

Another difference between an ordinary engine and the engine of an air compressor is shown by these cards. It will be seen that the amount of compression is very small. One of the principal effects of compression in a steam cylinder is to cushion the reciprocating parts. In an air compressor in which steam and air pistons are on the same piston rod, the cushioning is done very effectually by the compressed air in the air cylinder, hence there is not the same necessity for cushioning by steam.

The most common form of air valve is the poppet valve. Both suction and discharge valves of the high-pressure air cylinder in Fig. 20 are of this type. The discharge valves in Fig. 32 are also poppet valves.

The advantages of poppet valves are that they are very simple, have little tendency to leak, and are easily reground by hand if a slight leak should occur. They are entirely automatic, opening when the pressure on the face exceeds that on the back. This automatic action is particularly desirable for discharge valves, as the pressure of the discharge is variable, and hence a fixed point of opening would not be suitable.

Some objections to poppet valves are as follows: To insure prompt closing at all speeds, the springs must exert considerable force. In the case of inlet valves the throttling caused by the pressure of the springs, while hardly noticeable on the indicator-card, may cause quite a loss of capacity and a small loss of power. A throttling of eight ounces per square inch could hardly be seen on a card taken with a sixty spring, but yet it would cause a loss of 3.4% in capacity, and, at a discharge pressure of 100 pounds per square inch, a loss of about 1.2% in power. Another objection is that a large number of valves are necessary, on account of the small lift that can be allowed each one. A compressor of medium size would have from three to five inlet valves and two discharge valves for each end of each cylinder, making from ten to fourteen valves for each cylinder. The air, being forced to flow in thin streams over the metal, has a chance to become heated during admission, with consequent loss of power. Poppet valves nearly always chatter to some extent, and are liable to break and get into the cylinder, wrecking the machine. The defects of poppet valves are the most serious in the case of inlet valves, so that many makers who retain the poppet discharge valves have substituted some other form of inlet valve.

Corliss valves are used on the air cylinders of a number of com-

