J. PINISCH & J. SCHÜLKE.

Electric Gas-Lighting Device.

No. 211,044. Patented Dec. 17, 1878.

Fig: 1.

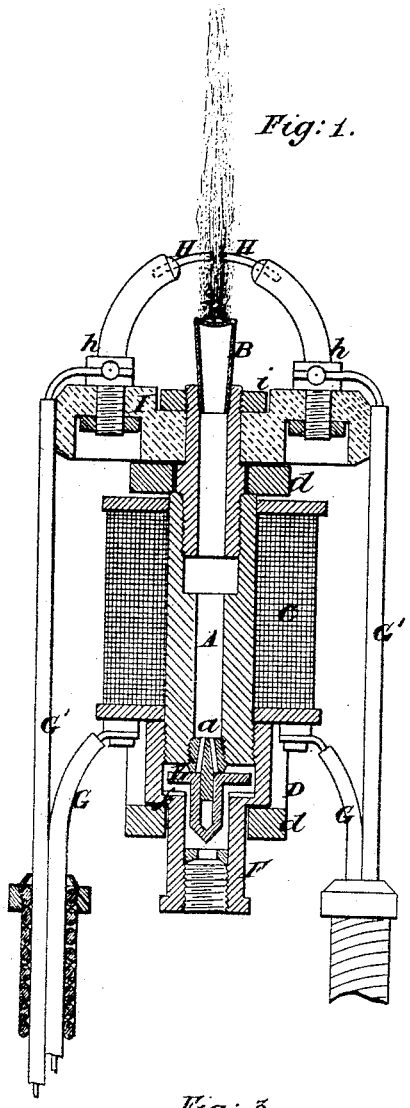


Fig: 2.

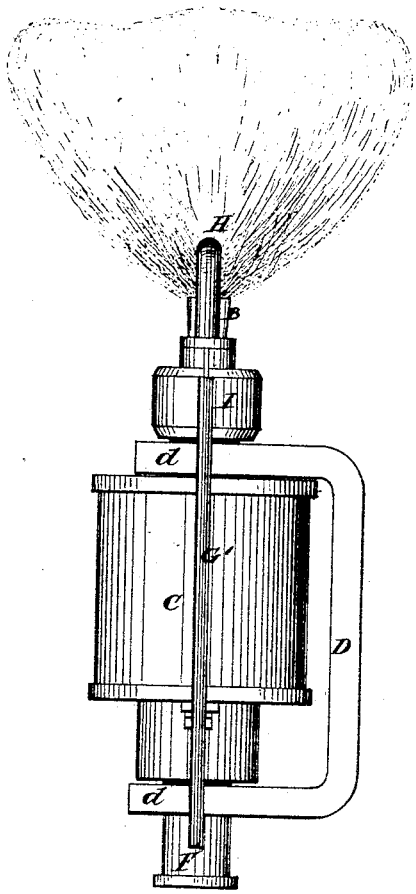


Fig: 3.

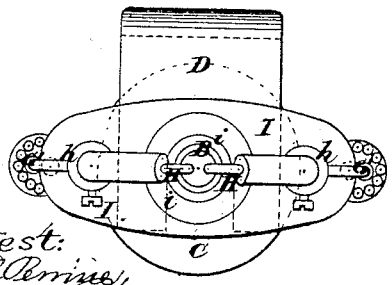
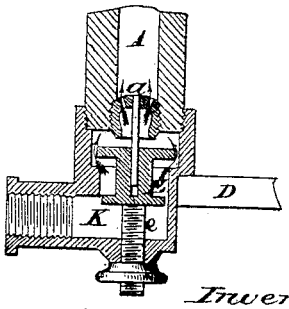


Fig: 4.



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JULIUS PINTSCH AND JULIUS SCHÜLKE, OF BERLIN, PRUSSIA, GERMAN EMPIRE.

IMPROVEMENT IN ELECTRIC GAS-LIGHTING DEVICES.

Specification forming part of Letters Patent No. **211,044**, dated December 17, 1878; application filed July 2, 1878; patented in England, April 23, 1878.

To all whom it may concern:

Be it known that we, JULIUS PINTSCH and JULIUS SCHÜLKE, both of Berlin, Prussia, in the German Empire, gas-engineers, have invented an Improved Electrical Apparatus for Kindling, Extinguishing, and Varying Gas-Lights; and do hereby declare that the following description, taken in connection with the accompanying sheets of drawings, hereinafter referred to, forms a full and exact specification of the same, wherein we have set forth the nature and principles of our said improvements, by which our invention may be distinguished from others of a similar class, together with such parts as we claim and desire to secure by Letters Patent—that is to say:

Our invention relates to apparatus applicable in cases where a number of gas-lights—such as those of a street or district—have to be simultaneously kindled or extinguished by electrical action directed from some central station, and the same apparatus is applicable when lights—such as those in floating vessels—have to be kindled or extinguished from a station on shore. It is also applicable when flashing-lights are employed for signaling purposes, the variation of the light at such intervals as may be desired being effected by the transmission, interruption, or reversal of electrical currents at a signaling-station, which may be at a distance from the signaling-light itself.

We will explain the construction of the apparatus which we employ for those purposes, referring to the accompanying drawings, Figure 1 representing a vertical section, Fig. 2 a side view, and Fig. 3 a plan, of the apparatus adapted to the burner or to each of a number of burners intended to be actuated by electricity. Fig. 4 is a part section of the lower part of the apparatus, with a slight modification in the arrangement of the valve.

