PROCEEDINGS

OF THE

SIXTEENTH ANNUAL
CONVENTION

OF

The National District Heating Association

HELD AT

WEST BADEN, INDIANA,

May 19, 20, 21, 22, 1925

PUBLISHED BY THE ASSOCIATION
D. L. GASKILL, *Secretary.* H. R. WETHERELL, *Technical Secretary.*

bottom of the bottle. It also provides a means of determining whether or not all of the sampling lines are working properly.

After leaving the bubbling bottles, the gas passes into a mixer. The duty of this mixer is to mix thoroughly the gas samples. With some of our installations we have eight sample tubes; or, rather, eight points in the back pass of the boilers from which samples are taken. The mixer combines these samples into one sample, the average of the stack gases. From this point the gas is taken directly into the CO_2 machines. (Fig. 1.)

NOTE.—Porous filter, drier, sulphur purifier, and CO_2 machine are Uehling Inst. Company products.

OPERATION OF 2,800 K. W. NON-CONDENSING TURBINE USED FOR SUPPLYING LOW PRESSURE STEAM TO THE STEAM DISTRIBUTION SYSTEM

MR. DE WOLF, *Rochester, New York*

In 1906 the Rochester Gas and Electric Corporation installed its first steam turbine. This was a 3,000 K. W. capacity vertical condensing turbine, operating on 220 pounds steam pressure. The increased demand for additional equipment necessitated the installation of larger and more modern types of turbines. With this new equipment installed the 3,000 K. W. vertical became less useful compared with the new type.

It had been customary to supply low-pressure steam to the distribution system by two methods: First, by bleeding steam from a 7,500 K. W. 25-cycle horizontal turbine; and secondly, by the use of a reducing valve directly on the boiler header. The 25-cycle load was very intermittent, so that bleeding from this turbine was likewise intermittent, and very little saving could be credited to this method. The next step was to remodel the 3,000 K. W. vertical to non-condensing and utilize the exhaust to supply the low-pressure steam to the distribution system.

Several advantages can be recognized in making such changes in this machine:

1. Utilizing apparatus that had become obsolete and inadequate.
2. A direct source of supply of low-pressure steam without the use of reducing valves.

