(No Model.)

3 Sheets—Sheet 1.

H. H. EDGERTON.

REGISTERING GAS CONSUMPTION AND MANUFACTURING TO A STANDARD.

No. 265,222. Patented Sept. 26, 1882.

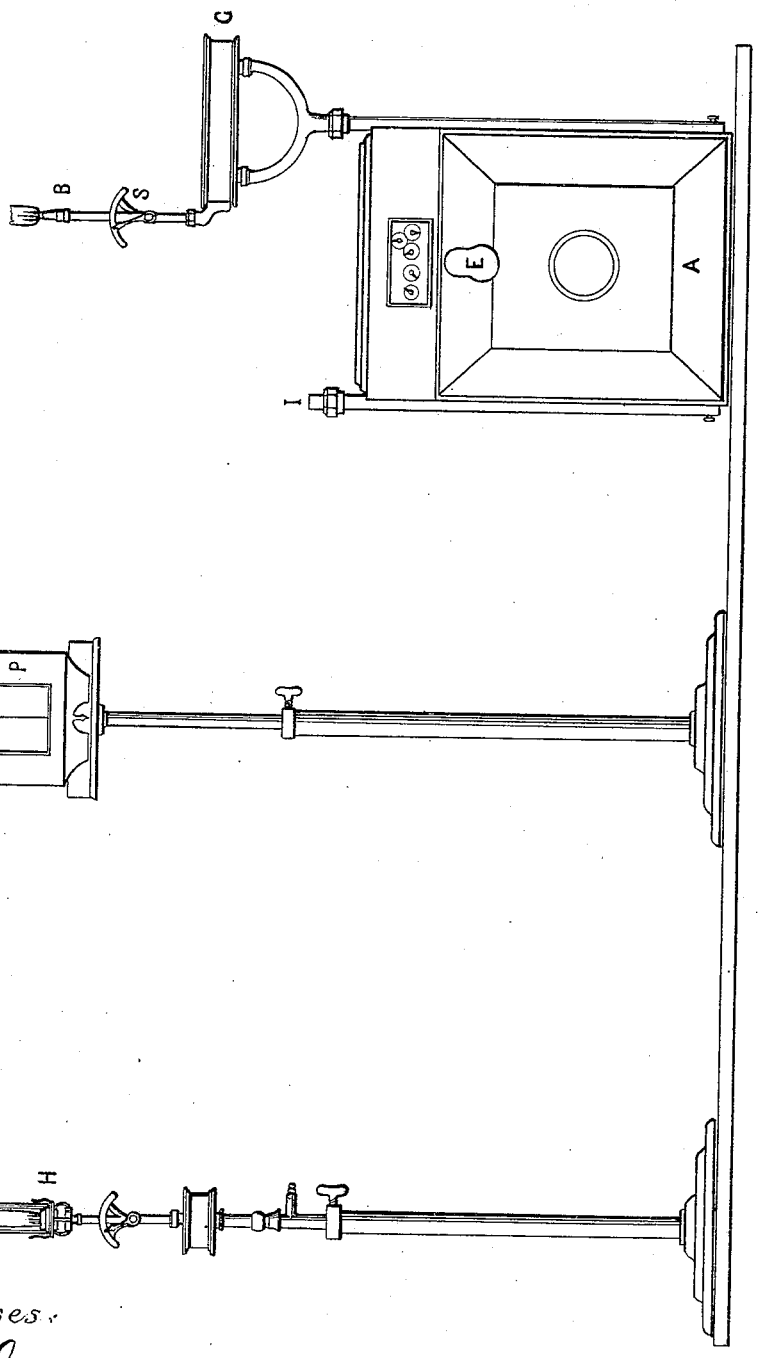

Fig. 1.

Witnesses:
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H. E. Courpenthwait Jr.

Inventor.
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(No Model.)

