

**IMPELLER SUPPORT MEMBER, IMPELLER SUPPORT STRUCTURE USING SAME,  
AND WATER SUPPLY METER**

[Field of the Invention]

[0001]

The present invention relates to an impeller support member, an impeller support structure using the same, and a water meter.

[Background of the Invention]

[0002]

A water meter with a pivot is known. The pivot that is integrally formed of a resin, comprises a tip part for receiving a load of an impeller and an outer peripheral section of a pivot shaft, and the pivot shaft is made of core material having hardness greater than that of the resin (Patent document 1).

[Prior Art Documents]

[Patent Literatures]

[0003]

[Patent Literatures 1] JP 2007-205833

[Summary of the Invention]

[Problems to be Solved by the Invention]

[0004]

An object of the present invention is to provide an impeller support member for a water meter, a support structure using same and a water meter, thereby allowing a flow rate to be measured correctly at a low cost.

[Means for Solving the Problems]

[0005]

In order to solve these problems, an impeller support member according to claim 1 is integrally formed of a synthetic resin, including:

a tip section having a tip SR shape;

a shaft section that includes a first shaft section having a first outer diameter, a second shaft section having a second outer diameter larger than the first diameter, and a third shaft section that gradually expands in diameter in a direction from the first shaft section to the second shaft section;

a flange section that is formed to protrude in a direction of perpendicular to an axis line of the shaft section at a bottom end of the second shaft;

a screw section having a male thread at a bottom end of the flange section.

[0006]

In order to solve these problems, an impeller support structure according to claim 2 includes an inlet port and an outlet port, in which the impeller support member according to claims 1 for rotatably supporting an impeller that rotates depending on amount of tap water is integrally formed at an inner bottom section.

[0007]

In the invention according to claim 3, the impeller support structure according to claim 2 is integrally formed of a polyacetal resin(POM) filled with a polyacrylonitrile (PAN) based carbon fiber, by an insert-molding at the inner bottom of a metering chamber that is provided within a body case having the inlet port and the outlet port, and that includes an inflow path for communicating with the inlet port and an outflow path for communicating with the outlet port on an outer peripheral section of the metering chamber.

[0008]

In the invention according to claim 4, the impeller support structure according to claim 3 further includes the metering chamber that is formed of a high impact polystyrene (HIPS).

[0009]

In the invention according to claim 5, the impeller support structure according to claim 3 further includes the metering chamber that is formed of a polyacetal resin(POM) filled with a polyacrylonitrile(PAN) based carbon fiber.

[0010]

In the invention according to claim 6, the impeller support structure according to claim 2 further includes the impeller support member that is formed of a polyacetal resin(POM) filled with a polyacrylonitrile(PAN) based carbon fiber, in which the screw section of the impeller support member is screwed into the inner bottom of the metering chamber integrally formed by an insert-molding at the inner bottom of a metering chamber which has the inlet port and outlet port.

[0011]

In order to solve these problems, the present invention provides a water meter according to claim 7, including:

the impeller support structure according to any one of claims 2 to 6;and

an impeller that includes a main shaft having a first shaft hole section with a first inner diameter, a second shaft hole section with a second inner diameter larger than the first inner diameter, and a plurality of blades radially projecting from the main shaft, in which the impeller is supported by the impeller support structure and rotates depending on an amount of tap water.

[Effect of the Invention]

[0012]

The invention according to claim 1 provides an impeller support member for a water meter that can correctly measure a flow rate at a low cost.

The invention according to claims 2 to 6 provides an impeller support structure that can depress an increase of rotational resistance of an impeller in tap water at a low cost comparing with a structure without the present configuration.

The invention according to claim 6 provides an impeller support structure that can depress an increase of rotational resistance of the impeller in tap water at a low cost comparing with a structure without the present configuration, and can be easily maintained.

The invention according to claim 7 provides a water meter that can correctly measure a flow rate at a low cost comparing with a meter without the present configuration.

[Brief Description of Drawings]

[Fig. 1] Fig. 1 is a vertical longitudinal sectional view of a double box water meter with an inner case 30.

[Fig. 2] Fig. 2a is a perspective view, Fig. 2b is a plane view, and Fig. 2c is a front view of a pivot shaft 1.

[Fig. 3] Fig. 3 is a vertical longitudinal sectional view of an inner case 30 having an integral structure to which the pivot shaft 1 is fastened.

[Fig. 4] Fig. 4 is a sectional schematic view showing a state that a die for insert-molding the pivot shaft 1 into the inner case 30 is closed.

