SUMMARY

[0004a] In accordance with a first aspect of the present disclosure, a water meter for determining a flow of water is disclosed. The water mater includes a meter maincase, a metering device and a flow restricting device. The meter maincase defines an inlet for receiving the flow of water and an outlet for discharging the flow of water. The metering device is positioned in the maincase between the inlet and the outlet and operable to measure the flow of water through the maincase from the inlet to the outlet. The flow restricting device is positioned between the metering device and the outlet. The flow restricting device includes a plurality of flexible vanes that define a variable orifice through which the water flows from the metering maincase to the outlet. The flexible vanes are each biased toward a closed position to restrict the size of the variable orifice and create a source of back pressure for the flow of water through the water meter.

[0004b] In accordance with a second aspect of the present disclosure, a water meter for determining a flow of water from a fire hydrant is disclosed. The water meter includes a meter maincase, a metering device and a flow restricting device. The meter maincase has an outlet and an inlet connectable to the fire hydrant to receive the flow of water. The metering device is positioned in the maincase between the inlet and the outlet and operable to measure the flow of water through the maincase from the inlet to the outlet. The flow restricting device is positioned between the metering device and the outlet. The flow restricting device includes a plurality of flexible vanes that define a variable orifice for water to flow into the outlet. The flexible vanes of the flow restricting device are biased toward a closed position to restrict the size of the variable orifice to create back pressure to the flow of water through the water meter and the flexible vanes flex toward an open position to increase the size of the variable orifice upon an increase of pressure from the flow of water.

[0004c] In accordance with a third aspect of the present disclosure, a flow restricting device for use in a water meter is disclosed. The flow restricting device includes a generally circular attachment rim, a planar outer surface integrally formed with the attachment rim and a plurality of flexible vanes extending away from the outer surface and toward a flow axis within the attachment rim. Each of the flexible vane flex toward an open position to increase the size of the variable orifice upon an increase of pressure against the flexible vanes.

[0005] The present disclosure relates to a water meter for use with a fire hydrant to determine the amount of water flowing from the hydrant. The water meter includes a meter maincase that defines both an inlet and an outlet for the water meter. The inlet of the meter maincase is connected to the hydrant to receive a flow of water from the hydrant.

[0006] The meter maincase defines a measuring chamber that includes a metering device. The metering device is operable to measure and display the amount of water flowing through the meter maincase.

[0007] A flow restricting device is positioned between the metering device and the outlet of the meter maincase. The flow restricting device creates a source of back pressure to the flow of water through the meter maincase. The source of back pressure created by the flow restricting device limits the flow of water through the meter maincase when the water meter is used without an outlet hose or other type of water distribution network.

[0008] The flow restricting device that forms part of the water meter includes a plurality of flexible vanes that define a variable orifice through which water flows from the metering device to the outlet of the water meter. The flexible vanes each extend in the direction of water flow from a vertical plane to a location downstream from the vertical plane. The spacing between the outer ends of the flexible vanes defines the variable orifice.

[0009] The flow restricting device, including each of the plurality of flexible vanes, is formed from a material that has a known spring rate. The known spring rate of the material used to create the flow restricting device and the flexible vanes is used to determine the amount of flow allowable at various water pressures.

[0010] The flow restricting device includes a circular, outer attachment flange that allows the flow restricting device to be securely mounted within the meter maincase. The outer attachment flange is connected to an outer face surface that defines a generally vertical plane when the flow restricting device is installed in the water meter. Each of the plurality of vanes extends away from the vertical plane toward a center flow axis. The variable orifice is centered along the center flow axis and the size of the variable orifice increases or decreases depending upon the pressure of water flowing against the individual flexible vanes.

[0011] Various other features, objects and advantages of the invention will be made apparent from the following description taken together with the drawings.

CLAIMS

I claim:

1. A water meter for determining a flow of water, comprising:

a meter maincase defining an inlet for receiving the flow of water and an outlet for discharging the flow of water;

a metering device positioned in the maincase between the inlet and the outlet and operable to measure the flow of water through the maincase from the inlet to the outlet; and

a flow restricting device positioned between the metering device and the outlet, wherein the flow restricting device includes a plurality of flexible vanes that define a variable orifice through which the water flows from the metering maincase to the outlet, wherein the flexible vanes are each biased toward a closed position to restrict the size of the variable orifice and create a source of back pressure for the flow of water through the water meter.