3 Sheets—Sheet 2.

H. H. EDGERTON.

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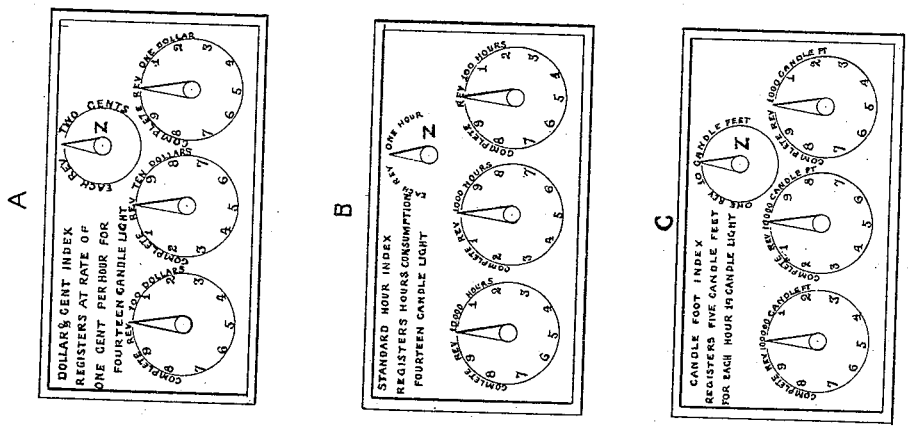
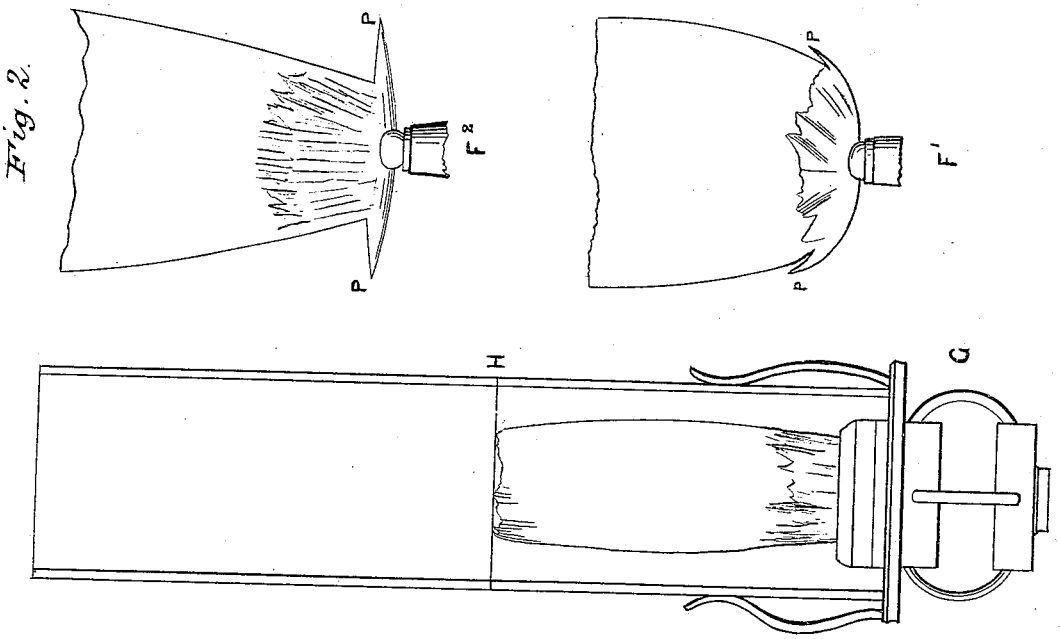


Fig. 2.



Witnesses:

C. E. Friedmann

G. E. Bowerthwait

Inventor:

Henry H. Edgerton

(No Model.) 3 Sheets—Sheet 3.

H. H. EDGERTON.

REGISTERING GAS CONSUMPTION AND MANUFACTURING TO A STANDARD.