[Fig. 5] Fig. 5 is a sectional schematic view explaining on a rotating support for an impeller 25 by the pivot shaft 1 in the inner case 30.

[Fig. 6] Fig. 6 is a vertical longitudinal sectional view of a single box water meter 10A having a metering chamber of the impeller that doubles with a lower case.

[Fig. 7] Fig. 7 is a vertical longitudinal sectional view of a lower case 20A to which the pivot shaft 1 is fastened.

[Description of the Embodiments]

[0014]

Next, examples of the embodiments of the present invention will be described with reference to the drawings, but it should be construed that the invention is in no way limited to the following embodiments.

It should be noted that in the following descriptions using the drawings, the drawings are schematic and are different from actual ones in proportion of sizes, and illustrations other than those of members necessary for explanation for easy understanding is appropriately omitted.

[0015]

(First embodiment)

(1) Configuration of water supply meter

Fig. 1 is a vertical longitudinal sectional view that shows a general configuration of a water meter 10 providing with an inner case 30. Hereinafter, an entire configuration

of a double box water meter 10 (hereinafter, described as a water supply meter 10) providing a pivot shaft 1 as an example of an impeller support member according to the present embodiment and the inner case 30 as an example of an impeller support structure using the pivot shaft 1.

[0016]

#### (1.1) Entire configuration of water meter

The water meter 10 includes a lower case 20 as an outer box of an inlet section having an inlet port 21 and an outlet port 22 on both ends thereof, and a strainer 23 is mounted in the inlet port 21.

An inner case 30 is stored in the lower case 20. The inner case 30 provides a plurality of inlet nozzles 31 and outlet nozzles 32 respectively, and the pivot shaft 1 is provided to stand at the center of an inner bottom section 33 of the inner case 30.

[0017]

In the inner case 30, an impeller 25 having a driving side magnet 24 on an upper section of the shaft is rotatably supported by the pivot shaft 1.

An indication unit 40 is provided on the upper section of the impeller 25 via a lower gasket G1.

Furthermore, in the inner case 30, a metering chamber A having the plurality of inlet nozzles 31 and outlet nozzles 32 is defined, and an impeller 25 is accommodated in the metering chamber A.

[0018]

The indication unit 40 comprises a register box 41, a lower base plate 42, an upper base plate 43, and a magnet gear 46 that mounts a magnet 45, a gear train 47, an indicator 48 (not shown), a digit wheel 49, and a glass plate 50 attached via an O-ring S1.

The magnet 45 of the magnet gear 46 and the driving side magnet 24 of the impeller 25 are magnetically connected facing each other across a bottom wall of the register box 41 (hereinafter, described as a magnet coupling M).

[0019]

An upper case 53 is provided on the indication unit 40 via an upper gasket G2 to

be screwed into the lower case 20. A lid 55 is attached to the upper case 53 with pin 54 to be openable up and down.

[0020]

#### (1.2) Operation of water meter

The water meter 10 that is thus configured is used in a state that the inlet port 21 and the outlet port 22 thereof are respectively connected with an upstream water pipe and a downstream water pipe (not shown). Tap water flowing from the inlet port 21 flows into the lower case 20 while removing foreign materials from the tap water by a strainer 23.

Then the tap water flows into the metering chamber A in the inner case 30 through the plurality of the inlet nozzles 31 in the inner case 30 to flow out from the nozzles 32 after rotating the impeller 25 depending on amount of the water. Thereafter, the tap water flows outside of the lower case 20 from the outlet port 22 of the lower case 20.

Meanwhile rotation of the impeller 25 is transmitted to the indication unit 40 via the magnet coupling M, rotates the indicator 48 via the gear train 47, and rotates the digit wheel 49 to indicate an integrated flow rate of the tap water passed through the water meter 10 at the indication unit 40.

[0021]

#### (2) Pivot shaft

Fig. 2a is a perspective view, Fig. 2b is a plane view, and Fig. 2c is a front view of the pivot shaft 1. The pivot shaft 1 is integrally formed of a synthetic resin on the same axis, including a tip section 2, a shaft section 3, a flange section 4, and a screw section 5.

[0022]

The tip section has a tip SR shape and reduces a rotational resistance of the impeller 25 when supporting at the reception of load of the impeller 25.

