ADJUSTABLE LINK MECHANISM FOR TANK OF TOILETS

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ABSTRACT

An angle adjustable link mechanism for toilets includes a flush handle connected to the tank and a connection extension extends from a shaft of the flush handle. An adjustable assembly includes a first part and a second part which is rotatably connected to the first part. The connection extension is connected to the second part. A link has an end connected to the first part which is pivoted about a common axis with the second part so that the position of the link is set relative to the flush handle by adjustment between the first and second parts.
ADJUSTABLE LINK MECHANISM FOR TANK OF TOILETS

[0001] This is a Continuation-In-part patent application for applicant’s former application Ser. No. 11/103,572, filed on Apr. 12, 2005.

FIELD OF THE INVENTION

Background of the Invention

[0002] A conventional toilet generally includes a bowl and a tank in which water is received and a link mechanism is located in the tank so that when the user pivots a flush handle, the water in the tank enters and flushes the bowl via a valve seat which is normally sealed by a tank ball. The link mechanism includes a link which is directly connected with the flush handle and the tank ball can be lifted by the pivotal movement of the link. The valve seat is sealed again when water re-fills the tank again. There are several types of arrangements for the link and the flush handle. The angle between the link and the flush handle is varied in different areas. If the angle is not correctly set, the volume of the water to flush the toilet might be affected. Therefore, the manufacturers have to manufacturer and assemble the link mechanism according to the requirements in different areas. This increases the cost of the manufacturers.

[0003] Berlovan (US 2005/0273919) and Chuang (U.S. Pat. No. 5,265,969) respectively disclose related link mechanisms for toilet, but there are too many parts needed for their link mechanisms. Besides, complicated machining processes are needed to make the desired shape of the parts. Obviously, the fabrication cost for two link mechanisms of Berlovan (US 2005/0273919) and Chuang (U.S. Pat. No. 5,265,969) will be too high to be accepted by the customers.

[0004] The present invention intends to provide an angle adjustable link mechanism which includes an adjustable assembly such that the angle of the link and the flush handle can be easily adjusted.

SUMMARY OF THE INVENTION

[0005] The present invention relates to a link mechanism for toilets and the mechanism comprises a flush handle with a connection extension extending from a shaft thereof and an adjustable assembly has a first part and a second part which is rotatably connected to the first part. The connection extension is connected to the second part. A link has a first end connected to the first part and a second end of the link is connected to the tank ball. The position of the link can be set by rotating the second part relative to the first part.

[0006] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is an exploded view to show the link mechanism of the present invention;
[0008] FIG. 2 is a perspective view of the link mechanism of the present invention;
[0009] FIG. 3 is a cross sectional view to show the link mechanism of the present invention;
[0010] FIG. 4 shows that the link is pivotable about the common shaft connecting the first and second part of the link mechanism of the present invention;
[0011] FIG. 5 is an exploded view to show another embodiment of the link mechanism of the present invention, and
[0012] FIG. 6 is a perspective view of the link mechanism of FIG. 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Referring to FIGS. 1 to 3, the link mechanism 1 for toilets of the present invention comprises a flush handle 10 pivotally connected to a tank of the toilet (not shown) and a shaft extends through the wall of the tank and a connection extension 11 extends from a shaft thereof.

[0014] An adjustable assembly 22 is connected between the flush handle 10 and a link 21, and includes a first part 221 and a second part 222 which is rotatably connected to the first part 221. The link 21 includes a first section 211 and a second section 212 which is parallel to the first section 211. The first and second sections 211, 212 are located on two different parallel planes. A connection section 213 is connected between the first and second sections 211, 212 at an angle.

[0015] The first part 221 includes a first connection member 2211 and a first pivotable member 2212 which is connected to a side of the first connection member 2211. The first connection member 2211 includes a first slot 2213 in which a first end of the link 21 is fixed therewith by extending a positioning member 30 through a hole 2214 defined in the first connection member 2211 and is connected with a hole 214 in the link 21 in the first slot 2213. A second end of the link 212 is connected to a tank ball (not shown) which seals a valve seat of the tank.

