

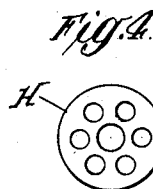
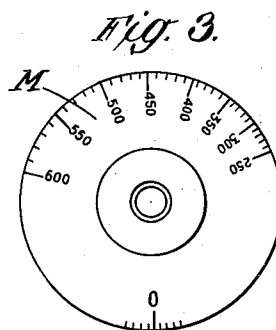
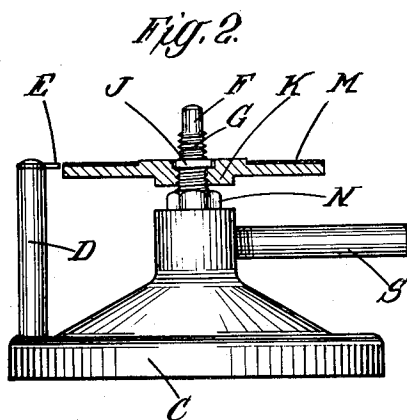
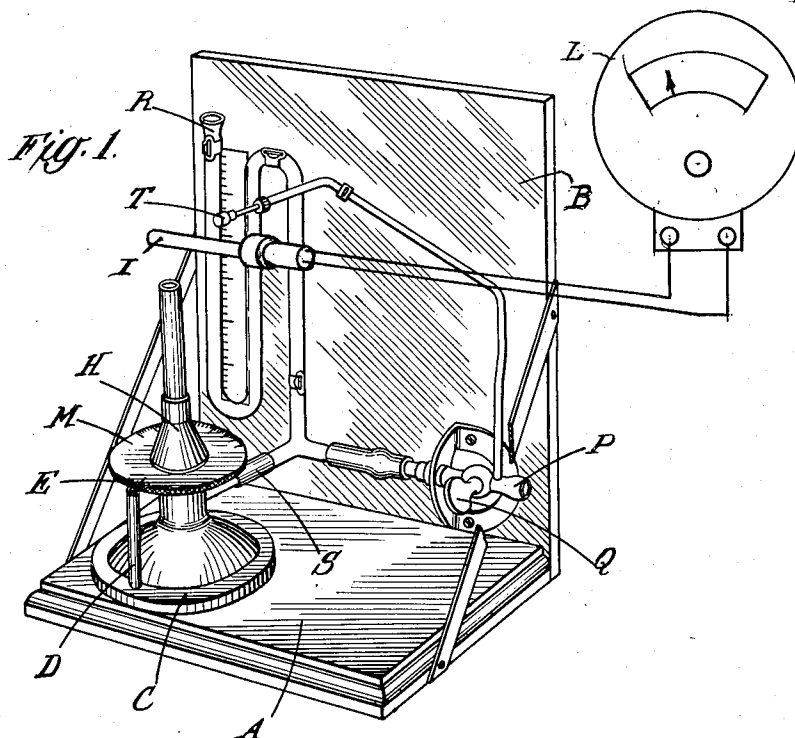
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GAS CALORIMETER

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UNITED STATES PATENT OFFICE

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GAS CALORIMETER

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1 Claim. (Cl. 73—184)

The subject of this invention is a gas calorimeter for determining the heating value of combustible gases obtained from retorts, coke ovens or other gas generators the heating power of which gases is substantially in inverse ratio to the proportion of inert gases contained therein, or to the proportion of water gas or other inferior gas admixed with coal gas.

A calorimeter according to the invention is arranged to receive a constant regulated supply of combustible gas, and a proportion of air adjusted in accordance with a calibrated indicator, in order to keep the mixture in such proportions as to maintain its explosive character, more air being required with a rich gas than with a gas of poor quality, so that the heating power of the gas can be ascertained by noting from the indicator the extent of admission of air necessary to maintain a series of small explosions, in other words to cause the mixture to "pop" continually when brought into contact with a flame.

