ABSTRACT

Disclosed herein is a water saving valve device having a valve body, a coupling unit, a spring, an actuating rod, a push plate, and a packing. A manual manipulating unit is coupled to the coupling unit to manually move the actuating rod up and down, and includes a lower body, a slide bar, a spring, and a locking piece. The lower body is coupled to the coupling unit and has a vertical pipe on its lower portion. The slide bar has on its upper end a magnet, thus vertically moving the actuating rod by magnetic force. The spring is fitted over the lower portion of the slide bar. The upper end of the locking piece is alternately stopped by first and second locking holes when the slide bar moves up and down, and the lower end is supported by the outer circumference of the vertical pipe.
WATER SAVING VALVE DEVICE

This application claims benefit of Serial No. 10-2008-0127689, filed 16 Dec. 2008 in South Korea and which application is incorporated herein by reference. To the extent appropriate, a claim of priority is made above disclosed application.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to water saving valve devices, and more particularly, to a water saving valve device which is installed at a position between a water pipe and a shower head and is manually opened or closed when necessary, thus controlling the discharge of water from the shower head, therefore saving water.

2. Description of the Related Art

Generally, a home bathroom, public bath, or swimming pool is provided with a shower facility. A shower is installed in the shower facility. The shower includes a water pipe which is connected to a water supply pipe, and a shower head which sprays water supplied through the water pipe. A valve or tap is coupled to the water pipe to control the supply of water.

As water shortages are becoming acute all over the world, many efforts at saving water have been actively made. As one example of the efforts, recently, a plurality of water saving showers is installed in the shower facility which is provided in a home, public bath, spa, or swimming pool. A water saving shower is a device which is constructed to automatically stop supplying water after a predetermined time has passed while a shower is being taken or when a human body is not sensed at a given position for a predetermined period of time. To this end, the water saving shower is provided with an additional intermediate valve between a water pipe and a shower head, in addition to a main valve, or is provided with a timer or human detection sensor, thus realizing the saving of water by opening or closing the valve if a specific condition is met.

A solenoid valve is mainly used as the intermediate valve. The solenoid valve uses an electromagnet, and moves a conductor by a magnetic field which is produced when current passes through a coil wound around the conductor, thus automatically opening or closing the valve.

FIG. 1 is an exploded perspective view illustrating a conventional solenoid valve. As shown in the drawing, the solenoid valve includes a valve body 10 which has a hollow part therein, with a water inlet port 12 and a water outlet port 14 formed at opposite sides of the valve body 10. A solenoid 42 is mounted to the lower end of the valve body 10 and operated in response to an electric signal. A connecting part 48 is provided on the upper end of the valve body 10, and has an actuating lever which is manually moved up and down. A coupling unit 34 having a coupling plate 36 and a pipe 38 is interposed between the valve body 10 and the solenoid 42. Here, the pipe 38 is inserted into a coil 44 which is provided on the inner circumference of the solenoid 42, and the coupling plate 36 is seated on the solenoid 42 and fastened to the valve body 10 via a fastening means such as a bolt. Meanwhile, a spring 32 and an actuating rod 30 are sequentially inserted into the pipe 38, and a protruding pipe 40 is provided on the upper surface of the coupling plate 36, with a circular push plate 26 inserted into the protruding pipe 40 in such a way as to move up and down. A perforation 28 is formed at a predetermined position in the push plate 26, and projections 25 and 27 are provided on the central portion of the push plate 26 in such a way as to extend upwards and downwards, respectively. An end of the projection 27 is in contact with the actuating rod 30. That is, the upper end of the actuating rod 30 which moves up and down comes into contact with the projection 27 of the push plate 26, thus making the push plate 26 move up and down.

A packing 20 formed of a synthetic resin material is seated on the upper surface of the push plate 26. That is, the projection 25 of the push plate 26 is inserted and secured to a through hole which is formed in the center of the packing 20, so that the packing 20 is seated on and secured to the upper surface of the push plate 26. Further, a plurality of perforations 24 is formed along the edge of the packing 20, and the outer circumference of the upper portion of the packing 20 constructed as described above is inserted into a packing insert hole 18 which is formed in the valve body 10. Meanwhile, a vertical pipe 16 which communicates at one end thereof with the water inlet port 12 is integrally provided in the central portion of the valve body 10, and the packing 20 is in contact with the lower end of the vertical pipe 16. Meanwhile, the connecting part 48 having a hollow portion is fastened to the upper surface of the valve body 10 in a threaded manner, and the actuating lever is coupled to the central portion of the upper portion of the connecting part 48 in such a way as to move up and down.

