HAGEN & AURNHAMMER.

Hydrogen Lamp.

No. 47,012. Patented March 28, 1865.

Fig. 1

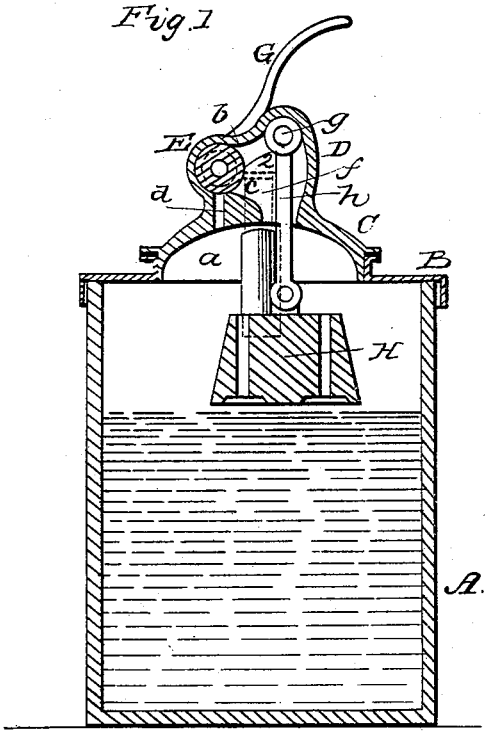


Fig. 2

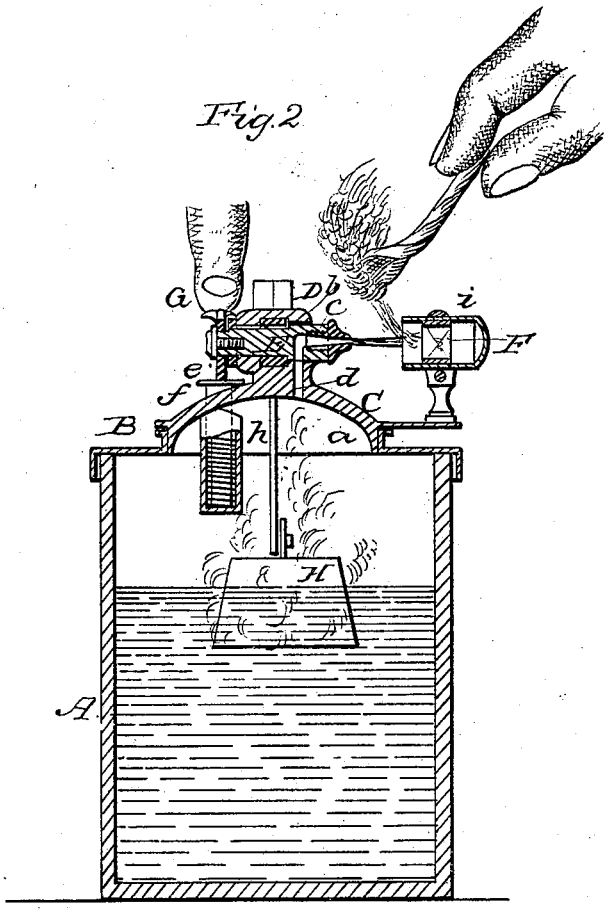
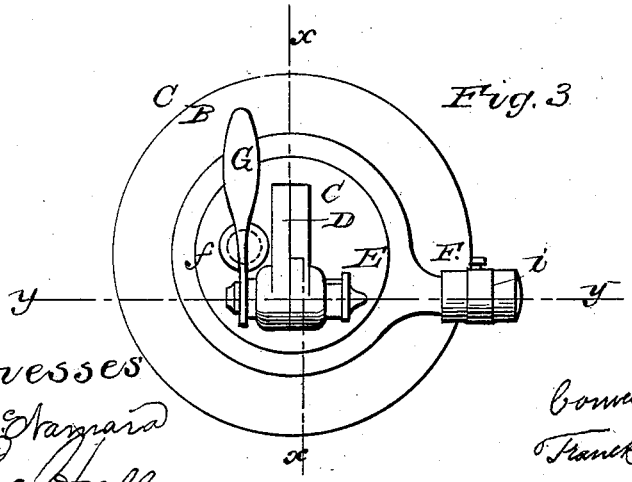


Fig. 3



Witnesses

Wm. P. McNamara

L. F. Hall

Inventor

Conrad Hagen

Franck Aurnhammer

UNITED STATES PATENT OFFICE.