[0023]

The shaft section 3 comprises a first shaft section 3a with a first outer diameter, a

second shaft section 3b with a second outer diameter that is larger than the first diameter, and a third shaft section 3c that gradually expands in the diameter from the first shaft section 3a toward the second shaft section 3b. The first shaft section 3a is inserted into a first shaft hole section 26a of the impeller 25 and rotatably supports the impeller 25, the second shaft section 3b is inserted into a second shaft hole section 26b of the impeller 25 and rotatably supports the impeller 25 (See Fig. 5).

[0024]

The pivot shaft 1 according to the present embodiment is integrally formed, including: the tip section 2 by receiving a load of the impeller 25; the first shaft section 3a that is inserted into the first shaft hole section 26a of the impeller 25 to rotatably support the impeller 25; and the second shaft section 3b that is inserted into the first shaft hole section 26a of the impeller 25 to rotatably support the impeller 25. Thus, the rotational resistance of the impeller 25 is reduced by rotatably supporting the impeller 25 in accuracy by the shaft section 3 comprising the tip section 2, the first shaft section 3a, and the second shaft section 3b on the same axis c.

[0025]

The flange 4 is formed to be protrude in a direction orthogonal of to the axis c of the shaft section 3 at a lower end of the second shaft section 3b, and the screw section 5 having a male thread on the same axis of the shaft section 3 is formed at a lower surface side of the flange 4.

As shown in Fig. 2b and Fig. 2c, the flange 4 has a thin plate shape that protrudes in the direction orthogonal to the axis c of the shaft section 3 and has a polygonal-shaped outline. Although, there is no limitation to the polygonal-shape, however, as describe later, a polygonal shape preferably has a starting point of rotation, when the flange 4 is screwed into and is provided to stand at the center of the inner bottom section 33 of the inner case 30. Examples of the polygonal shape include a triangle, a square, a pentagon, a hexagon and an octagon.

[0026]

As described later, the screw section 5 is screwed into a female thread 33a that is

formed in the inner bottom section 33 of the inner case 30, when the pivot shaft 1 is provided to stand at the center of the inner bottom section 33 of the inner case 30. The screw section 5 is used as a retainer, when the pivot shaft 1 is formed integrally with the inner case 30 by the insert-molding. Specifically, the pivot shaft 1 and the inner case 30 are formed of different synthetic resins, the male thread of the screw section 5 increases extraction force.

[0027]

### (3) Inner case 30

Fig. 3 is a vertical longitudinal sectional view of the inner case 30 having an integral structure to which the pivot shaft 1 is fastened, Fig. 4 is a sectional schematic view showing a state that a die for insert-molding the pivot shaft 1 into the inner case 30 is closed, and Fig. 5 is a sectional schematic view explaining a rotating support for the impeller 25 by the pivot shaft 1 in the inner case 30. Hereinafter, the inner case 30 as an impeller support member using the pivot shaft 1 is explained with reference to the drawings.

[0028]

#### (3.1) Configuration of inner case 30

The inner case 30 has the inner bottom section 33 and is formed as a cylindrical tubular with an opening at an upper end thereof. The pivot shaft 1 that protrudes toward the center section of the metering chamber A is fastened to the center section of the inner bottom section 33 of the inner case 30 to configure the impeller support structure.

[0029]

The metering chamber A is provided within the inner case 30, and the metering chamber A includes the impeller 25 that rotates by receiving a fluid pressure to be rotatably inserted into the pivot shaft 1.

[0030]

The plurality of inlet nozzles 31 are provided at a lower section in a peripheral wall 30a of the inner case 30 from the inlet port 21 of the lower case 20 in a tangential direction toward the metering chamber A. The outlet nozzle 32 that opens from the

metering chamber A toward the outlet port 22 of the lower case 20 is provided at an upper section in the peripheral wall 30a of the inner case 30.

[0031]

The impeller 25 comprises a main shaft 26 and a plurality of blades 27. The main shaft 26 includes the first shaft hole section 26a having the first inner diameter for inserting the pivot shaft 1 and the second shaft hole section 26b having a second inner diameter that is larger than the first inner diameter. The blades 27 radially protrude from the main shaft 26. The driving side magnet 24 that configures the magnet coupling M is fastened to the upper end section of the main shaft 26.

The impeller 25 is rotatably supported by inserting the first shaft section 3a of the pivot shaft 1 into the first shaft hole section 26a, and by inserting the second shaft section 3b of the pivot shaft 1 into the second shaft hole section 26b.

[0032]

### (3.2) Molding of inner case 30

The inner case 30 configures the impeller support structure by integrally formed by an insert-molding so that the pivot shaft 1 erects at the center section of the inner bottom section 33 of the inner case 30.

