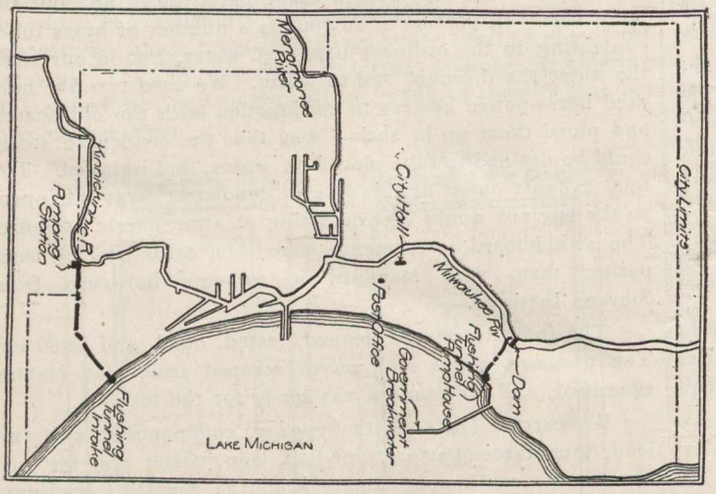
THE KINNICKINNIC PUMPING STATION.

By Frank C. Perkins.

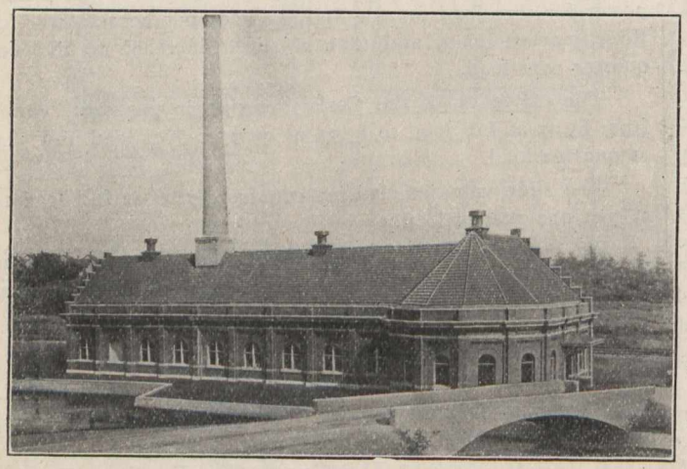
One of the most remarkable and interesting pumping engines in the world has recently been installed at the Kinnickinnic Pumping Station at Milwaukee, Wisconsin, as shown in the accompanying illustration and drawings, the photograph showing the power-house and the cylinder and valve gear of this wonderful engine.



It was constructed for a capacity of three hundred and twenty-three million gallons of water per day of twenty-four hours operating against a head of 3½ feet. This engine of Allis-Chalmers construction is of the tandem compound type of Reynolds-Corliss system operating a screw pump of enormous proportion.

The screw of 12½ feet in diameter has six blades mounted on a large shaft one foot in diameter. It is driven by a vertical tandem compound engine operating at a speed of 52 revolutions per minute. This Reynolds-Corliss engine has two cylinders, one measuring 18 in. in diameter receiving the high pressure steam while the low pressure cylinder arranged below and in tandem with the one just mentioned has a diameter of 38 inches, the stroke measuring 42 inches in length.

It is stated that the city and government are expected to widen the Kinnickinnic River soon, and it is held that the largest vessels on the lake can then be accommodated in the

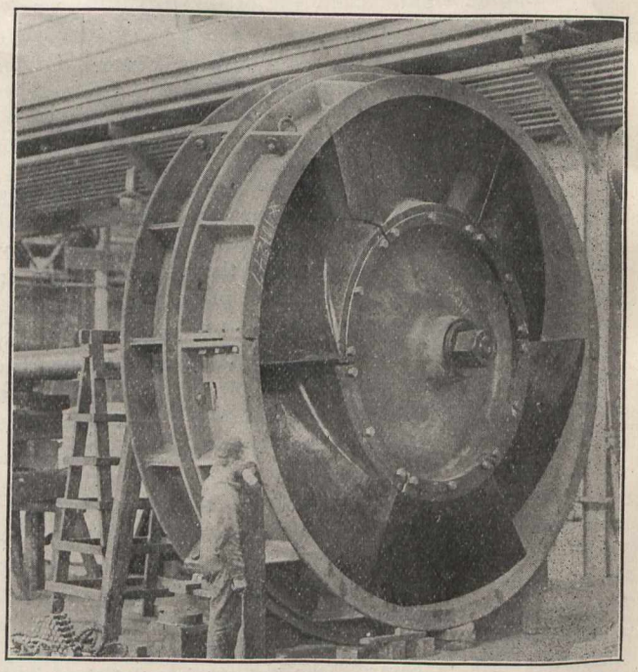


Kinnickinnic Pumping Station.

turning basin to be provided. It will be noted that the engines is of the vertical tandem-compound condensing type with Corliss liberating valve gear, and it has sufficient capacity, when supplied with steam at 140 pounds pressure and running at 55 revolutions per minute to drive the pump, so the latter will raise 30,000 cubic feet of water per minute against the head above mentioned. The air pump for the jet condenser, which is supplied with water from the tunnel, and all other auxiliaries are driven by rocker arms attached to the cross-head of the engine.

It may be stated that steam is generated in two 72-inch by 18 feet return tubular boilers equipped with Hawley down-draft furnaces and Forest superheaters. The furnaces are connected to a Costodis radial brick stack 135 feet high. The superheaters supply steam to the engine at a temperature of 100° Fahr. above that of saturated steam. The pump has a sheel made up with six impeller blades attached to a 12-inch shaft which revolves in a casing set in the tunnel lining. A cone 6 feet in diameter at the base, is placed concentric with the wheels on the side from which the water approaches the latter and directs the flow on the blades. A second casing placed just beyond the wheels contains stationary deflector blades which reduce the swirling motion given to the water by the wheel. The 12-inch shaft on which the wheel is mounted is carried by an outboard bearing in the centre of the second casing, where it is supported by the reflector blades. The pull on the shaft is taken by the thrust bearing of special design, of the marine type which is placed inside the engine pit. The shaft is 32 feet long, extends through a stuffing box on the side of the engine pit and is direct-connected to the crank disc of the engine.

The station is shown in the accompanying illustration and measures 34 x 165 feet in plan in the clear, the front end being made wider to accommodate the engine which drives the pump in the tunnel.



Engine Cylinder.

It is of interest to note that the intake at the lake, from which the tunnel starts, consists of two parallel, rock-filled pile piers which are 60 feet apart and extend 385 feet into the lake from the shore line, the channel between the piers having been dredged to a depth of 16 feet. As practically all heavy storms on the lake and most of the floating ice come from the north-east, the intake has been built to provide against any difficulties which may arise from this condition. The pier on the south side extends 300 feet from the shore line, an opening 75 feet wide being left between it and the end of the intake; the pier on the north side is carried 75 feet farther out, and has a section 80 feet long, at right angles to it at the end, which section is across the end of the intake channel, and protects the opening along the south side of the intake.

It is of interest to note that the corner between the end and north side piers is reinforced with a diagonal pier on the inside and is riprapped on the outside with heavy stones for a width of 32 feet along the end and for 50 feet from the corner along the side. The two parallel side piers converge at the inshore end, and in a distance of 85 feet from the shore line the space between them is reduced to a width of 12 feet. A short length of concrete conduit connects the end of the intake with the tunnel proper, the cross section of this