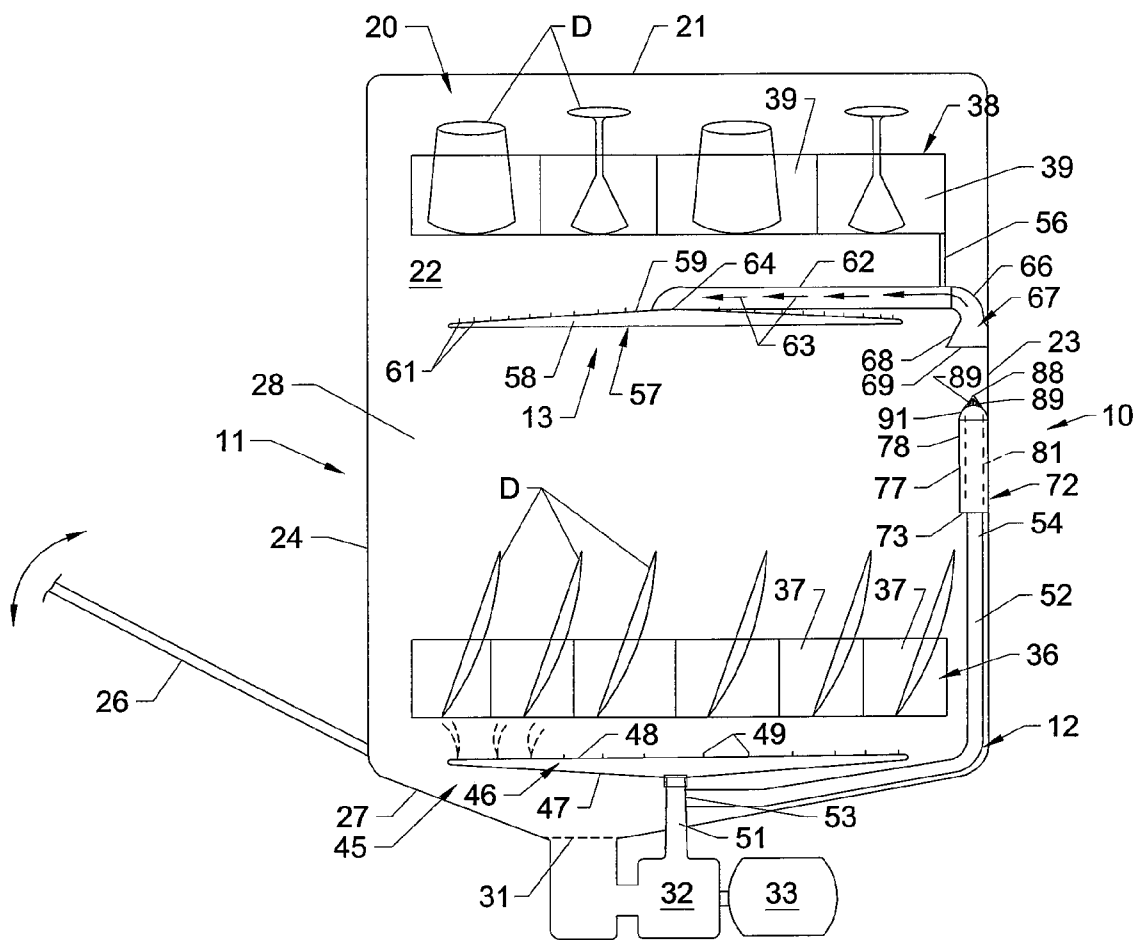
(76) Inventors: **John Edward Dries**, Louisville, KY (US); **Jerry Wayne Ferguson**, Greenwood, MS (US)

Correspondence Address:
WOMBLE CARLYLE SANDRIDGE & RICE, PLLC
ATTN: PATENT DOCKETING 32ND FLOOR,
P.O. BOX 7037
ATLANTA, GA 30357-0037

A fluid coupling assembly is provided for releasably connecting a wash fluid supply line of a dishwasher to an upper spray arm assembly of the dishwasher. The fluid conduit assembly includes an extensible tower that is moved into an extended position, engaging the coupling of a feed tube for the upper spray arm assembly for the dishwasher when wash fluid is passed therethrough, and is automatically disconnected and moves to a retracted, non-engaging position when the flow of wash fluid is discontinued so as not to interfere with the sliding movement of the upper and lower dish racks of the dishwasher for loading and unloading of dishes therefrom.

