Fig. 14b front

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Fig. 14c. Back (enlarged). Equipment*Repair Work Order.

because the gage connection is leaking, as he will adjust the damper in accordance with the wrong indications. This would be the instrument man's fault, not the fireman's, and while the former will lose his hours, the latter mayabe allowed his, if nothing else was done wrong. To carry out this plan, it is evidently the duty of the planning department to investigate every failure at once, before the man affected comes back for his next turn; otherwise, the mistake may be unknowingly repeated and a late investigation sometimes will not reveal the real cause.

18 The success of our maintenance method depends in no small degree upon careful selection, standardization and purchase of all supplies and materials. The maintenance-record cards, Figs. 15 and

15a, referred to before are of material assistance for at least abandoning the use of supplies and materials that proved short-lived and expensive. Expensiveness, however, is figured out in the planning department not as cost per pound, foot, or what not, but as cost per time in service of material required for a job, plus labor cost, plus overhead charge during the repair time. Such data often give an effective weapon to fight some short-sighted purchasing agent's hobby to buy the cheapest stuff on the market, or with too general a fancy that the most expensive is the best. Neither of these generalities can, of course, remain true in all cases. In this way, for instance, it was found that a very cheap and comparatively poor qual-

44:		420 tubes.
ļi.		Capacity 625 B.H.P. dixinous H.S. 6250 sq. ft.
		Date of Inetal, 1911
		Catalogue Na.
		Serial No.
		Tree
		Nobe H. B. Co.
		Berrier Per Generating Steam
		Plant No. 742
		Lorantea West Poiler Room

Fig. 15 from

)	REPAIR RECORD	ċ	мхѕ	F.
	-			COST	
Date Out	Days & Hours Out of Service	NATURE OF REPAIR	Labor	Material	Total
12/28	10 d.	Out to change water &	7		
1914		inspect tubes. Bracket			
		valves cleaned and re-			
		packed. Main steam drum	,	- 1	
		cleaned. No.1-2-3 and 9			
		Blow off valves repacked			
		No.4 Blow off valve re-			
		placed by repaired one.	15.80	5.24	21.04
2/26	33d.	Out for Ins. Inspection			
1915		Inspected by McGowan, M.C.			
		Co. 3/11/15. O.K. Main			
	-	steam & mud drum cleaned			
		Tubes polished 16 All			
		17 All, - 18 All, - 19 All,			
		20 All. Cut in 3/31/15	24.10	1.98	26,08
6/1	12d.	Cut out. Change water			
1915		and inspect tubes. Comb.			
		removed; water column			
		overhauled and all valves			
		repacked. No.3 & 7 Blow			
		down cocks renewed.			
		Main steam drum cleaned.			
		Cut in 6/13/15.	12.20	34.30	46.50
8/24	7 d.	Cut out. Change water			
1915		& inspect tubes. Comb.			
AU M-		removed, water column			
		overhauled.& all valves			
		repacked. Main steam			
		drum cleaned. Tube No.1			-
		1st row. 2 Unit. No.1.2.			
		& 3- 1st row, 3 Unit, &			
		No.1-2 row. 3 Unit.re-			
		expanded. Cut in 9/1/15.	9.57	3.49	13,06
10/15	B d.	Order - S - 19	7.46	2.48	9.94
1915					

Fig. 15a. Back (enlarged).

Maintenance Work Card for Equipment Repairs.

ity firebrick gave excellent results if used in conjunction with somewhat expensive fireclay cement, or that expensive grease for cylinder lubrication was cheaper to use than the cheapest cylinder oil, etc.

The most important material used in the powerplant is, of course, fuel. It has little influence on maintenance, but is a deciding factor on the cost of operation. The old Chinese custom to pay a ransom for the bride in proportion to her weight is still prevailing among coal buyers and dealers. The attempts made to buy fuel on the basis of its heat value, steaming capacity, etc., with penalties and premiums for certain composition by approximate analysis, proved beyond any doubt that the knowledge of the composition of coal and maintaining the quality of supply uniform are of paramount importance for securing uniform results as good as other conditions permit. It is therefore quite necessary that the planning department keep a watch on this subject and, with every change in the composition of coal, authorize the necessary research in the best use of this grade if it is not, standardized already. The heating value of the coal, however, has no influence on the method as a rule, except in cases of wide fluctuations; but its effect on the result is automatically adjusted in figuring out the boiler and furnace efficiency. A convenient method of keeping tab on the quality, quantity and time of coal deliveries is exhibited in the chart Fig. 16.

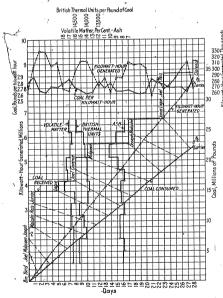


Fig. 16. Coal Movement Record.

19. To enable an efficient and uninterrupted conduct of any operation; the storeroom service shall be well regulated, but in a power plant this function takes on a special aspect.

The largest bulk of material that is used is coal. If spacious coal storage is not provided or handling is expensive, the quantity of coal on hand must be kept as low as permissible, considering the transportation and deliveries. Small supply of coal on hand is also sometimes desirable from the viewpoint of reducing Besides, certain grades of interest charges. coal deteriorate rapidly and some are subject to spontaneous combustion. Again, all deliveries being not equal in quality and characteristic therefore the mixing of various coals is undesirable. All these facts complicate the problem of planning the coal supply and storage, and the previously mentioned Schaller's diagram, Fig. 16, is very serviceable as it shows at a glance quantity, quality, rates of delivery and use, dates of shipments, means of shipment and other useful information combined on a small chart

The main principle of efficient store service is nevertheless the same in the case of coal as in any other supply, either for power-plant or factory use. It may be briefly characterized as follows:

- A. Carry only standardized stores.
- B. Have as little of stores on hand as possible.
- C. Purchase a new lot when the quantity left is just sufficient to last until a new supply reaches the stores.
- D. 'Issue from the old stock until exhausted, not mixing it with new lots.
- E. Control issues and purchases from planningdepartment balances.
- F. Carry a permanent inventory.
- G. Protect stores against deterioration.

In other words, the planning of power-plant work, to make possible the application of knowledge gained through scientific research work, must cover not only the maintenance of conditions and surroundings that permit the application of proper methods and the maintenance of equipment in a condition that will allow the accomplishment of the results anticipated from the correct carrying out of instructions, but the maintenance of such store service as will enable proper operation and upkeep.

OBSERVING THE RESULTS

20. The machinery of planning cannot be operated smoothly unless adequate means are provided for observing and checking the results following the planning done in the past. There is no need here to go into a detailed discussion as to what recording or indicating instruments are indispensable for economic