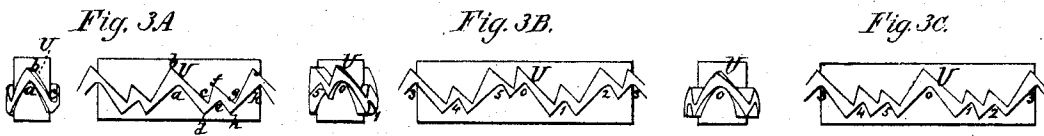
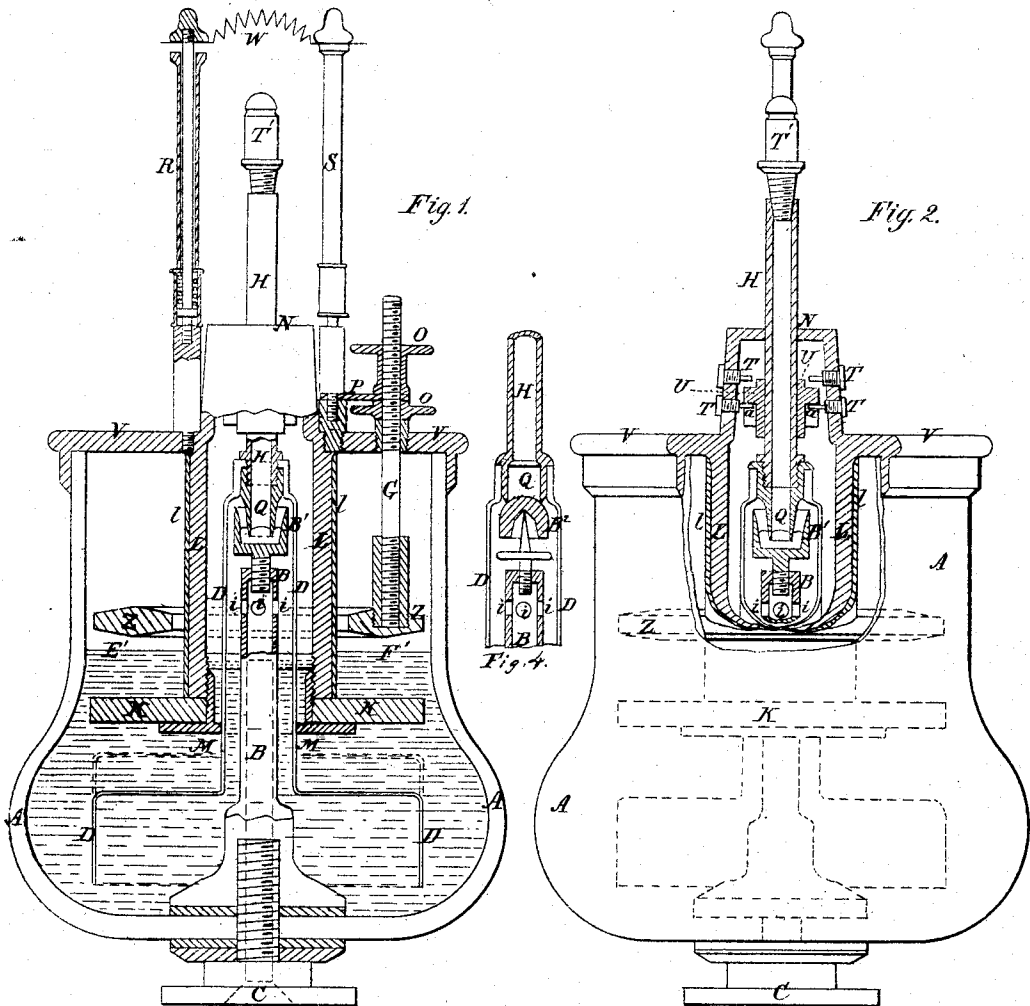


C. G. MUELLER & H. MEIER.

Electrical Gas-Lighting.

No. 139,599.

Patented June 3, 1873.



Witnesses:

J. M. Wagner,
R. Howard.

Inventors:

Charles Gustave Mueller
and
Heinrich Meier

By Johnson, Klauke & Co.
their Attorneys

UNITED STATES PATENT OFFICE

CHARLES G. MUELLER AND HEINRICH MEIER, OF HANOVER, GERMANY;
SAID MEIER ASSIGNOR TO SAID MUELLER.

