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(19) **United States**(12) **Patent Application Publication****Kang**(10) **Pub. No.: US 2006/0180222 A1**(43) **Pub. Date: Aug. 17, 2006**(54) **MESH-TYPE ANGLE-ADJUSTABLE FAUCET**(52) **U.S. Cl. 137/801**(75) **Inventor: Hak Kuy Kang, Kim Po City (KR)**(57) **ABSTRACT**

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Disclosed is a mesh-type angle-adjustable faucet for a kitchen sink, which can control the angle stepwisely by crown gears arranged at contact surfaces of two tubes. The faucet includes: a raw water pipe; a water tap; flow rate controlling means; a first tube connected with the water tap and having a first crown gear fixed at an end portion of the water tap via fixing means for preventing an idle rotation; a second tube having a second crown gear engaged with the first crown gear of the first tube at an end thereof via fixing means for preventing the idle rotation, the other end of the second crown gear being connected with the raw water pipe; an elastic member for allowing the first and second crown gears to be in close contact with each other; and a watertight member arranged at the contact surfaces of the first and second tubes.

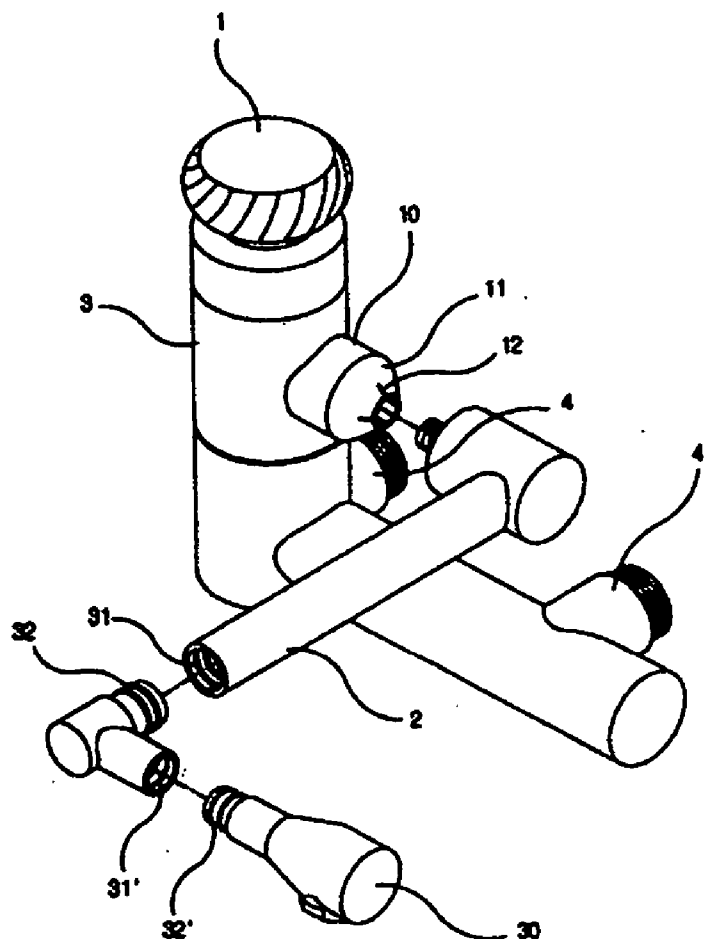


FIG. 1

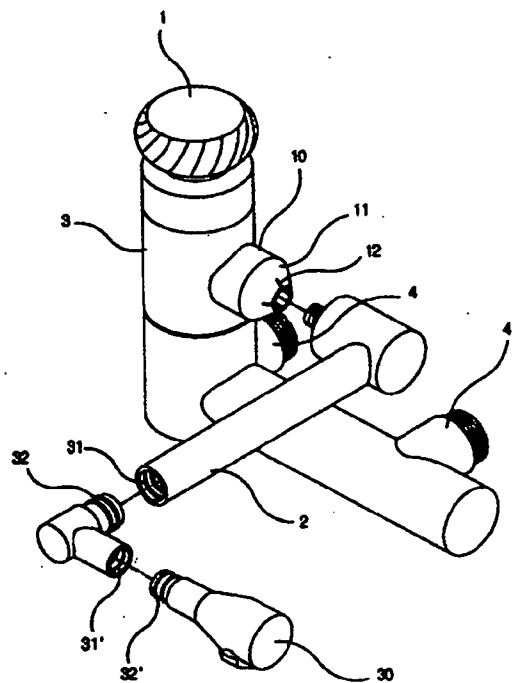


FIG. 2

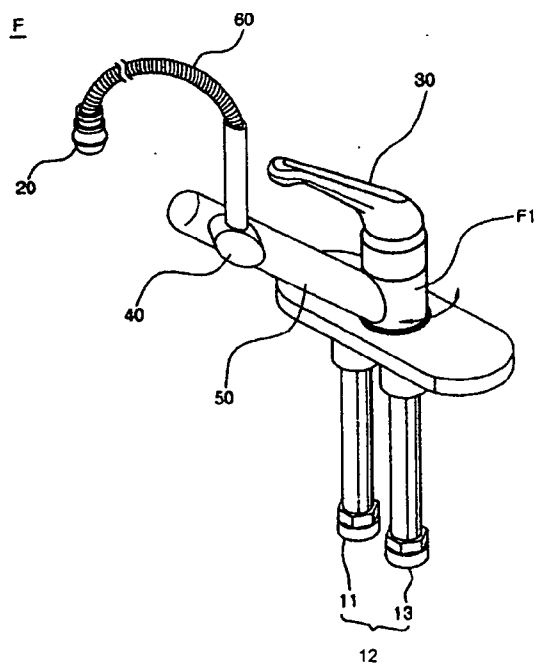


FIG. 3a

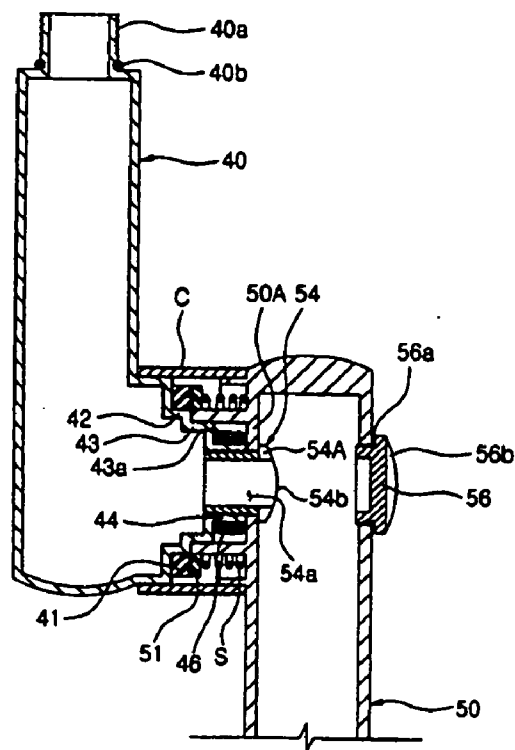


FIG. 3b

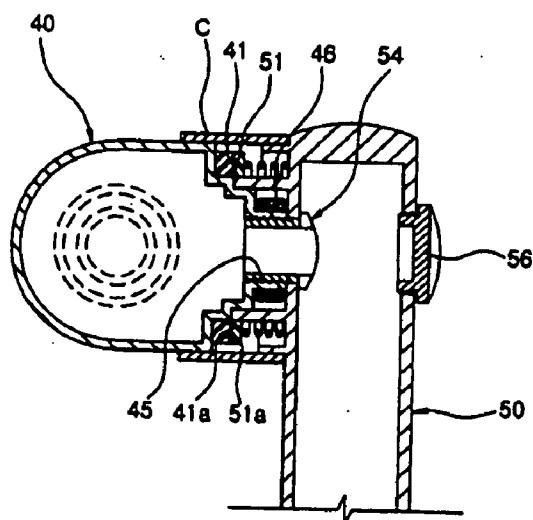
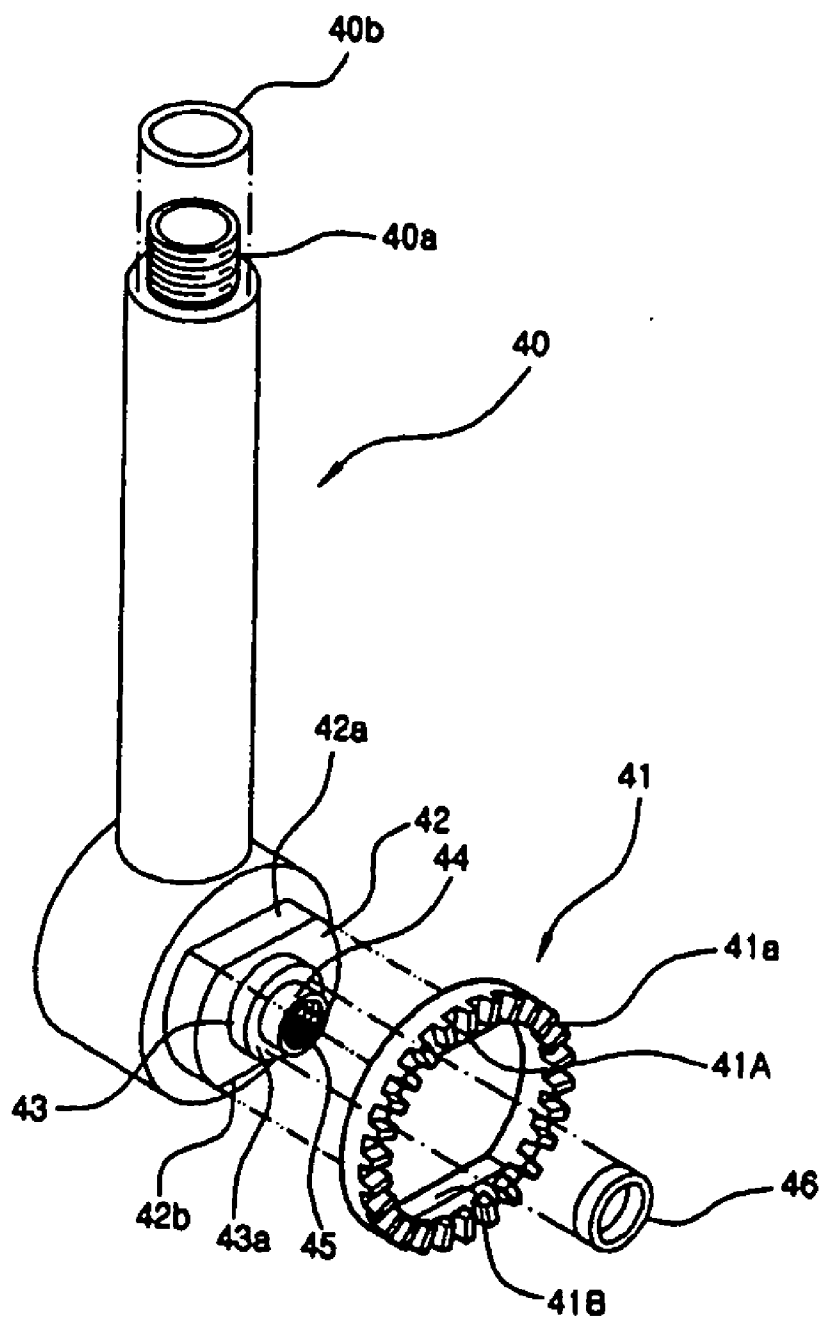


FIG. 4



MESH-TYPE ANGLE-ADJUSTABLE FAUCET

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a faucet capable of adjusting the angle of a water tap in a mesh type, and more particularly, to a faucet for a kitchen sink, which can adjust the angle stepwisely by crown gears arranged at contact surfaces of two tubes.

[0003] 2. Background Art

[0004] In general, a faucet, particularly, installed at a kitchen sink which is one of kitchen utensils, needs to regulate the angle of a water tap according to kinds and the volume of vessels to be washed.

[0005] To regulate the angle of the water tap, Korean Utility Model Registration No. 0165227 (registered on Oct. 15, 1999) discloses a built-in water tap for kitchen. In the built-in water tap, a main body which includes a shut-off valve is connected with a water tap via a flexible hose, so as to freely regulate the angle of the water tap in all directions.

[0006] However, the angle-adjustable faucet disclosed in Korean Utility Model Registration No. 0165227 has been decayed since the advent of a 'ring-type weight of a water tap having a drawable hand spray' disclosed in Korean Utility Model Registration No. 0109088 (registered on Sep. 3, 1997). The faucet disclosed in Korean Utility Model Registration No. 0109088 can draw a water tap connected with a raw water pipe via a hose, thereby allowing a user to clean the entire sink conveniently.