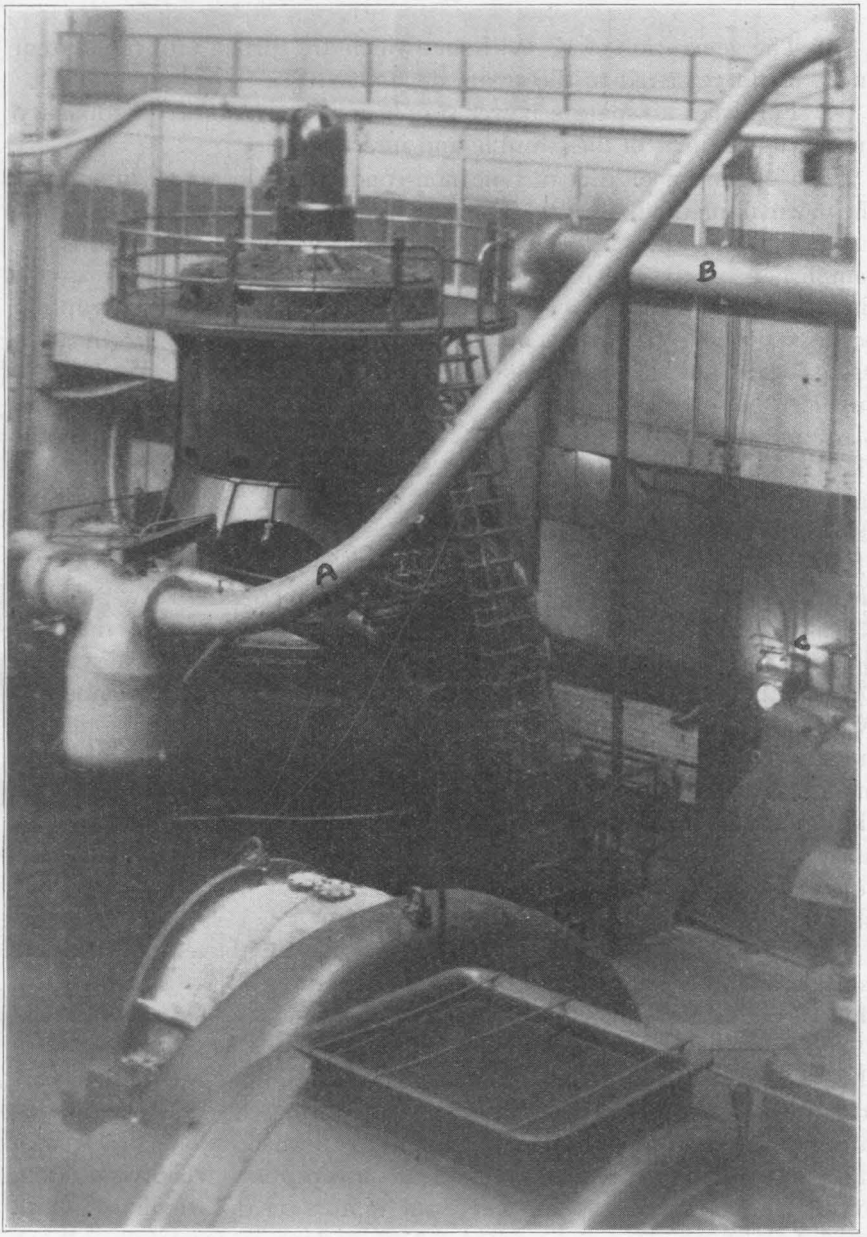


PHOTO NO. 1

(A) Steam inlet main. (B) Steam outlet main. (C) Bailey meter on inlet steam.

3. The generation of K. W. hours which are turned into the system and a credit rendered to the steam department.

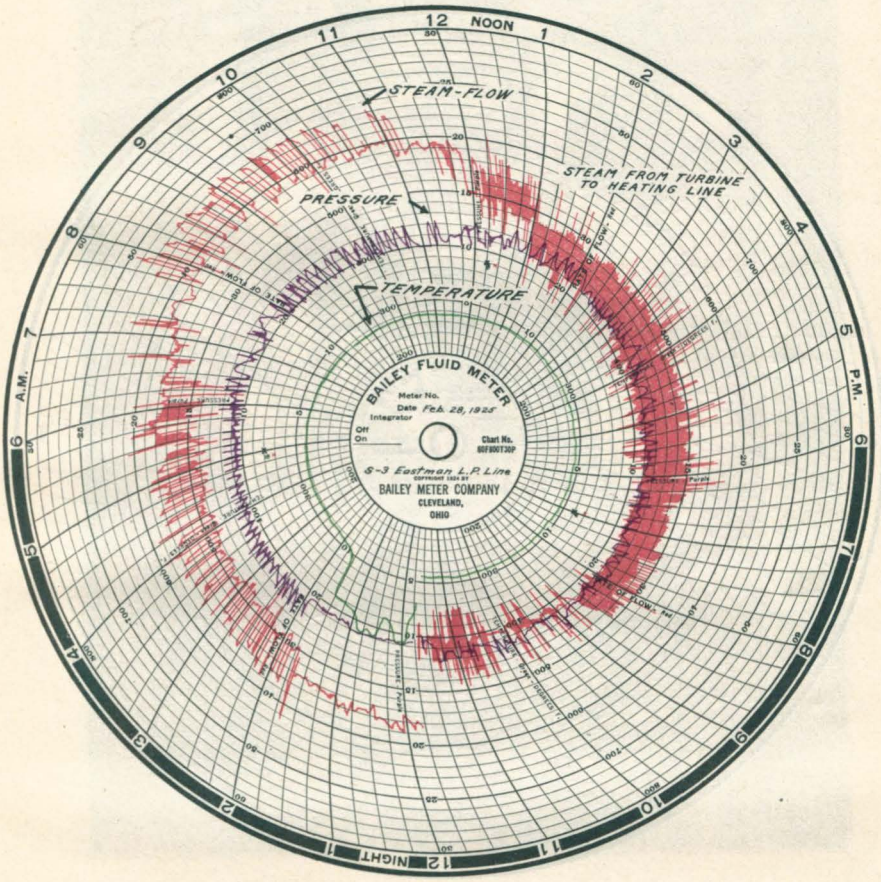
4. Furnishes a separate power supply for operation of the auxiliary apparatus in times of line trouble and interruptions.