(21) Appl. No.: **11/611,496**

(22) Filed: **Dec. 15, 2006**



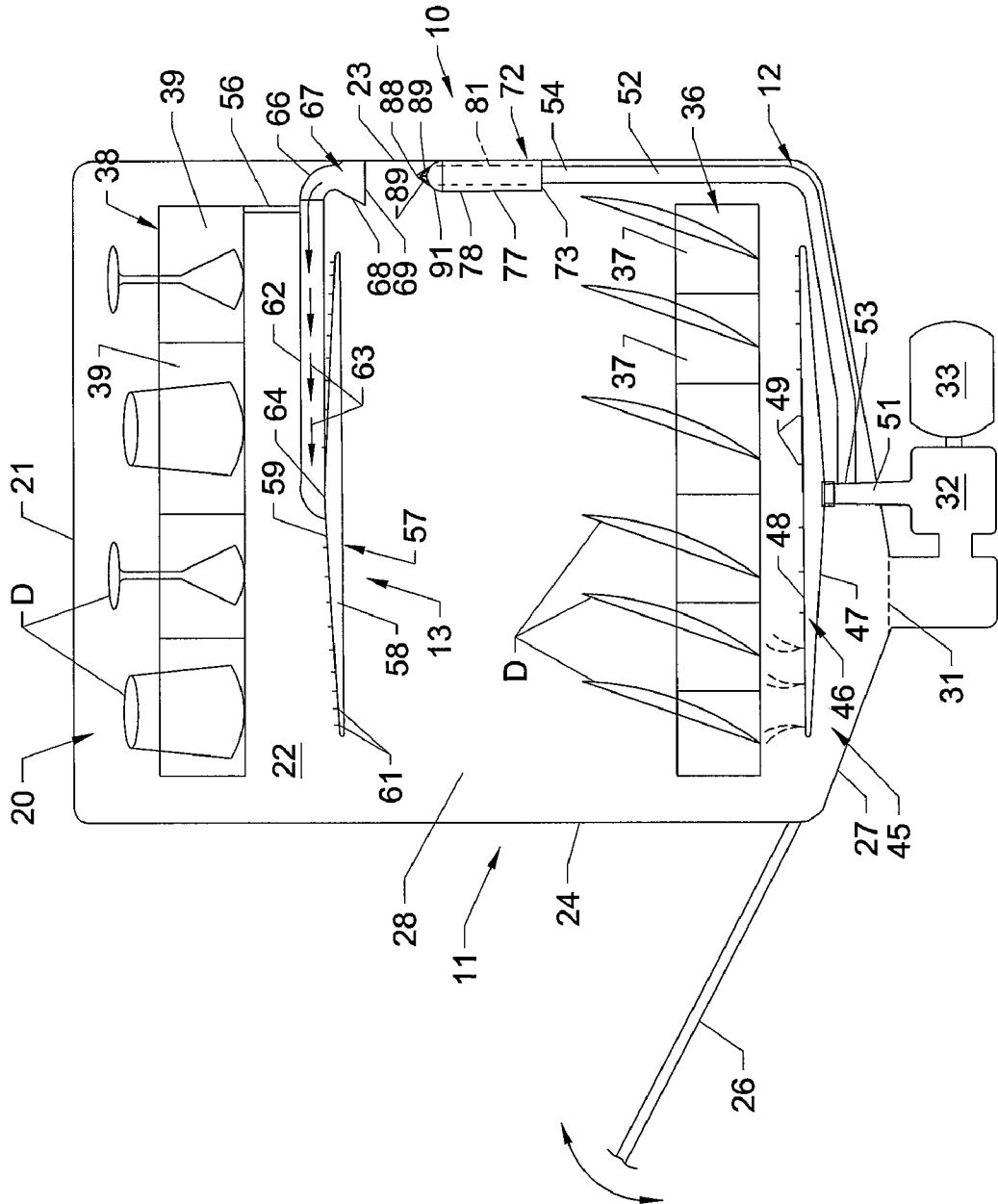


Fig 1

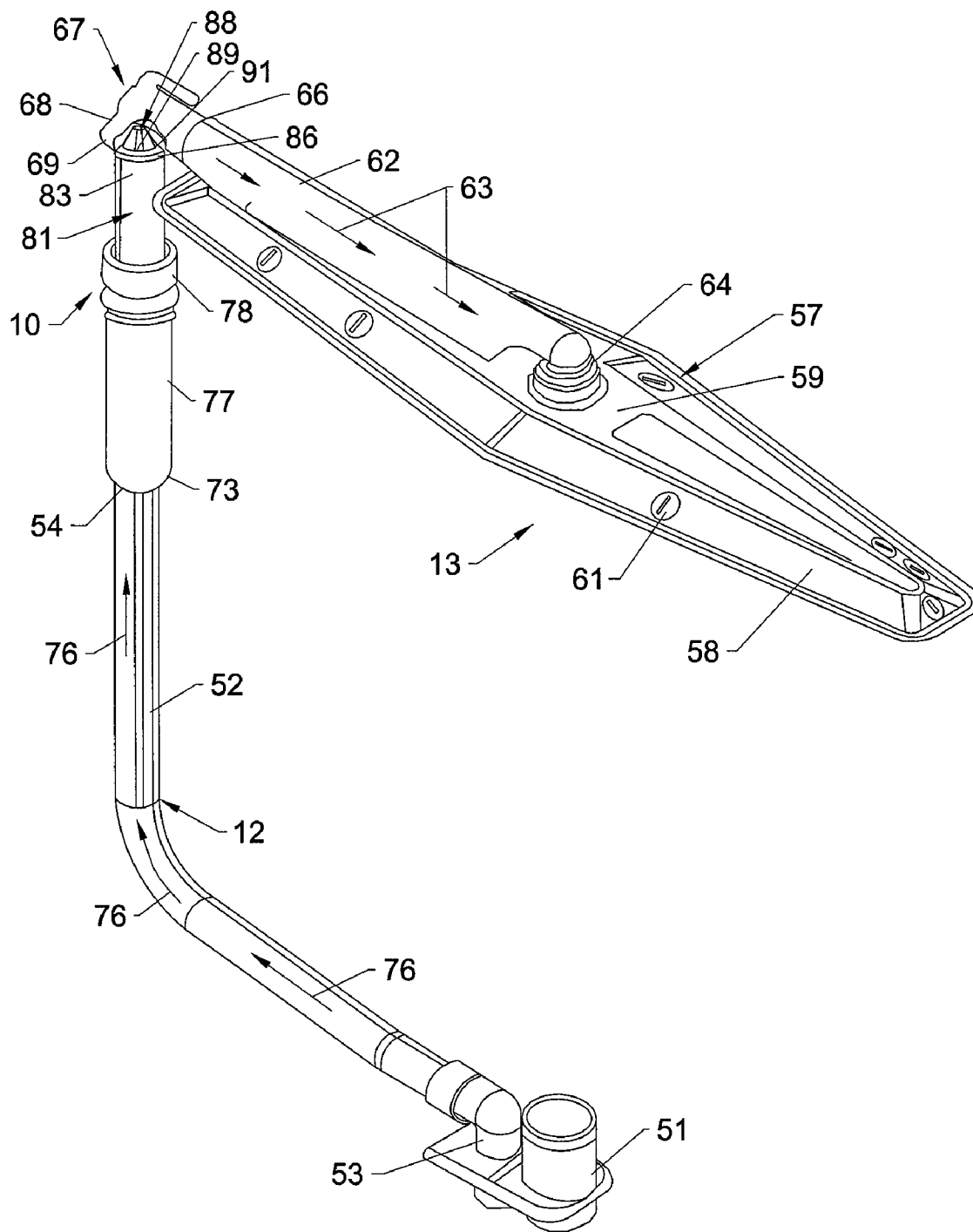


Fig. 2

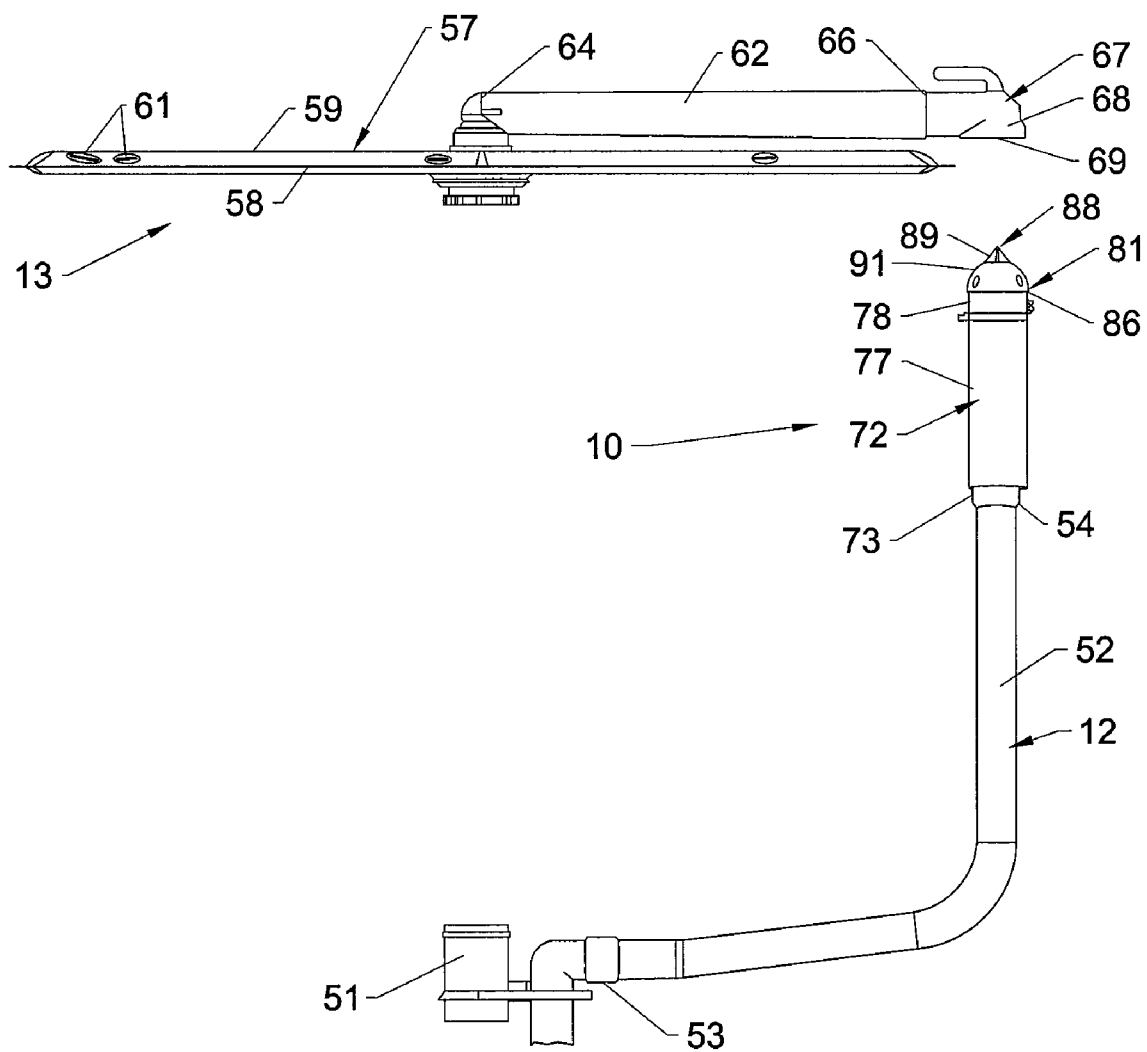


Fig 3A

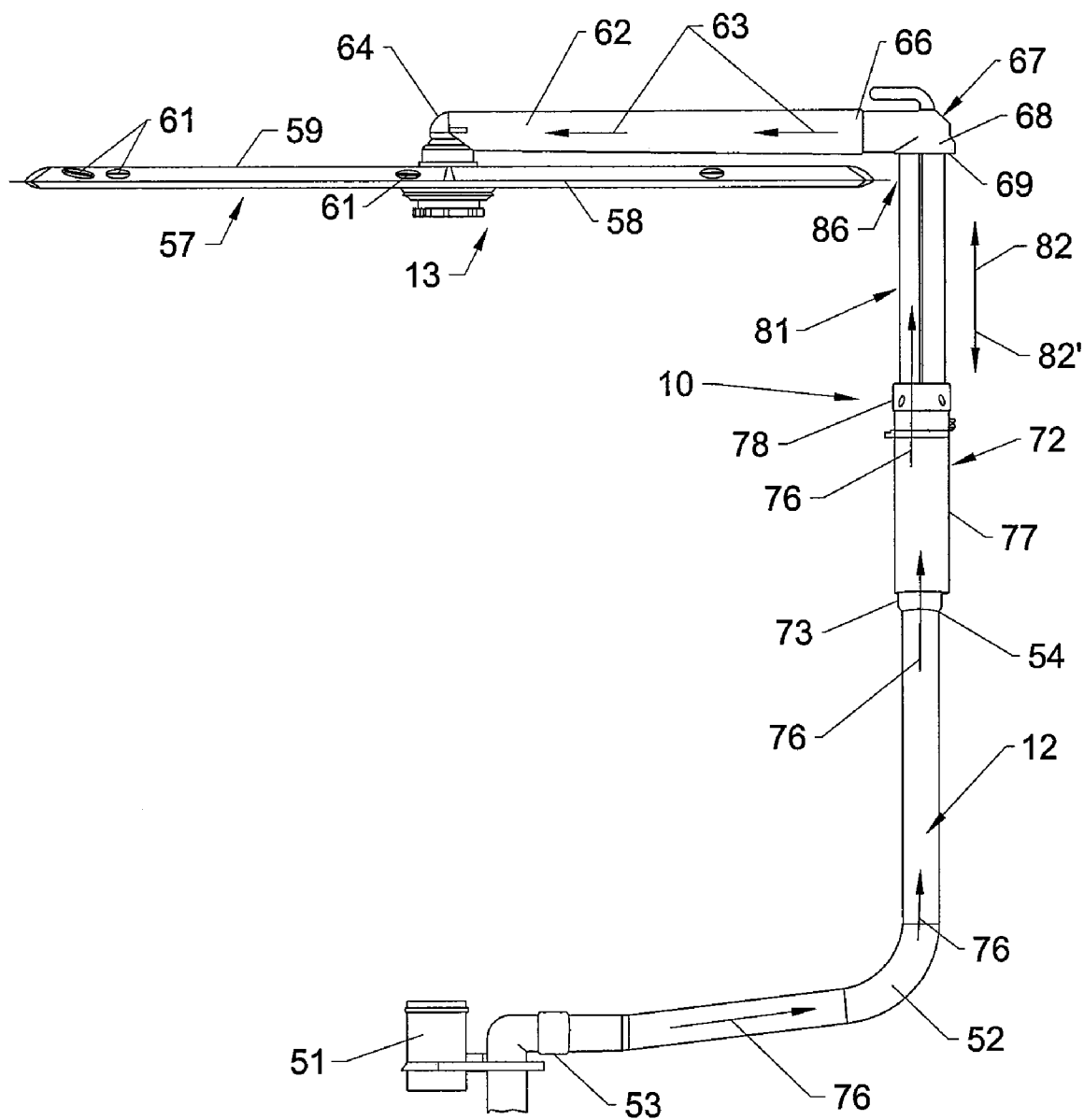


Fig 3B

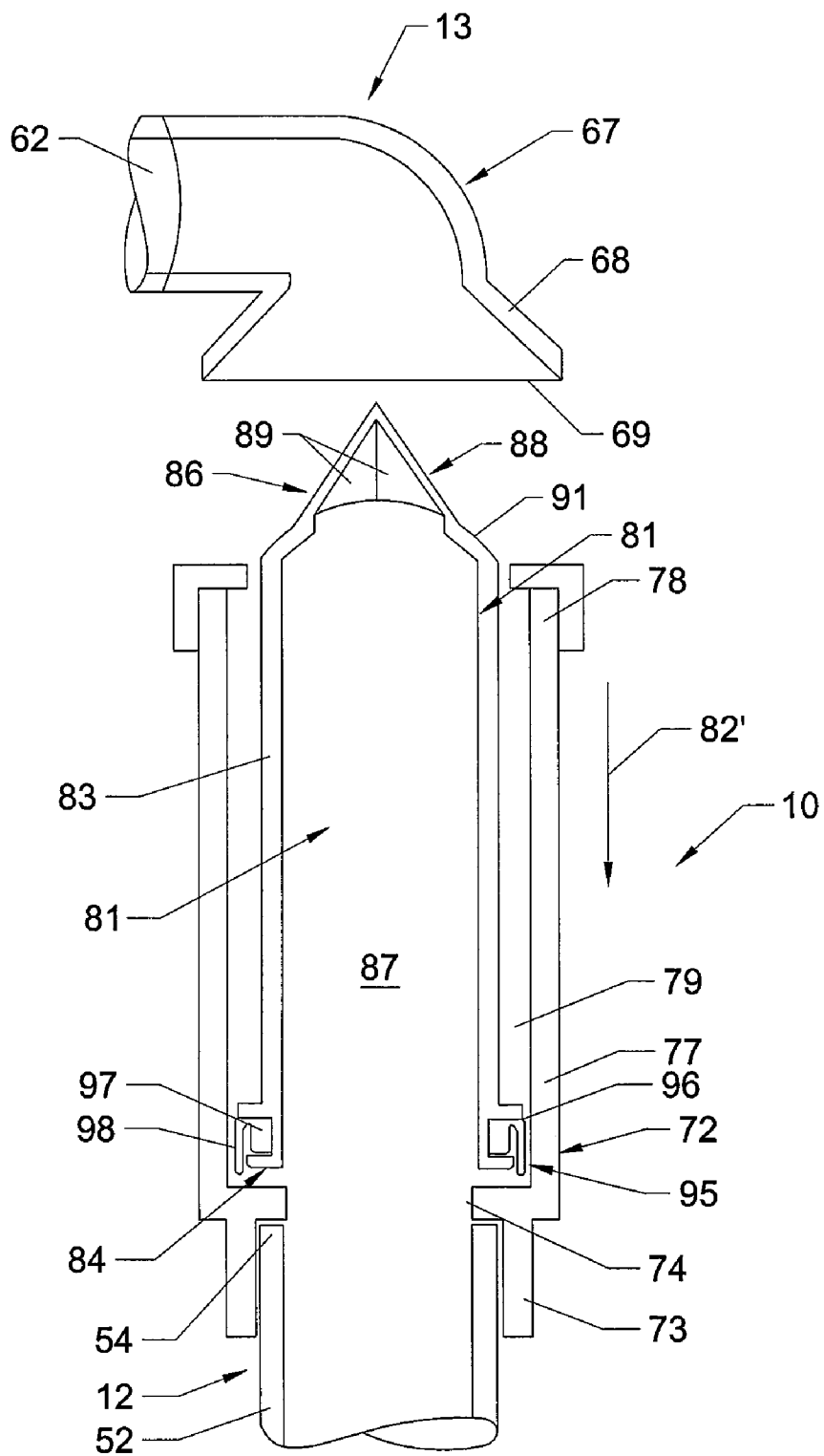


Fig 4A

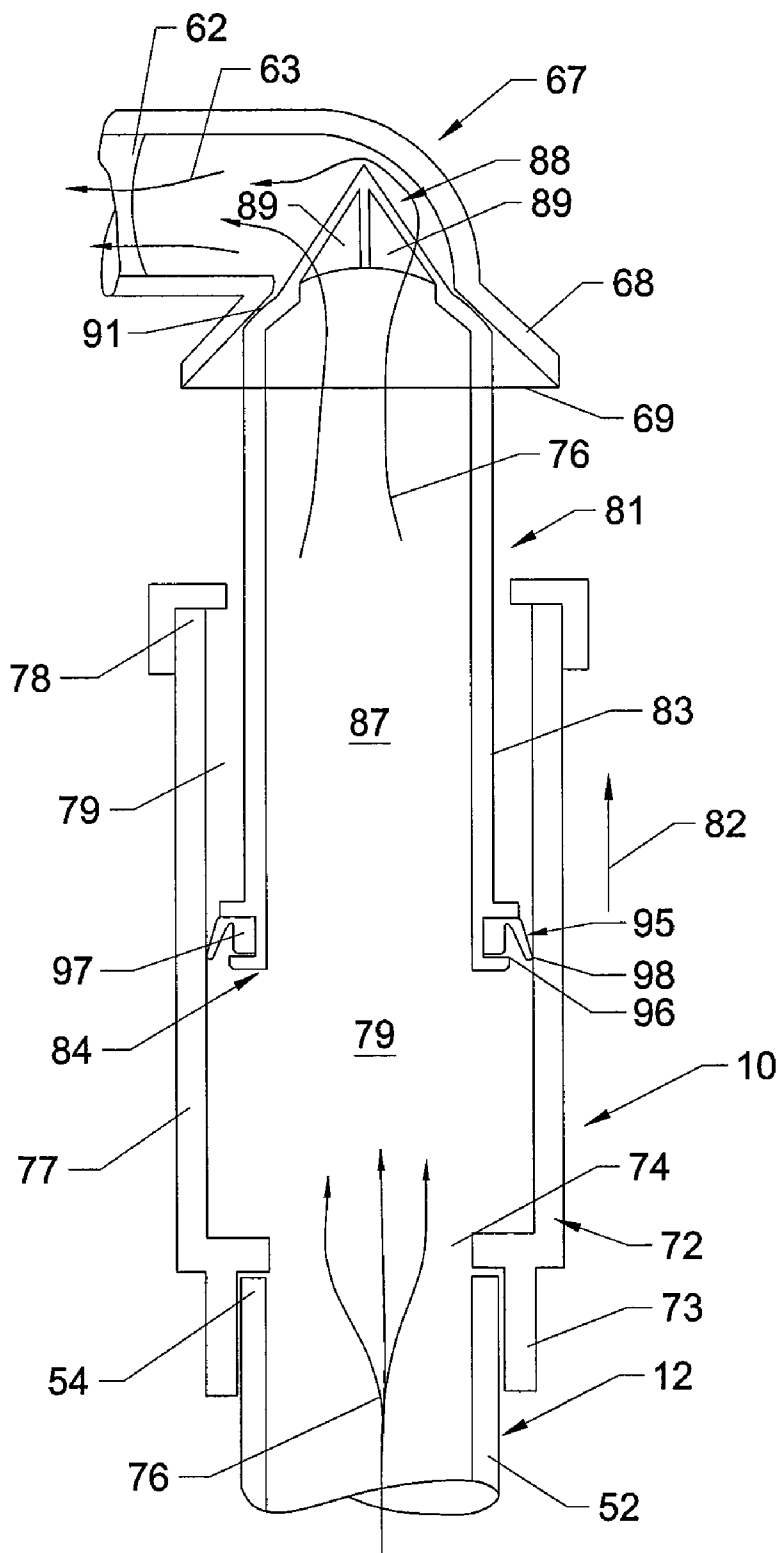


Fig 4B

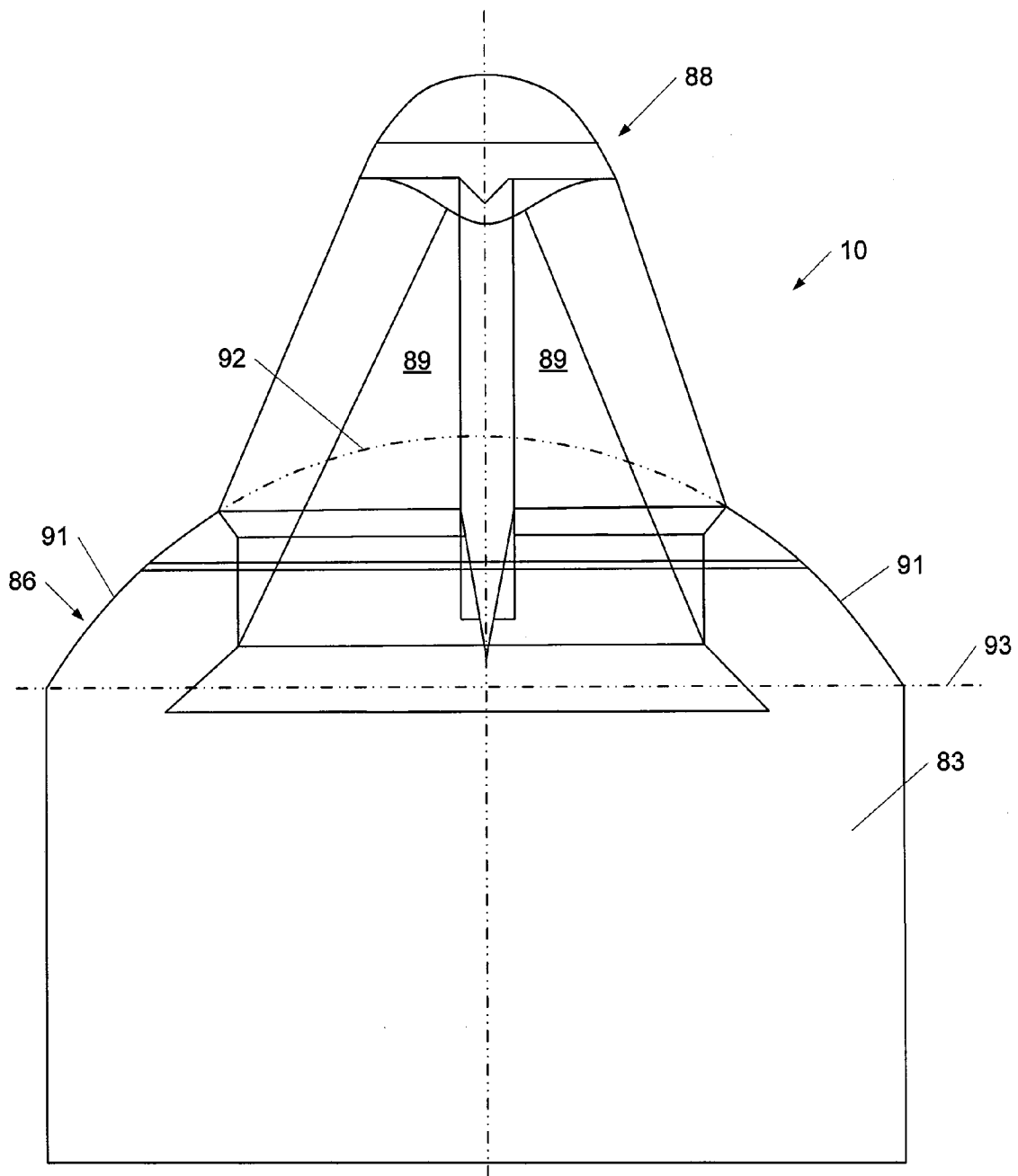


Fig. 4C

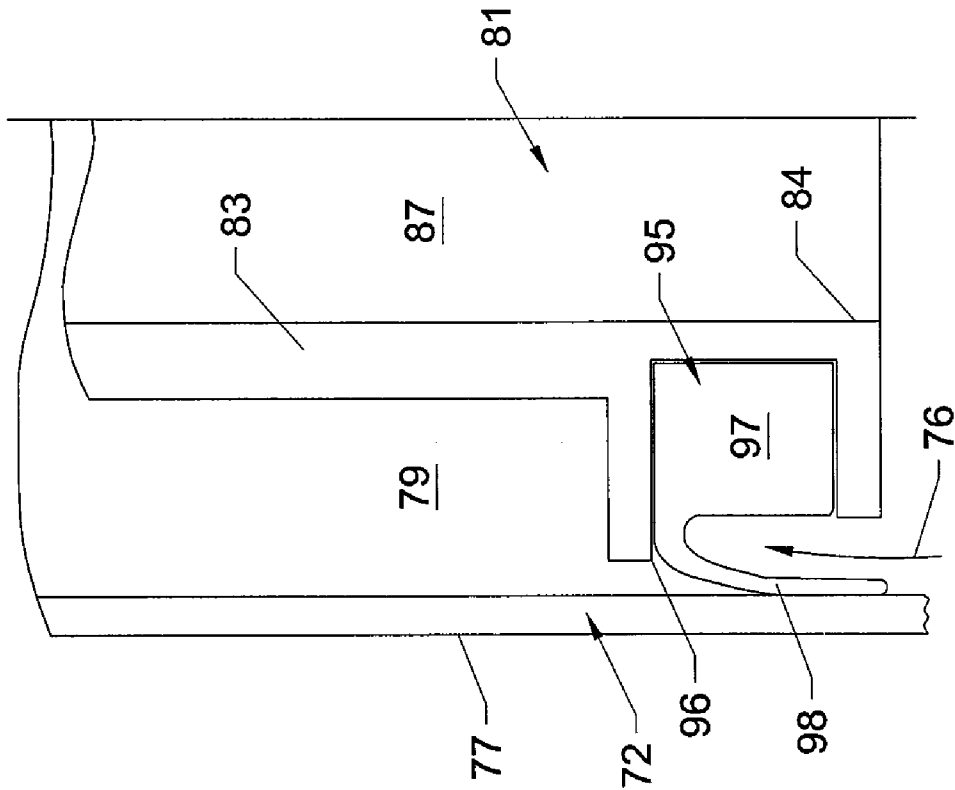


Fig. 5B

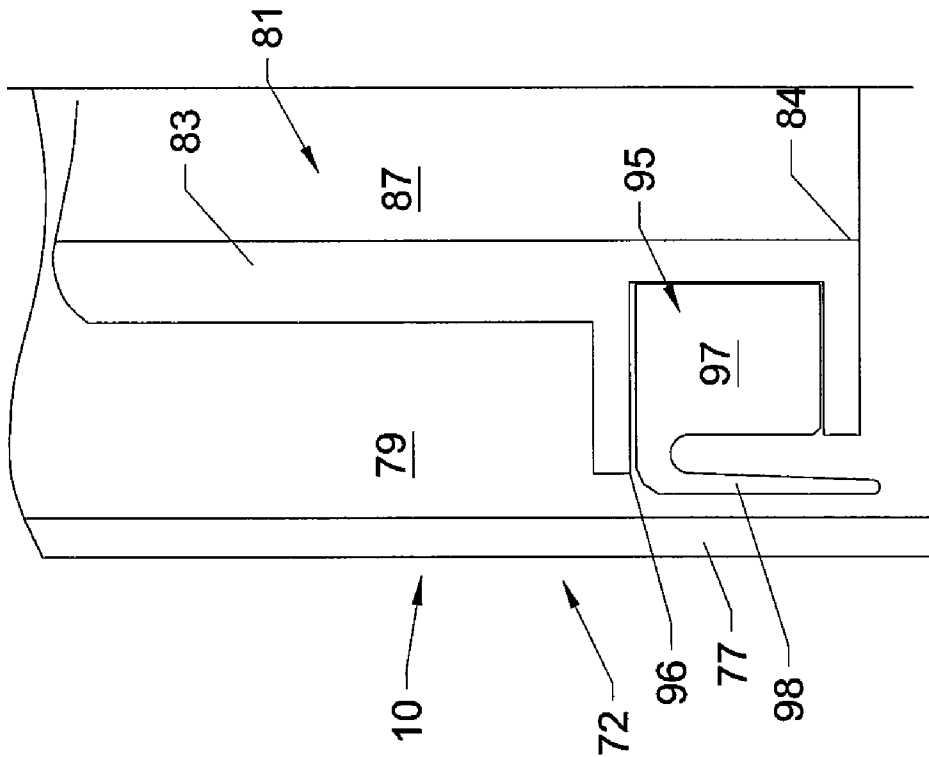


Fig. 5A

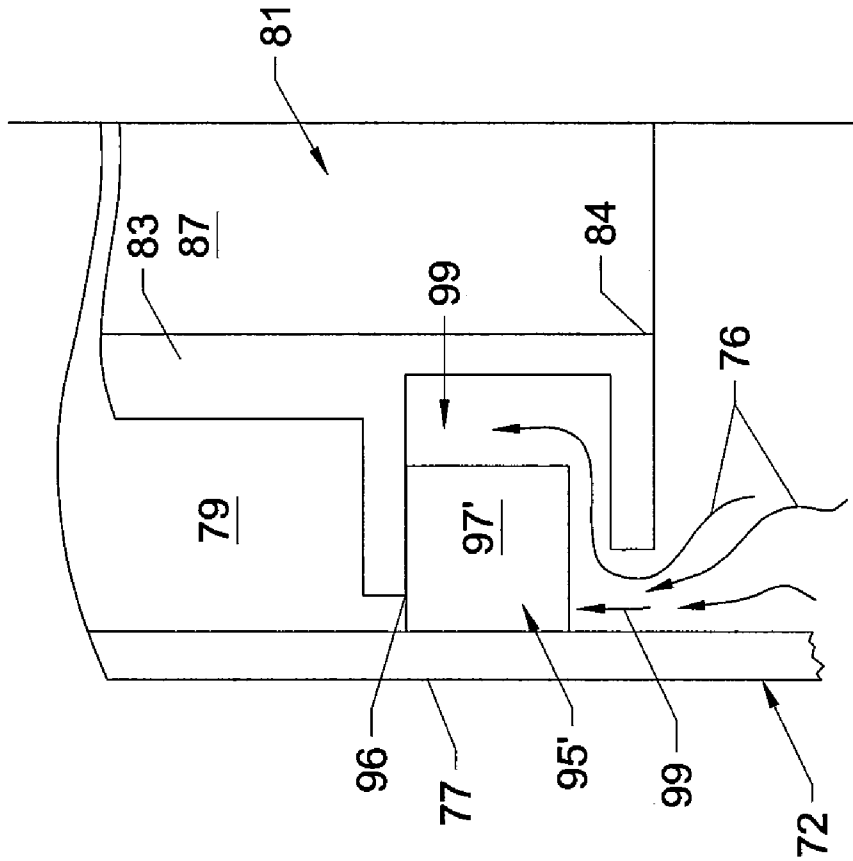


Fig. 6B

