STEAM TURBINES AND STEAM RECENERATORS.

The accompanying drawing (Fig. 1) shows the steam turbo-alternator unit of the St. Denis turbine station of the Societe d'Electricite de Paris. These turbo-alternators are the three-phase type, are of the Parsons-Brown, Boveri type, installed by the Cie Electro Mecanique of Paris. Each unit is of 6,000 kilowatts' capacity, and operate at a speed of 750 revolutions per minute, the three-phase alternators supplying a current of a frequency of 25 cycles per second and a pressure of 10,250 volts for use on the electric light and power distribution circuits.

The station is 20 meters wide, the distance between the centre of the steam turbine units being 8 meters and the

steam turbines. The steam turbine is largely utilized at the present time with steam regenerators, thereby producing a wonderful saving in connection with the operation of rolling mill engine steam hammers and hoisting engines, this apparatus usually exhausting direct to atmosphere, and, therefore, the consumption per horse-power being very high.

By means of steam regenerators and low-pressure turbines on the Rateau system it is possible to utilize the exhaust steam on this apparatus to great advantage The steam regenerator as utilized for this purpose is constructed both of the vertical and horizontal types. In mining and steel plants the hoisting engines and reversible rolling mill engines are not economical in the use of the steam on account of their intermittent action, and even with a super-



Fig. 1.

distance from the centre of the steam turbine to the walls of the power house 6 meters, while the total height from the turbine base and the floor of the station to the ceiling is 12.25 meters. The basement containing the electricallydriven pumps on the condensers is 5 meters high, while the chambers for the vertical electric centrifugal pump are 4.2 meters high, and located below this basement. This St. Denis station is one of the most complete and thoroughly up-to-date plants in France, while at Liege, Belgium, there is a unique turbine station equipped with tandem turbogenerator outfit, consisting of direct current dynamo and alternator, mounted together on the extended shafts of the

heated steam and condensing plant they cannot be worked with the same economy in steam consumption as continuous running engines. In many plants the steam consumption is as high as 80 to 100 pounds per effective horse-power hour for ore hoisted by the winding engines in large mines, while the steam consumption for cogging mill engines and engines for driving finishing trains vary from 20,000 pounds per hour to even 50,000 pounds per hour for rail mills and large plate mills.

The efficiency of low-pressure turbines is very high, and by means of the Rateau steam regenerator system it is possible to obtain a constant flow of steam with slight varia-