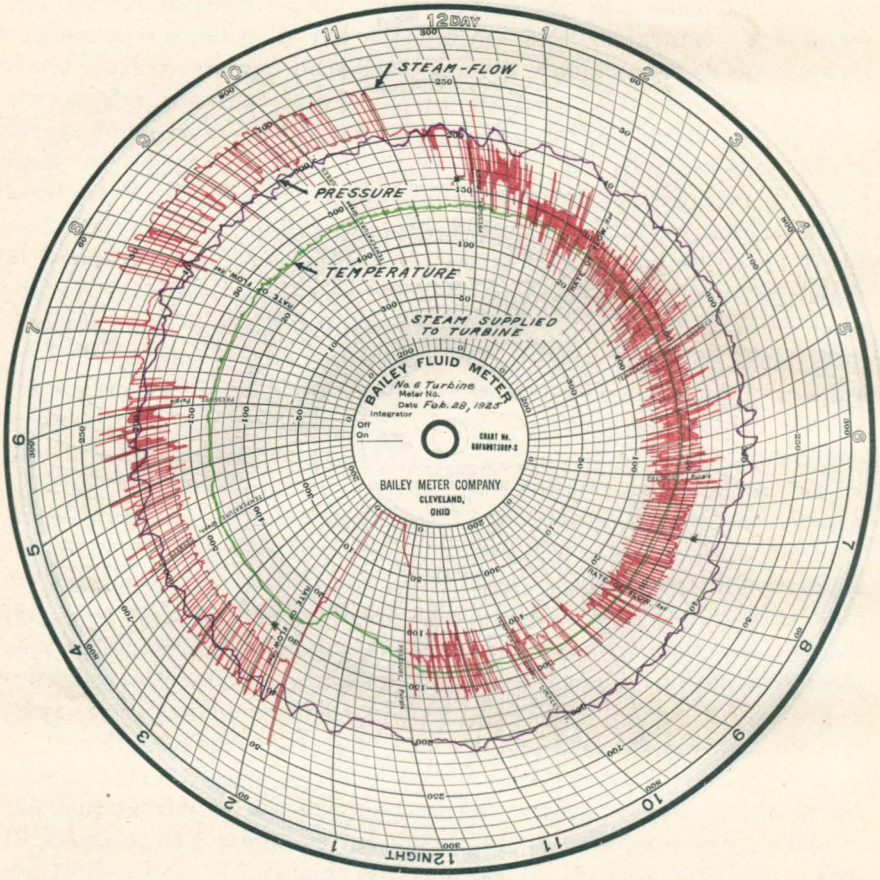
The operation of this turbine non-condensing does not differ from the normal method, except that the amount of steam used by this turbine is controlled by the demand on the heating line. This is accomplished by the use of a back-pressure regulator which operates on the regular governor valves of the turbine. When an interruption occurs on the electrical system, this vertical turbine automatically trips itself loose from the main bus and isolates itself and a section of the auxiliary bus which furnishes power for the auxiliary equipment in the plant and furnishes all the axuiliary power. The back-pressure regulator also trips out, and the turbine will then operate at normal speed. If the turbine exhausts more steam than is required by the heating mains, the balance is discharged to the atmosphere.

For the season from November, 1923, to and including May, 1924, this turbine ran 1,744 hours, supplying 48,111,600 pounds of low-pressure steam, which was 55.6 per cent of the total steam used on the low-pressure lines and delivered 744,000 K. W. hours to the electrical system.