[0007] However, such drawable faucet disclosed in Korean Utility Model Registration No. 0109088 has an advantage in that the user has to wash vessels with one hand while keeping proper angle and height after drawing the faucet with the other hand.

[0008] Therefore, also such drawable faucet disclosed in Korean Utility Model Registration No. 0109088 needs a device to allow the user to wash vessels with both hands after previously regulating and setting the angle of the faucet.

[0009] To solve the above problem, as shown in **FIG. 1**, Korean Utility Model No. 0358852 (registered on Aug. 4, 2004) discloses 'a rotational structure of a discharge pipe of a faucet supplying hot water and cold water'. In Korean Utility Model No. 0358852, a support pipe **10** of a body **3** having a flow rate controller **1** is coupled with a discharge pipe **2** via a slip wedge of spline type, and a vertical angle of the discharge pipe **2** is regulated only by forced power due to friction of an inclined slip contact surface.

[0010] However, such faucet disclosed in Korean Utility Model No. 0358852 also has a disadvantage in that the discharge pipe droops if a nut of the slip wedge for connecting the support pipe with the discharge pipe gets loose due to a repeated angle regulation. To solve the above problem, the user, for example, a house wife has to disassemble the faucet, tighten the nut and closely connect the support pipe with the discharge pipe again in order to re-regulate friction force.

[0011] Therefore, the above prior art has several problems in that durability of the prior art is weak and lots of costs are needed to repair and maintain the faucet.

SUMMARY OF THE INVENTION

[0012] Accordingly, the present invention has been made to solve the above disadvantages of the prior arts, and it is an object of the present invention to provide a mesh-type angle-adjustable faucet, which can control the angle of the water tap in the vertical and lateral directions by the stepwise engagement of the crown gears arranged at the contact surfaces of the tubes, thereby preventing drooping of the tubes in spite of the repeated use and preventing a trouble of the faucet.

[0013] It is another object of the present invention to provide a mesh-type angle-adjustable faucet, which includes crown gears disposed at contact surfaces of the tubes and serving as means for controlling a vertical angle of the water tap and lateral angle controlling means and/or a flexible hose, thereby solving the problems of the conventional faucets installed at the kitchen sink.

[0014] It is a further object of the present invention to provide a mesh-type angle-adjustable faucet, which has a special watertight member for guaranteeing watertightness provided to the contact surfaces of the tubes, thereby providing watertightness and a strong coupling force between the two tubes and allowing a user to easily assemble and repair it.

[0015] To accomplish the above objects, according to the present invention, there is provided a mesh-type angle-adjustable faucet including: a raw water pipe; a water tap; flow rate controlling means; a first tube connected with the water tap and having a first crown gear fixed at an end portion of the water tap via fixing means for preventing an idle rotation; a second tube having a second crown gear engaged with the first crown gear of the first tube at an end thereof via fixing means for preventing the idle rotation, the other end of the second crown gear being connected with the raw water pipe; an elastic member for allowing the first and second crown gears to be in close contact with each other; and a watertight member arranged at the contact surfaces of the first and second tubes, and wherein the watertight member includes: a packing ring disposed on the contact surfaces of the first and second tubes; a female screw hole formed on the first tube or the second tube; and a male screw member engaged with the female screw hole to allow the first and second tubes to be close in contact each other, the male screw member having a water discharge hole and being mounted through a mounting hole formed on the first tube or/and the second tube, the mounting hole being closed by a stopper which is screw-coupled with the mounting hole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred embodiments of the invention in conjunction with the accompanying drawings, in which:

[0017] **FIG. 1** is an exploded perspective view of a faucet shown in **FIG. 1** of the official gazette of Korean Utility Model Registration No. 0358852;

[0018] **FIG. 2** is a perspective view of a faucet according to the present invention;

[0019] **FIGS. 3a** and **3b** are sectional views of the first tube and the second tube of the faucet, which have different cutting directions from each other, according to the present invention; and

[0020] FIG. 4 is a perspective view of the first tube of the faucet according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] Reference will be now made in detail to the preferred embodiment of the present invention with reference to the attached drawings.