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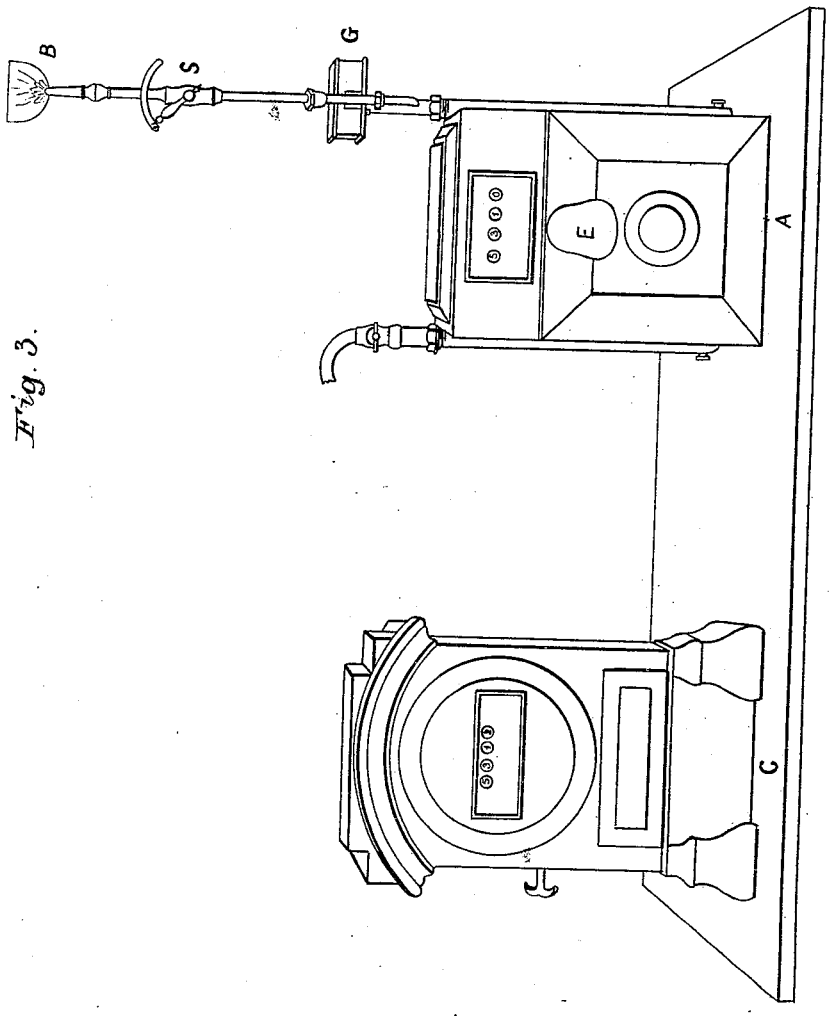

Fig. 3.

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C. E. Friedmann
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Inventor:
Henry H. Edgerton

UNITED STATES PATENT OFFICE.

HENRY H. EDGERTON, OF DANBURY, CONNECTICUT.

REGISTERING GAS-CONSUMPTION AND MANUFACTURING TO A STANDARD.

SPECIFICATION forming part of Letters Patent No. 265,222, dated September 26, 1882.

Application filed April 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. EDGERTON, of Danbury, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Registering Gas-Consumption and Manufacturing to a Standard, which improvement is fully set forth in the following specification.

Gas is generally sold by the cubic foot without regard to quality. According to the method by which quality is ascertained it appears that quantity and quality are convertible terms. For instance, two and one-half cubic feet of thirty-candle gas last as long and give as much light in a suitable burner as five cubic feet of fifteen-candle gas.

The gas-consumer has at present no standard of comparison in regard to the cost of gas-light save the price per thousand cubic feet, which is entirely fallacious. The comparison by quality as ordinarily reported is equally misleading, for the reason that the consumer is led to believe that a thirty-candle gas is twice as bright as a fifteen-candle gas, whereas thirty-candle gas as ordinarily burned is but little brighter than fifteen, but twice as durable, or, in other words, giving out the same light, it lasts twice as long. This arises from the fact that rich gases properly burned give off light very nearly in proportion to the amount consumed. This fact is not only lost sight of, but sedulously kept in the background by some manufacturers, and consumers are constantly taught to compare the cost of gas by the price per thousand. A comparison by quality misleads still further in favor of poor gas. Therefore capacity to produce a given light for a specified time by consumption in a proper burner is the only true test of value, and prices should be based thereon. As at present manufactured in various localities, a cubic foot of gas may last one hour while giving a fourteen-candle flame, or it may last but fifteen minutes, according to the material used to produce it. Hence prices based upon the cubic foot alone give no idea of the relative cost of gas-light to the consumer, and yet price per thousand cubic feet is almost universally used as a basis of comparison. This common error has operated against improving the quality or lasting-power of gas, whereby alone great economy can be introduced into the manufacture, for it is much cheaper to manufacture one thousand cubic feet of forty-five-candle gas than three thousand cubic feet of fifteen-candle gas. It only remains to get a proper price to make the manufacture of rich gas much more profitable both to producer and consumer.