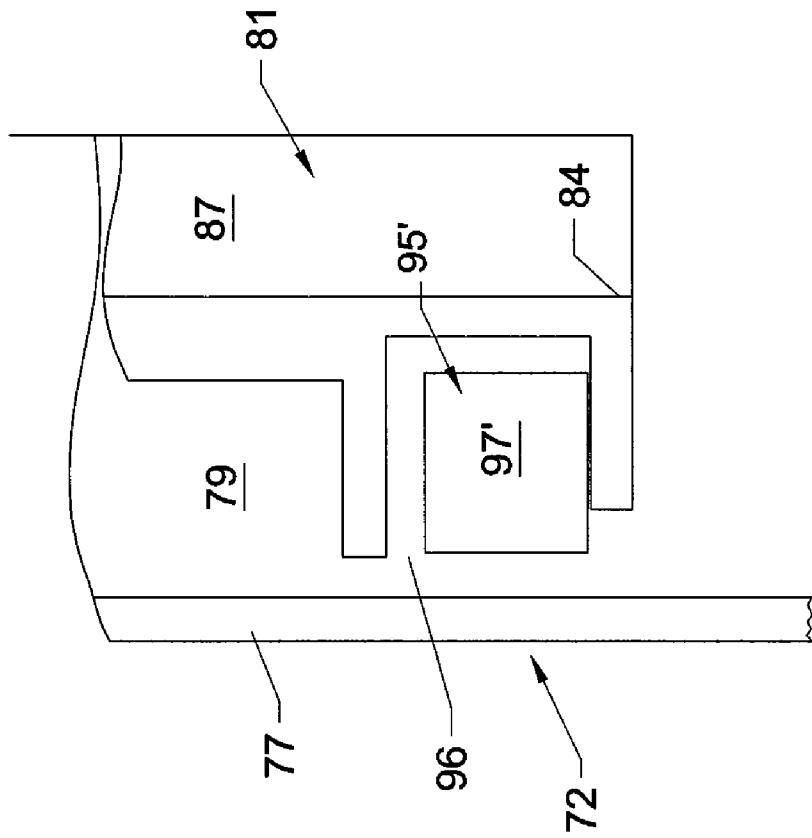


Fig. 6A

FLUID COUPLING ASSEMBLY FOR A DISHWASHER

FIELD OF THE INVENTION

[0001] The present invention generally relates to dishwashers, and in particular to a flexible fluid coupling assembly for connecting a wash fluid supply line of a dishwasher to an upper spray arm assembly of the dishwasher.

BACKGROUND OF THE INVENTION

[0002] A significant majority of dishwashers being manufactured today typically have an upper and a lower rack or basket in which dishware to be cleaned by the dishwasher are loaded. The lower rack of the dishwasher generally is positioned at the lowest practical level within the wash chamber, while the upper rack generally is positioned above the lower rack and adjacent the upper portion or top of the wash chamber of the dishwasher so as to provide the maximum amount of useful volume inside the wash chamber of the dishwasher for loading dishes. Jets of water or other cleaning fluids are directed at dishes contained within the upper and lower racks at various angles so as to pass through the racks and strike the surfaces of the dishes with a minimal amount of deflection from the racks. The primary washing action for at least the lower dish rack typically is provided by a lower spray arm that is mounted directly below the lower rack and sprays jets of water upwardly against the dishes within the lower rack. The lower spray arm can be stationary or can be a rotating spray arm that is driven by the force of the water or other cleaning fluid passing therethrough, with the rotation of the lower spray arm generally insuring greater spray coverage for the dishes loaded into the lower rack to provide enhanced washing action for the dishes.

