The new dam is located approximately 20 ft. below the old dam and was designed for the development of 800 h.p. It is of the stop-log type, with piers 4 ft. thick, at 18-ft. centres. Allowance was made for a height of 10 ft. of stop-logs, effecting a 28-ft. head. The whole undertaking contained about 8,500 cu. yds. of concrete. The spillway, which is divided by the piers into ten sections, is about 190 ft. long, but with the coal pockets, and earth embankments on

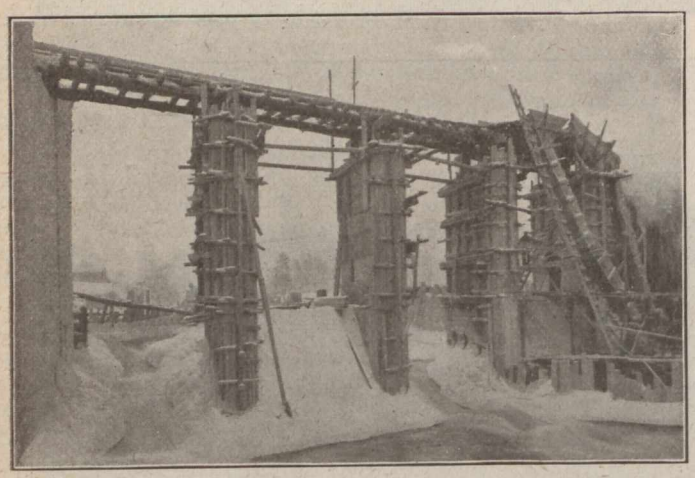

FIG. 4—THESE SECTIONS WERE LEFT OPEN DURING CONSTRUCTION OF REMAINDER OF DAM

each end, the overall dimension of the dam is about 580 ft. A typical cross-section through a spillway is shown in Fig. 6.

The unusual features in the design were in no way related to the development of power, but were principally due to the geographical location of the industry. The factory is on the east side of North river and had never had any railway connection. The C.P.R. was too far away and on the opposite side of the town. The C.N.R. was only about one-third of a mile away, but on the other side of the river, and a siding was never considered to be of sufficient value to warrant the expenditure for a bridge. The new dam was designed to carry a railway siding from the C.N.R. This

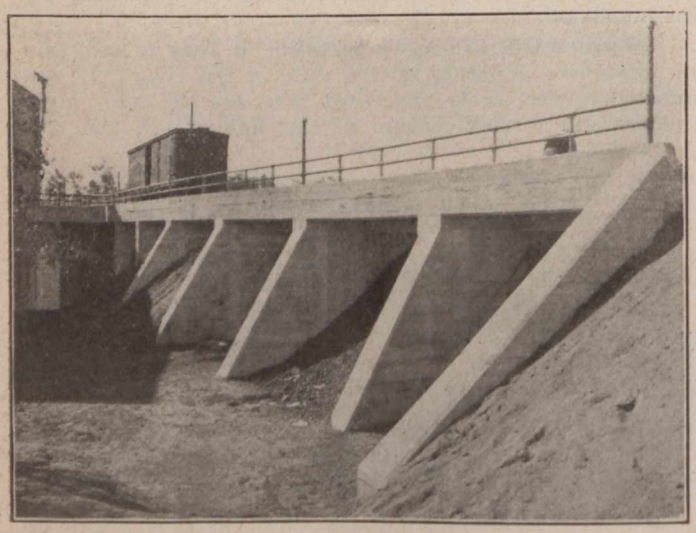

FIG. 5—COAL POCKETS IN CUT-OFF WALL

meant that the deck of the dam had to be 7 ft. higher than would otherwise have been necessary, in order to get proper grades, and had to be widened considerably.

Further widening of the dam was ordered so that a highway for pedestrians could be provided. The nearest bridge by which the company's employees could cross the river necessitated a detour of about half a mile, so that this feature of the design was much appreciated. Because of these conditions, the design of the deck of course is much different from the usual structures. It is quite possible that considerable benefit may be derived by the town due to the fact that the C. N. R. now has access to both sides of the river.

The concrete cut-off wall at the east end of the dam is supported by buttresses instead of by earth fill, thus providing coal pockets under the deck and adjacent to the boiler room. These are shown in Fig. 5. The coal is required for heating purposes in connection with some of the manufacturing processes and also makes it possible to operate the old steam plant should it ever become necessary.

The .stop-logs throughout the spillway section are handled by a hand-operated winch that travels on the siding rails.

The old dam developed about 200 h.p. under full head, and with so great an increase in the amount of power available, it was natural there would be great changes in the mechanical end of the development. The old power plant was abandoned and a new surge tank, power house and drive room were constructed. The surge tank is 290 ft. downstream from the face of the dam and the water is carried to it by an 8-ft. diameter steel penstock. The surge tank is 39 ft. long by 13 ft. 6 ins. wide by 25 ft. high, and is reinforced concrete construction. A horizontal double-runner hydraulic turbine was placed inside the tank, with its shaft projecting on one side into the power house and on the other into the drive room.

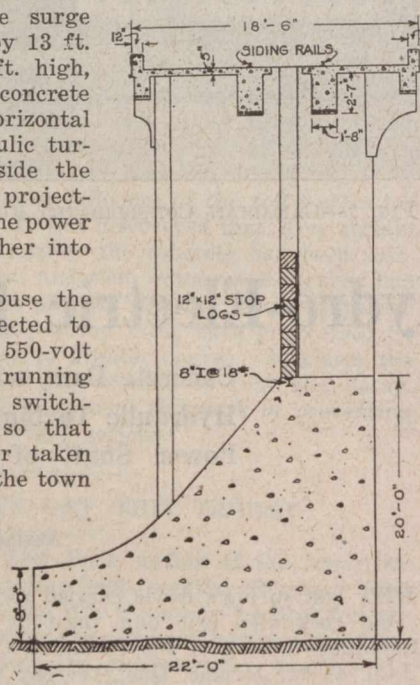

FIG. 6—TYPICAL CROSS-SECTION THROUGH DAM

In the power house the shaft is direct-connected to a 3-phase 60-cycle 550-volt 312-k.v.a. generator, running at 250 r.p.m. The switchboard is arranged so that power can be either taken from or supplied to the town of St. Jerome.

In the drive room the turbine shaft is connected through a 500-h.p. silent chain drive to the main power shaft of the factory. This drive reduces the speed from 250 to 75 r.p.m. The main shaft drives all the rubber-refining machines and provides for the principal power requirements of the whole factory.

On the turbine shaft, close to where it protrudes from the surge tank, is a 10-ton cast-iron flywheel, which was necessary, in addition to the turbine governor, to overcome the great variations in load caused by rubber-refining machinery.

Between the flywheel and the chain drive is a hand-operated clutch, and between the chain drive and the main shaft of the factory is an electrically-controlled clutch and brake that can be operated from any of the machines that are driven by that shaft. This brake is solely for emergency purposes, and is very successful in its operation.

The outflow from the turbine passes through a concrete draft tube under the floor of the power house and into the tailrace. The tailrace runs parallel to the river and is divided from the river by a retaining wall about 100 ft. long.

In order that full advantage might be taken of low-water conditions that existed at the time the work was started, a rather comprehensive plant layout was supplied by the contractor. Operations were going on simultaneously on all parts of the work, and it was necessary that an abundance of machinery be available. The value of the contractor's plant amounted to approximately 14% of the value of the work covered by the contract.