[0016] The second part 222 includes a second connection member 2221 and a second pivotable member 2222 which is connected to a side of the second connection member 2221. The second connection member 2221 includes a second slot 2223 in which the connection extension 11 is fixed therewith by extending another positioning member through a hole 2224 defined in the second connection member 2221 and contacting against the connection extension 11. A collar 2231 is mounted on a top of the second pivotable member 2222 and the common axle 224 extends through the collar 2231, the second pivotable member 2222 and a passage 2215 in the first pivotable member 2212 and is connected with a nut 225. A tongue 2232 extends radially from the collar 2231 and a stud 2233 extends from an undersize of the tongue 2232. The stud 2233 is inserted in a recess 2217 defined in a top of the first connection member 2211. The first connection member 2211 includes a rack portion 2216 integrally formed on the side where the first pivotable member 2212 is connected. The rack portion 2216 is formed axially in the side of the first connection member 2211 and the first pivotable member 2212 is located beneath the rack portion. The second pivotable member 2222 is a cylindrical member which includes teeth 2225 integrally defined in an outer periphery thereof so as to be directly engaged with the rack portion 2216. Therefore, the first connection member 2211 is pivotable about the common axle 224 as shown in FIG. 4 to set the desired position of the link 21. The teeth 2225 of the second pivotable member 2222 are located in the whole outer periphery of the cylindrical second pivotable member 2222 so that the angular position between the first connection member 2211 and the second pivotable member 2222 can be set as needed in almost every
direction. The link mechanism can be used in different areas and meets requirements for different areas by adjusting the position of the link 21.

[0017] Once the angular position between the first and second connection members 2211, 2221 is set, the common axle 224 is secured by the nut 225 so that the first connection member 2211 and the second pivotable member 2222 are set and do not rotate relative to each other. There is no extra element needed to set the relative position between the first and second connection members 2211, 2221. Besides, the engagement between the rack portion 2216 and the teeth 2225 is direct, strong and reliable.

[0018] FIGS. 5 and 6 show another embodiment of the present invention wherein the first pivotable member 2212 includes teeth “A” defined in a top thereof and the second pivotable member 2222 includes teeth “A1” defined in a bottom thereof. The teeth “A” the first pivotable member 2212 are engaged with the teeth “A1” the second pivotable member 2222.

[0019] While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A link mechanism for toilets, comprising:
   a. a flush handle with a connection extension extending from a shaft thereof;
   b. an adjustable assembly having a first part and a second part which is rotatably connected to the first part, the first part including a first connection member and a first pivotable member which is connected to a side of the first connection member, the first connection member including a first slot, the second part including a second connection member and a second pivotable member which is connected to a side of the second connection member, the second connection member including a second slot in which the connection extension is fixed therewith, the first connection member including a rack portion integrally formed on the side where the first pivotable member is connected, the rack portion being formed axially in the side of the first connection member and the first pivotable member located beneath the rack portion, the second pivotable member being a cylindrical member and including teeth integrally defined in an outer periphery thereof so as to be directly engaged with the rack portion, the first and second pivotable members rotatably sharing a common axle, and
   c. a link having a first end which is connected to the first slot in the first part.

2. The mechanism as claimed in claim 1, wherein a collar is mounted on a top of the second pivotable member and the common axe extends through the collar, the second pivotable member and the first pivotable member and is connected with a nut, a tongue extends radially from the collar and a stud extends from an underside of the tongue, the stud is inserted in a recess defined in a top of the first connection member.

3. The mechanism as claimed in claim 1, wherein a positioning member extends through a hole defined in the first connection member and is connected with a hole in the link in the first slot.

4. The mechanism as claimed in claim 1, wherein a positioning member extends through a hole defined in the second connection member and contacts against the connection extension in the second slot.

5. The mechanism as claimed in claim 1, wherein the first pivotable member includes teeth defined in a top thereof and the second pivotable member includes teeth defined in a bottom thereof, the teeth the first pivotable member are engaged with the teeth the second pivotable member.

6. The mechanism as claimed in claim 1, wherein the link includes a first section and a second section which is parallel to the first section, the first and second sections are located on two different parallel planes, a connection section is connected between the first and second sections at an angle.

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