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tending from a pinion geared to the toothed quadrant and passing through a gland in the crown of the cylinder. The upper end of the shaft is provided with a handle and pointer, which indicates on a graduated quadrant the extent of the gate opening.

Suitable pressure gauge connections have been arranged in the upper and lower parts of the cylinder.

The power of the turbine is determined by the friction-brake already described.

Experimental Pump.—This pump is of the vertical triple throw single acting plunger type, and is driven by two 10 inch double leather belts running on 48 inch pulleys formed on the outer cranks, or discs. The plungers are 7 ins. in diameter and have an 18 inch stroke. The approximate maximum delivery is estimated to be 1,000 gallons per minute when the pump is running at a speed of 150 revolutions per minute against a pressure of 120 lbs. per sq. inch. The suction valve chambers are placed directly over the calibrating tank nearest the east wall, and draw the water from this tank through two 10-inch suction pipes. Each discharge valve chamber is directly connected with a 12 inch header, which discharges into the 8 inch ceiling circuit. The water may be made to flow in almost a direct line to the point of discharge, or it may be made to pass around the three sides of a rectangle so that the effect of the additional bends and increased length of piping may be estimated. The water flows into the experimental tank at a point 20 feet above the level of the discharge valves.

One of the features of the pump is the provision made that the valves can be taken out and replaced by others of a different type. The valves at present in situ are a Kiedler valve and two others with groups of 36 circular disc valves of $1\frac{1}{8}$ inches diameter in each.

In addition to the usual pressure gauges, tachometer and revolution counter, the pump is fitted with a specially designed continuous triple indicator apparatus, which autographically records during any given time of a trial the speed, variation and duration of the valve chamber pressure at any point of the stroke. Sight holes are provided for observing the movement of the valves and indicators for recording their lift. A special recording gauge also registers the pressure in the delivery pipe.

As the pump is for experimental work, it has been made unusually heavy, its total weight being about 55,000 lbs. The plungers, valves and valve seats, all internal screws, nuts, etc., are of bronze, and weigh more than 3,700 lbs.