

apparatus for analyzing samples of the mine air similar to those used for analyzing flue gases, and capable of detecting the percentage of oxygen, carbon monoxide and carbon dioxide.* A number of portable electric lamps corresponding to the number of rescue apparatus should be kept ready for use, and smoke helmets similar to those used by firemen might also be stocked for dealing with small fires in the pit or stables, etc.

REQUIREMENTS OF THE APPARATUS

The rescue apparatus, to be of real practical value, should not be too heavy or cumbersome, and should have its weight distributed over the various parts of the body; an automatic arrangement for the supply of oxygen is essential, as it is often absolutely vital that an explorer should have the free use of both hands; two oxygen cylinders with separate valves are necessary, one for use in advancing and the other for retreating; the gauge recording the pressure of oxygen in the cylinders should be so placed that the wearer can read it either direct or by means of a mirror placed within the protecting cover of the gauge, so that in case he should find himself alone he would immediately be able to determine what amount of oxygen he may have left to enable him to reach a place of safety. The apparatus should allow the head full freedom, and the wearer should be able to breathe in a natural way, not with the nose clipped or the mouth gagged.

The mouthpiece should be so constructed that it may be easily slipped on and off, so that whenever fresh air is encountered, advantage may be taken of it and a corresponding quantity of oxygen saved. The eyes should be protected by goggles for use in smoke, but these should be so arranged that they can be easily removed independently of the helmet as they are often unnecessary in afterdamp. Each apparatus should be capable of supplying the wearer with air as required for a period of at least two hours whilst engaged in laborious work, or for four or five hours if the physical work is easy, as when taking readings of a thermometer in a heated and noxious atmosphere; the cylinders containing the oxygen should be sufficiently strong to withstand a working pressure of 120 atmospheres (1,800 lbs. per square inch) if the generator type of apparatus be used. The chemicals used for the absorption of the carbonic acid gas should be of the very best quality, and not deteriorated by previous exposure to air, and a large surface should be exposed in the purifier for active chemical combination.

* This apparatus will also be found useful for analyzing samples of the air in the breathing apparatus during practice.

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SUGGESTED R

Use of Portable collieries where only explosion is generall shaft and on the hau gation of the explosiv and in the neighbour sides, roof, etc., usua to reduce the explosiv of a fire at the down damaged, it frequentl of the upcast shaft, a portable breathing aj fulness of the appara the rescuers have un physical condition of state, height and inclin atmosphere, the obsti made for contingencie safety. The following be observed.

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