

SECTION XI

CHAPTER 2

HIGH-PRESSURE OXYGEN BREATHING APPARATUS

Purpose of the apparatus

1. The human body requires a constant supply of oxygen for its normal functioning, and this is obtained from the air, through the walls of the lungs. The amount which the lungs can absorb varies with both the pressure and the proportion of oxygen to other gases in the lungs. At high altitudes the pressure is so reduced that enough oxygen cannot be obtained by normal breathing. This deficiency is overcome by providing an additional supply of pure oxygen from the breathing apparatus and thus increasing the proportion of oxygen to other gases.

2. Since the density decreases with increasing height, a greater rate of flow of oxygen will be required at greater heights. The rates of supply required for normal flight at various altitudes have been determined from information as to the normal consumption at ground level and the change in density with height. The breathing apparatus allows for adjustment of the rate of supply to suit the altitude. If abnormal bodily effort is expended the rate of supply must be increased.

General

3. The oxygen is stored in small steel cylinders which are initially charged with pure, dry oxygen at a pressure of 120 atmospheres or 1,800 lb./sq. in. Certain cylinders are provided "The cylinders are finished with a black varnish paint, and a notice in white stencilled on them reads "Use no oil or grease, they cause explosions." The original black paint should not be covered or partially covered with that of any other colour, since the colour of a cylinder denotes its contents."

4. Connection between the cylinders and the regulators is made by high tensile copper tubing which is used in conjunction with heavy brass union fittings. Non-return valves are incorporated in convenient positions in these fittings to prevent oxygen escaping from the system, should part of it sustain damage.

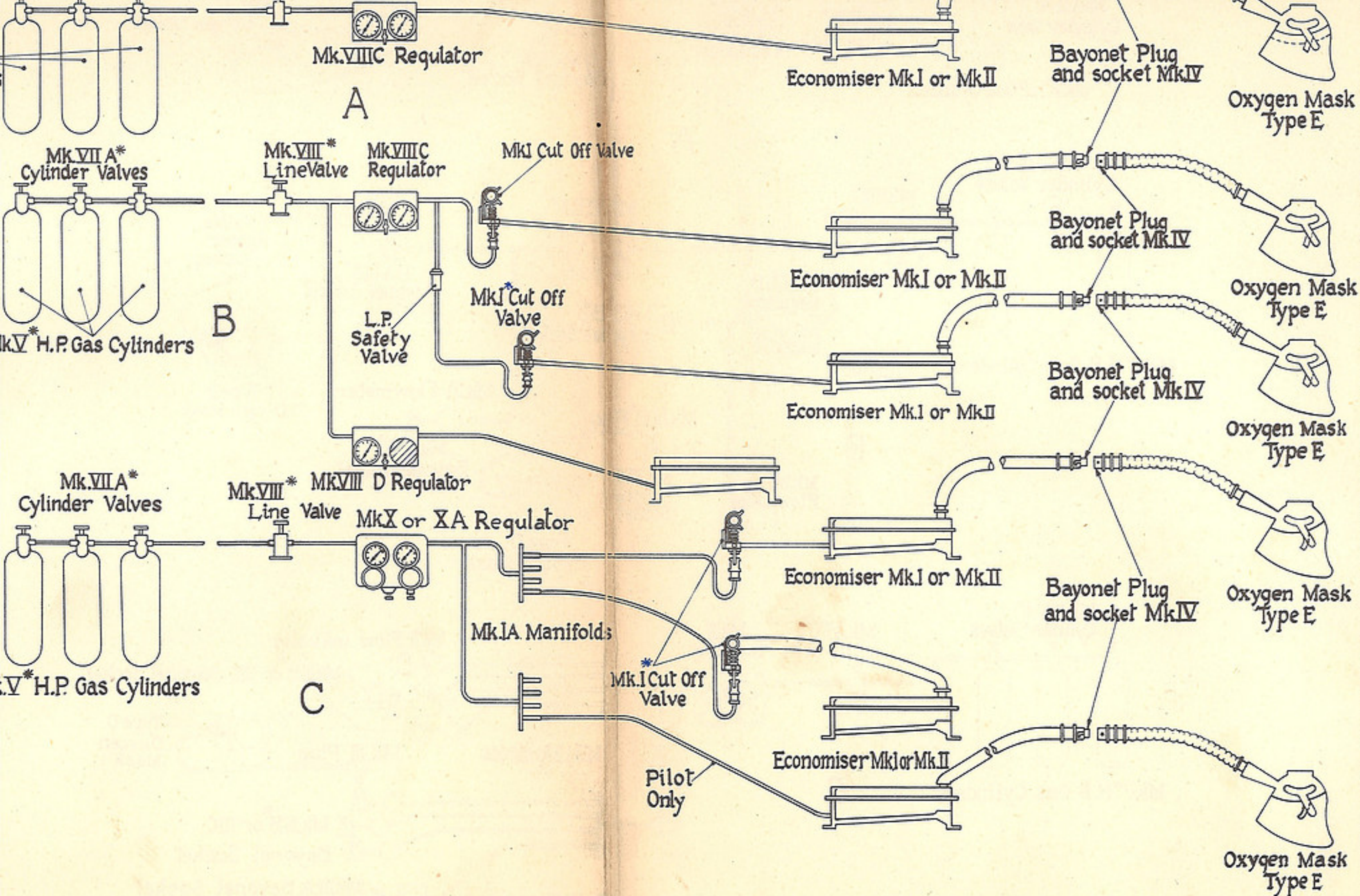
5. A line valve is also installed in the high-pressure piping between the cylinders and regulators, thus enabling the user to shut off the oxygen supply where cylinder valves are not fitted. This valve, shown in fig. 4, is also incorporated in certain installations where cylinder valves are fitted, in order that the supply may be turned on or off rapidly, thus avoiding the delay which would otherwise be involved in operating a number of valves in individual cylinders.

6. The delivery of oxygen is controlled by one or more regulators, in which the necessary reducing valves, flow controls and the flow and supply indicating apparatus are incorporated.

7. Oxygen is distributed at low pressure, from the regulators, through low-pressure tubing and fittings, to the economizers or bayonet sockets whichever is appropriate.

8. Suitable breathing masks are provided from which the oxygen is inhaled by the wearer. They are supplied with flexible tubing and bayonet plugs suitable for connection to the economizers or bayonet sockets.

9. The equipment may be arranged to supply any number of men up to eight in number from a common supply. The apparatus is designed to provide an adequate flow of oxygen for all heights up to 40,000 ft.



SYSTEMS FOR USE WITH MASK, TYPE E



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