STRATFORD BRANCH C. A. S. E.

CONTINUING our sketches of the Presidents of the various branches of the Canadian Association of Stationary Engineers, we have the pleasure this month of presenting to our readers a portrait of Mr. John Hay, who ably presides over the destinies of the Stratford branch. Mr. Hay's acquaintanceship with the steam engine dates back some seventeen years, during which period he has been laying up a store of practical knowledge which is the foundation of his present efficiency.

The other officers of the Stratford Association are: Messrs. S. H. Meir, Vice-President; W. Bates, Secretary; A. McArthur, Treasurer; P. A. McDonald, Conductor.

The Association has suffered the loss of a considerable percentage of its membership, owing to the removal from the city of a number of the members, but it is gratifying to know that notwithstanding these discouragements, the remaining members of the organization are pushing forward the work of self-improvement which it was designed to accomplish."

THE VALUE OF A CONDENSER.

IT is sometimes difficult to decide whether a condenser attached to an engine will pay or not. At first sight one is apt to at once declare, "Why, of course if a condenser will add 25% or more to the power of the engine or diminish the fuel bill that much, it must pay!"

In the early days of the steam engine as a practical machine, the condenser played a most important part. At first the steam cylinder itself formed the condenser, and in 1769 James Watt obtained a patent for improvements in "fire engines," of which the following were some of the claims;

"*First.*—That vessel in which the "powers of steam are to be employed "to work the engine, which is called "the cylinder in common fire engines, "and which I call the steam vessel, "must during the whole time the en- "gine is at work be kept as hot as the "steam that enters it; first, by enclos- "ing it in a case of wood or any other "material that transmits heat slowly; "secondly, by surrounding it with steam "or other heated bodies; and, thirdly, "by suffering neither water nor any "other substance colder than the steam "to enter or touch it during that time."

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"*Secondly.*—In engines that are to "be worked wholly or partially by con- "densation of steam, the steam is to be "condensed in vessels distinct from the steam vessels or cylin- "ders, although occasionally communicating with them; these "vessels I call *Condensers;* and whilst the engines are work- "ing, these condensers ought at least to be kept as cold as "the air in the neighborhood of the engines, by application of "water or other cold bodies."

"*Thirdly.*—Whatever air or other elastic vapour is not con- "densed by the cold of the condenser, and may impede the "working of the engine, is to be drawn out of the steam vessels "or condensers by means of pumps, wrought by the engines "themselves, or otherwise."

From these claims it will be seen that Watt had a clear idea of the economical working of a steam engine, even before any such were in existence. In his fourth claim he describes a non-condensing engine discharging steam into the atmosphere, and, of course, using steam of a higher pressure.

In the early condensing engines the pressure of steam used was very low, and the withdrawal of the pressure of the atmosphere by means of the condenser was really the main source of the power of the engine. Steam of two or three pounds pressure raised the piston in a large cylinder which was open to the air on the other side of the piston. When the top of the stroke was reached, the valve opened, the steam escaped to the condenser, and a vacuum being formed on the under side, the weight of the atmosphere forced the piston down. These single acting engines were chiefly used for pumping water out of mines. In a later style of engine, also patented by Watt, the double acting engine was produced, and another of Watt's patents describes the expansive use of steam in the cylinder.

It will be apparent that with the low pressure of steam used, the condenser was of great advantage, but the point now to be considered is. Having steam of from 90 lbs. to 100 lbs. on the boiler and an automatic cut-off engine, will it pay to add a condenser? The answer to this problem can only be correctly solved by considering what use can be made of the exhaust steam, and what it will cost to get water enough to work a condenser. Sometimes the exhaust steam can be utilized during part of the year for heating buildings, and in factories where large quantities of hot water are used, for heating water. If water for condensing can be had cheaply, in most cases it would pay better to use a condenser, and taking the water from the condenser at about 120° temperature, feed the boilers from this and use live steam to heat the buildings and the water. But if water has to be bought, as is often the case in cities, it will require a careful calculation to determine at what price for water will a condenser cease to pay.

Let us suppose a case of an engine indicating eighty horse-power. No use can be made of the exhaust steam except to heat the feed water, and water for condensing purposes can be had at 20 cents per thousand gallons. Will it pay to use it?

A non-condensing engine with a good feed water heater, and using steam expansively as is commonly done, will in every day work require about thirty pounds weight of steam for each horse-power per hour. With the ordinary boiler efficiency, this means a consumption of coal for eighty-horse power of about thirty-six hundred (3600) pounds per day.

The same engine with a condenser attached would use about twenty-two pounds weight of steam for each horse-power per hour, and the consumption of coal would be about 2460 lbs. per day for eighty horse-power. The condenser would require a supply of water of about 50,000 gallons per day more than the amount required to feed the boilers. The saving effected in coal was shown to be not quite half a ton per day, amounting in value to a little over two dollars, taking coal at $4.40 per ton. The water used to effect this saving amounts to 50,000 gallons, and if bought at 20 cents per thousand gallons would cost ten dollars, making a loss of eight dollars per day without adding anything for interest on the additional cost of the condenser or for "wear and tear."

If the water can be had for the pumping, by having the engine and factory close to a river or lake, a condensing engine will in most cases be the more economical one to use, and where there is any doubt about its economy, it would be better to attach an independent condenser and arrange the engine to be run either with or without the condenser.

In the winter time the exhaust steam might be utilized for heating purposes, and in the summer time the condenser could be used.

TRADE NOTES.

Mr. G. W. McCrae, of Montreal, has received an order from the St. John's, Que., Electric Light Co, for a 150 h. p. triple expansion engine to drive their electric plant. This is said to be the largest engine ever built in Canada on this principle. The maker guarantees a saving of 20 per cent. in the quantity of coal used.

The Dodge Wood Split Pulley Co. advise us that the introduction of the dynamo and motor has materially increased the demand for high class pulleys, and that they are daily in receipt of special orders for pulleys to run at high speed for electrical purposes, and that in addition to their regular wood split pulley, they make a specialty of an iron centre pulley with fine hard maple face, which has given excellent service where a great amount of power is required at high speed. They report recent large orders from the Toronto Electric Light Co., Toronto, and Saint John Gas & Electric Light Co., St. John, N. B., as well as many others, and invite correspondence from all in need of anything in this line.