[0003] In most dishwashers, the operation of the lower spray arm generally is fairly efficient, since its proximity to the water pump of the dishwasher makes it easy to supply water to the lower spray arm with a minimal pressure loss from the pump to the lower spray arm. However, providing an efficient, enhanced washing action to the upper rack of dishwashers has traditionally proven to be a more difficult task. Since the upper rack generally is mounted adjacent the upper edge or surface of the wash chamber of the dishwasher, the dishwasher wash water supply system must route the wash water or other cleaning fluid from the water pump, typically located in the bottom of the dishwasher, upwardly and along the wash chamber to the upper rack. Since both the upper and lower racks must also be able to slide into and out of the dishwasher for the loading and unloading of the dishes therein, the water supply system must be designed in such a way that it provides enough of a volume of wash water to the upper spray arm at pressures sufficient to provide efficient and substantially complete cleaning of the dishes in the upper rack, while not obstructing the sliding movement of the upper or lower racks into and out of the dishwasher. In addition, it is often desirable to make the upper rack vertically adjustable to provide more flexibility in loading larger items into the dishwasher, which adjustment of the upper rack further limits the design of the water supply system.

[0004] Various solutions have been proposed over the years to try to provide enhanced washing action to the upper rack of a dishwasher. For example, one proposed solution has been to fix a stationary tower to the center of the lower rack, with the tower including a rotating arm or section having one or more

spray nozzles for applying wash water to the dishes in the upper rack. Typically, water is fed to the rotating tower by means of a removable coupling system mounted on the top center of the lower spray arm, with the coupling being moved into engagement with the bottom of the tower when the dishwasher pressurizes the lower spray arm with wash water. The coupling then retracts when the wash pump shuts off the flow of water therethrough, so as to enable the lower rack to slide freely into and out of the dishwasher. Problems that have been observed with such a system have included limited wash action and coverage provided by the tower, as opposed to a rotating spray arm located directly beneath the upper rack, the loss of rack space due to the positioning of the tower in the center of the rack, which thus limits the available space for loading dishes, as well as the potential for one or more of the spray nozzles to be partially or completely blocked by large dishes placed into the lower rack by the user, thus preventing efficient cleaning of the dishes loaded in the upper rack.

[0005] Another, alternative system utilizes a collapsible tower that extends from the center of the lower spray arm, through the lower rack, and couples to the upper spray arm when in use. The tower then collapses below the surface of the lower rack when the wash pump is switched off. Such a system, however, still suffers from many of the same drawbacks of the fixed tower system, because even though the retractable tower collapses when the pump is off, the user still cannot load dishes within the area where the tower extends, as doing so would block the extension of the tower. Still other systems have used rotating spray arms mounted directly below the upper rack with a supply line or distribution system that supplies wash water to the spray arms being releasably coupled thereto, which type of system generally has been accepted as the method that delivers the best washing action to the dishes in the upper rack. The challenge presented by such a system is, however, designing an efficient washer distribution system that supplies water to the spray arm without interfering with or consuming space in the lower rack that is needed for loading dishes, while at the same time, avoiding an unacceptable large loss of head pressure in the wash water being supplied thereto. Additionally, since the upper rack must be pulled out of the dishwasher for loading or unloading, the coupling will need to be disconnected from the water supply line and reconnected to the water supply line when the upper rack is pushed back into the dishwasher. However, it is important for the function of such a system that the spray arm coupling be able to connect and disconnect cleanly from the water supply line, even when the vertical position or angle of the upper rack is changed.

[0006] Accordingly, it can be seen that a need exists for a system for supplying wash fluid to the upper spray arm of the dishwasher that addresses the foregoing and other related and unrelated problems in the art.

SUMMARY OF THE INVENTION

[0007] Briefly described, the present invention generally relates to a fluid coupling assembly for a dishwasher to facilitate formation of a substantially water-tight connection between a wash fluid supply line and an upper spray arm assembly for the dishwasher, which coupling will be disconnected upon the drop in fluid pressure when the flow of wash fluid through the fluid supply line is shut off for opening and loading/unloading of the dishwasher. The fluid coupling assembly of the present invention generally will be mounted

within a wash chamber of a dishwasher housing or tub body as part of the wash fluid supply line of the dishwasher. The dishwasher further typically will include upper and lower racks that are slideably received within the wash chamber of the dishwasher for supporting dishes during washing operations.

[0008] A lower spray arm assembly typically is provided along the bottom or lower portion of the dishwasher, positioned below the lower rack. The lower spray arm assembly generally includes an arm having a series of nozzles mounted therealong for directing sprays of washing fluid toward the dishes stacked or loaded within the lower rack. The upper spray arm assembly generally is mounted beneath the upper rack in a position or elevation to enable a sliding movement of the upper rack, as well to accommodate adjustments of the upper rack to varying elevations and/or angles as needed for loading dishes of varying sizes and shapes therein. The upper spray arm assembly generally includes a rotating spray arm having a series of ports or spray openings formed therealong for spraying jets of washing fluid against the dishes in the upper rack. A feed tube is connected to the center of the upper spray arm and includes a feed tube coupling at its opposite end. The feed tube coupling generally is conically or substantially funnel shaped, with a flared lower end for releasably connecting the feed tube of the upper spray arm assembly to the washing fluid supply line for the dishwasher.

[0009] The fluid coupling assembly of the present invention is mounted to a free or distal end of the wash fluid supply line and generally comprises a connector or coupling having a base mounted to the wash fluid supply line, and an extensible tower received within the base. The tower includes an open first or bottom end having a sealing member positioned thereabout, and a second or upper end including a nozzle. A substantially curved or spherically shaped wall portion is formed at the upper end of the tower, about the nozzle thereof. As the washing fluid is passed from the fluid supply line into the fluid coupling assembly, the pressure of the washing fluid urges the extensible tower upwardly toward engagement with the feed tube coupling of the upper spray arm assembly. The nozzle of the tower engages the coupling at the end of the feed tube of the upper spray arm assembly, with the curved or spherically shaped wall portion of the tower tending to help guide or direct the nozzle into a substantially sealed engagement or connection with the conically shaped wall of the feed tube coupling, even as the upper rack is adjusted to various elevations and at varying angles to accommodate dishware of different sizes and configurations. At substantially the same time, the sealing member positioned about the bottom portion of the tower is moved into a sealing position between the base and the tower of the fluid coupling assembly.

[0010] Various objects, features and advantages of the present invention will become apparent to those skilled in the art upon a review of the following detailed description, when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a side elevational view taken in partial cross section of a dishwasher incorporating the fluid coupling assembly of the present invention for connecting the wash fluid supply line to a feed tube for the upper spray arm assembly of the dishwasher.

[0012] FIG. 2 is a perspective illustration of the upper spray arm assembly and the fluid coupling assembly according to the present invention.

[0013] FIGS. 3A and 3B are side elevational views illustrating the engagement/coupling of the fluid coupling assembly of the present invention with the feed tube of the upper spray arm assembly.

[0014] FIGS. 4A and 4B are side elevational views illustrating the extension and engagement of the tower of fluid coupling assembly of the present invention with the feed tube coupling of the upper spray arm assembly.

[0015] FIGS. 4C is a side elevational view of the nozzle, illustrating the spherical wall section of the tower of the fluid coupling assembly.

[0016] FIGS. 5A and 5B are side elevational views illustrating the operation of the sealing member for sealing the area between the tower and base of the fluid coupling assembly of the present invention.

[0017] FIGS. 6A and 6B are side elevational views illustrating the operation of an additional embodiment of a sealing member for use with the fluid coupling assembly of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Referring now to the drawings in which like numerals indicate like parts throughout the several views, as shown in FIG. 1, the present invention generally relates to a flexible fluid coupling assembly 10 for use in a dishwasher 11 for releasably coupling or connecting a wash fluid supply 12 to an upper spray arm assembly 13 of the dishwasher 11. The fluid coupling assembly 10 of the present invention is designed to facilitate and ensure consistent formation of a sealed, substantially fluid-tight connection between the wash fluid supply and the upper spray arm assembly of the dishwasher during a washing operation, with the fluid coupling assembly being automatically disconnected from the upper spray arm assembly when the flow of washing fluid is shut off, so as not to interfere with the loading and unloading of dishware D within the dishwasher, and without reducing the amount of useable space within the dishwasher for loading dishware D therein.