[0033]

Before insert-molding the inner case 30 and pivot shaft 1, the pivot shaft 1 is integrally formed of the synthetic resin, including the tip section 2, the shaft section 3, the flange section 4 and the screw section 5 by injection molding.

[0034]

The polyacetal resin(POM) filled with the polyacrylonitrile(PAN) based carbon fiber is used for the material of the synthetic resin to form the pivot shaft 1. The pivot shaft 1 needs to be formed of material that has excellent friction and abrasion properties in the fluid in order to rotatably support the impeller 25 that rotates by receiving the fluid flow pressure within the metering chamber A.

Although a self-lubricating property which is originally provided with the polyacetal resin possibly does not work in water for example, the friction and abrasion

properties of the impeller 25 can be maintained successfully in water by appropriately filling the polyacetal resin with the PAN based carbon fiber so that the carbon fiber works as a solid lubricant.

[0035]

Then, the inner case 30 is formed by the insert-molding, using the polyacetal resin(POM) filled with the polyacrylonitrile(PAN) based carbon fiber or a high impact polystyrene(HIPS) in a state that the pivot shaft 1 erects at the center section of the inner bottom section 33 of the inner case 30.

[0036]

As shown in Fig. 4, the insert-molding die of the inner case 30 includes a fixed die M1 and a movable die M2. The movable die M2 provides a fitting hole M2a into which the preliminary insert-molded pivot shaft 1 is fitted. A plurality of gates G for filling a resin are provided to the fixed die M1. Note that the gates G can be set into appropriate number and arrangement position according to molding conditions and the like.

The fitting hole M2a is controlled to have a vertical angle with respect to the movable die M2 and have an accurate clearance of a hole diameter so that the pivot shaft 1 fixed to the movable die M2 can erect to be fixed without backlash when closing the molding die.

[0037]

A slide core section Sa is movably provided on a side surface of the movable die M2 to form the outlet nozzle 32. Note that the inlet nozzle 31 is formed by push-cutting with a core of the movable die M2 that forms the metering chamber A.

A plurality of ejection pins P1 (not shown) for extracting the inner case 30 after the injection molding are provided on a bottom surface M2c of the movable die M2. A support pin P2 for holding the pivot shaft 1 is provided to the center section of a bottom surface M1c of the fixed die M1 to hold the pivot shaft 1 by fitting a lightening hole of the pivot shaft 1 to the support pin P2.

[0038]

Then, the resin is filled from the gates G into a cavity C in a state that the die is closed by uplifting the movable die M2 with respect to the fixed die M1, and the inner case 30 is formed around the pivot shaft 1 preliminary formed by the insert molding.

As a result of that, the impeller support structure can be obtained in which the pivot shaft 1 that formed of the polyacetal resin(POM) filled with the polyacrylonitrile (PAN) based carbon fiber is integrally provided to stand at the center section of the inner bottom section 33 of the inner case 30 that is formed of the polyacetal resin(POM) filled with the polyacrylonitrile(PAN) based carbon fiber or the high impact polystyrene(HIPS).  
[0039]

As shown in Fig. 5, in the double box water supply meter 10, a water flow F flowing through the inlet nozzle 31 flows out to the outlet nozzle 32 after rotating the impeller 25. Since the outlet nozzle 32 is arranged to the peripheral wall 30a of the inner case 30, in proximity to the inlet nozzle 31, the water flow F flowing through the inlet nozzle 31 acts only on an outer peripheral section of the blade 27 of the impeller 25, thereby rotating the impeller 25.  
[0040]

As a result of that, the fluid around the center of the impeller 25 is drawn toward the peripheral wall 30a side by rotation of the impeller 25, and pressure around the impeller 25 is relatively reduced.

Since the fluid around the lower section of the impeller 25 tends to be drawn toward the peripheral wall 30a side, pressure at the lower section of the impeller 25 is also reduced to press the impeller 25 downward (See R in Fig. 5). As a result of that, the pivot shaft 1 that supports the impeller 25 is applied to loads, and when it used over a long time frame, the tip section 2 of the pivot shaft 1 is abraded to decrease the position of the impeller 25. Thus, there is a worry that instrumental error variation to the metering value is caused.  
[0041]

According to the inner case 30 with respect to the present embodiment, the pivot shaft 1 is vertically provided integrally to the center of the inner bottom section 33 of the

inner case 30. The pivot shaft 1 is integrally provided to stand at the center of the inner bottom section of the inner case 30. The pivot shaft 1 is integrally formed, comprising the tip section 2 having the tip SR shape that receives the load of the impeller 25, the first shaft section 3a which is inserted to the first shaft hole section 26a of the impeller 25 to rotatably support the impeller 25, and the second shaft section 3b which is inserted to the second shaft hole section 26b of the impeller to rotatably support the impeller 25.