IMPROVEMENT IN ELECTRICAL GAS-LIGHTING.

Specification forming part of Letters Patent No. **139,599**, dated June 3, 1873; application filed December 5, 1872.

To all whom it may concern:

Be it known that we, CHARLES GUSTAVE MUELLER and HEINRICH MEIER, of the city of Hanover, in Hanover, in the Kingdom of Prussia, in the German Empire, have invented, jointly, a new and useful Improvement in Apparatus for the Automatic Lighting of Gas, of which the following is a specification:

Our invention consists in an improved apparatus for the ignition of gas-lights, as originally invented by Professor Klinkerfues, of Goettingen, the object of it being to overcome and annihilate the disturbing influence which any common variations in the pressure of the gas are apt to exert on the same.

The main feature of the said original apparatus consists in an arrangement for exciting an electric current in a galvanic element by means of temporary elevation in the pressure of the gas, and thereby igniting the same.

It has been found in practice that the unavoidable variations in the pressure of the gas caused certain disturbances in the said original apparatus, and we have made an improvement in the same, of which we will proceed to give a precise description.

In the accompanying drawings, Figure 1 represents a vertical section of an automatic gas-lighting apparatus, embracing our invention. Fig. 2 represents a sectional elevation of the same. Figs. 3A, 3B, and 3C represent different guides, in top, elevation, and plan, for effecting the letting on and cutting off the gas.

Referring to these drawings, A, Figs. 1 and 2, represents a glass vessel, in which is fixed the pipe B, which at C is to be connected to the gas conduit-pipe. On the top of the pipe B is fastened a valve or valve-seat, Q B¹, of metal, India rubber, leather, or other suitable material.

In Figs. 1 and 2 this valve is represented to close hermetically by means of mercury contained in the small cup B¹, forming the lower part of the valve, (while in Fig. 4 the valve B² is shown as being made of brass and suspended on a pin,) the valve-seat Q being

formed by the lower extremity of the gas-pipe H, carrying at its top the gas-burner T.

The cover V of the glass vessel A is made of suitable metal, for instance, a composition of lead and antimony. It carries a tube, L, to which is fastened a disk, K, made of gas-coke. Above the coke disk a zinc disk, Z, is suspended, adjustably, by a brass screw, G. The latter is in metallic contact with the zinc on the inside, and by means of nuts O O and the plate P, with the small brass pillar S, on the outside, while all these pieces are isolated from the cover V by suitable parts of hard India rubber. Also, the tube L has an Indiarubber covering, l, to prevent any contact between it and the zinc; likewise the screw G, to protect it from corrosion by the fluid contained in the vessel. The second brass pillar R is screwed into the cover V, and the disk of carbon K brought into safe contact with the tube L by means of pieces of platina soldered to the latter. The tops of the pillars R and S are connected by a spiral, W, of thin platina wire, which is properly held in its place by means of springs in the interior of the pillars.

To complete the galvanic circuit, the vessel A is filled to a certain level with a fluid adapted to excite the galvanic current, as, for instance, a mixture of a solution of bichromate of potass. with diluted sulphuric acid; but the surface of this fluid is to remain below the zinc under all ordinary circumstances.

Connected to the gas-tube H, and consequently to the gas-valve Q, is the vessel D, made of glass or any other suitable material not exposed to a chemical action of the fluid surrounding it. This vessel, which may be called a diving-bell, is guided in the tube L, at the points M and N, with as little friction as possible, so as to allow it to move freely up and down. Lastly, the tube H bears a peculiarly zigzag-shaped piece, U, acted upon by pins T, (see Fig. 2,) the object of which will be shown hereafter.