Hereinafter, the operation of the conventional solenoid valve constructed as described above will be described with reference to FIGS. 2A and 2B. FIG. 2A is a view illustrating the state in which current is not supplied to the coil 44 of the solenoid, so that the valve is closed. Referring to the drawing, the actuating rod 30 provided in the pipe 38 is elastically biased upwards by the spring 32, thus pushing the push plate 26 and thereby supporting the packing 20 seated on the push plate 26. At this time, the packing 20 is in contact with the lower end of the vertical pipe 16, thus keeping the valve closed.

FIG. 2B is a view illustrating the state in which the valve is open. Referring to the drawing, when current is supplied to the coil 44 by a sensor or switch, the actuating rod 30 is magnetized and moved down. Simultaneously, the push plate 26 seated on the actuating rod 30 is also moved downwards. Thereafter, the packing 20 supported by the push plate 26 is separated from the push plate 26 by the pressure of water fed into the vertical pipe 16, thus causing water to flow through the vertical pipe 16 to the water outlet port 14. That is, the valve is kept open by the above-mentioned operation, thus smoothly supplying water. Further, when a user desires to close the valve, current supplied to the coil 44 of the solenoid 42 is shut off, so that the actuating rod 30 loses magnetizing force and thus is elastically moved upwards by the spring 32. Therefore, the push plate 26 also moves upwards and supports the packing 20. The packing 20 comes into contact with the vertical pipe 16 again, so that the supply of water is cut off, thus keeping the valve closed.

The conventional water saving valve device is very convenient in that the supply of water is automatically cut off. However, since the conventional water saving valve device uses the solenoid, the malfunction of the valve device frequently occurs at the time of performing the switching operation in response to an electric signal. Further, the solenoid increases the volume of the valve device, so that installation is
limited and manufacturing cost is very high, and maintenance cost is very high due to the use of power. Further, when the problem of power, for example, the exhaustion of a battery for supplying current occurs, leakage of water may continue.

SUMMARY OF THE INVENTION

[0013] Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a water saving valve device, which does not use a solenoid and manually moves an actuating rod up and down, thus preventing malfunction by an electric signal, therefore reducing manufacturing cost and maintenance cost, and which has a small volume, thus making it easy to install, and which is capable of preventing the leakage of water when the supply of power is shut off.

[0014] The above and other objects, features and advantages of the present invention will be more clearly understood from the following detailed description and embodied by a preferred embodiment. Further, the objects and advantages of the present invention are realized by the means disclosed in the claims and the combinations thereof.

[0015] In order to accomplish the above object, the present invention provides a water saving valve device having a valve body including a water inlet port, a water outlet port and a vertical pipe, a coupling unit including a coupling plate coupled to a lower portion of the valve body and a pipe provided on a lower portion of the coupling plate, a spring and an actuating rod inserted into the pipe, a push plate contacting the actuating rod in such a way as to move up and down, and a packing, wherein a manual manipulating unit is coupled to a lower portion of the coupling unit to manually move the actuating rod up and down. The manual manipulating unit includes a lower body coupled to the lower portion of the coupling unit, the lower body being open at a top and having a space therein, with a vertical pipe provided on a lower portion of the lower body, a slide bar having on an upper end thereof a magnet and vertically moving the actuating rod accommodated in the pipe of the coupling unit by a magnetic force of the magnet, as the slide bar inserted into the vertical pipe slides up and down, a spring fitted over an outer circumference of a lower portion of the slide bar to elastically support the slide bar in the vertical pipe, and a locking piece, an upper end thereof being alternately stopped and supported by a first locking hole and a second locking hole which are formed side by side at upper and lower positions on an outer circumference of the slide bar when the slide bar moves up and down, a lower end thereof being supported by an outer circumference of the vertical pipe, so that the slide bar is secured alternately at a position where magnetic force acts on the actuating rod and a position where magnetic force does not act on the actuating rod.

[0016] A guide hole may be formed between the first locking hole and the second locking hole to guide a movement of the upper end of the locking piece. The guide hole may include a first upward guide part for guiding the locking piece obliquely upwards from the first locking hole, a first downward guide part for guiding the locking piece obliquely downwards from an end of the first upward guide part to the second locking hole, a second upward guide part for guiding the locking piece obliquely downwards from the second locking hole, and a second downward guide part for guiding the locking piece obliquely downwards from an end of the second upward guide part to the first locking hole.