The object of this invention is to provide a means of registering gas-consumption, whereby quality as well as quantity shall be kept constantly in view, both in the manufacture and sale of gas. The proper measuring of quality is durability—that is, the capacity to produce a standard light for a greater or less time. A gas which will by proper burning give a standard light for two hours has twice the durability or lasting-power of a gas producing by the consumption of the same quantity or bulk of gas the same light for half the time, or one hour. To keep durability of gas-light constantly in view, the price must be based on it, and hence, though the quantity of gas is measured as heretofore, the price is based upon the length of time a fourteen-candle gas-flame will last.

The object can be attained as follows: I provide a meter constructed as ordinarily, except that the dial-plate indications are dollars and cents, with a proving-hand which may indicate cents or cubic feet, or both. The cog-wheels are so geared, having in view the durability, lasting-power, or quality of the gas to be used, that the hands shall be pushed forward at a stipulated rate per hour for each burner affording a given light, and for greater or less consumption in proportion. This stipulated rate per hour for each burner in use is affixed plainly and securely upon the meter by means of a metal label or escutcheon, or upon the dial-plate. The durability can be tested by a correct time-piece, and the indications of the meter verified at any time by the consumer; and to do this I provide ready means for obtaining a given plane.

I will now more particularly describe my invention, so that it can be understood by one instructed in the manufacture and distribution of gas, reference being had to the accompany-

ing drawings, which form a part of this specification and represent apparatus for carrying the invention into effect.

A, Figure 1, is an ordinary gas-meter, provided with a dial such as shown in Fig. 2 at A, B, or C. Supposing the meter be provided with a dial, as shown at B, Fig. 2, the indications are given in terms of durability of a fourteen-candle gas-flame, and the indications are made out to the consumer in that manner. For instance, every complete revolution of the extreme right index-hand shows the meter has passed gas to furnish one hundred hours of light. The consumer can test the meter to his satisfaction in the following manner: F', Fig. 2, represents a fourteen-candle burner of the variety known as "excavated lava-tip bat-wing." By "fourteen-candle burner" is intended a burner which, when properly turned up, will give a fourteen-candle flame with the gas to be supplied by the gas company. This burner should be turned on until the jets P P, which in F^2 are very pronounced under too heavy pressure, just unite with the body of the flame. This is the point of maximum light from the gas, and will be, if the manufacture is conducted properly, as hereinafter described, quite or approximately fourteen-candle light. With one or more of such burners lighted and turned to fourteen-candle flame the hand Z will revolve at the rate of one revolution per hour for each burner lighted.

Should it be found that the hand Z revolves more than one revolution for a light, this will show at once that the gas supplied is not up to the guaranteed quality, and the consumer, by noting the rate at which the meter overruns itself, will be able to check his account. For example, suppose the test-burner is adapted, when turned up to the described point, to give a fourteen-candle light with forty-five-candle gas, (the meter being also adapted to give correct indications with such gas;) if the gas be allowed to fall below the standard—say to forty-three-candle gas—the test-flame will not vary appreciably from the luminosity of fourteen candles, but gas will be consumed more rapidly, and the hand Z, instead of moving one revolution per hour, will move one revolution and a fraction per hour. This fraction will indicate the error of the meter, and the consumer will be able to correct the bill when presented. Should the gas fall very much below the standard—say to thirty-candle power—the meter will move still faster, and the consumer will see not only that the meter is overrunning itself, but will also notice that the flame is below the normal brightness. On the other hand, if the gas is richer than the standard, the hand Z will take longer than one hour to make a revolution, and the consumer will know that he is charged for less than has been supplied him. When, however, the manufacture is properly carried out, the registration will vary but little. A recorded test made in this manner by means of a clock and meter such as shown at A C, Fig. 3, showed as follows from February 9 to March 28, 1882:

