

connection are simplicity, positive action and small friction losses. Direct-connected water power compressors (see Figs. 21 and 22) are, almost without exception, driven by Pelton wheels. This wheel is very simple and its form and its weight are such that it can be put in place of the belt pulley of a belted compressor and can furnish driving power and act as a fly-wheel as well. By choosing a suitable diameter of the wheel it is possible to have the best peripheral speed of the buckets for the given head and at the same time to have the best speed of rotation for the compressor. Fig. 21 shows an Ingersoll-Sergeant straight-line water-power compressor, and Fig. 22 shows a Rand duplex water-power compressor. The sheet iron casing around the Pelton wheel of the latter is merely to prevent the water from spraying over the machine.

We now come to the last and in many respects most important method of driving compressors, that of direct connection to a steam engine. Even if we do not include with them the 30,000 air-brake pumps used by the American railroads, the direct-connected steam-driven compressors probably still out-number all others. It has been previously pointed out that there is greater room for economy in the design of the steam end than in the design of the air end. Under ordinary conditions the greatest possible difference in the efficiency of compression between a poor compressor and the best compressor made is about 20 per cent., while the difference between the steam consumption per horse-power-hour of a common slide-valve engine and the best Corliss engine may be 200 or 300 per cent. of the latter quantity. It is natural then to make the description of the steam engine a most important part in the name of a compressor. For example, a compressor which is generally used to produce large quantities of compressed air at the lowest power cost is called the Duplex Cross Compound Condensing Corliss Compressor.

Figs. 13 and 14 show different arrangements of straight-line steam-driven compressors. Fig. 13 is a very common type. Fig. 37 shows the Rand compressor of this type. This arrangement makes a very compact machine, while at the same time giving a fairly long connecting rod. It is generally self-contained, so that little or no foundation is necessary. The cross-head is made to swivel at the centre so that no bending strain shall be brought on the piston-rod. In Figs. 20 and 21 there is shown a section of the cross-head at its point of connection to the piston rod, in which the pin of the swivel connection can be seen. The clearance can be adjusted by "taking up" the connecting rods or by moving the cross-head along the piston-rod.

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