[0017] A removal prevention ring may be fitted over the outer portion of the locking piece to prevent the locking piece from being removed from the vertical pipe.

[0018] A through groove may be provided in a predetermined portion on an outer circumference of an upper portion of the vertical pipe of the lower body in such a way as to extend in a horizontal direction, so that the upper end of the locking piece passes through the through groove and moves along the guide hole formed in the outer circumference of the slide bar, and the lower end of the locking piece is rotatably fitted into a shaft insert hole which is formed in the outer circumference of the vertical pipe provided on the lower portion of the lower body.

[0019] A fan-shaped hole may be formed right under the through groove of the vertical pipe in such a way as to be tapered in a direction from an upper position to a lower position, and may provide a horizontal rotating space for the locking piece.

[0020] A catcher may be coupled to the lower end of the slide bar to be easily caught when the slide bar is manually moved up and down.

[0021] The water saving valve device may be installed at a position between a water pipe and a shower head.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG. 1 is an exploded perspective view illustrating a conventional solenoid valve;

[0023] FIG. 2A is a view illustrating the state in which current is not supplied to the coil 44 of the conventional solenoid valve, so that the valve is closed;

[0024] FIG. 2B is a view illustrating the state in which current is supplied to the coil of the conventional solenoid valve, so that the valve is open;

[0025] FIG. 3 is a view illustrating a water saving valve device according to the present invention which is installed between a water pipe and a shower head;

[0026] FIG. 4 is an exploded perspective view illustrating the water saving valve device according to the present invention;

[0027] FIG. 5 is an exterior front view illustrating the state in which the water saving valve device according to the present invention is open;

[0028] FIG. 6 is a sectional view illustrating the state in which the water saving valve device according to the present invention is open first;

[0029] FIG. 7 is a view illustrating the state in which the slide bar of the water saving valve device according to the present invention is pulled downwards once and then released;

[0030] FIG. 8 is a view illustrating the state in which the slide bar of the water saving valve device according to the present invention is pulled downwards once again from the position of FIG. 7 and released.

[0031] FIG. 9 is a view illustrating the state in which the slide bar is pulled downwards once again from the position of FIG. 8 and released.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0032] Hereinafter, the construction of a water saving valve device according to the preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings.
FIG. 3 illustrates a water saving valve device according to the present invention which is installed to a shower, and FIG. 4 is an exploded perspective view illustrating the water saving valve device according to the present invention.

As shown in FIG. 3, the water saving valve device according to the present invention is provided between a water pipe 50 connected to a water supply pipe and a shower head 60 to temporarily cut off the supply of water to the shower head 60 as necessary. Preferably, the water saving valve device is surrounded by an additional casing, as shown in the drawing.

The upper construction of the water saving valve device according to the present invention remains the same as that of the conventional solenoid valve which has been described above. That is, the valve device includes a valve body 10, a push plate 26, a packing 20, a coupling unit 34, and an actuating rod 30, except for a solenoid 42 which is provided on the lower portion of the conventional solenoid valve. The valve device of the present invention includes a manual manipulating unit 100 to manually move the actuating rod 30 up and down, in place of the solenoid. Since the upper construction including the valve body 10 has been already described in the related art, the detailed description will be omitted herein. Hereinafter, the manual manipulating unit 100 for manually moving the actuating rod 30 up and down will be described in detail.

As shown in FIG. 4, the manual manipulating unit 100 of the water saving valve device according to the present invention includes a lower body 110, a slide bar 120, a spring 130, a locking piece 140, and a removal prevention ring 150.

The lower body 110 is the part which is fastened to the lower portion of the coupling unit 34 via a bolt or a similar fastening means. The lower body 110 is open at its top, and has a predetermined space 112 to receive the pipe 38 of the coupling unit 34 and the upper end of the slide bar 120 which will be described below in detail. The lower body 110 has at its lower portion a vertical pipe 114 into which the slide bar 120 is slidably inserted.

A rectangular through groove 116 which extends long in a horizontal direction is formed at a predetermined position on the outer circumference of the vertical pipe 114 of the lower body 110, and a fan-shaped hole 118 is formed right under the rectangular through groove 116 in such a way as to be tapered in a direction from an upper portion to a lower portion. The fan-shaped hole 118 sets the limit of a width within which the locking piece 140 rotates, and provides a space in which the locking piece 140 rotates leftwards and rightwards. A shaft insert hole 119 is formed in a vertex located in the lowermost end of the fan-shaped hole 118, so that one end of the locking piece 140 is rotatably inserted into the shaft insert hole 119. The coupling and rotating operation of the locking piece 140 will be described below.

