(No Model.)

J. W. C. C. SCHIRM.

METHOD OF PRODUCING INTENSE LIGHT BY MAGNESIUM OR OTHER GLOWING MATERIALS.

No. 446,891. Patented Feb. 24, 1891.

Fig. 2.

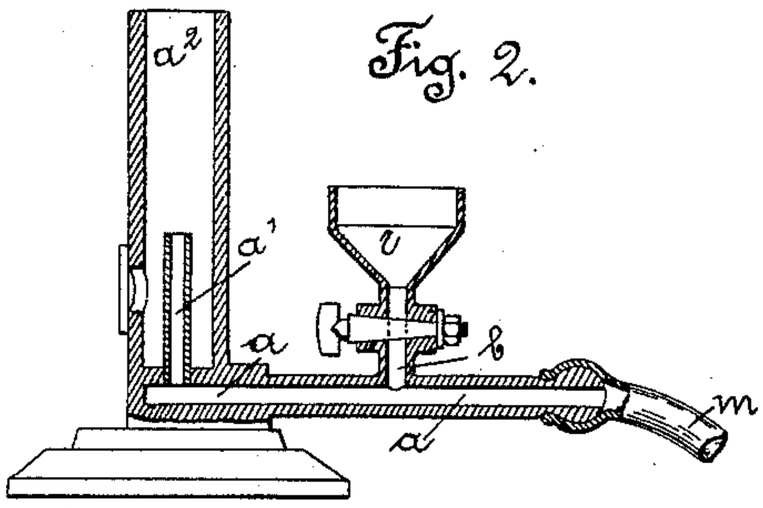


Fig. 2a.

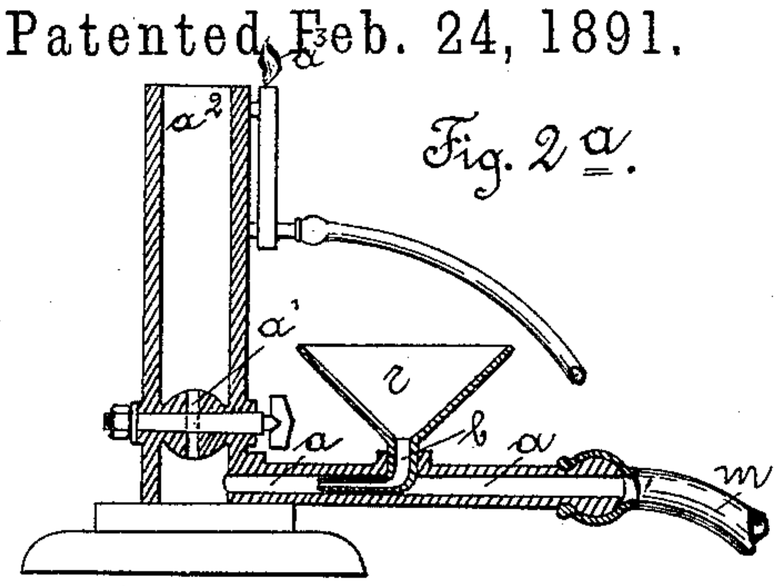


Fig. 1.

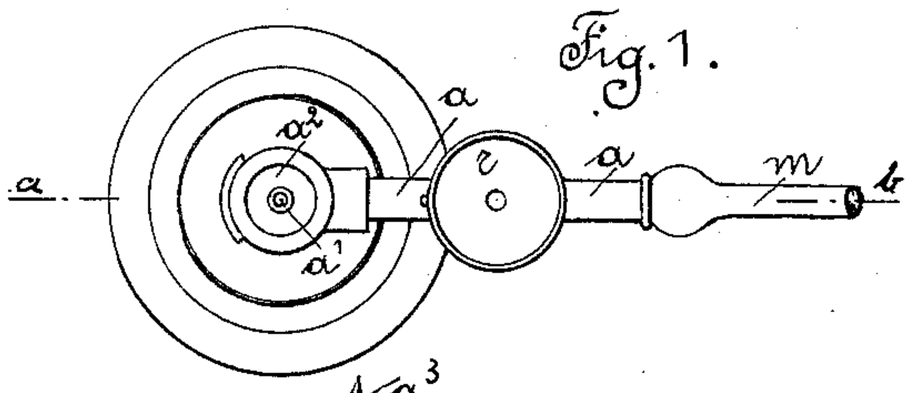


Fig. 1a.

