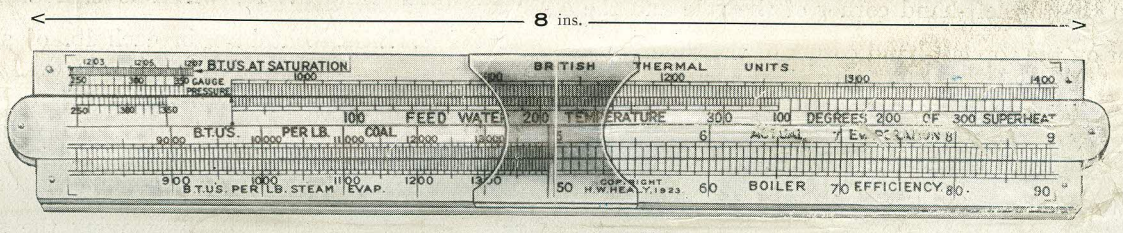
The

"ELECTROFLO"

(Regd. Trade Mark)

BOILER EFFICIENCY SLIDE RULE.



The Only Correct Standard of Comparison of Boiler Performance

$$= \frac{\text{Actual Heat Content of Steam Output (above Feed Water temp.) in B.Th.U's.}}{\text{Heat Input of Fuel Consumed in B.Th.U's.}}$$

The ever increasing interest and concentration centred on the problem of economical steam raising assures a ready welcome to any methods whereby a continuous check may be exercised on the operating efficiency of steam raising units, and it will be obvious that the provision of simple methods and the elimination of laborious and uninteresting calculations, will do much to quicken interest in and assist concentration on essentials. The essentials of this calculator, namely practical application and accuracy, typify the features embodied in all the Electro Flow Meters Company's products.

EXCLUSIVE FEATURES OF THE CALCULATOR.

(1) Three settings of the slide will enable all the calculations involved in computing Boiler Efficiency to be carried out.

(2) The calculator, which only measures 8 ins., can be conveniently accommodated in the pocket.

(3) The calculator combines the utility of a book of steam tables with the accuracy of a 15 in. slide rule.

(4) Factors of evaporation have been entirely eliminated and the calculations carried out direct in British Thermal Units, thus ensuring extreme accuracy.

The ranges of Boiler Pressures, feed water temperatures, B.Th. Unit content of coal and actual evaporation cover the conditions met with in the majority of steam raising plants, and it has been considered justifiable to sacrifice a too general application to extreme accuracy.

MADE IN TWO RANGES — 150/250 AND 250/350 lbs. per □"

WHEN ORDERING PLEASE STATE BOILER PRESSURE.

PRICE 10s. 6d. Post Free.

ELECTRO FLOW METERS COMPANY,

ABBEY ROAD WORKS, PARK ROYAL, LONDON, N.W.10.

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1000-3-25

HOW TO USE THE CALCULATOR.

Move the slide until the required boiler pressure coincides on the two pressure scales, one of which is on the top left-hand corner of the rule and the other on the top left-hand corner of the slide.

Next place the cursor against the known superheat temperature and the B.Th.U. content per lb. of steam above 32° F can be read off above this figure.

Place against the quantity thus found, by moving the slide, the known feed water temperature, and above the arrow mark at the left-hand end of the feed water temperature scale, read off the B.Th.U. content per lb. of steam above the feed water temperature, which is equivalent to actual B.Th.Us. contained in each lb. of steam delivered.

Transfer this quantity to the B.Th.U. per lb. of steam scale, at the lower left-hand end of the rule, and place against it (by moving the slide) the known B.Th.U. content per lb. of coal. Move the cursor to the known *actual* evaporation, and against this quantity will be found the Boiler Efficiency.

EXAMPLE :—

Quantities known :—

(1) Boiler pressure—190 lbs. per sq. in. gauge.
(2) Superheat—200 degrees Fahrenheit.
(3) Feed temperature—190 degrees Fah.
(4) B.Th.U.'s per lb. coal—10,500.
(5) Actual evaporation—7 lbs. of water per lb. of coal.

Proceed as follows :—

Move the slide until 190 lbs. pressure coincides on the two pressure scales. Move cursor to 200 on the superheat scale. Move the slide until 190 on the feed water temperature coincides with the point just located by the cursor, and read off against the arrow mark at the extreme left-hand end of the feed water temperature scale the B.Th.U. content per lb. of steam.

Transfer this quantity, 1,152 B.Th.Us. to the scale marked B.Th.Us. per lb. of steam evaporated. Place against this quantity (by moving the slide) the B.Th.U. content per lb. of coal, namely 10,500 B.Th.Us. Move the cursor to the known actual evaporation, namely 7 lbs. of water per lb. of coal, and below this figure, on the Boiler Efficiency Scale, will be found the required boiler efficiency, namely 76.75 per cent.

When dealing with saturated steam read off the B.Th.Us. on the scale above the known pressure on pressure scale and transfer this quantity to the B.Th.U. content per lb. steam scale, and proceed as set out in the foregoing paragraph.