For the present heating season this turbine, from September to April 1, ran 3,184 hours, supplying 73,104,300 pounds of low-pressure steam, or 89.2 per cent of the total steam sent out on the low-pressure line, and has delivered 977,600 K. W. hours to the electrical system for the same period. This past season the turbine has been operated also as a house turbine when the low-pressure steam demand has not been sufficient to justify its operation, but the value as a house turbine has offset any apparent inefficiency.

It will be noticed by using the figures given above that there is considerable difference in the pounds of steam per K. W. hour used by this turbine during the first and second heating seasons. During the 1924 season 64.6 pounds of steam per K. W. hour was used, while in the 1925 season 74.7 pounds of steam per K. W. hour was used. This increase is accounted for by the fact that during the 1925 season this turbine was used as a stand-by machine to furnish auxiliary power to the plant auxiliaries in the event of an interruption, which invariably lowers the voltage to a point where the motors on this auxiliary equipment fail to maintain their speed. This turbine is practically always on the line except at times during the night when the steam plant has


12 NOON
1
2
3
4
5 P.M.
6
7
8
9
10
11
A.M.
12 NIGHT
STEAM-FLOW
PRESSURE
TEMPERATURE
STEAM FROM TURBINE TO HEATING LINE
BAILEY FLUID METER
Meter No.
Date Feb. 28, 1925
Integrator
Off
On
Chart No.
8SF80T30F
S-3 Eastman L.P. Line
BAILEY METER COMPANY
CLEVELAND, OHIO


12 DAY
12 NIGHT
STEAM-FLOW
PRESSURE
TEMPERATURE
STEAM SUPPLIED TO TURBINE
BAILEY FLUID METER
No. 6 Turbine
Meter No.
Date Feb. 28, 1925
Integrator
Off
On
CHART No.
BAILEY METER COMPANY
CLEVELAND, OHIO

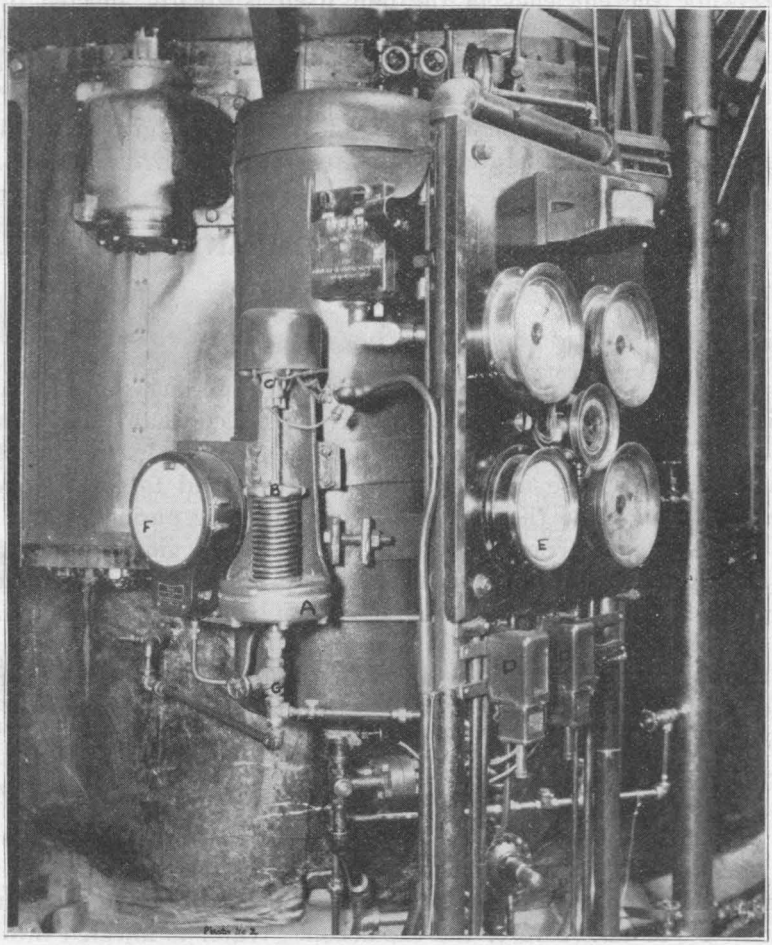


PHOTO NO. 2

(A) Diaphragm valve. (B) Contact rod and spring. (C) Contacts. (D) Relays.
(E) Indicating pressure on exhaust chamber. (F) Recording pressure on exhaust chamber.
(G) Exhaust pressure line to diaphragm valve.

