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MR. J. J. WRIGHT.

THE subject of the accompanying portrait was born in Yarmouth, England, in 1850, and came to Canada about twenty-one years ago. Mr. Wright was in the States at the time of the Centennial Exhibition, of 1876, at which time electricity was beginning to attract attention as a possible means of giving light. He there became acquainted with Prof. Thomson, who was then occupying the Chair of Chemistry in the High School, in Philadelphia, Pa., at which time he in conjunction with Prof. Houston of the same school was commencing experiments which have led up to the brilliant results of to-day. Mr. Wright built all the machinery during these experiments; he also built and put up the first electric street lamp on the continent of America, which was placed on the corner of 21st street and Washington ave. in the year 1879. He was amongst the first to handle electric light wires in the construction of underground service, having constructed a line of underground wire for electric lighting in Market street, Philadelphia, and another between the City Hall and 4th street. Mr. Wright was a member of the National Conference of Electricians convened by the United States Government, and whilst in Philadelphia was a member of the Franklin Institute of Science and Arts, and is now connected with the Electric Light Association of the United States.

MR. J. J. WRIGHT.

In the spring of 1883 Mr. Wright returned to Canada and built a small plant for the supply of light which was operated on Yonge street near King, and since then he has identified himself with the electric lighting interests of this city as manager of the Toronto Electric Light Company. He also built and put in operation the electric locomotive which has been used at the Industrial Exhibition for the past few years—which may be considered the pioneer electric railroad in Canada.

SAFETY VALVES—THEIR HISTORY, ANTECEDENTS, INVENTION AND CALCULATION.

BY WILLIAM BARNET LE VAN.

The function of a safety valve, as used on a steam boiler, is to discharge steam so rapidly, when the pressure within the boiler reaches a fixed limit, that no important increase of pressure can then occur, however rapidly steam may be made. It should be so constructed and arranged, that should any accident occur, it may be opened by hand and the steam pressure lowered very rapidly, even when the grates are covered with a mass of incandescent fuel, and steam is being generated rapidly, without increasing the pressure in the boiler over 10 to 15 per cent. above that to which the valve may be loaded.

The grate surface, all things considered, is the best unit of measurement for determining the size of safety valves. The ordinary rate of combustion runs from 10 to 15 pounds of coal per square foot of grate, and the rate of evaporation may be taken at 9 pounds of water per pound of coal as the maximum.

The higher the pressure the smaller the orifice will have to be; and on the other hand, the lower the pressure the larger must the outlet be. A boiler in which the pressure does not exceed 40 pounds per square inch, may require from 30 to 40 square inches of area; while the same quantity of steam would escape through 4 square inches of area in a boiler carrying 150 pounds pressure.

A safety valve should not exceed 4 inches in diameter; when a valve of larger area than 4 inches is wanted, an extra safety valve should be added. The area of a valve increases nearly as the square of its diameter; the circumference, directly as the diameter. The escape of the steam is around the circumference, and it will be understood, of course, that a point would soon be reached in which the area would be of little account if carried to large diameters and figuring on ordinary valves. For example, if the grate area required a common valve 6 inches in diameter, it would have a circumference of 18.84 inches; the same area would be furnished by two 3½-inch valves, the combined circumferences of which would equal $9.621 \times 2 = 19.242$ inches.

As the safety valve is the main reliance in case of neglect or inattention of the engineer or fireman, it is important to carefully examine its mode of operation, and the ordinary methods of construction and calculation for safety. However, before proceeding as above, we will endeavor to give the early history of the safety valve, as well as the antecedents, invention and the manner of proportioning and calculating all its parts. As this is a subject that has already been very carefully traversed, I do not pretend to offer much that is new or original, but will try to give that which will be the most useful, for the benefit of a portion of the rising generation, as well as for some others who may be interested, and in as simple language as is consistent with plainness; so that any one who can solve simple equation in algebra, and who knows the simple definitions of trigonometry, and the elements of physics, shall understand it. Mathematics will be dispensed with as far as possible; but in each case, where possible, written rules, together with the particulars of working examples, will be given, so that the reader may study the subject for himself.

STEAM.

As the first result of the application of heat to a solid substance is to dilate it, and the next to melt it, so also the further application of heat converts it from a liquid into a vapor or gas. The point at which successive increments of heat, instead of raising the temperature, are absorbed in the generation of vapor, is called the "boiling point" of the liquid. Different liquids have different boiling points under the same pressure, and the same liquid will boil at a lower temperature in a vacuum, or under a low pressure, than it will under a high pressure. As the pressure of the atmosphere varies at different altitudes, liquids will boil at different temperatures at different altitudes, and the height of a mountain may be approximately determined by the temperature at which water boils at its summit.