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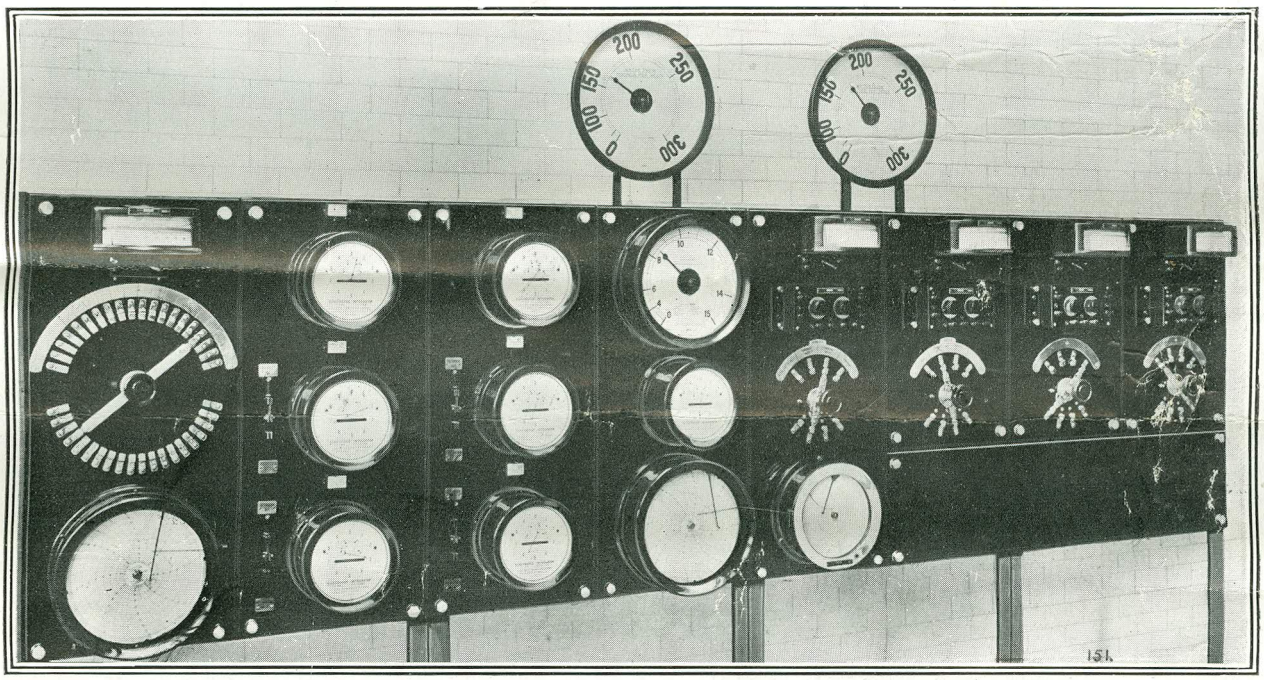
TO OBTAIN QUANTITATIVE DATA APPLYING TO ALL THERMAL EFFICIENCY PROBLEMS CONNECTED WITH STEAM GENERATION CONSUMPTION AND DISTRIBUTION, INSTAL—

"ELECTROFLO"

(Regd. Trade Mark.)

WORKS CONTROL INSTRUMENTS.



"Electroflo" centralised instrument equipment (part of contract for an important modern Generating Station) comprising reading instruments of steam and water flow meters, Vacuum Recorder, Electrical Resistance Distance Indicating Thermometers and Distance Indicating thermocouple-type Pyrometer.

FULL DESCRIPTION WILL BE FORWARDED ON REQUEST.

The insistent demand for cheaper power production with which is inseparably linked its extension and more general application, has led to careful scrutiny of all the factors involved in power production and distribution, and since steam generation is the main basis of power production, the economics of steam generation are being subjected to investigation.

It is now well recognised that no steam raising unit can be run at either its economical load line or full efficiency extracted from it in service unless equipped with accurate and reliable measuring apparatus at all its vulnerable points.

To obtain such continuous data of performance there are many unknowns in the operation of steam-raising units that require to be recorded if a basis of comparison of performance is to be established. Itemised, these may be set down as follows:—

(1) Steam pressure.
(2) Feed water inlet temperature.
(3) Steam temperature.
(4) CO2 content of products of combustion
(5) British Thermal Unit content per lb. of coa consumed.
(6) Actual weight of steam produced per pound of fuel consumed.