The slide bar 120 has on its top a magnet 122. Thus, as the slide bar 120 inserted into the vertical pipe 114 of the lower body 110 slides up and down, the slide bar 120 vertically moves the actuating rod 30 accommodated in the pipe 38 of the coupling unit 34, by magnetic force. The slide bar 120 is not limited to a specific shape. However, preferably, as shown in FIG. 4, the upper portion of the slide bar 120 has a cylindrical shape and the lower portion of the slide bar 120 has the shape of a rod which is smaller in diameter than the upper portion so that a step is formed between the upper and lower portions.

A first locking hole 124 and a second locking hole 126 are formed at predetermined positions in the outer circumference of the slide bar 120, in detail, formed in the outer circumference of the cylindrical upper portion of the slide bar 120. A guide hole 128 is formed between the first locking hole 124 and the second locking hole 126 to guide the movement of the locking piece 140. The first locking hole 124 and the second locking hole 126 are formed in the outer circumference of the slide bar 120 in such a way as to be arranged side by side at upper and lower positions. The guide hole 128 provides a moving course along which the locking piece 140 moves between the first locking hole 124 and the second locking hole 126. As shown in FIG. 4, the guide hole 128 includes a first upward guide part 128a which guides the locking piece 140 obliquely upwards from the first locking hole 124, a first downward guide part 128b which guides the locking piece 140 obliquely downwards from an end of the first upward guide part 128a towards the second locking hole 126, a second upward guide part 128c which guides the locking piece 140 obliquely upwards from the second locking hole 126, and a second downward guide part 128d which guides the locking piece 140 obliquely downwards from an end of the second upward guide part 128c towards the first locking hole 124. Thus, the guide hole 128 generally has the shape of a heart (Ⅳ). The operation of the locking piece 140 moving along the first locking hole 124, the second locking hole 126, and the guide hole 128 will be described below.

The slide bar 120 slides up and down in the vertical pipe 114 of the lower body 110. To this end, a spring 130 is fitted over the lower portion of the slide bar 120 to elastically support the slide bar 120 in the vertical pipe 114. As described above, the slide bar 120 is inserted into the vertical pipe 114 which is provided on the lower portion of the lower body 110, and is shaped such that the lower portion of the slide bar 120 has a smaller diameter than the upper portion thereof, thus forming the step between the upper and lower portions. The spring 130 is fitted over the lower portion which has a smaller diameter than the upper portion, so that one end of the spring 130 is supported by the step. Meanwhile, a through hole (not shown) is formed in the lower end of the vertical pipe 114 of the lower body 110 and has a diameter corresponding to that of the lower end of the slide bar 120. Further, a stopping step is provided around the through hole on the lower end of the slide bar 120 to support the other end of the spring 130.

Through such a construction, when the lower end of the slide bar 120 protruding through the through hole in the state where the slide bar 120 is fitted into the vertical pipe 114 of the lower body 110 is held and pulled downwards, the spring 130 is compressed, so that the slide bar 120 is moved downwards. If the pulling force is released, the slide bar 120 is moved upwards again by the restoring force of the spring 130.

Preferably, the lower end of the slide bar 120 is machined such that its outer circumference has a hexagonal shape, thus preventing the slide bar 120 fitted into the vertical pipe 114 from rotating. Therefore, preferably, the through hole through which the lower end of the slide bar 120 passes is also machined to have a hexagonal shape. Further, in order to easily hold and pull the slide bar 120, a catcher insert hole 129 is formed in the lower end of the slide bar 120, and a catcher 200 such as a cord, wire, ring, or stick is inserted into the catcher insert hole 129, as shown in FIG. 3. Thus, by pulling the cord or wire after a user holds it or releasing the pulling force, the valve can be manually opened or closed.
As described above, the actuating rod 30 is moved up and down by the vertical motion of the slide bar 120. To this end, when the slide bar 120 is moved down, the magnet 122 provided on the upper end of the slide bar 120 must be spaced apart from the pipe 38 accommodating the actuating rod 30 by a predetermined interval so that magnetic force is not applied to the actuating rod 30. Meanwhile, when the slide bar 120 is moved up, the magnet 122 provided on the upper end of the slide bar 120 must come into contact with the lower surface of the pipe 38 so that magnetic force is applied to the actuating rod 30. Here, the interval between the slide bar 120 and the pipe 38 is adjusted by the locking piece 140.

