CLAIMS

1. A shut-off device for pipe for use in a pipeline for operation in response to ingress of water, comprising:

a valve for installation in a pipe of said pipeline, the valve comprising a valve member supported for movement between an open position when the valve is open to permit passage through said pipe and a closed position when the valve is closed to shut off passage through said pipe; ~~and~~

a buoyant member associated with the valve member for moving the valve member to the closed position automatically in the presence of ingress water in the vicinity of the buoyant member; and

a housing in which the valve and the buoyant member are provided, the housing having opposite open ends which include pipe jointing means.

2. The shut-off device as claimed in claim 1, wherein the valve member is arranged, upon movement from the open position to the closed position, to move into the passage through said pipe.

3. The shut-off device as claimed in claim 2, wherein the valve member is arranged to stay clear of the passage through said pipe when it is in the open position.

4. The shut-off device as claimed in any one of claims 1 to 3, wherein the valve member is arranged to move along a non-linear path from the open position to the closed position.

5. The shut-off device as claimed in any one of claims 1 to 4, wherein the valve member has a planar body and is

arranged, in the open position, to extend along the direction of the passage through said pipe and, in the closed position, to extend transverse to the direction of the passage through said pipe.

6. The shut-off device as claimed in any one of claims 1 to 5, wherein the valve member normally stays in the open position and is adapted to return automatically to the open position upon removal of said ingress water.

7. The shut-off device as claimed in any one of claims 1 to 6, including a connecting mechanism provided between the valve member and the buoyant member such that the valve member is directly movable by or with the buoyant member.

8. The shut-off device as claimed in claim 7, wherein the connecting mechanism has a configuration which enables the buoyant member to move the valve member from the open position to the closed position along a relatively longer path compared to the path of the movement of the buoyant member causing the movement of the valve member.

9. The shut-off device as claimed in claim 7 or claim 8, wherein the connecting mechanism comprises a linkage having a first link pivotably inter-connecting the valve member and the buoyant member for simultaneous movement.

10. The shut-off device as claimed in claim 9, wherein the linkage includes a base and a second link pivotably connecting the buoyant member to the base, with the first link pivotably connecting the valve member to the buoyant member.

11. The shut-off device as claimed in claim 10, wherein the linkage includes a pair of said second links of equal length and extending in parallel with each other such that the buoyant member is pivotable about the base at a constant angular position relative to the base.

12. The shut-off device as claimed in claim 10 or claim 11, wherein the valve member is pivotably connected to the base for angular movement about the base between the open position and the closed position.

13. The shut-off device as claimed in claim 12, wherein the linkage includes a third link fixed with and supporting the valve member, by means of which third link the valve member is pivotably connected to the base and to the buoyant member via the first link.

14. The shut-off device as claimed in any one of claims 1 to 13, wherein the buoyant member is pivotable at a constant angular position, and the valve member has a sealing surface and is arranged to be pivoted by the buoyant member from the open position with the sealing surface extending perpendicular to the angular position to the closed position with the sealing surface extending parallel to the angular position.

15. The shut-off device as claimed in any one of claims 1 to 14, wherein the valve includes a valve seat from which the valve member disengages in the open position and with which the valve member engages in the closed position.

16. The shut-off device as claimed in claim 15, wherein the valve member and the valve seat have respective sealing

parts for inter-engagement to close the valve, and at least one of the sealing parts is provided with a magnet or magnets for magnetic attraction with the other sealing part to hold the valve member in the closed position.

17. The shut-off device as claimed in any one of claims 1 to 16, wherein the buoyant member comprises a plurality of buoys connected together by means of a bracket.

~~18. The shut-off device as claimed in any one of claims 1 to 17, including a housing in which the valve and the buoyant member are provided, the housing having opposite open ends which include pipe jointing means.~~

18~~19~~. The shut-off device as claimed in any preceding claim ~~18~~, wherein the housing has a main chamber for acting as part of the passage through said pipe and includes a bottom chamber immediately underneath the main chamber, accommodating the buoyant member and for collecting ingress water, and the buoyant member is arranged to float on collected ingress water to rise outwardly of the bottom chamber and in turn move the valve member towards or to the closed position.

19~~20~~. The shut-off device as claimed in claim 18~~19~~, wherein the bottom chamber has a lower part which is openable for removal of ingress water collected in the bottom chamber.

~~21. A shut-off device for pipe for use in a pipeline for operation in response to ingress of water, substantially as hereinbefore described with reference to Figures 1 to 4 of the accompanying drawings.~~