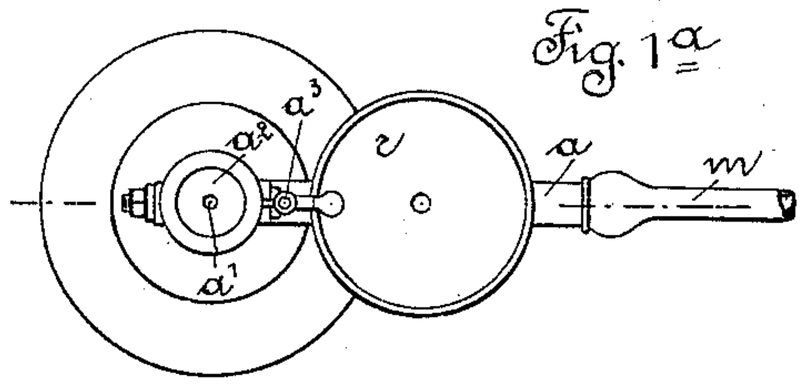


Fig. 2b.

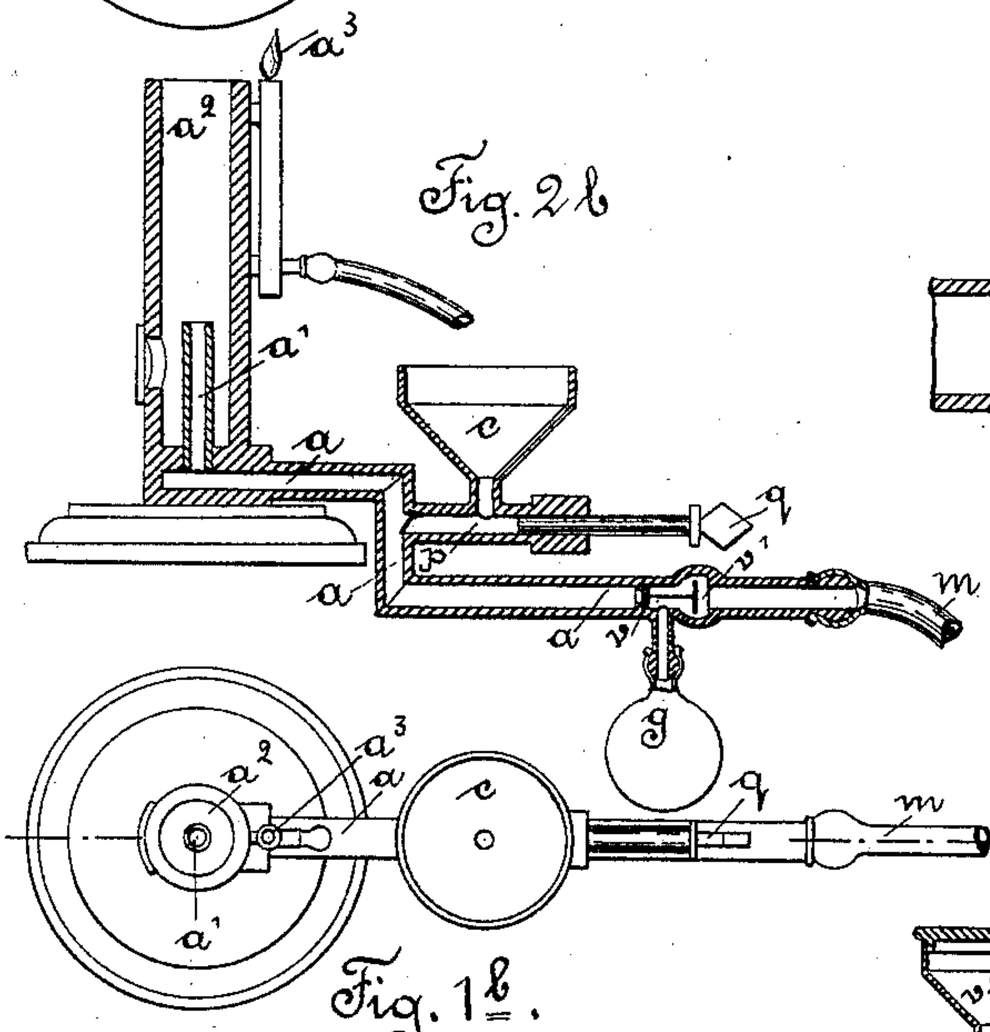


Fig. 2c.

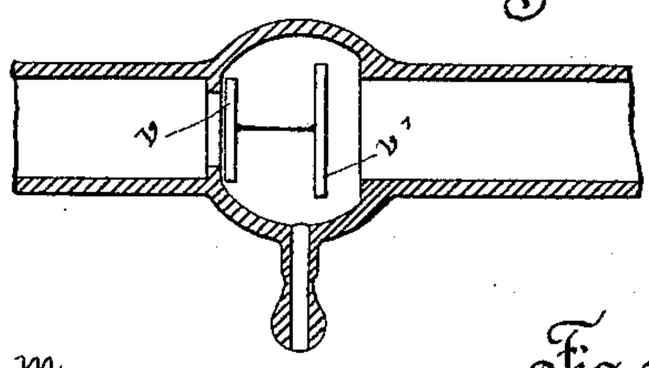