	Hours.		Hours.
Register of clock at beginning	2,563;	meter,	2,567
On February 15	2,706;	meter,	2,709
February 23	2,895;	meter,	2,893
March 2	3,050;	meter,	3,049
March 14	3,331;	meter,	3,327
March 28	3,670;	meter,	3,672

The intermediate record showed but slight departure from an absolutely uniform rate. Thus the variations with the ordinary consumers—fourteen-candle burner, properly turned on—will be but slight; but for great exactness the consumer's proving-burner shown at G can be employed. This burner is of the type known as "Sugg's London B;" and with a flame turned on to a height marked on the chimney a fixed and definite light is afforded, no matter what the incidental variations in the quality of gas. The Sugg's burner, to produce the same light, consumes more gas (when this is of a high candle-power or very rich) than a flat-flame burner. The height is therefore marked not at fourteen candles, but at a point as much less than fourteen candles as the consumer's flat-flame burner is superior to it in light-giving qualities. In other words, it is marked at such a point that with gas of the guaranteed quality the Sugg's burner will consume the quantity of gas which would, if burned in a flat-flame burner, give a fourteen-candle light.

Having provided the consumer with a meter indicating the value of the light in durability, and afforded him a means of testing it to his own satisfaction, the manufacturer must see that the gas made is of such uniform durability to move the hands as specified. To do this is now comparatively easy. The relative durability of gas-lights depends upon the relative percentage and weight of hydrocarbon gases as heavy or heavier than olefiant gas. The percentage of hydrocarbons can now be varied over a wide range by various methods of manufacture. Without specifying any, it is merely necessary for the purposes of my method that the richness of the gas be under easy control. The following is the manner of bringing to a proper standard. H, Fig. 1, is a Sugg London fourteen-candle burner, denominated "C," and under control of a double-pressure regulator. The height of flame is adjusted to fourteen candles and a mark made on the chimney at that height. P is a photometer-screen, the center of the screen about three feet from the burner. On the opposite side of the screen, in true line, and at exactly equal height and distance, is a consumer's flat-flame burner, B, Fig. 3, the plane of the flame at an angle of forty-five degrees with the line between the burners. The gas is turned on at B, with the usual precautions to exclude all reflected light, until the screen P is equally lighted on both sides. The clock C, registering hours and decimal fractions of an hour, for convenience, can be started in agreement with the indications of the meter, and the manufacture

so controlled as to keep the meter and clock-hands revolving in unison. This can be done with great regularity. It will be then certain that the indications of the consumer's meters will entirely agree with the stipulated value or durability of a standard flame.

I am aware that dials in dollars and cents have been heretofore used, but not in conjunction with a durability or value stipulation expressed upon the meter, nor with means provided to enable the consumer to accurately test or verify the indications of the meter, either by the ordinary excavated bat-wing burner, with the points P P as a guide, or the argand G, adjusted to the difference in light-giving power between F′ and H.

The inability to put the consumer in a position to easily and accurately obtain a fourteen-candle flame was a defect in previous attempts to sell upon an illuminating basis, and led to a lack of uniformity in the light. The present invention entirely remedies the defects of the former.

Having described my said invention and the manner of carrying the same into effect, what I claim is—

1. In a system of supplying gas to consumers on an illuminating basis, the consumer's gas-meter, registering gas-consumption in dollars and cents, standard hours, candle-feet, or the like units indicating or representing the production of a given light for a specified time, in combination with a test-burner for proving the accuracy of registration, substantially as described.

2. A gas-meter having an index with divisions or graduations indicating standard hours, candle-feet, or like terms directly expressive of quality and quantity, in contradistinction to terms expressive only of quantity—such as cubic feet—or terms indirectly expressive of quantity and quality—such as dollars and cents—substantially as described.

3. The combination, with a consumer's gas-meter registering the gas-consumption in units indicating or representing the production of a given light for a specified time, of a flat-flame test-burner for proving the accuracy of registration, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY H. EDGERTON.

Witnesses:

C. E. FRIEDMANN,

EDMUND ALLEN.