Until the introduction of "Electroflo" Meters it was the fashion to instal such instruments as were available for the continuous measurement of these essentials of boiler operation at the various points of measurement on the steam-raising unit, with the consequence that a great deal of physical discomfort ensued fron the effort entailed in taking readings at all these points. The "Electroflo" principle of centralisation, an inherent characteristic of all the instrument equipment designed

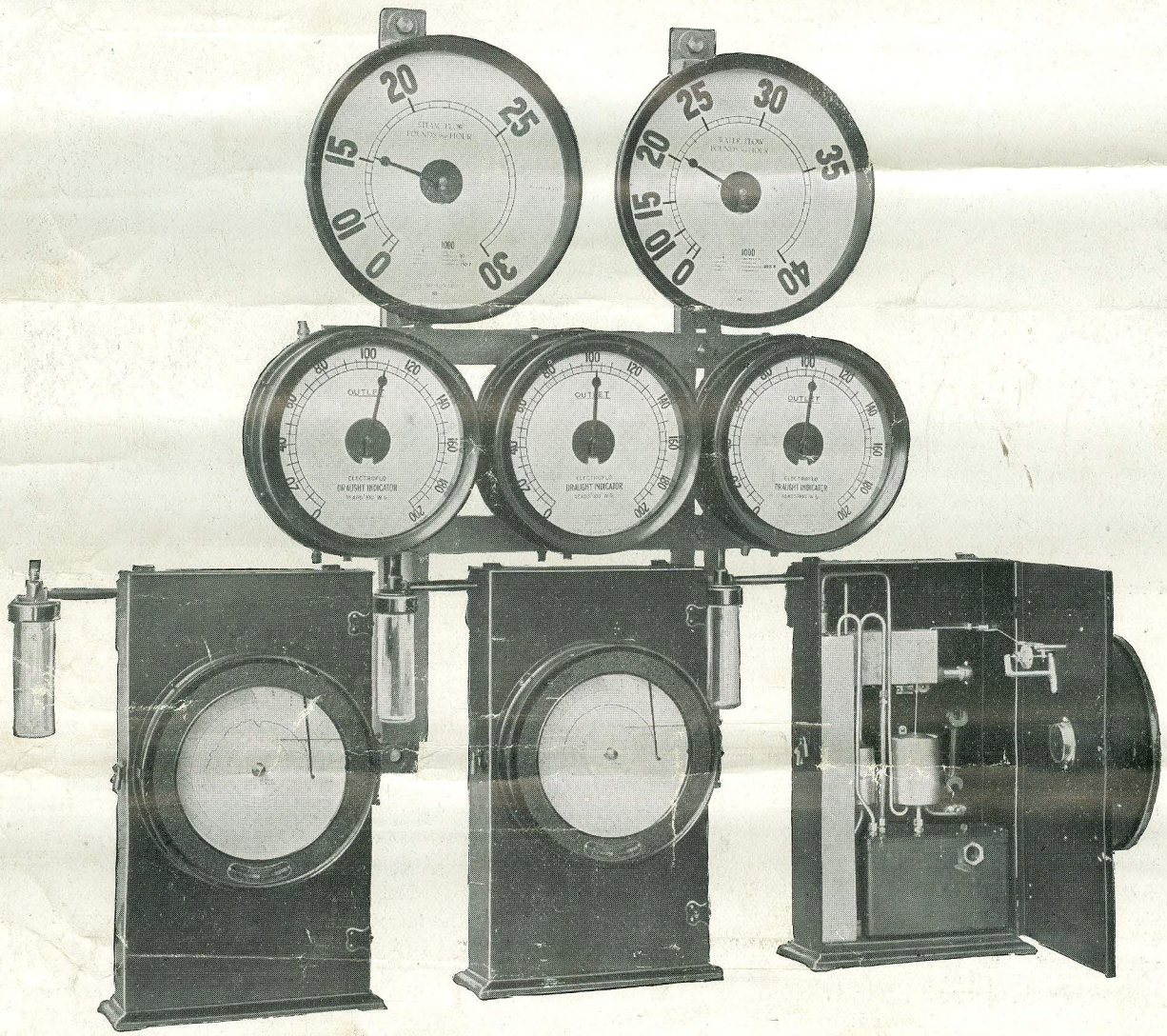
and manufactured by the Electro Flow Meters Co., has now made it possible to assemble indicating, integrating and recording instruments in such a variety of combinations as to be suitable for every conceivable plant layout.

" Electroflo " Steam and Water Flow Meters will give instantaneous indications of the steam evaporated by the boiler, and/or the water fed into the boiler and the large, clearly visible indicators which are a distinctive feature of this meter can be mounted at just that position essential for the guidance of the Plant Operator.

The importance of such an arrangement as this cannot be stressed too greatly, particularly where a battery of boilers is being operated. There is an instant indication to the Operator of any one boiler that is lagging behind the others, resulting in immediate attention. Only by such methods can boiler plant be operated at its most economical load factor.

The measurement of feed water temperatures, steam temperatures and flue gas temperatures is also capable of being centralised by means of the " Electroflo " Distance Thermometer ; thus can be made available at one central spot, always under supervision, continuous information as to boiler performance under all and every load condition.

It will thus be seen that " Electroflo " meters and measuring instruments have been designed not only to meter and measure accurately, but to give continuous service. The Operator's and Supervisor's point of view has been preserved throughout, with the consequence that no essential feature has been missed to impair their utility, and assembly is always achieved so that not only a pleasing result is obtained, but nothing in connection with plant operation can escape the attention of the Operator.



FOR ALL METERING AND MEASURING REQUIREMENTS, SPECIFY :

"ELECTROFLO" WORKS CONTROL INSTRUMENTS.

WRITE FOR GENERAL FOLDER S.L.P.I.

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