

such plants throughout the country, so what applies to this may help more than one. Supposing we are to take charge of such a plant, to operate it. What sort of a scheme is best to get in close touch with it and its needs?

One of the most important things to know is what each piece of machinery does, for how long, at what efficiency in comparison with standard work; also with reference to other apparatus of the same sort in the plant. To keep track of these things a series of printed blanks are needed. It depends on the size of the plant and the number of hours it is operated as to whether it is best to have all the data on one sheet or on several. In the one in question there are so many items it would seem best to have several blanks, each one for a special purpose. The plant being operated 24 hours per day, with three

the average weight. Of course you would subtract the weight of the holders from the total weight when making your test.

When one looks at such sheets every day, he soon notes any change in percentage of the ash to coal burned even without calculation, and so by comparing the coal, ash and water evaporated can quickly note a change in quality of coal or firing.

The record also shows the number of hours each boiler is in use, and insures that they are used in proper turn. If it was noticed that No. 1 feed pump was used only half as often as the others, it would be a sign that it needed attention.

A register of the amount of "make up" for the feed is often of value in pointing out trouble, for if your load is about as usual and your make up

the usual temperature would show the need for investigation. Many other things suggest themselves to you, but enough has been said to explain its use. There is no reason why the fireman cannot keep this log as a part of his regular routine. Under remarks may be noted anything out of the ordinary, poor coal, much dirt in the coal, leaks, the hour a fire was started in a certain boiler and so on. It is often of use to know who was on watch six months ago, when such and such a thing happened. For this reason the names of the men on watch ought always to be on the blank.

Keeping Tab in Engine Room.

It is necessary to know what the engines are doing, so then a blank such as Fig. 2 may help to keep track of their performances. If the plant is ar-

[illegible]

FIG. 5.

watches, it is a matter of choice as to whether it is best to put all the data for the day on one sheet, or to have a separate sheet for each watch.

Boiler Room Record.

Let us begin with boilers. Figure 1 will serve as an illustration. An X mark under the boiler number shows it to be in use, A—that it was shut down in that watch. The time may be indicated under the mark, or in the place for remarks. Coal ought always to be weighed. The blank can be arranged to have the weights as weighed, or only the total for the watch, as in the illustration. An ordinary school slate ruled with a scribe or the point of a knife, is a good tally sheet for the fireman to use when weighing coal or ash, the total from the slate being put on the blank.

Ash cannot well be weighed for the reason that it is more or less wet. But you can get a good idea of the weight by weighing a number of receptacles, wheelbarrow or whatever it may be you use to carry the ash away full of dry ash. Then divide the total amount by the number of receptacles and you get

goes higher than usual, you possibly have a leak somewhere, perhaps in the closed heater some of the tubes are leaking.

If the make up meter shows much less, it may be that the tubes of the surface condenser are leaking, and the circulating water getting in with the feed. The finding of faults by means of meters and the daily registration of their readings, before the fault becomes large, is one of the reasons for doing work of this kind.

The regular keeping of temperatures is often of much help in finding the cause of trouble. They may be taken every hour or as often as thought necessary, but ought always to be taken at some fixed time. Of course the very best way is to have automatic recording thermometers, but this is a refinement which many do not care to pay for.

If the load is normal and the heater does not heat the water to the usual temperature, it is possible that the heater is dirty. The same may be said of the economizer. The scrapers might have stopped, or a portion of the apparatus become broken. A change of

anged so that each engine with its condenser and auxiliaries makes a complete unit and cannot be cross connected with one others, then the condenser heading may be cut out, for in such a case the engine generator and auxiliaries would come under 1, 2, or 3 as the case might be. The object is to find out the amount of work done by the various machines. If one does it more efficiently than the other, then the lack should be inquired into. This is specially true of the auxiliaries if they are in duplicate, and you get better results from one set than you do with the other. On this blank can be arranged a space for the wattmeter readings, or, depending on the amount of data needed, on another blank such as Fig. 3.

This blank can be extended at will. If there are recording wattmeters for each line, they may each have a space. In this event it may not be necessary to put down the amperes and voltage except to keep a check on the wattmeters. The headings, power, light, station, may not have recording meters for each division, but will have ammeters. If there be a special man to take charge