Therefore, a rotation support section comprising the shaft section 3 performs the rotation support accurately while reducing a PV value at the second shaft section 3b that is larger than the first shaft section 3a in diameter, by receiving the load of the impeller 25 at the tip section 2 to suppress the abrasion of the pivot shaft 1, and thus a vertical supporting position in the metering chamber A can be accurately maintained over a long time frame.

[0042]

The inner case 30 according to the present embodiment is integrally formed of the polyacetal resin(POM) filled with the polyacrylonitrile(PAN) based carbon fiber or a high impact polystyrene(HIPS) by the insert-molding, in a state that the pivot shaft 1 erects at the center section of the inner bottom section 33 in the inner case 30.

Thus, the low-cost impeller support structure can be obtained without the work for assembling the inner case 30 and the pivot shaft 1.

Furthermore, a consistent gap between the peripheral wall 30a of the inner case 30 and the tip section in the blade 27 of the impeller 25, and the impeller 25 can be rotatably supported accurately in the metering chamber A.

[0043]

(Second embodiment)

(1) Entire configuration and operation of water meter

Fig. 6 is a vertical longitudinal sectional view of a single-case water meter 10A having a metering chamber of an impeller which doubles with a lower case.

Hereinafter, an entire configuration of the single box water supply meter 10A (hereinafter, described as a water meter 10A) is explained with reference to the drawing.

The water meter 10A comprises a pivot shaft 1 as an example of an impeller support member according to the present embodiment and a lower case 20A as an example of an impeller support structure using the pivot shaft 1. Note that the same reference numerals are used to indicate the elements corresponding to the double box water meter 10 according to the first embodiment and detailed explanation is omitted.

[0044]

The water meter 10A includes a lower case 20A as an outer box of an inlet section having an inlet port 21A and an outlet port 22A on both ends thereof. A metering chamber A having the inlet port 21A and the outlet port 22A is defined inside the lower case 20A.

The impeller 25 having a driving side magnet 24 on the upper section of the shaft is rotatably supported by the pivot shaft 1. A mechanical indication unit 40 comprising a gear train as an indication mechanism in a condition of intercepting water with respect to the metering chamber A is mounted on an upper side of the metering chamber A.

[0045]

The water meter 10A thus configured is used in a state that the inlet port 21A and outlet port 22A thereof are respectively connected with an upstream water pipe and a downstream water pipe (not shown). Tap water flowing from the inlet port 21A flows into the lower case 20A while removing foreign materials by a strainer 33A.

Then the tap water flows into the metering chamber A in the lower case 20A, and flows outside the lower case 20A through the outlet port 22A of the lower case 20A after rotating the impeller 25 depending on amount of the water.

Meanwhile rotation of the impeller 25 is transmitted to the indication unit 40 via a magnet coupling M, rotates a indicator 48 (not shown) via the gear train 47, and rotates a digit wheel 49 to indicate an integrated flow rate of the tap water passed through the water supply meter 10A at the indication unit 40.

[0046]

(2) Lower case

Fig. 7 is a vertical longitudinal sectional view of the lower case 20A to which the

pivot shaft 1 is fastened. Hereinafter, a configuration of the lower case 20A as an impeller support structure using the pivot shaft 1 is explained with reference to the drawing.

[0047]

The lower case 20A is formed as a cylindrical tubular with an inner bottom section 23A and with an opening at an upper end thereof, and has the inlet port 21A and the outlet port 22A. The strainer 33A is provided at the inlet port 21A.

A female thread section 23Aa is formed at the center section of the inner bottom section 23A of the lower case 20A and the screw section 5 of the pivot shaft 1 is screwed into the female thread 23Aa so that the pivot shaft 1 is vertically provided at the inner bottom section 23A.

[0048]

A flange 4 of the pivot shaft 1 has a polygonal-shaped outline with a starting point of rotation. The male thread section 23Aa of the lower case 20A is screwed into the flange 4 with a commonly known rotating tool having a polygonal-shaped socket section. As result of that, the pivot shaft 1 is fastened firmly to the inner bottom section 23A of the lower case 20A even over long-term usage.