~~2. The water meter of claim 1 wherein the flexible vanes are biased toward a closed position to restrict the size of the variable orifice.~~

~~3. The water meter of claim 2 wherein the flexible vanes create a source of back pressure for the flow of water through the water meter.~~

42. The water meter of claim ~~2~~ 1 wherein the flexible vanes flex toward an open position to increase the size of the variable orifice upon an increase of pressure from the flow of water.

53. The water meter of claim ~~2~~ 1 wherein the flexible vanes are formed from a plastic resin.

64. The water meter of claim ~~2~~ 1 wherein the vanes of the flow restricting device have a known spring rate to provide the source of back pressure to the flow of water through the meter.

75. The water meter of claim 1 wherein the plurality of vanes of the flow restricting device each extend along a flow axis extending through the variable orifice and toward the outlet.

~~8~~6. The water meter of claim ~~7~~5 wherein the flow restricting device includes a circular outer flange located in an attachment plane, wherein the plurality of vanes each extend along the flow axis at an angle to the attachment plane.

~~9~~7. The water meter of claim 1 wherein the vanes of the flow restricting device each have a base and an outer end, wherein the base is wider than the outer end.

~~10~~8. The water meter of claim 1 wherein the flow restricting device including the plurality of vanes is formed as a single piece.

~~11~~9. A water meter for determining a flow of water from a fire hydrant, comprising:

a meter maincase having an outlet and an inlet connectable to the fire hydrant to receive the flow of water;

a metering device positioned in the maincase between the inlet and the outlet and operable to measure the flow of water through the maincase from the inlet to the outlet; and

a flow restricting device positioned between the metering device and the outlet, wherein the flow restricting device includes a plurality of flexible vanes that define a variable orifice for water to flow into the outlet,

where the flexible vanes of the flow restricting device ~~creates~~ are biased toward a closed position to restrict the size of the variable orifice to create back pressure to the flow of water through the water meter and the flexible vanes flex toward an open position to increase the size of the variable orifice upon an increase of pressure from the flow of water.

~~12. The water meter of claim 11 wherein the flexible vanes are biased toward a closed position to restrict the size of the variable orifice.~~

~~13. The water meter of claim 12 wherein the flexible vanes flex toward an open position to increase the size of the variable orifice upon an increase of pressure from the flow of water.~~

~~14~~10. The water meter of claim ~~12~~9 wherein the flexible vanes are formed from a plastic resin.

~~15~~11. The water meter of claim ~~11~~ 9 wherein the plurality of vanes of the flow restricting device each extend along a flow axis extending through the variable orifice and toward the outlet.

~~16~~12. The water meter of claim ~~15~~ 11 wherein the flow restricting device includes a circular outer flange located in an attachment plane, wherein the plurality of vanes each extend along the flow axis at a known angle relative to the attachment plane.

~~17~~13. The water meter of claim ~~11~~ 9 wherein the vanes of the flow restricting device each have a base and an outer end, wherein the base is wider than the outer end.

~~18~~14. A flow restricting device for use in a water meter, comprising:

a generally circular attachment rim;

a planar outer surface integrally formed with the attachment rim; and

a plurality of flexible vanes extending away from the outer surface and toward a flow axis within the attachment rim, wherein each of the flexible vanes includes a base connected to the outer surface and an outer end, wherein the outer ends of the plurality of flexible vanes define a variable orifice therebetween, wherein the flexible vanes are each biased toward a closed position to restrict the size of the variable orifice and create a source of back pressure for the flow of water through the water meter, wherein each of the flexible vane flex toward an open position to increase the size of the variable orifice upon an increase of pressure against the flexible vanes .

~~19. The flow restricting device of claim 18 wherein each of the flexible vane flex toward an open position to increase the size of the variable orifice upon an increase of pressure against the flexible vanes.~~

~~20~~15. The flow restricting device of claim ~~18~~ 14 wherein each of the flexible vanes are formed from material having a known spring rate to bias the flexible vanes toward a closed position to restrict the size of the variable orifice.

~~21~~16. The flow restricting device of claim ~~20~~ 15 wherein the flexible vanes are formed from a plastic resin.