The locking piece 140 is the part which limits the upward movement of the slide bar 120 by the force of the spring 130 fitted over the lower portion of the slide bar 120, thus alternately securing the slide bar 120 to a height at which magnetic force is applied to the actuating rod 30 or a height at which magnetic force is not applied to the actuating rod 30. The upper and lower ends of the locking piece 140 are bent in the same direction such that the locking piece 140 has the shape of a “C”. The bent lower end is rotatably fitted into the shaft insert hole 119 which is formed in the outer surface of the vertical pipe 114 provided on the lower portion of the lower body 110, and the bent upper end is moved along the guide hole 128 to be alternately stopped and supported by the first locking hole 124 or the second locking hole 126. When the upper end of the locking piece 140 is stopped by the first locking hole 124 which is formed at the lower position, the upper end of the slide bar 120 is in close contact with the bottom of the pipe 38. Meanwhile, when the upper end of the locking piece 140 is stopped by the second locking hole 126 which is formed at the upper position, the upper end of the slide bar 120 is spaced apart from the pipe 38 by a predetermined interval. The operation will be described below in detail.

The removal prevention ring 150 is fitted over the outer circumference of the vertical pipe 114 of the lower body 110, preferably, the outer portion of the locking piece 140 so as to prevent the locking piece 140 from being removed from the vertical pipe 114.

Hereinafter, respective components of the water saving valve device according to the present invention have been described. Heretofore, the operation of the intermediate valve including the above-mentioned components will be described in detail.

FIGS. 5 through 10 sequentially illustrate the operation of the locking piece 140 and the slide bar 120 when a user pulls the slide bar 120 from a lower position and releases the slide bar 120 two times.

First, as shown in FIG. 5, when the bent upper end of the locking piece 140 is stopped by the first locking hole 124, the slide bar 120 is pushed up by the force of the spring 130, so that the magnet 122 provided on the upper end of the slide bar 120 is in contact with the bottom of the pipe 38 of the coupling unit 34. Thus, as shown in FIG. 6, the actuating rod 30 fitted into the pipe 38 is affected by magnetic force, so that the spring 32 coupled to the lower portion of the actuating rod 30 is compressed, and the actuating rod 30 is moved downwards. When the actuating rod 30 moves downwards, the push plate 26 seated on the actuating rod 30 is also moved downwards. Thereafter, the packing 20 supported by the push plate 26 is separated from the push plate 26 by the pressure of water fed into the vertical pipe 16, so that the water flows through the vertical pipe 16 into the water outlet port 14.

In such a state, when a user desires to temporarily stop supplying water so as to lather his or her body or perform another task during a shower, the catcher 200 such as a cord or wire coupled to the lower end of the slide bar 120 is pulled downwards. FIG. 7 illustrates the state of the valve after the catcher 200 is pulled once when in the state of FIG. 5 and released. As shown in the drawing, if the catcher 200 is pulled once, the spring 130 installed in the vertical pipe 114 is compressed, and the slide bar 120 is moved downwards. Thus, the upper end of the locking piece 140 is moved obliquely upwards from the first locking hole 124 along the first upward guide part 128a of the guide hole 128. At this time, the lower end of the locking piece 140 is rotated in the shaft insert hole 119, and the central portion of the locking piece 140 is moved to one side of the fan-shaped hole 118. Subsequently, when the catcher 200, such as a cord or wire, coupled to the lower end of the slide bar 120 is released, the upper end of the locking piece 140 is moved along the first downward guide part 128b of the guide hole 128 and then stopped and supported by the second locking hole 126. At this time, the locking piece 140 rotates and returns to the center of the fan-shaped hole 118.

FIG. 8 is a sectional view of the valve device when the locking piece 140 is stopped and supported by the second locking hole 126 by pulling the catcher 200 once and releasing it as shown in FIG. 7. In this state, the upper end of the slide bar 120 is spaced apart from the bottom of the pipe 38 of the coupling unit 34 by a predetermined interval, so that magnetic force is not applied to the actuating rod 30. Thus, the actuating rod 30 is pressed upwards by the restoring force of the spring 32, thus pushing the push plate 26 and supporting the packing 20 seated on the push plate 26. Thereby, the packing 20 comes into contact with the lower end of the vertical pipe 16, so that the valve maintains a closed state and the supply of water is temporarily cut off.

