

The invention claimed is:

1. A fluid flow control apparatus for use in an oilfield tubular positioned in a wellbore extending through a subterranean formation, the oilfield tubular for flowing fluid therethrough, the apparatus comprising:

a tubular defining a fluid passageway;

a port positioned in the passageway;

a rotational, fluid-driven valve member, the valve member mounted for rotation about a longitudinal axis in the passageway, fluid flow through the fluid passageway imparting rotation to the valve member, wherein rotation rate of the valve member is in response to changes in a fluid flow characteristic, wherein the valve member comprises a plurality of balance members mounted for radial movement in response to rotation of the valve member; and

a valve restriction member movably mounted to the valve member and movable to restrict flow through the port.

2. The apparatus as in claim 1, the valve restriction member mounted to move longitudinally in the tubular passageway.

3. The apparatus as in claim 2, wherein the valve restriction member moves between an open position wherein flow through the port is unrestricted and a closed position wherein flow through the port is restricted.

4. The apparatus as in claim 1, wherein the fluid flow characteristic is viscosity, velocity, flow rate, or density.

5. The apparatus as in claim 4, wherein fluid flow through the port is restricted when the fluid reaches a preselected viscosity.

6. The apparatus as in claim 5, wherein the fluid flow is restricted at a lower viscosity and fluid flow is unrestricted at a higher viscosity.

7. The apparatus as in claim 1, wherein the balance members are pivotally mounted to move radially in response to rotation of the valve member.
8. The apparatus as in claim 1, wherein radial movement of the balance members causes longitudinal movement of the valve restriction member.
9. The apparatus as in claim 1, wherein the valve restriction member moves in response to centrifugal force exerted on the valve member.
10. A fluid flow control apparatus for use in an oilfield tubular positioned in a wellbore extending through a subterranean formation, the oilfield tubular for flowing fluid therethrough, the fluid having a density which changes over time, the apparatus comprising:
 - a tool housing;
 - a valve assembly positioned in the tool housing and having a valve housing with at least one inlet and at least one outlet;
 - a rotatable fluid diverter positioned in the tool housing and adjacent the exterior of the valve housing, the fluid diverter rotated about a longitudinal axis of the fluid diverter by change in the fluid diverter buoyancy in response to change in the fluid density, the fluid diverter rotatable to restrict the fluid flow through at least one valve inlet in response to change in the fluid density;
 - wherein the valve assembly further comprises spaced apart first and second inlets; and
 - wherein the diverter is operable to change the fluid flow ratio between the first and second inlets in response to fluid density change.
11. The apparatus as in claim 10 wherein the change in fluid flow ratio is operable to actuate a valve member in the valve assembly.
12. The apparatus as in claim 11 wherein the valve assembly further comprises a valve chamber in fluid communication with the valve inlets and valve outlet, the valve chamber housing a valve member, the valve member movable between a closed position wherein

fluid flow through the valve outlet is restricted and an open position wherein fluid flow through the valve outlet is less restricted.

13. The apparatus as in claim 12 wherein the valve member is a pivotable valve arm having one end proximate the valve outlet and operable to restrict flow through the outlet.

14. The apparatus as in claim 11 wherein the valve assembly further comprises venturi pressure converter.