The pipe A, leading up to the burner B, is of soft iron, constituting the core of an electro-magnet, and for that purpose being surrounded by a coil, C, of insulated wire. The lower end of the pipe A is screwed into a socket, F, of non-magnetic material, such as brass. D is a permanent magnet, of horseshoe form, having its polar extremities *d d* forked, to receive the pipe A in the upper fork and the socket F in the lower fork, so that A is polarized by induction from the magnet D. In the socket F is formed a widened cavity, in which is placed a soft-iron valve, E, which, being attracted toward the end of the pipe A, is caused to seat upward against a perforated nipple, *a*, of ivory or vulcanite, and so to close the passage through *a*, thereby cutting off the supply of gas to the burner B. The valve E lies sufficiently above the forked lower pole of the magnet D to cause said valve to have a tendency to rise should said lower pole at any time have a repulsively-magnetic relation to it.

Insulated conducting-wires G G′ lead to and from the coil C, and also to and from two platinum nibs, H H, situated a little above the orifice of the burner B, with their points at a suitable distance apart to permit an electrical spark to pass from the one to the other. Connections are made from the wires G′ to these nibs H by conducting-pieces *h h*, fixed on a piece, I, of insulating material, such as vulcanite, which is secured to the burner-pipe by a nut, *i*.

When it is desired to kindle the gas-flame, electrical currents are sent along the conducting-wires G G′ from any convenient source of electricity, or from a condenser or inductor, the current transmitted through the coil C being of such sign as to neutralize and overcome the magnetism induced by the magnet D on the pipe A and valve E. The valve E, being thus no longer attracted by A, or being repelled from it, drops away from the nipple *a*, partly by gravity and partly from the attractive force of the lower pole of magnet D, and rests on projecting ribs *f*, whereupon gas flows from the supply-pipe F past the valve E, and through the nipple *a* to the burner, and issuing therefrom is ignited by the spark passing between the nibs H H. The electrical current may then be intermitted until it is desired to extinguish the light, in which case an electrical current is transmitted by the wires G through the coil C of such sign as to restore to the lower end of A attractive force sufficient to draw to it the valve E, which thereupon rises and closes the gas-passage.

The distance between the ribs *f* and the lower end of the core A is such that when the

valve E rests upon said ribs it will not be close enough to said core to be attracted thereby, as the effect of the induction of magnet D in said core; but the attractive force of said core must be re-enforced by the electro-magnetism induced by the electric current in coil F in the proper direction. The entire attractive power of the core A is then assisted by the repulsive force of the lower pole of the permanent magnet D, which, of course, begins to act upon the valve E immediately an attractive force begins to act upon said valve from the opposite pole. These combined forces give the valve a very prompt action. In order to insure its prompt movement, it is desirable that the valve should be as light as possible. Were it not for the attraction of the lower pole of the magnet for the valve, it would, of course, have to be heavy enough to resist displacement and elevation by the current of gas issuing from pipe F; but owing to the effect of said lower pole in holding the valve to its seat, I am enabled to make it much lighter than would otherwise be the case.

According to the modification shown in Fig. 4, the supply of gas is by a lateral branch, K, and an adjustable screw, *e*, forms the stop on which the valve E rests when the gas-passage through *a* is opened.

Instead of employing separate conducting-wires G G′ for the coil C and the nibs H H, respectively, both the coil and the nibs may be connected in one circuit, either parallel or continuous; but in the case of parallel connection the coil must be such as to present considerable resistance to the electrical current, so as to insure the production of a spark between the nibs H H.

The transmission, interruption, and reversal of the electrical currents at the sending-station may be effected by any known key or apparatus ordinarily used for telegraphic purposes; and when the kindling or extinction of the light is used for signaling, the key apparatus at the sending-station may be worked as a relay, translating signals, such as those of the Morse or other known codes, into flashes or obscurations of the light of varying duration, as may be readily understood.

Sometimes for signaling purposes it is of advantage that the light should never be quite extinguished, but only at intervals obscured. In that case we provide a small by-pass orifice provided with a stop-cock, which allows a small quantity of gas to pass the nipple *a* when its perforations are closed by the valve E, this small supply being just sufficient to keep the gas kindled, but not with a luminous flame.

The gas supplied to burners fitted with our apparatus may be conducted to them by pipes, in the ordinary way; or, in cases where it is inconvenient to conduct pipes to them—as, for example, when they are on light-ships at sea—the gas may be supplied from portable reservoirs, into which it is compressed, and whence it is led to the burners through suitable governors, as described in Pintsch's patent of 22d May, 1877.

Having thus described the nature of our invention, and the best means we know of carrying it out in practice, we claim—

1. In an electrical gas lighting and extinguishing apparatus, an electro-magnet the soft-iron hollow core of which forms part of the gas-passage, a permanent magnet having one of its poles connected to one end of said core, a soft-iron valve adapted to close the passage in said core, and arranged between the other end thereof and the other pole of the permanent magnet, substantially as and for the purpose set forth.

2. The combination of the electro-magnet having the soft-iron hollow core A, the unmagnetic valve supporting pipe-section F, the permanent magnet D, having one of its poles in contact with the upper end of said hollow core, and its other lying under the valve-seat, and the soft-iron valve E, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 6th day of June, 1878.

JULIUS PINTSCH.
JULIUS SCHÜLKE.

Witnesses:
ROBERT GOTTHEIL,
BERTHOLD ROI.