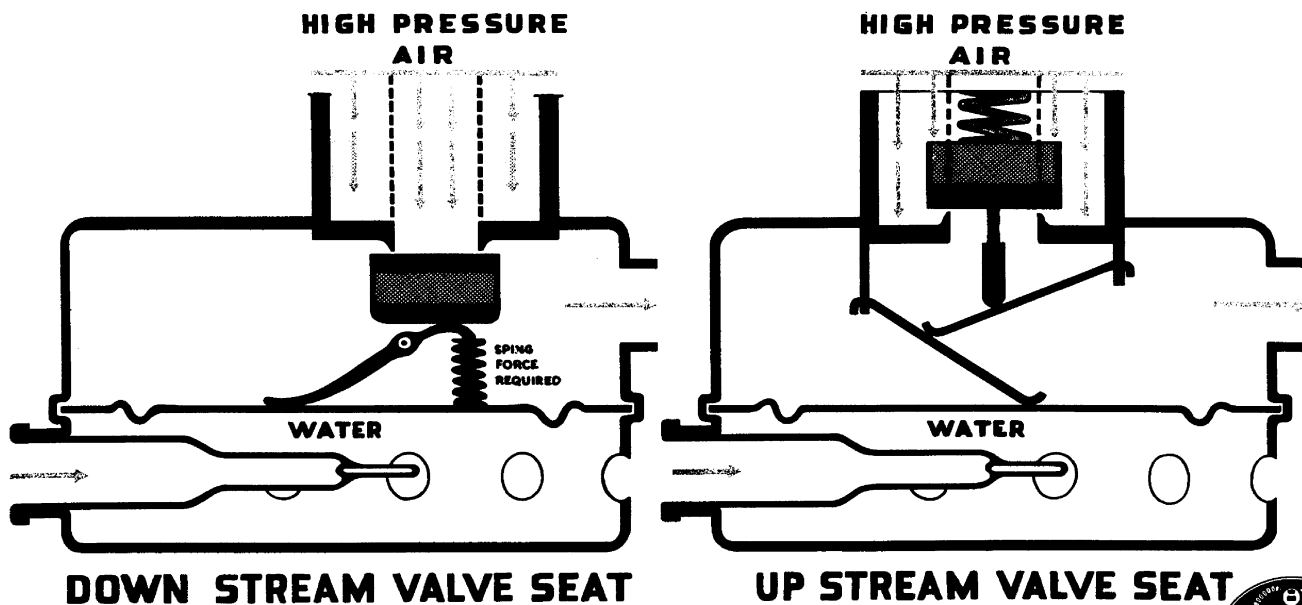


ONE STAGE REGULATOR



No.2

9201-02

Fig.113. The Upstream and Downstream Single Stage

An engineer designing a regulator mechanism is immediately faced with the problem of variation of pressure from 2,000 psi to 200 psi in the cylinder. This cylinder pressure acts on the valve seat to either open or close the valve depending upon whether the valve opens "downstream" or "upstream" with the flow of air. Both types are illustrated in the drawing above.

In the "downstream" type it is clear that high pressure air entering through the orifice tends to *open the valve*. The force exerted is calculated by multiplying the area of the orifice times the pressure in the cylinder.

This opening force of high pressure air vitally affects the operation of the regulator. A mechanical force, such as a spring, must be balanced against the force of the cylinder air pressure. It is also clear that the opening force will vary with the pressure in the cylinder. A full cylinder of 2,000 lbs. pressure will exert more opening force than when its pressure has dropped to 500 lbs.

In the "upstream" type valve, the variation is exactly the opposite. The high pressure cylinder air acts as a *closing force* and tends to seat the valve. As cylinder pressure drops, this force becomes less, and breathing becomes easier. This is at low cylinder pressure—at the end of a dive. *Courtesy U. S. Divers Co.*