

COMPRESSED AIR FOR TRAMWAYS

The air brake seems to have first taken shape at this time, 1828, in Wright's patent with an eccentric on a wheel shaft, connected with a piston which was to be operated as a brake on down grades by pumping air into the air chambers, but it was not until 1869 that air brakes began to take a practical form under the patents of Westinghouse.

In 1828 Bompas, in England, built a compressed air locomotive. The first compound compression of air was probably suggested in the patent to William Mann in 1829. The use of two or more cylinders which was properly claimed not only to affect great economy in compressing air, but also to decrease the machinery strain and to admit of lighter construction of the compressor.

The use of compressed air machinery for quarrying, mining, and tunneling, and means of compressing air along economical lines have been greatly extended by the inventive genius of Burleigh, Ingersoll, Sargeant, Rand, Clayton, and others, who have contributed to and promoted the economy of practical operation in rock-boring machinery that has so greatly aided in excavating the vast system of railway tunnels of the United States, and in sinking and drifting in the mines of all countries during the past quarter of a century.

Every implement required in the generation of compressed air power and its uses has overflowed its earlier and narrow field of work and is now encompassing a wide area of usefulness in our workshops, factories, and in hundreds of industrial operations, transportation, railway appliances, refrigeration, even unto the painting of building and structural work, and the dusting of furniture, carpets, and clothing. The later development and actual application of compressed air at extremely high pressures and its economical use by reheating, derived from the persistent efforts of Mekarski, Beaumont, and others in Europe, and of Judson, Hoadley, Knight, and Hardie in the United States, have brought the use of compressed air to a new condition of application and a high pressure storage of 2,500 or more pounds per square inch in a condensed space of from 170 to 180 volumes to one volume. This allows for sufficient storage volume within the limit of passenger car and vehicle capacity for runs of reasonable distances.

The precise limit of the compressibility of air at ordinary temperatures is as yet an unknown quantity. It has been compressed to 14,000 pounds per square inch in experiments for blasting rock; and it has been asserted, and there seems to be no reason to doubt, that any pressure may be obtained within the limits of safety in the strength of metals to hold the pressure.