When a user desires to use water again, the catcher 200, such as a cord or wire, coupled to the lower end of the slide bar 120 is pulled downwards again. FIG. 9 illustrates the state of the valve after the catcher 200 is pulled once from the state of FIG. 8 and released. As shown in FIG. 9, if the catcher 200 is pulled again, the slide bar 120 is moved downwards and the spring 130 is compressed. Further, the upper end of the locking piece 140 is moved obliquely upwards along the second upward guide part 128c of the guide hole 128. Subsequently, if the catcher 200 is released again, the slide bar 120 is moved up by the restoring force of the spring 130, so that the magnet 122 provided on the upper end of the slide bar 120 comes into contact with the pipe 38 of the coupling unit 34, and the upper end of the locking piece 140 moves along the second downward guide part 128d of the guide hole 128 to return to the first locking hole 124 again. Thus, as shown in FIG. 6, the valve is open, so that water is supplied to the shower head 60.

As such, when the catcher 200, such as a cord or wire, coupled to the lower end of the slide bar 120 is pulled once and released with the valve open first, the valve is closed, so that the supply of water is cut off. If the catcher 200 is pulled once again and released, the valve is open, so that the supply of water resumes. In this way, by repeatedly pulling and releasing the slide bar 120, the supply of water to the shower head 60 can be manually controlled.

As described above, the present invention provides a water saving valve device, which is constructed to manually move an actuating rod up and down without using a solenoid,
thus preventing malfunction by an electric signal, reducing manufacturing cost and maintenance cost, and which has a small volume, thus making it easy to install, and which is capable of preventing the leakage of water due to the interruption or instability of power.

[0055] Although the preferred embodiment of the present invention has been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A water saving valve device having a valve body including a water inlet port, a water outlet port and a vertical pipe, a coupling unit including a coupling plate coupled to a lower portion of the valve body and a pipe provided on a lower portion of the coupling plate, a spring and an actuating rod inserted into the pipe, a push plate contacting the actuating rod in such a way as to move up and down, and a packing, wherein
   a manual manipulating unit is coupled to a lower portion of the coupling unit to manually move the actuating rod up and down, the manual manipulating unit comprising:
   a lower body coupled to the lower portion of the coupling unit, the lower body being open at a top and having a space therein, with a vertical pipe provided on a lower portion of the lower body;
   a slide bar having on an upper end thereof a magnet, and vertically moving the actuating rod accommodated in the pipe of the coupling unit by a magnetic force of the magnet, as the slide bar inserted into the vertical pipe slides up and down;
   a spring fitted over an outer circumference of a lower portion of the slide bar to elastically support the slide bar in the vertical pipe; and
   a locking piece, an upper end thereof being alternately stopped and supported by a first locking hole and a second locking hole which are formed side by side at upper and lower positions on an outer circumference of the slide bar when the slide bar moves up and down, a lower end thereof being supported by an outer circumference of the vertical pipe, so that the slide bar is secured alternately at a position where magnetic force acts on the actuating rod and a position where magnetic force does not act on the actuating rod.

2. The water saving valve device as set forth in claim 1, wherein a guide hole is formed between the first locking hole and the second locking hole to guide a movement of the upper end of the locking piece, the guide hole comprising:
   a first upward guide part for guiding the locking piece obliquely upwards from the first locking hole; a first downward guide part for guiding the locking piece obliquely downwards from an end of the first upward guide part to the second locking hole; a second upward guide part for guiding the locking piece obliquely upwards from the second locking hole; and a second downward guide part for guiding the locking piece obliquely downwards from an end of the second upward guide part to the first locking hole.

3. The water saving valve device as set forth in claim 1, wherein a removal prevention ring is fitted over an outer portion of the locking piece to prevent the locking piece from being removed from the vertical pipe.

4. The water saving valve device as set forth in claim 2, wherein a through groove is provided in a predetermined portion on an outer circumference of an upper portion of the vertical pipe of the lower body in such a way as to extend in a horizontal direction, so that the upper end of the locking piece passes through the through groove and moves along the guide hole formed in the outer circumference of the slide bar, and the lower end of the locking piece is rotatably fitted into a shaft insert hole which is formed in the outer circumference of the vertical pipe provided on the lower portion of the lower body.

5. The water saving valve device as set forth in claim 4, wherein a fan-shaped hole is formed right under the through groove of the vertical pipe in such a way as to be tapered in a direction from an upper position to a lower position, and provides a horizontal rotating space for the locking piece.

6. The water saving valve device as set forth in claim 1, wherein a catcher is coupled to the lower end of the slide bar to be easily caught when the slide bar is manually moved up and down.

7. The water saving valve device as set forth in claim 1, wherein the water saving valve device is installed at a position between a water pipe and a shower head.