Supposing the pressure of the gas inside the pipe B, communicating with the upper part of the diving-bell D by lateral orifices i, to be equal to the atmospheric press-

ure, the surfaces of the fluid inside and outside of the bell D will be on a level, E' F', but if the pressure of the gas be raised the inside surface will be depressed and the outside one raised comparatively to the pressure. The difference of heights of the two surfaces will depend solely on the pressure of the gas; consequently, if this pressure is large enough to depress the inside surface into the enlarged lower part of the bell, the amount of displaced fluid for a certain amount of increase of pressure will be larger in proportion to the extent of surfaces; and consequently the upward pressure on the bell be so much increased that the latter will rise into the position shown in dotted lines, Fig. 1, thereby open the gas-valve Q, and allow the gas to pass out of the burner T'. The fluid displaced from the inside of the bell rising outside will come into contact with the zinc, and consequently excite a galvanic current, which will heat the platina spiral W, and, by the peculiar action of this metal, cause an ignition of the gas coming from the burner. The diving-bell bears, as has been mentioned, on its upper part or tube H certain zigzag projections U, shown in detail in Fig. 3. These projections moving up and down with the bell, are governed in such a manner by the pins T that on any upward or downward motion of the bell the inclined surfaces of the zigzag projections press on the pins T and cause the bell to revolve to a certain extent. Now, the inward corners of these zigzag guides not being in a vertical line with the outer ones, but the pins T being placed and fixed in such a line, a revolving motion of the bell must ensue in any case that an upward or downward motion is caused by the pressure of the gas. Suppose the bell with the guide, Fig. 3A, to be supported in their lowest position at point *a* by the lower pin T. The bell now being raised, surface *b c* of the guides will slide along the upper pin T and make the bell revolve to the left (looking at the drawing) until point *d* has cleared the lower pin. On relief of pressure surface *d e* will slide along this same pin to point *e*, at which the bell will be supported until a renewed upward and downward motion brings the point *k* onto the lower pin.

It will be easily seen that if the bell on being supported at *a* closes the gas-valve, and being left at a higher position corresponding to point *e*, leaves this valve open, an admission to as well as a cutting off from the burner of the gas will be caused by raising the pressure of the same to the required extent, while any smaller amount of pressure will not affect the instrument.

The temporary raising of the gas pressure to an amount at which, as has been shown, an ignition of the gas will ensue, and which we have termed igniting pressure, will then in one case cause an ignition of the gas and

in another an extinguishing of the same, and this will take place alternately with the arrangement of guides, as at Fig. 3A. But if the guides be arranged as at Fig. 3B and Fig. 3C, this will be different.

Starting from point *o*, Fig. 3B, the first igniting pressure will, in both cases, ignite the gas and bring the point 1 of the guides on to the pin; the second igniting pressure allowing on its relief-point 2, of the guides of Fig. 3B, to descend to the lower pin, will close the gas-valve and extinguish the light; but at Fig. 3C point 2, being at a height with 1, will leave the lights burning.

A third time the pressure being raised and then relieved, point 3 of the guides will come to the pin, and in the arrangement Fig. 3B not cause a renewed lighting, and in Fig. 3C extinguish the gas.

By these means it is possible to extinguish a part of the lights at an earlier period than another, or, by a slight variation, in bringing the first igniting pressure to act simultaneously on point 2, of Fig. 3B, and on *o*, of Fig. 3C, &c. One part may be ignited at a different period from the other.

On the same principle other combinations may be arranged, which will allow the lighting and extinguishing of the different burners at three or more different periods.

The guides, instead of forming a projection, may be made in shape of a groove and only one pin, T, employed; the design, as described, has, however, been preferred on account of the greater facility it presents in execution.

The nature of the invention having been described, and the manner in which its workings are to be performed fully set forth, we wish it to be understood that we do not confine ourselves to the precise details described and represented, as the same may be varied without departing from the said invention.

Having described our invention, we claim—

1. In an automatic gas-lighting and extinguishing apparatus, the gas-burner tube H, arranged to have a direct vertical adjustment between guides M N by the action of the diving-bell D on its lower end, and which forms an integral part therewith to open and close, through said adjustment of the burner-tube, the valve Q, which it also carries, substantially as and for the purpose described.

2. In combination with the bell D, the guides U and pins T, arranged and operating essentially as herein described.

3. The combination of the bell D with the gas-valve Q, both arranged to operate essentially as herein described.

CHARLES GUSTAVE MUELLER.
HEINRICH MEIER.

Witnesses:

D. W. C. SPRAGUE,
THOS. KRACKE.