Although the flange section 4 has a hexagonal-shaped outline in the present embodiment, examples of the polygonal shape may include a triangle, a square, a pentagon, a hexagon and an octagon.

[0049]

The impeller 25 is rotatably supported by the thus-configured pivot shaft 1 of the lower case 20A. As a result of that, a first shaft hole section 26a having a first diameter of the impeller 25 and a second shaft hole 26b having a second inner diameter that is larger than the first inner diameter are respectively inserted into a first shaft section 3a having a first outer diameter and a second shaft section 3b having a second outer diameter that is larger than the first outer diameter of the pivot shaft 1 to be rotatably supported in a state that the tip section 2 receives a load of the impeller 25.

[0050]

Therefore, the load of the impeller 25 is distributed, a rotation support section comprising the shaft section 3 performs a rotation support accurately while reducing a PV value at the second shaft section 3b that is larger than the first shaft section 3a in diameter to be able to suppress the abrasion of the pivot shaft 1.

Furthermore, when replacing the pivot shaft 1, after being unscrewed, a new pivot shaft 1 can be easily screwed to be vertically provided by using the rotating tool.

[Description of the Reference Numerals]

[0051]

- 1...Pivot shaft
- 2...Tip section
- 3...Shaft section
  - 3a...First shaft section
  - 3b...Second shaft section
  - 3c...Third shaft section
- 4...Flange section
- 5...Screw section
- 10...Double-case water supply meter
- 10A...Single-case water supply meter
- 20, 20A...Lower case
- 21, 21A...Inlet port
- 22, 22A...Outlet port
- 23, 33A...Strainer
- 23A...Inner bottom section (Lower case)
  - 23Aa...Female thread (Lower case)
- 24...Driving side magnet
- 25...Impeller
- 26...Main shaft
  - 26a...First shaft hole section
  - 26b...Second shaft hole section

27...Blade

30...Inner case

30a...Peripheral wall

31...Inlet nozzle

32...Outlet nozzle

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33...Inner bottom section (Inner case)

33a...Female thread section

40...Indication unit

41...Register box

42...Lower base plate

43...Upper base plate

45...Magnet

46...Magnet gear

47...Gear train

48...Indicator (not shown)

49...Digit wheel

50...Glass plate

53...Upper case

55...Lid

A...Metering chamber

S1...O-ring

M1...Fixed (die)

M2...Movable (die)

M2a...Fitting hole (die)

P2...Support pin

## CLAIMS:

1. An impeller support member that is integrally formed of a synthetic resin, comprising:
  - a tip section having a tip SR shape;
  - a shaft section that includes a first shaft section having a first outer diameter, a second shaft section having a second outer diameter larger than the first diameter, and a third shaft section that gradually expands in diameter in a direction from the first shaft section to the second shaft section;
  - a flange section that is formed to protrude in a direction perpendicular to the axis line of the shaft section at a bottom end of the second shaft; and
  - a screw section having a male thread at a bottom end of the flange section.
2. An impeller support structure, comprising
  - an inlet port and an outlet port, wherein
  - the impeller support member according to claims 1 for rotatably supporting an impeller that rotates depending on an amount of tap water, is integrally formed at an inner bottom section.
3. The impeller support structure according to claim 2, wherein the impeller support structure is integrally formed of a polyacetal resin(POM) filled with a polyacrylonitrile (PAN) based carbon fiber, by an insert-molding at an inner bottom of a metering chamber that is provided within a body case having the inlet port and the outlet port, and that includes an inflow path for communicating with the inlet port and an outflow path for communicating with the outlet port on an outer peripheral section of the metering chamber.
4. The impeller support structure according to claim 3, wherein the metering chamber is formed of a high impact polystyrene(HIPS).

5. The impeller support structure according to claim 3, wherein the metering chamber is formed of a polyacetal resin(POM) filled with a polyacrylonitrile(PAN) based carbon fiber.

6. The impeller support structure according to claim 2, wherein the impeller support member is formed of a polyacetal resin(POM) filled with a polyacrylonitrile(PAN) based carbon fiber, and the screw section of the impeller support member is screwed into the inner bottom section of the metering chamber having the inlet port and the outlet port.

7. A water supply meter, comprising:  
the impeller support structure according to any one of claims 2 to 6; and  
an impeller that includes a main shaft having a first shaft hole section with a first inner diameter, a second shaft hole section with a second inner diameter larger than the first inner diameter, and a plurality of blades radially projecting from the main shaft, wherein the impeller is supported by the impeller support structure and rotates depending on an amount of tap water.