no load to carry. This schedule of operation reduces the possibility of a low-voltage period to zero. It can readily be appreciated, therefore, that while the efficiency of the unit itself is greatly affected by this method of operation, that this inefficiency is outweighed, due to the fact that interruptions on the plant power system are practically eliminated.

The accompanying photographs and charts will give some idea of the appearance and operation of this turbine.

ILLINOIS ELECTRIC POWER COMPANY, PEORIA, ILL.

GEO. C. DANIELS

TRACY PURIFIERS

We have six plants equipped with Tracy purifiers on all kinds of boilers. We find if they are properly installed that they eliminate moisture and suspended matter from steam. We have these installed in plants where we use treated water where we had to discontinue the treating previous to the installation of the Tracy purifiers on account of the sediment carried over with the steam clogging up the valves, super-heaters, and cutting the turbine loading. We have also eliminated the slugs of water from the old-type Sterling boilers in one of our engine-driven plants. We have found that they keep down the concentration of soluble salts in the boiler water without blowing down the boiler; but the insoluble salts increase to such an extent that the boiler has to be blown down to keep the lower tubes from filling with mud.

DE-SUPERHEATERS

For the past ten years we have been using a De-Superheater designed by the Power Specialty Company. This is composed of two headers, connected together with approximately a dozen 2″ pipes, bent into a letter "S" to take care of the expansion. Water is injected into each of the 2″ pipes and the temperature controls the amount of water injected. While this De-Superheater has worked well, a much less expensive De-Superheater can be made with a spray nozzle inside of a pipe.

FLUE BLOWERS

We find that we can cut down the steam used for soot blowing by blowing the last pass of the boiler several times a day and the first and

the best of any Association in the United States, and I know it, from the fact that the data that this Association has gathered is standard for the world. And if you could see in my offices the inquiries that come in—there come inquiries from France, from England, from Germany, from Canada, and from Japan. They are all watching every move that this Association makes, and when our Proceedings go out, they don't only go to you, but they go to Japan, they go to Germany, they go to France, they go to England, and they used to go to Russia. I don't know whether you know it or not, but the czar of Russia was a member of this Association for several years. I am sorry he is not now. He maintained a membership under another name, but that was a fact. And while he, of course, gave it no personal attention, his great corps that he had under him was, because before Russia went to pieces under the Soviet administration they were giving district heating a very careful consideration.

Now, I speak of these things to keep your interest in the Association alive. Your conventions will increase in usefulness and in far-reaching effect as long as you keep gathering up this data such as you have heard this morning and as you have heard all during the four days that you have been here.

I wish to express my appreciation of the very cordial support you have given the Secretary. I am Secretary also of the East Central Geographic Division of the National Electric Light Association, composed of the States of Ohio, Kentucky, and West Virginia, and every moment that I put on that work is a moment of pleasure, and I know the value of these Associations, in the utility business especially, because there was a time if we hadn't hung together we would have been hung separately. But that day is all over. Just as Mr. Marshall has outlined to you this morning, we have been, not educating the public, but we have been telling the public of our problems, and the public, always fair, as a mass, has taken those problems and given us the benefit of the doubt. (Applause.)

Mr. Shultz: I would like to take this opportunity of expressing my own appreciation of the splendid convention we have had and to present a resolution as follows:

"The National District Heating Association at its Sixteenth Annual Convention takes this occasion to extend to the Entertainment Committee its heartfelt thanks for the splendid entertainment and