[0019] As generally illustrated in FIG. 1, the dishwasher 11 includes a housing or tub body 20 having an upper portion or top 21, side walls 22, a rear or back wall 23, an open front portion 24, at which a door 26 generally is mounted for opening and closing the dishwasher, and a lower or base portion 27, all of which define an open ended wash chamber 28 within the dishwasher tub 20. As additionally illustrated in FIG. 1, the lower or base portion 27 of the dishwasher tub 20 can be formed with a sloped or inwardly tapering surface 29 that directs the used wash fluid downwardly toward a drain 31 at the bottom of the dishwasher tub 20, whereupon the contaminated or used washing fluid can be drained from the dishwasher. A water pump 32, which is typically connected to a motor 33, also generally is mounted at the bottom of the dishwasher tub. The water pump will be connected to a washing fluid supply, such as a water line or fluid reservoir and will supply the washing fluid under pressure to the dishwasher for spraying and cleaning dishware D contained within the wash chamber.

[0020] The dishwasher 11 also typically includes a lower rack 36 that is slideably received within the wash chamber 28 adjacent the lower or base portion 27 of the dishwasher tub 20 as indicated in FIG. 1. The lower rack 36 can be made from plastic coated wire or other substantially rigid, durable materials as is known in the art, with spaces or compartments for receiving the dishware D defined therein. The lower rack 36

further generally is mounted on rails (not shown) so as to be slideable into and out of the wash chamber through the open front 24 of the dishwasher tub as needed for loading and unloading the dishware D.

[0021] As additionally indicated in FIG. 1, an upper rack 38 is received within the wash chamber 28 adjacent the upper portion or top 21 of the dishwasher tub 20. The upper rack 38 can be formed from a plastic coated wire material similar to that of the lower rack, with spaces or compartments 39 for receiving dishware D defined therein. As with the lower rack 36, the upper rack 38 generally is mounted on slides or rails (not shown) to enable the upper rack to be moved or slid into and out of the wash chamber of the dishwasher for loading and unloading of dishware D, such as glasses, etc., therein. The upper rack further can be adjustably mounted on its slides or rails so as to be positionable at varying elevations as needed or desired to provide more room above or below the upper rack to accommodate varying size dishware being loaded in the upper and lower racks. In addition, the upper rack also can be adjustable to differing angles or orientations as needed or desired to enhance the cleaning of the dishware contained therein.

[0022] As illustrated in FIG. 1, a lower spray arm assembly 45 is mounted within the dishwasher tub 20 adjacent the lower portion or base 27 of the tub. The lower spray arm assembly generally includes a spray arm 46 having an elongated body 47 with an upper surface 48. A series of spray nozzles or ports 49 generally are mounted in spaced series across the upper surface of the body of the spray arm 46. The nozzles 49 direct pressurized sprays of washing fluid upwardly, typically at varying angles, toward the dishes D contained within the chambers or compartments 37 of the lower rack. The lower spray arm 46 also typically can be rotatably mounted to a pump discharge line or feed tube 51 for the water pump 32, which supplies the washing fluid under pressure to the lower spray arm, and thus causes rotation of the lower spray arm 46. The pressure of the wash fluid passing through the pump discharge tube and through the lower spray arm will cause rotation of the lower spray arm to further enhance the washing fluid coverage and thus the cleaning provided by the lower spray arm. In addition, as further illustrated in FIG. 1, a conduit 52 of the fluid supply line 12 connects to the pump discharge line 51 at a first or inlet end 53 thereof and extends along the lower portion 27 and back wall 23 of the dishwasher tub toward engagement with the upper spray arm assembly 13, terminating at a discharge or second end 54.

[0023] The upper spray arm 13 assembly typically is mounted beneath the upper rack 38, such as by vertically extending supports 56 that support the upper spray arm assembly 13 from the upper rack. The upper spray arm assembly 13 generally includes an upper spray arm 57 that can have a similar construction to the lower spray arm 46, including an elongated body 58 having an upper surface 59. A series of spray jets or ports 61 are formed along the upper surface 59 of the upper spray arm 57 for directing jets or flows of washing fluid against the dishware D contained within the compartments 39 of the upper rack 38.

[0024] As generally illustrated in FIGS. 1, 2 and 3A-3B, the upper spray arm 57 generally is rotatably mounted to a feed tube 62 for the upper spray arm assembly 13, which supplies a flow of wash fluid (indicated by arrows 63 in FIGS. 1 and 3B) to the upper spray arm during a dishwashing operation. The feed tube 62 can be formed from a plastic or metal

material and is connected at a first or proximal end 64 to the upper spray arm 57. The feed tube 62 extends rearwardly from the upper spray arm 57 toward the back wall 23 of the dishwasher tub 20, terminating at a second or distal end 66 adjacent the back wall 23. A feed tube coupling or connector 67 is attached to the second end 66 of the feed tube 62 for forming a releasable connection to the fluid supply line 12 of the dishwasher. The coupling 67 generally includes a substantially conically shaped, open ended body 68 having an outwardly flaired, downwardly extending wall 69 as illustrated in FIG. 3A-4B.

[0025] As illustrated in FIGS. 2-4B, the fluid coupling assembly 10 of the present invention is mounted to distal end 54 of the fluid supply line conduit 52 and functions as an extensible connector for releasably connecting the fluid supply line 12 to the feed tube coupling 67 during a dishwashing operation. The fluid coupling assembly 10 generally includes a substantially cylindrical base 72 having a circular flange or connector portion 73 formed about the bottom thereof. The circular flange 73 of the base 72 is connected to the open distal end 54 of the fluid supply line conduit 52 and defines an inlet opening 74 (FIGS. 4A-4B) through which the washing fluid flows from the fluid supply line, as indicated by arrows 76 in FIGS. 2, 3B and 4B. The base 72 further includes an upstanding side wall or body 77 having an upper end 78 defining a cylindrical chamber 79 (FIGS. 4A-4B), therein.

[0026] An extensible tower 81 is slideably received within the chamber 79 of the base 72 and is movable therealong in the direction of arrows 82 and 82' (FIGS. 4B and 4A) so as to move the tower 81 between an extended, engaging or connected position, shown in FIG. 4B, and an lowered, disconnected position shown in FIG. 4A. The tower 81 includes a cylindrical body 83 having an open first or inlet end 84 and a second or outlet end 86, with a flow passage 87 defined between the inlet and outlet ends of the tower. As illustrated in FIGS. 4A and 4B, the outlet end 86 of the tower 81 generally includes a conically shaped nozzle 88 having flow openings 89 formed therein, and a substantially cylindrically or spherically shaped wall portion 91 formed thereabout.

[0027] The substantially spherically shaped wall portion 91 of the extensible tower 81 helps guide the nozzle portion 88 of the extensible tower into a sealed, substantially fluid-tight engagement with the conical wall 68 of the feed tube coupling 67. The substantially spherically shaped wall portion 91 further generally can have a radius of curvature between approximately 0.3-0.75 inches, and can extend at an angle or arc, indicated at phantom lines 92 in FIG. 4C, from about 30°-32° to approximately 48°-50° above a horizontal plane 93 extending across the outlet end 86 of the tower below the spherically shaped wall portion and nozzle 88 thereof as shown in FIG. 4C. Larger or smaller angles or curves also can be used for the spherical wall portion 91. As a result, the spherically shaped wall portion tends to readily engage and seal against the conical side wall 68 (FIG. 4B) of the feed tube coupling 67 as the nozzle portion 88 of the tower 81 engages the coupling, even when the upper rack 38, and with it the feed tube coupling 67, is oriented at varying angles and elevations as may be required to accommodate loading of varying sizes or configurations of dishware for most conventional dishwashing operations.

[0028] The tower 81 itself typically will be approximately four to six inches in length, although its length can be varied as needed to provide a longer or shorter engagement range, depending the upper rack and the top wall of the dishwasher

tub and between the upper and lower racks as needed or desired for operation of the dishwasher. In addition, the diameter of the base portion 72 of the fluid coupling assembly typically can be in a range of approximately 0.8-1.2 inches, and the extensible tower 81 can have an inner diameter of between approximately 0.5 to 0.75 inches, although it will be understood that greater or lesser diameters also can be used for the base and for the extensible tower, depending upon the volume and/or pressure of the flow of washing fluid to be supplied to the upper spray arm.

[0029] As further illustrated in FIGS. 4A-5A, a sealing member 95 generally is mounted in a recess 96 formed about the lower inlet end 84 of the tower body 83. The sealing member typically is formed from an elastomeric, plastic, or rubber materials, or various other flexible, sealing materials, and typically is of a diameter slightly larger than the diameter of the recess 96 so as to be able to expand and/or move in response to the pressure of the wash fluid urging the extensible tower upwardly to its extended, engaging position. As shown in FIG. 5A, in a first embodiment of the sealing member 95, the sealing member will include a substantially square shaped body 97 with an outwardly spaced flange 98 formed therewith. As indicated in FIGS. 5B and 4B, when the pressurized washing fluid 76 is passed through the fluid coupling assembly 10, it engages and urges the extensible tower upwardly to its extended position (FIG. 4B). At the same time, the flow of washing fluid 76 also tends to cause the flange portion 98 of the sealing member 95 to be urged outwardly into substantially sealed contact with the inner wall of the base so as to form a seal between the tower 81 and the base portion 72 of the fluid coupling assembly. This sealing action helps reduce leaks and minimize potential loss of head pressure of the washing fluid being supplied to the upper spray arm assembly, to help enhance the cleaning action thereof.