Fig. 1b.

Fig. 3.

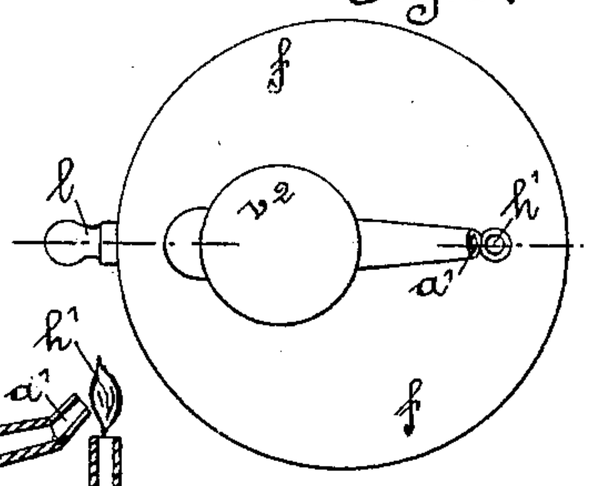


Fig. 4a.

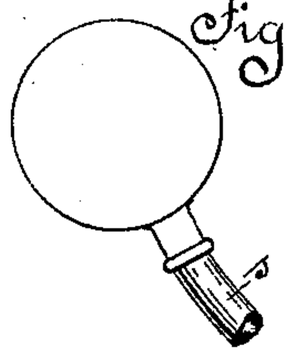
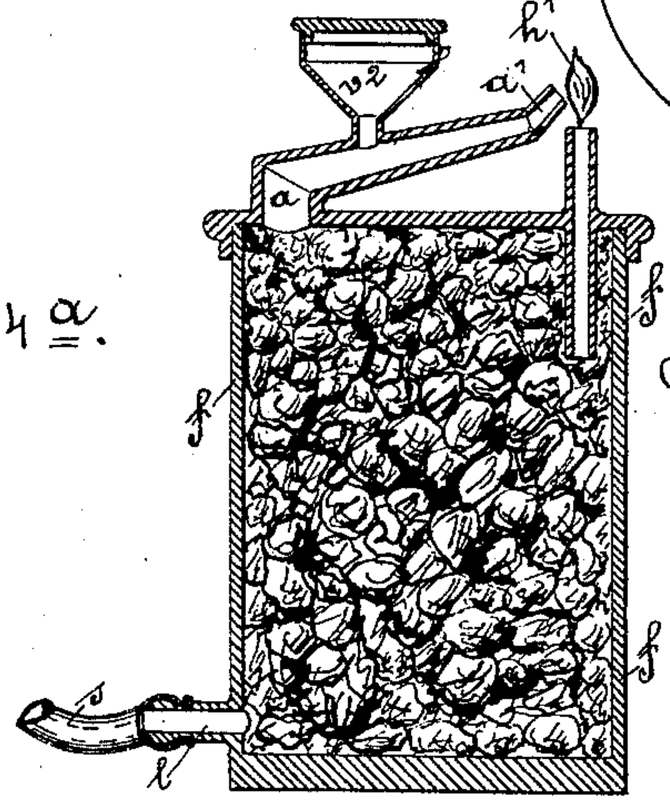


