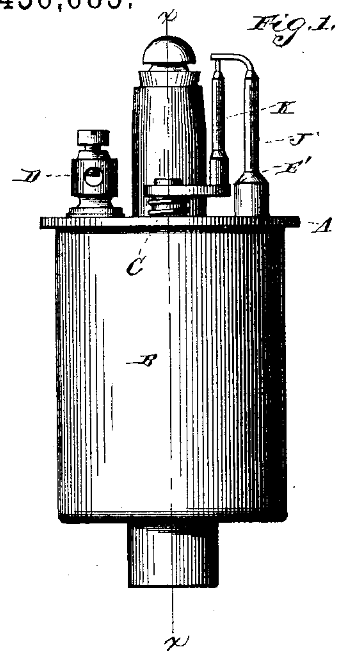
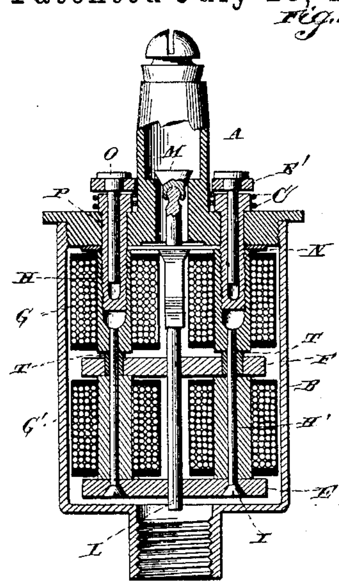
(No Model.)

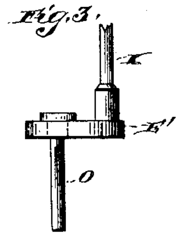
A. WUNDERLICH.

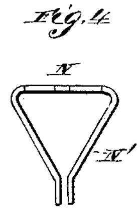
AUTOMATIC ELECTRIC GAS LIGHTER.

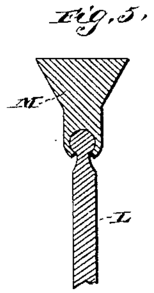
No. 456,685. Patented July 28, 1891.

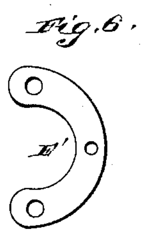


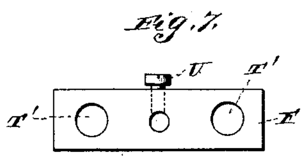


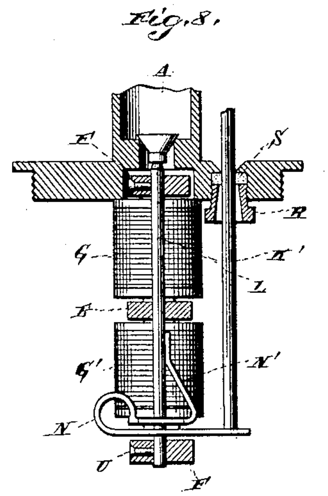












Witnesses:
J. F. Saganke
W. Wunderlich.

Inventor:
Adolph Wunderlich.

UNITED STATES PATENT OFFICE.

ADOLPH WUNDERLICH, OF CLEVELAND, OHIO.

AUTOMATIC ELECTRIC GAS-LIGHTER.

SPECIFICATION forming part of Letters Patent No. 456,685, dated July 28, 1891.

Application filed December 5, 1890. Serial No. 373,721. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH WUNDERLICH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Automatic Electric Gas-Lighter, of which the following is a specification.

My invention relates more particularly to automatic electric gas-lighters in which the working mechanism is contained within a closed case which forms the passage-way of the gas; and the objects of my improvements, tersely stated, are to construct a device that may be cheaply manufactured and be of such few and simple parts as assure reliability, efficiency, and compactibility.

The essential features of the invention are, first, the arranging of electro-magnets in such a manner that their action on the armature will be direct, but inversely opposite to each other; second, the actuation of the vibrating electrode, so there will be no escape of gas by means of an armature outside of the case; third, the construction of a valve adapted to adjust itself to its seat and overcoming any inaccuracy in the construction of the burner, and, fourth, the application of a spring which acts as a friction device and holds the armature wherever placed. These features I attain by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical view of the entire lighter. Fig. 2 is a sectional view taken on the line X X, Fig. 1. Fig. 3 is a side elevation of the vibrating electrode, the vibrating armature, and its guiding-pins. Fig. 4 shows the end view of the friction-spring. Fig. 5 is a sectional view on an enlarged scale, showing the construction of the valve and stem. Fig. 6 is a plan of the armature used for the vibrating electrode. Fig. 7 is a plan of the armature that operates the valve, and Fig. 8 shows a modification of the invention.