[0022] A faucet according to the present invention can be used in all existing faucet facilities such as a kitchen sink or a washing stand. In the present invention, for the sake of convenience in description, the faucet for a kitchen sink will be described. However, the present invention is not restricted to the following description of the faucet for the purpose of a special use.

[0023] First, as shown in FIG. 2, the faucet (F) according to the present invention includes a water tap 20 connected to a raw water pipe 12 having a hot water pipe 11 and a cold water pipe 13 for directly discharging water from the raw water pipe 12, flow rate controlling means 30, and tubes 40, 50 and 60 for connecting the water tap 20 with the raw water pipe 12.

[0024] It is preferable that the water tap 20 is a well-known tap which can convert its water spray type into a shower type and a spouting type. Furthermore, the flow rate controlling means 30 is a four-way switching type valve in the drawing, but may be a rotatable valve or one of well-known valves.

[0025] As shown in FIGS. 2, 3a, 3b and 4, crown gears 41 and 51 provided to contact surfaces of the first and second tubes 40 and 50 which are the essential parts of the faucet serve as vertical angle controlling means of the faucet according to the present invention.

[0026] In FIG. 2, the second tube 50 connected with a body (F1) of the faucet (F) having the flow rate controlling means 30 has lateral angle controlling means. The lateral angle controlling means can be realized by coupling cylinders of various sizes or by interposing bearings among the cylinders in such a way that the cylinders are not separated from each other.

[0027] A flexible hose 60 is interposed between the water tap 20 and the first tube 40 so as to promote a convenience in angle control of the water tap 20.

[0028] In the faucet according to the present invention, the crown gears can be all used for the vertical and/or lateral angle controlling means, and at least three tubes each of which has the crown gear may be mounted.

[0029] In FIGS. 3a, 3b and 4, the first tube 40 has a connection portion 40a formed at an end portion thereof for connecting the flexible hose 60 (the reference numeral 40b designates an O-ring for watertightness). Additionally, the first tube 40 has a first protrusion 42 formed at the other end portion thereof, namely a portion which contacts with the second tube 50, on which the first crown gear 41 is fit.

[0030] In FIG. 4, the first protrusion 42 is means for preventing an idle rotation of the crown gear 41, and has holding portions 42a and 42b which are in the form of a shape that two portions of a cylinder are symmetrically cut in a lateral direction, and the first crown gear 41 has holding

jaws 41A and 41B corresponding to the holding portions 42a and 42b. The idle rotation preventing means including the holding jaws 41A and 41B and the holding portions 42a and 42b can be substituted with other means such as a key or a screw.

[0031] A second protrusion 43 having the outer diameter smaller than that of the first protrusion 42 is formed at an end of the first protrusion 42, and a third protrusion 44 having the outer diameter smaller than that of the second protrusion 43 is formed at an end of the second protrusion 42. The third protrusion 44 has a female screw hole 45 formed on the inner circumference thereof (see FIGS. 3b and 4) and a packing ring 46 disposed on the outer circumference thereof as a watertight member. The protrusions 42, 43 and 44 form concentric circles.

[0032] The female screw 45 of the third protrusion 44 is screw-coupled with a male screw 54, which will be described later, and so serves means for coupling the two tubes 40 and 50.

[0033] The second tube 50 has the outer diameter corresponding to the outer diameter of the first protrusion 42 of the first tube 40, which is formed at a portion contacting with the first tube 40, and the inner diameter corresponding to the outer diameter of the second protrusion 43, and includes the second crown gear 51 engaged with the first crown gear 41 of the first tube 40.

[0034] Not shown in the drawings, it is preferable that an annular protrusion 52 of the second tube 50 also has a holding portion as means for preventing an idle rotation of the crown gear 51 and the second crown gear 51 has a holding jaw corresponding to the holding portion, like the first crown gear of the first tube.

[0035] Moreover, the second tube 50 further includes an insertion hole 53 having the inner diameter corresponding to the outer diameter of the third protrusion 44 of the first tube 40, and a male screw member 54 screw-coupled with the female screw hole 45 of the third protrusion so as to serve as means for coupling the two tubes 40 and 50. The annular protrusion 52 and the insertion hole 53 also form concentric circles.