Fig. 4.



Witnesses:
G. A. Taube.
W. W. Wenski.

Inventor:
Johann W. C. C. Schirm.
by Albert G. Davis
Attorneys.

UNITED STATES PATENT OFFICE.

JOHANN WILHELM CARL COWEN SCHIRM, OF BERLIN, GERMANY.

METHOD OF PRODUCING INTENSE LIGHT BY MAGNESIUM OR OTHER GLOWING MATERIALS.

SPECIFICATION forming part of Letters Patent No. 446,891, dated February 24, 1891.

Application filed May 22, 1890. Serial No. 352,809. (No model.)

To all whom it may concern:

Be it known that I, JOHANN WILHELM CARL COWEN SCHIRM, a subject of the King of Prussia, German Emperor, and a resident of Berlin, W. 20 Pottsdamer Strasse, in the Kingdom of Prussia, German Empire, have invented some new and useful Improvements in the Method for Producing Intense Light by Magnesium or by other Glowing Materials, of which the following is a clear specification.

One of the two methods hitherto known for producing magnesium light consists in diffusing magnesium powder from above into the flame, while with the other method the lightening material is supplied to the flame from below or sidewise. Though the latter method, owing to its comparative economy in the material employed is to be preferred to the first named, it still involves great waste of material, as a proportional diffusion of the magnesium over the flame cannot be attained, and consequently a portion of the luminous material fails to receive full glowing heat. The said waste of material is intended to be effectually obviated by the improved method, in which the magnesium is not, as in the above methods, supplied to the flame from outside, but mixed with the current of gas before the latter reaches the mouth of the burner, while the velocity of said current is at the same time increased, so as to expel the magnesium powder in a diffused state from the burner.

Reference being had to the accompanying drawings, in which like letters denote like or similar parts throughout the various figures, Figure 1 is a top view of the main arrangement. Fig. 2 is a vertical section from left to right along line *a b*, Fig. 1. Figs. 1^a and 2^a represent, respectively, a top view and vertical section of a modification. Figs. 1^b and 2^b are the top view and vertical section, respectively, of another modification. Figs. 3 and 4 are respectively a top view and vertical section of a burner adapted for petroleum, alcohol, ligroin, or benzine. Figs. 2^c and 4^a represent details.

In Figs. 1, 2, 1^b, and 2^b a Bunsen burner is employed, producing a better effect. The apparatus may, however, also be provided with a common gas-burner.

In the gas-inlet pipe of the burner terminates laterally a tube *b*, serving for the introduction of the powder of magnesium, zinc, or aluminum, which is supplied either continually or intermittently, according as a continuous or a sudden or intermittent effect is intended to be produced. The rapid gas-current pressed through pipe *a* instantly diffuses the magnesium or other suitable powder and, on being mixed with the atmospheric air and ignited, produces at the mouth *a'* a constant Bunsen flame, in which the continuous or intermittent supply of magnesium or other powder burns with a very bright light. a^2 is the funnel of the Bunsen burner. The requisite gas-pressure is produced in a gas-meter. The rapid current of gas may also be caused to act by suction on the contents A of the magnesium-receptacle, (shown in Fig. 1^a and 2^a,) and, operating like an ejector, carry the powder out of receptacle *r* and tube *b*. If sudden or flash light is to be produced, a small auxiliary flame a^3 is employed, which is kept burning near the mouth of the Bunsen burner and ignites the luminous mixture at the desired moment.