CONRAD HAGEN AND FRANK AURNHAMMER, OF NEW YORK, N. Y.

IMPROVED HYDROGEN LAMP.

Specification forming part of Letters Patent No. 47,012, dated March 28, 1865.

To all whom it may concern:

Be it known that we, CONRAD HAGEN and FRANK AURNHAMMER, of the city, county, and State of New York, have invented a new and Improved Hydrogen Lamp; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical central section of this invention in a state of rest, taken on the plane *x x*, Fig. 3. Fig. 2 is a similar section of the same when in operation, the line *y y*, Fig. 3, indicating the plane of section. Fig. 3 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts.

This invention consists in the application of an oscillating arm secured to the plug of the cock which serves to admit the hydrogen gas to the platina sponge, in combination with the block of zinc, and with a suitable spring acting on the lever which serves to open the cock in such a manner that on depressing said lever or on opening the cock the zinc block is lowered into the acid contained in the jar and a sufficient quantity of hydrogen gas is evolved to produce the desired effect, and when the lamp is not used and as soon as the lever is relieved from pressure it flies back to its original position, closing the cock and raising the block of zinc above the surface of the acid, and the evolution of an excess of gas is prevented.

A represents a jar, of glass or any other suitable material, of a cylindrical or other suitable form or shape. It is covered with a plate, B, of brass or other suitable material, which is or may be firmly cemented to the edge of the jar, to prevent any loss of gas. This plate is perforated in its center with a flanged hole, *a*, provided on its inner edge with a screw-thread to receive the cap C, which supports the entire mechanism of the lamp. From the center of this cap rises the case D, the sides of which are bored out to receive the plug E, through which gas is admitted from the interior of the jar to the platina sponge F. This plug is fitted into an arm, *b*, and a small key projecting from the plug catches into a seat in the boss of the arm to prevent it from turning round independent of the plug. In order to make room for this key, it is necessary to decrease the size of the plug at one end, as clearly shown in Fig. 2 of the drawings.

The thick end of the plug, or that end facing the sponge F, is perforated with an angular channel, *c*, and by turning the plug the inner end of this channel can be made to register with a hole, *d*, bored through the cap C, and leading to the interior of the jar. The outer end of the channel *c* is constructed so that the gas escaping from the same forms a fine jet.

The thin end of the plug, or that end of the same which faces away from the sponge F, is fitted into a handle or lever, G, which is provided with a shoulder, *e*, bearing on a spring-plug, *f*. By the action of the spring-plug on the lever G the plug E is turned in such a position that the communication between the interior of the jar and the internal atmosphere is closed, but by depressing said lever the communication is opened.

The arm *b*, which is fitted to the plug E, connects at its loose end by a pivot, *g*, with a link, *h*, from which the block H, of zinc, is suspended, as clearly shown in Fig. 1 of the drawings. When the lever G is forced up by the spring-plug *f*, the block H is raised above the surface of the acid in the jar, and no gas is evolved; but if the lever is depressed, as shown in Fig. 2, the block H sinks down into the acid, and the hydrogen gas evolved by the decomposition of the water and zinc escapes through the channel *c* in the plug and strikes the platina sponge F. This sponge is secured in a tubular case, *i*, and it is adjustable toward and from the end of the plug E, so that it can always be brought in that position in which the best effect will be produced.

The gas evolved by the action of the acid on the zinc ignites as it comes in contact with the platina sponge, and if the desired effect has been produced the lever G is released and the plug E closes. Simultaneously therewith the block of zinc is raised above the surface of the acid, and the evolution of hydrogen gas is stopped. The pressure of the gas in the jar, therefore, is not perceptibly larger than that of the internal atmosphere, and it

is not necessary to take any particular care to prevent the escape of gas from the jar. No internal glass tube is needed, and the block of zinc is not exposed to the action of the gas any longer than necessary to produce the desired effect.

We claim as new and desire to secure by Letters Patent—

1. The application of the arm *b*, in combination with the plug E, block of zinc H, lever G, and spring-plug *f*, all constructed and operating substantially as and for the purpose herein shown and described.

2. Making the sponge adjustable toward and from the discharging end of the plug, as set forth.

CONRAD HAGEN.
FRANK AURNHAMMER.

Witnesses:
WM. F. MCNAMARA,
M. M. LIVINGSTON.