The device may comprise a base, a fixed pointer thereon, an externally screw threaded spindle bored for the passage of gas, a disc bearing calibrated indications and rotatable on the said spindle to ascend and descend within set limits, a cone or inverted funnel secured on the said spindle and provided with air inlet openings adjacent its periphery, a pilot jet, and a pressure gauge. The disc can be set at zero, when it entirely excludes air from the funnel, and when an arcuate movement is given to the disc, air is admitted between the disc and the funnel and passes along with the gas coming from the bored spindle up the vertical barrel or cylindrical part of the funnel, which thus acts as a Bunsen burner. On the disc being turned to increase the admission of air until the gas and air mixture issuing from the top of the funnel, where the pilot jet is situated, begins to pop, the figures on the disc opposite the pointer indicate the thermal units in the gas. If popping ceases, showing an increase in the heating value of the gas, the disc is turned to increase the proportion of air when the difference between the previous reading and that of the figure thus brought opposite the pointer indicates the extent of the increase in heating value.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be more fully described with reference to the accompanying drawing in which:—

Figure 1 is a perspective view of a device exemplifying the invention;

Figure 2 is an elevation of the spindle and associated parts;

Figure 3 is a plan of the disc detached;

Figure 4 is a plan of the underside of the funnel.

A indicates the base board and B the back wall on which the device is mounted, C the metal base, on which is fixed a pillar D terminating in a pointer E. In the base C is secured a spindle F (see Figure 2) bored for the passage of gas, and screw-threaded at G for the attachment of a funnel H (Figures 1 and 4). The spindle has a collar or enlargement J on which is a micrometer screw thread, on which is fitted the boss K of a disc M. A nut N on the spindle F forms a stop to limit the downward movement of the disc M, and the funnel H is screwed down on to the spindle F until the lower edge of the said funnel touches the boss K, and thus prevents upward movement of the disc from its zero position.

Combustible gas entering the pipe P (Figure 1) controlled by the tap Q is connected with a pressure gauge R and with a pipe S entering the base C, within which it communicates with the bore of the spindle F. A pilot jet T supplied from the pipe P is arranged to provide a permanent flame adjacent the open top or nozzle of the funnel H.

The tap Q being adjusted to allow a predetermined pressure of gas as indicated by the pressure gauge R, the disc M, which may have a milled edge, is turned to the left on the screw threaded part J of the spindle and is thus caused to descend slightly, air being thus admitted between the periphery of the funnel H and the upper surface of the boss K of the disc, until the gas and air mixture begins to pop at the top of the funnel H. If popping ceases owing to an increase in the quality of the gas, the disc M must be turned further towards the left, increasing the amount of air admitted to the funnel, and the difference between the previous reading and that of the figure on the disc then represents the increased heating value of the gas. If the quality of the gas is reduced, the disc is turned back to the right.

In order to make an automatic record of the heat of the gas at the nozzle of the funnel H, a thermo-couple I (Figure 1) may be located in the flame, and connected with a suitable recording instrument L of known type calibrated in actual calorific values. The thermo-couple is made from two dissimilar metals, which are coupled together with wires; the heat of the flame of the

Bunsen burner causes an electric current to pass through the wires, which actuates the recording instrument. The burner is set in the first place so that it pops at the correct calorific value of the gas passing through the burner; the thermocouple will instantaneously cause the recording instrument to indicate and register the calorific value. If the burner stops popping, the recording apparatus will indicate and register a higher calorific value. Should the quality of the gas become poorer, the burner will pop more frequently and cause a lower reading of the recording apparatus.

What I claim and desire to secure by Letters Patent of the United States is:—

A gas calorimeter arranged to receive a constant regulated supply of gas and a proportion of air adjusted in accordance with a calibrated indicator, in order to keep the mixture in such proportions as to maintain its explosive character, so that the heating power of the gas can be ascertained by noting from the indicator the

extent of admission of air necessary to maintain a series of small explosions when the mixture is brought into contact with a flame, comprising a base, a fixed pointer thereon, an externally screw threaded spindle bored for the passage of gas, means to supply a constant regulated supply of gas to said spindle, a disc bearing calibrated indications and threaded on said spindle to ascend and descend within set limits, an inverted funnel secured on said spindle, a pilot jet, and a pressure gauge, the arrangement being such that when the disc is set with the calibrations opposite the pointer at zero, the upper surface of the disc touches the edge of the funnel and prevents the admission of any air to the funnel, and as the disc descends the air admission opening is progressively increased to the extent necessary to maintain a series of small explosions when the mixture is brought into contact with the flame issuing from the pilot jet at the top of said spindle.

CHARLES GRAY.