[0036] The male screw member 54 is inserted into the insertion hole 53, and has a head 54A caught to the inner surface of a partition 50A disposed between the annular protrusion and the insertion hole 53 of the second tube 50. The male screw member 54 has a water discharge hole 54a for allowing a flow of water from the raw water pipe 10 to the first tube 40 through the second tube 50.

[0037] Furthermore, the female screw hole 45 and the male screw member 54 are coupled with each other so that the packing ring 46 which is a watertight member is in close contact with the outer surface of an end plate 43a of the second protrusion 43 of the first tube 40 and the outer surface of the partition 50A, thereby securing watertightness.

[0038] Differently from FIGS. 3a and 3b, but to closely contact the partition 50A with the end plate 43a while interposing the packing ring 46 between them, it is preferable that the third protrusion 44 of the first tube 40 has the outer diameter which can be inserted into the insertion hole 53 of the second tube 50.

[0039] In the present invention, the word of 'corresponding' in connection with the size of the components (41, 42, 43 and 44) and (51, 52 and 53) arranged on the contact portions of the first and second tubes 40 and 50 means that the corresponding components have the size to couple them with each other within a range capable of guaranteeing engagement and watertightness of the crown gears 41 and 51.

[0040] Hereinafter, an assembly of the faucet (F) according to the present invention will be described. The male screw member 54 is coupled with the female screw hole 45 through a mounting hole 55 formed at the opposite side of the insertion hole 53 of the second tube 50. At this time, it is preferable that the head 54A of the male screw member 54 has a driver insertion slot 54b for allowing rotation of the male screw member by a tool.

[0041] After the coupling between the male screw member 54 and the female screw hole 45, the mounting hole 55 is closed by a stopper 56 having an O-ring 56a for watertightness. It is preferable that the stopper 56 also has a driver insertion slot 56b. The mounting hole 55 and the stopper 56 screw-coupled with the mounting hole 55 allow a user to easily repair the faucet (F) when there is an error at the contact portions of the tubes 40 and 50.

[0042] The male screw member 54 and the stopper 56 respectively having the driver insertion slot 54b and 56b may respectively have a head having a hexagonal cross section so as to allow the user to tighten and untighten the male screw member using a wrench.

[0043] In the faucet (F) according to the present invention, it is essential to provide an elastic member serving contrary functions to prevent drooping of the tubes through the close engagement between the first and second crown gears 41 and 51 and to guarantee the rotation of the tubes by the deviation between the crown gears 41 and 51.

[0044] For this, in the present invention, the elastic member, particularly, a coil spring (S) is disposed on the annular protrusion 52 of the second tube 50, so that the second crown gear 51 can be in close contact with the first crown gear 41.

[0045] In FIGS. 3b and 4, when the user grasps and vertically rotates the first tube 40, symmetrical-type trapezoidal teeth 41a of the first crown gear 41 are deviated from teeth 51a of the second crown gear 51, and so, the second crown gear 51 is elastically sprung by the elastic member (S) and moved backward toward the second tube 50, so that the crown gears can be rotated.

[0046] To prevent abrasion of the crown gears due to the repeated rotation, it is preferable that the crown gears made of an abrasion resistance material, particularly, synthetic resin.

[0047] Additionally, a cover (C) is provided to the contact surfaces of the first and second tubes 40 and 50 for preventing exposure of the crown gears 41 and 51 to the outside. If necessary, the cover (C) may be made of a transparent material so as to increase an aesthetic effect.

[0048] Moreover, the cover which covers the crown gears can be substituted with a female screw hole and a male screw member in order to couple and fix the contact portions of the two tubes from the outside like the female screw hole 45 and the male screw member 54.

[0049] As described above, the mesh-type angle-adjustable faucet according to the present invention can control the angle of the water tap in the vertical and lateral directions by the stepwise engagement of the crown gears arranged at the contact surfaces of the tubes, thereby preventing drooping of the tubes in spite of the repeated use and preventing a trouble of the faucet.

[0050] Furthermore, the present invention includes the crown gears disposed at the contact surfaces of the tubes and serving as the means for controlling the vertical angle of the water tap and the lateral angle controlling means and/or the flexible hose, thereby solving the problems of the conventional faucets installed at the kitchen sink.

[0051] Moreover, the present invention has the special watertight member for guaranteeing watertightness provided to the contact surfaces of the tubes, thereby providing watertightness and a strong coupling force between the two tubes and allowing the user to easily assemble and repair it.