The device for producing sudden or intermittent effects, which is to be employed in practice, is shown in Figs. 1^b and 2^b. *a a'* is the Bunsen burner in a caoutchouc gas-tube; *c*, a receptacle for the luminous powder; *p*, a leaf-valve in pipe *a* for the Bunsen burner, and *q* a small piston or plunger serving to supply to the pipe *a* the magnesium or other powder falling in between valve *p* and piston *q*.

The mouth of pipe *b* is opened for admitting the corresponding supply of powder and reclosed, respectively, by the forward or backward movement of piston *q*. The pipe *a* is provided with a button *t*, carrying suspended therefrom an india-rubber ball *g*. Said pipe incloses, moreover, a double seat-valve *v v'*, Fig. 2^c, the seat and the passage *v'* of which are larger than the cross-section of portion *v*. The two valves are rigidly connected with each other and so determined relatively to their seats as to allow only the one or the other valve to be closed at a time, Fig. 2^c. Normal pressure obtaining in the caoutchouc tube *m* is sufficient to cause the valve *v* to be kept closed.

When the india-rubber ball, which is filled with combustible gas, is compressed by the hand of the operator, the higher pressure produced closes the valve v', while the valve v is opened and the amount of gas contained in g rushes with corresponding energy through pipe a toward the mouth a'. The force thereby produced causes the magnesium or other powder which has accumulated in the pipe to be diffused into dust, and subsequently the mixture is ignited by the auxiliary flame referred to, which is entertained and fed from the caoutchouc tube t' and produces the desired luminous effect.

The application of the improved method to benzine, ligroin, alcohol, and petroleum burners is illustrated in Figs. 3 and 4. A reservoir f, filled with sponge impregnated with the respective fuel, carries at the top a burner-tube a, connected with a box v^2, for the magnesium or other powder. A small igniting-flame h', likewise provided at the top of said receptacle, is fed by the liquid contained in and by the vapors arising from the impregnated sponge. An india-rubber ball and caoutchouc tube s are suspended by a button l from the reservoir. From the box or funnel v^2 the requisite quantity of luminiferous powder is delivered into the burner-tube a, and in order to produce flash light the photographer or operator energetically compresses the india-rubber ball, thereby suddenly expelling an amount of combustible vapor from the reservoir through tube a, while at the same time causing the powder contained in the latter to be diffused by and mixed and expelled with the vapor. The intimate mixture thus produced is ignited by the auxiliary flame and exhibits the desired flash light. The burner-tube a, being in free communication with the sponge-reservoir, atmospheric air is allowed to enter into the latter and mixed with the combustible vapors contained therein. A valve device similar to that above referred to may, however, also be employed, so as to normally keep the sponge-reservoir closed and open the same at the opportune moment.

Preferably powdered magnesium, zinc, or aluminum are employed as materials for producing the luminous effect.

Having thus fully described the nature of my said invention, what I desire to secure by Letters Patent of the United States is—

1. The method of producing intense light for photographic or other purposes, consisting in mixing luminiferous substance or substances—such as powder of magnesium or equivalent material—with a current of gas prior to the arrival of the gas at the mouth of the burner, and diffusing said luminiferous material and expelling the mixture from the burner by the pressure of the gas proper, substantially as and for the purpose specified.

2. The method of producing intermittent or flash light, consisting in mixing luminiferous materials with a current of gas or other combustible vapor prior to such current reaching the mouth of the burner, diffusing them and conducting the mixture to the burner or flame by means of a pressure produced by a gas or vapor compression device, which is in communicating connection with the burner-tube, the whole combined and operating substantially as illustrated and described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHANN WILHELM CARL COWEN SCHIRM.

Witnesses:

ROBERT DEISSLER,

ROBERT BREDE.