[0030] FIGS. 6A and 6B illustrate an alternative embodiment of the sealing member 95' in which the sealing member is formed with a substantially square shaped body 97' and is loosely mounted within the recess 96 of the tower. As the washing fluid passing through the fluid coupling assembly engages this alternative embodiment of the sealing member 95', the force of the washing fluid tends to urge the sealing member 95' upwardly and outwardly, as indicated by arrows 99, against the upper edge of the recess 96 and against the inner wall of the base portion 72 of the fluid coupling assembly 10 to form a substantially fluid-tight seal therebetween.

[0031] In operation of the dishwasher 11 (FIG. 1) incorporating the fluid coupling assembly 10 of the present invention, the user will load the upper and lower racks 36 and 38 with dishware D, after first adjusting the elevation of the upper rack as needed, depending upon the size and configuration of the dishware to be loaded. Thereafter, the user will slide the loaded upper and lower racks back into the wash chamber 28 of the dishwasher and close the front door. As the dishwasher starts the washing operation, the washing fluid, typically water, is pumped from the water pump 32 in the bottom of the dishwasher, through the pump discharge line 51 and into the lower spray arm assembly 46. The lower spray arm assembly 46, in turn, sprays the dishes in the lower rack 36 with pressurized jets of washing fluid, cleaning dirt and debris therefrom. At substantially the same time, a pressurized flow of washing fluid also is fed through the fluid supply line 12 to the upper spray arm assembly 13. As the washing fluid passes through the fluid coupling assembly 10, the extensible tower 81 of the fluid coupling assembly of the present invention is

urged upwardly to its extended position, projecting toward and into engagement with the feed tube coupling 67 (FIG. 1) of the feed tube of the upper spray arm assembly 13.

[0032] The extension of the tower 81 generally is controlled or limited by its engagement with the feed tube coupling of the feed tube of the upper spray arm assembly. As the tower 81 comes into contact with the feed tube coupling, its nozzle 88 and the substantially spherically shaped wall portion 91 formed about the upper end of the tower 81 will engage and slide along the conically shaped wall 68 of the feed tube coupling 67. As a result, the nozzle of the tower is guided into a coupled, substantially sealed engagement with the feed tube. The substantially spherically shaped surface or wall portion 91 formed about the upper end of the tower helps ensure that a substantially fluid-tight, sealed engagement is created between the tower and the conical inner wall 68 of the feed tube coupling 67, even when the upper rack has been adjusted or oriented into various angled orientations as needed to accommodate the dishware loaded therein.

[0033] At substantially the same time, the sealing member mounted about the bottom of the tower further will be urged into sealing contact with the inner wall of the base portion of the flexible fluid coupling assembly of the present invention so as to form a substantially fluid and pressure-tight seal therebetween to avoid significant pressure loss of the washing fluid as it passes through the flexible fluid coupling assembly of the present invention and into the feed tube of the upper spray arm assembly. During the washing operation, the pressurized washing fluid supplied to the upper and lower spray arm assemblies is directed via the spray nozzle or ports formed along the upper and lower spray arms against the dishes contained within the upper and lower rack for cleaning the dishes.

[0034] The flexible fluid coupling assembly of the present invention thus provides for automatic compensation of misalignment between the feed tube coupling of the upper spray arm assembly and the fluid supply line of the dishwasher, either due to misalignments resulting from manufacturing tolerances and/or from inconsistencies in deflection of the upper rack due to variations in weight of the dishes loaded therein, as well as enabling the upper rack to be adjusted over a wide range of vertical and angular positions. The design of the flexible fluid conduit coupling assembly further helps to ensure that a substantially sealed engagement or connection is formed between the tower and feed tube coupling of the upper spray arm assembly over a wide range of angular misalignments so as to avoid creation of leaks or substantial, undesirable drops or losses of pressure in the wash fluid being supplied to the upper spray arm assembly due to an incomplete connection between the fluid coupling and feed tube coupling.

[0035] It will be further understood by those skilled in the art that while the present invention has been described above with reference to preferred embodiments, numerous variations, modifications, and additions can be made thereto without departing from the spirit and scope of the present invention as set forth in the following claims.

What is claimed:

1. A dishwasher for cleaning dishware, comprising:
 - a body having an upper portion, a lower portion, and side walls defining a wash chamber;
 - at least one rack received within said wash chamber for supporting the dishware therein for cleaning;

- a spray arm assembly for spraying washing fluid at the dishware within said rack, said spray arm assembly including a spray arm and a feed tube connected at one end to said spray arm, with a feed tube coupling at an opposite end thereof; and
 - a fluid supply line extending along said wash chamber and having an extensible fluid coupling assembly adapted to move into releasable engagement with and engage said feed tube coupling of said spray arm assembly in substantially sealing engagement, said fluid coupling assembly including a nozzle with a substantially spherically shaped wall portion formed thereabout to facilitate the guiding of said nozzle of said fluid coupling assembly into a coupled engagement with said feed tube coupling and substantially sealed against said feed tube coupling.
2. The dishwasher of claim 1 wherein said at least one rack comprises an upper rack slidably mounted within said wash chamber and further comprising a lower rack slideably received within said wash chamber along said lower portion of said body.
 3. The dishwasher of claim 1 and further comprising a lower spray arm mounted adjacent said lower portion of said body, and a lower rack in which dishware is received for application of washing fluid thereto, slidably received within said wash chamber of said body adjacent said lower spray arm.
 4. The dishwasher of claim 1 and wherein said substantially spherically shaped wall portion formed about said nozzle can extend from about 30° to about 50° above a horizontal plane adjacent said nozzle.
 5. The dishwasher of claim 1 and wherein said fluid coupling assembly comprises a base and an extensible tower received within said base and moveable between an extended portion and a retracted position upon passage of the wash fluid therethrough.
 6. The dishwasher of claim 5 and wherein said extensible tower comprises a body having an open inlet end and an open outlet end about which said nozzle is mounted.
 7. The dishwasher of claim 6 and further comprising a sealing member positioned about said inlet end of said body of said extensible tower, which sealing member is adapted to move into a sealing position between said body of said extensible tower and said base of said fluid coupling assembly as the wash fluid passes through said connector.

8. In a dishwasher for washing dishes and having a housing with upper and lower racks for holding the dishes slideably received therein, the improvement comprising:
 - a spray arm for directing a wash fluid at the dishes within the upper rack;
 - a feed tube connected to said spray arm at a first end and having a feed tube coupling at a second end thereof;
 - a fluid supply line extending through the housing of the dishwasher; and
 - a fluid coupling assembly connected to one end of said fluid supply line and comprising a base and an extensible tower received within said base and moveable between a retracted position and an extended portion so as to engage said feed tube coupling, said tower having a first open end and a second end comprising a nozzle with a substantially curved wall portion formed thereabout to facilitate the engagement of said nozzle of said fluid coupling assembly with said feed tube coupling to form a substantially sealed connection therewith, and defining a flow passage through which the wash fluid is directed into said feed tube for supply to said spray arm.
9. The dishwasher of claim 8 and wherein said substantially curved wall portion formed about said nozzle extends from about 30° to about 50° above a horizontal plane extending across said second end of said tower.
10. The dishwasher of claim 9 and wherein said substantially curved wall portion formed about said nozzle comprises a substantially spherically shaped wall formed about said nozzle.
11. The dishwasher of claim 8 and further comprising a sealing member received about said first open end of said tower and adapted to move into a sealing position between said tower and said base as the wash fluid is passed through said fluid coupling assembly.
12. The dishwasher of claim 11 and wherein said sealing member comprises a ring formed from an elastomeric material, rubber or flexible plastic material.
13. The dishwasher of claim 8 and wherein said feed tube coupling comprises a conically shaped section having an outwardly flared end for guiding said nozzle of said tower into substantially sealed engagement therewith.
14. The dishwasher of claim 13 and wherein said curved section formed about said nozzle of said tower comprises a spherical surface adapted to substantially seal against said conically shaped section of said feed tube coupling.

* * * * *