production, but not so with the industrial. In the latter, at least in certain seasons, some of the steam is used for space heating and process requirements. Therefore, some charge only for the B.t.u. value of the heat removed in making power; if non-condensing, this amounts to from 3600 to 4500 B.t.u. per kwh. generated plus the heat lost through exhaust heads; if condensing, the same figures plus heat rejected to the condenser are used; in bleed units the computation is a little more involved. Others charge any arbitrarily determined percentage of the steam passing through the turbine they may choose, with some regard to bleed, exhaust or condensing pressures. And there are still other methods and variations. Attempts are also being made by the American Society of Mechanical Engineers to standardize these costs. In any event, once the method is known, comparisons may be reduced to the same basis.

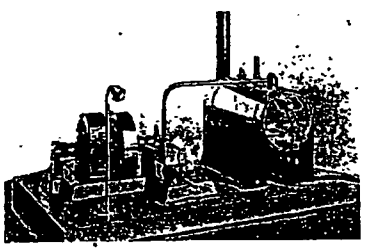
Plants Purchasing Electric Power

In plants purchasing or selling all or part of their power, certain instruments are always provided by the utility on which to base its billing. These instruments are usually relied on by both the power purchaser and seller, but in some of the larger plants separate check instruments are installed. The usual instruments consist of a recording or integrating kwh. meter or kva.-hr. meter or both, with a demand recorder in either kw. or kva. or both. A power factor indicator and sometimes an ammeter and a voltmeter are also provided. The records from all of these should be tabulated in a suitable record file or book in any plant from the smallest to the largest. It is indispensable for proper control to have these records from month to month and year to year and to include at least total kwh., total kva.-hr., peak kw. and peak kva. and the average power factor. Records of this sort in the hands of one capable of making the proper analysis may be used for revising operating methods or installing corrective equipment to the financial advantage of the owner of the records.

The unit cost of purchased power per kwh. may be easily computed from the bill or readings if all power is purchased. If only part is purchased, the quantities and costs should be added in with the corresponding generated power items. A method sometimes followed, and one oftentimes leading to erroneous and costly conclusions, is to figure the cost separately for each of the two. But this overlooks the points that either the purchased or generated power would be more expensive without the other; and that some of the distribution expense within the plant should be borne by purchased power.

The second and last part of this article by Lewis J. Sforzini will appear in the Winter Issue of POWERFAX.

★ELLIOTT EMPLOYEE BUILDS TOY POWER PLANTS



ELLIOTT Company at its Ridgway works, builds a complete line of steam engine - generator units. But J. D. Pedersen, experimental engineer at Elliott Company's Jeannette works, is in the steam engine business also — on the side. Mr. Pedersen, with his brother-in-law, has been manufacturing, for the past couple of years, toy steam engine outfits, such as the one illustrated at the left. These units have been sold by the two men to department stores from New York to Chicago. They have sold 110 outfits just a little smaller than the one pictured here, without a generator, in addition to quite a few of the complete outfits shown.

The men recently had a letter from an enthusiast at Springfield, Illinois, in which the statement was made that these units were the first example he had ever seen of a truly representative mechanical toy steam engine made in the U. S.

The unit pictured at the left has a boiler 3″ in diameter by 6″ long. It may be fired with an electric heating element or by an alcohol burner. The boiler is equipped with safety pop valve, whistle, gauge glass and drain cock. The engine has a cylinder diameter of 9/16″ bore by 5/8″ stroke. Current from the generator lights the light shown. The entire unit is finished pleasingly in nickel plate with a mahogany base 10″ x 15″.

The smaller engine without generator has a 1/2″ bore by 9/16″ stroke and the boiler is 2 1/2″ in diameter by 5″ long.