[0052] While the present invention has been described with reference to the particular illustrative embodiment, it is not to be restricted by the embodiment but only by the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiment without departing from the scope and spirit of the present invention.

1. A mesh-type angle-adjustable faucet comprising:

a raw water pipe;

a water tap;

flow rate controlling means;

a first tube connected with the water tap and having a first crown gear fixed at an end portion of the water tap via fixing means for preventing an idle rotation;

a second tube having a second crown gear engaged with the first crown gear of the first tube at an end thereof via fixing means for preventing the idle rotation, the other end of the second crown gear being connected with the raw water pipe;

an elastic member for allowing the first and second crown gears to be in close contact with each other; and

a watertight member arranged at the contact surfaces of the first and second tubes, and

wherein the watertight member includes:

a packing ring disposed on the contact surfaces of the first and second tubes;

a female screw hole formed on the first tube or the second tube; and

a male screw member engaged with the female screw hole to allow the first and second tubes to be close in contact with each other, the male screw member having a water discharge hole and being mounted through a mounting hole formed on the first tube or/and the second tube, the mounting hole being closed by a stopper which is screw-coupled with the mounting hole.

2. A mesh-type angle-adjustable faucet according to claim 1, wherein lateral angle controlling means is disposed between the raw water pipe and the second tube, and the first and second crown gears serve as vertical angle controlling means.

3. A mesh-type angle-adjustable faucet according to claim 1, wherein a flexible hose is interposed between the water tap and the first tube.

4. A mesh-type angle-adjustable faucet according to claim 1, wherein the first tube or the second tube includes:

a first protrusion having a first crown gear or a second crown gear;

a second protrusion formed at an end portion of the first protrusion and having the outer diameter smaller than that of the first protrusion; and

a third protrusion formed at an end portion of the second protrusion, the third protrusion having the outer diameter smaller than that of the second protrusion, the third protrusion having the female screw hole formed on the inner circumference thereof and a packing ring disposed on the outer circumference thereof, and

wherein the first tube or the second tube includes:

an annular protrusion disposed on the first crown gear or the second crown gear, the annular protrusion having the outer diameter corresponding to that of the first protrusion and the inner diameter corresponding to the outer diameter of the second protrusion; and

an insertion hole having the inner diameter corresponding to the outer diameter of the third protrusion, wherein the male screw member is inserted into the insertion hole and the male screw member and the insertion hole form concentric circles.

5. A mesh-type angle-adjustable faucet according to claim 2, wherein the first tube or the second tube includes:

a first protrusion having a first crown gear or a second crown gear;

a second protrusion formed at an end portion of the first protrusion and having the outer diameter smaller than that of the first protrusion; and

a third protrusion formed at an end portion of the second protrusion, the third protrusion having the outer diameter smaller than that of the second protrusion, the third protrusion having the female screw hole formed on the

inner circumference thereof and a packing ring disposed on the outer circumference thereof, and

wherein the first tube or the second tube includes:

an annular protrusion disposed on the first crown gear or the second crown gear, the annular protrusion having the outer diameter corresponding to that of the first protrusion and the inner diameter corresponding to the outer diameter of the second protrusion; and

an insertion hole having the inner diameter corresponding to the outer diameter of the third protrusion, wherein the male screw member is inserted into the insertion hole and the male screw member and the insertion hole form concentric circles.

6. A mesh-type angle-adjustable faucet according to claim 3, wherein the first tube or the second tube includes:

a first protrusion having a first crown gear or a second crown gear;

a second protrusion formed at an end portion of the first protrusion and having the outer diameter smaller than that of the first protrusion; and

a third protrusion formed at an end portion of the second protrusion, the third protrusion having the outer diameter smaller than that of the second protrusion, the third protrusion having the female screw hole formed on the inner circumference thereof and a packing ring disposed on the outer circumference thereof, and

wherein the first tube or the second tube includes:

an annular protrusion disposed on the first crown gear or the second crown gear, the annular protrusion having the outer diameter corresponding to that of the first protrusion and the inner diameter corresponding to the outer diameter of the second protrusion; and

an insertion hole having the inner diameter corresponding to the outer diameter of the third protrusion, wherein the male screw member is inserted into the insertion hole and the male screw member and the insertion hole form concentric circles.

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