horizontal engines. A somewhat novel feature are the concrete foundations, about 18 inches high, supporting the fan engines and absorbing the vibrations very fully.

The pump room contains one 12″x7″x10″ Blake duplex outside-packed boiler feed pump, and one 7½″x5″x6″ Worthington boiler feed pump; also one 10″x7″x12″ Northey duplex water service pump, and one 16″x9″x12″ Northey fire pump, with priming tank. In the pump room is also located the 1,500 h.p. Class E. C. Webster Star vacuum feed water heater.

The condensing plant was built by the John MacDougall Caledonian Iron Works, of Montreal. It consists of a Worthington ejector condenser, with cast iron discharge pipe and entrainer, supplied by an 8-inch Worthington circulating involute pump driven by a Robb engine. The condensing plant is designed to be of sufficient capacity for the power plant, as enlarged in the future to the full capacity of the building. The exhaust riser is 20 inches in diameter, the condenser tail pipe 10½ inches in diameter. There is also a Knowles 6″x12″x10″ air pump. Both pumps are steam driven and located in the engine room, as shown in plan.

### Engines, Generators, Switchboards and Air Compressors.

The engines are of the vertical quick-revolution type, built by Messrs. Belliss & Morcom, of Birmingham, England, and were erected by Messrs. Laurie & Lamb, of Montreal. They are cross compound, double crank, two-cylinder, vertical, enclosed double-acting self-lubricating engines.

The larger unit has a capacity of 365 b.h.p. at 350 r.p.m. The diameter of the high pressure cylinder is 15 inches, and that of the low pressure 24 inches, with an 11-inch stroke. The smaller unit is of 145 b.h.p. capacity at 475 r.p.m. The high and low pressure cylinders are of 10″ and 16″ diameter, respectively, with an 8-inch stroke.

The large number of revolutions permits the use of light and economical generators, and reduces the floor space occupied by the unit to a minimum. For the larger engine the floor space occupied by the set is 13′ 6″x6′, and the extreme height 10′ 3″. For the smaller unit the floor space required is only 10′ 9″x4′ 6″, with a maximum height of 8′ 1″.

It should be noted, too, that notwithstanding the large number of revolutions per minute, the piston speed is quite moderate, being 642″ for the 365 h.p., and 633″ for the 145 h.p. engine, a speed hardly in excess of that in so-called slow-speed engines.

There is a system of forced lubrication by which the oil is drawn from the reservoir by means of a force pump driven from an eccentric on the main shaft, and distribu[illegible] under a pressure of 15 to 20 pounds per square inch. The engines are designed to operate successfully with steam superheated 150° F.

The governors are of the centrifugal type, controlling an equilibrium steam throttle valve, connected directly to the high pressure steam chest.

The frames of the engines are of an extremely massive character, reducing the vibrations to a very small amount, even with the high speed used. Their performance in actual service has so far been very satisfactory.

A series of tests were made at the builders' works to determine the steam consumption of the engines under various loads, and when operated both condensing and non-condensing. The following is a summary of these tests witnessed by the purchaser's engineer:

Engine Tests of Belliss & Morcom Engines.
(N.B.—Efficiency is ratio of brake h.p. to indicator.)

| | Steam Pressure lbs. per sq. in. | Superheat | Vacuum inches | Efficiency | Steam consumption, per B.H.P. lbs. | Steam consumption per I.H.P. lbs. |
|---|---|---|---|---|---|---|
| **365 b.h.p. Engine.** | | | | | | |
| Full load, condensing . . . | 153 | 141° F. | 25.2″ | 92.3 | 15.1 | 13.94 |
| Half load, condensing..... | 147 | 71° F. | 24.5″ | 90.6 | 19.3 | 17.48 |
| Full load, non-condensing. | 154 | 130° F. | 0 | 91.9 | 18.4 | 16.90 |
| Half load, non-condensing | 155 | 64° F. | 0 | 89.2 | 23.8 | 21.23 |
| **145 B.H.P. Engine.** | | | | | | |
| Full load, condensing..... | 157 | 159° F. | 24.5″ | 92.5 | 15.3 | 14.15 |
| Half load, condensing..... | 163 | 116° F. | 26.2″ | 90.5 | 16.5 | 14.93 |
| Full load, non-condensing | 163 | 172° F. | 0 | 91.8 | 17.4 | 15.97 |
| Half load, non-condensing | 159 | 194° F. | 0 | 90.3 | 20.1 | 18.15 |

The generators were built by the Canadian Westinghouse Co., at Hamilton, Ont. They are direct connected to the engines, and mounted on a common base. The capacity of the units is 250 kilowatts and 100 kilowatts, respectively. They are compound wound for 240 volts, and are of the Westinghouse standard make in other respects.

The switchboard was built by the Westinghouse Co. It is Vermont marble, and contains three generator panels, one lighting panel and balancer set panel, and one total light-measuring panel; one power panel, with circuit breakers, and one total power-measuring panel. Recording watt meters of General Electric make, and Westinghouse registering ammeters, are used on the power and light totalling panels.

There are two air compressors. One of them is of the Ingersoll-Sergeant type, built by the Allis-Chalmers Co.; has duplex steam cylinders, 10″ diameter, and two stage air compression cylinders 10¼″ and 16¼″. The stroke is 12″. Its capacity is 444 cubic feet of free air per minute.

The second compressor was built by the Canadian Rand Co. It is compounded for both steam and air. It has a stroke of 22″, with high and low pressure steam cylinders 14″ and 24″, and air cylinders 14″ and 22″, respectively. The normal speed is 105 r.p.m. and its capacity at this speed is 1,209 cubic feet of free air per minute.

The steam piping is somewhat elaborate, as it was desired to utilize the exhaust steam as fully as possible at all times, while interfering as little as possible with the use of the condenser. An exhaust main was therefore laid along both the east and west walls of the engine room and connected by transverse pipes with each engine and compressor. One of these mains leads to the condenser, while the other connects with the heating system and the free exhaust.

By operating valves attached to indicator standards just above the floor, the exhaust from each engine and compressor can be turned into the condensing system or utilized for heating. Even in very cold weather the exhaust from the auxiliaries and the compressors has generally proved sufficient for heating purposes, while during the spring and autumn months, when only a small amount of heat is required, almost all the units remain connected with the condensor.

The live steam piping is of the highest grade, the main header in the boiler room being built in only three lengths, having welded nozzles and Van Stone joints. The supply pipes are also of the welded type with rolled steel flanges, Van Stone joints, and Swedish iron gaskets.

All live steam pipes are covered with 85% magnesia