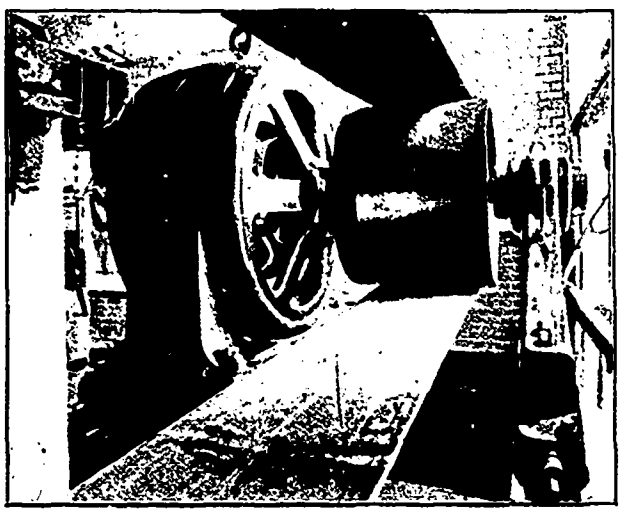
In tower "B" there is a double throw switch, which, on being reversed, changes the connections in the secondary of the spare transformer from 500 volts to 110 volts, so that in case of breakdown of a transformer on either voltage the switch can be thrown so as to supply the proper voltage and a double throw switch then connects the spare transformer so as to supply the necessary current in place of the one to which an accident may have occurred.

As the mill has to pay for the leakage current or core loss in lighting transformers it is essential to obtain apparatus of very high efficiency and the specifications were accordingly made to provide for about one per cent. core loss. The type "L" transformers, furnished by the Packard Electric Co., have a remarkably low core loss and a regulation of about one per cent.



Cut 4.

All of the large motors are directly connected to the 2200 volt main line pressure. The main switchboard in the top floor of each tower controls all of the motors, as well as the feeders coming into the tower. The small motors are supplied from 550 volt circuits and these are also controlled from the towers, an ammeter being provided in one phase so as to indicate how the motors are starting and permits of their operation from a central point. Emergency switches are, however, placed at the more distant motors so that in case of accident the circuit can be opened at the motors. These switches are seldom used, however, and all motors are usually started by the attendants in the towers. Each of the large motors being operated directly at line pressure of 2200 volts has a circuit breaker in one side of each phase so that in case of any sudden overload the motor opens its individual circuit without blowing the fuses on the feeders coming into the main switchboard or those which protect the various lines in the towers.

The lines supplying the Hochelaga and St. Anns' mills come by three distinct routes, on separate pole lines most of the way, no part of the lines having less than two pole lines. This provides a means of feeding either of the towers from the other tower in case of fire or other interruption to the lines by means of bridge circuits between the towers; the switches controlling which are usually closed, connect all the buss bars in multiple. As the motors in tower "B" drive two sections of the mill these have, with one exception, pulleys on both ends of the motor shafts belting through separate openings into the mill and drive onto the end of two shafts, each extending in opposite directions so as to drive the machinery in the two sections of the mill, each about 200 feet in length. The motors in tower "A" have a pulley on one end of the motor shaft only and belt through the opening in the wall between the tower and the mill to the centre of the shaft in number 3 mill about 200 feet long. This would be the most advantageous drive, as it admits of tapering the shaft in both directions from the center, saving considerable weight of shafting and friction, besides reducing the torsion of the shafts, which often produces unpleasant speed conditions in long shafts, particularly where mule spinning is driven, the end of the long shaft sometimes making several turns faster or slower than the head shaft—that is, winding up and unwinding like the spring on a watch escapement. This method of driving would have been pursued in the other sections of the mill except for the increased cost of the additional tower that would have been required and for lack of available space for its erection.

The small motors scattered about the different departments away from the main mill, are some of them located on platforms above the floor, some on angle iron brackets bolted to the side walls, and some inverted and suspended from the ceiling, depending upon the location, the work to be driven and conditions to be overcome. In ordering the motors careful tests were made to determine the sizes of motors to drive the different departments, and in every case the motors were loaded as nearly as possible to full load in order to take advantage of the increased efficiency and better power factor obtained under these conditions. Any of the motors will stand a considerable overload for several hours, without excessive heating, and as the power factor increases with the load it is advantageous to run motors overloaded rather than with underload, where load conditions are variable, but the load being so constant in a cotton mill it is impracticable to figure on operating under overload conditions, except in a few instances.

The arrangement of the motors in St. Ann's mill is practically the same as in the Hochelaga mill, except that the tower is located at one end of the main mill which is about 200 feet long, and instead of belting as in the case of Hochelaga, the motor shafts were extended through small openings in the wall between the motor tower and the mill and the line shafts driven from this shaft extension, a complete cut-off between the motor tower and mill being obtained by small self-closing doors, operating on practically the same principle as the auto-