Similar letters refer to similar parts throughout the several illustrations.

The cap A and body B constitute the closed case of the burner, through which the gas passes. The frictional spring N and magnets G are fastened to the under side of the cap A by iron screws P. (See Fig. 2.) The lower magnets G′ are fastened by brass screws I and sleeves T, the sleeves acting as shoulders, so that the two pairs of magnets may be screwed tight together, the brass screws I extending all the way from the yoke-piece E through the cores H′ of the magnets G′ and into the cores H of the magnets G. The armature F, operating between the two pairs of magnets G and G′, (see Fig. 2,) has two holes T′ (see Fig. 7) to allow the sleeves T to slip through. This becomes necessary from the manner in which the magnets are held, but is nicely adapted to keep the armature from turning sidewise and holds it directly between the poles of the magnets. The valve-stem L passes exactly through the middle of the armature F and is tightened by means of a set-screw U. (See Fig. 7.) Said valve-stem L also passes through holes located, respectively, in the center of the yoke-piece E and frictional spring N, which, in connection with the two holes T′ in the armature F, serve to guide both armature and stem. On the upper end of stem L is fastened a valve M.

A valve which is fastened tight to the stem will not always completely close the flow of gas, owing to the fact that the stem may not be exactly in the middle of the hole which forms the valve-seat. To overcome this defect I construct my valve as shown in Fig. 5, the stem and valve being connected by a socket or ball joint conveniently made by spinning them together. This completely overcomes this difficulty, as it allows the valve to tip in any position, thereby allowing for considerable inaccuracy, as the valve will always find its seat.

To sufficiently open the valve, the armature F need not travel more than a fiftieth part of an inch. This brings the poles of the magnets within about the same distance of the armature F, thereby producing a very strong attraction, which imparts a quick and reliable motion to the stem and valve.

The vibrating electrode K is fastened in the center of the curvature-armature E′. To said armature are secured two pins O, (see Fig. 3,) which fit and extend into the iron screws P, (see Fig. 2,) thereby forming a simple guide. By this arrangement the armature E′ may readily move down and up, the springs C serving to press the armature up, so the electrodes will form a good contact at the sparking-point.

The iron screws P serve as the poles of the magnets G, and as the armature E′ may be very close the magnets G, when energized, produce a strong attraction, thereby forcing the armature E′ down, and with it the electrode K, which breaks contact with the fixed electrode J (see Fig. 1) and produces a spark. This spark weakens the current, and thereby the magnetism in the magnets G, which allows the armature to slightly ascend to its former position, being forced up by the springs C. These movements take place in rapid succession and produce the spark essential to the lighting of the burner.

To the upper side of the cap A are fastened two binding-posts D and the fixed electrode J. (See Fig. 1.) These binding-posts and electrode are insulated from the burner-body.

To light the burner the upper magnets G are set in operation, the circuit being as follows: The current enters at one of the binding-posts D, goes through the magnets G to the fixed electrode J, thence to the vibrating electrode K, which is not insulated, and conducts it to the burner-body, which, in connection with the gas-pipe, serves as a return-circuit. It will readily be understood that when the magnets G are thus energized the armature F will be attracted up, thereby opening the valve M, the lugs N′ of the friction-spring N holding said armature and valve up until attracted down by the magnets G′. This armature when up takes the place of a yoke-piece to the magnets G, (it having no other function except the closing of the valve when the lower magnets are operated.) Simultaneously with the acting of this armature F and until the circuit is broken the upper armature E′ on the outside of the case is set in rapid vibrations and produces a spark between the electrodes K and J, which lights the gas. To extinguish this burner the lower magnets are operated, the circuit being as follows: The current enters at the other binding-post D and goes through the magnets G′ and into the burner-body, which again serves as the return-circuit. When thus energized, the armature F will be attracted down until the valve is closed, which will extinguish the light. The armature F is so set in reference to the valve M that when the valve is closed the armature will not quite touch the cores of the magnets G′, which assures perfect closure of the valve. The two lugs N′ of the friction-spring N, pressing on the stem L and holding the valve M and armature F wherever placed, produce a certain amount of friction; but it is readily overcome, there being very little pressure required to hold the armature, as described.

The foregoing specification is a simple way in which my invention may be applied; but, as shown in Fig. 8, it may be modified and be equally practical and reliable.

By reference to Fig. 8 it will be seen how by a modification of the friction-spring N it may be made to serve as a spring for the electrode K′. This spring when thus modified is riveted to the cores of the magnets, and the electrode K′, where it passes through the cap A, is made gas-tight by packing S, preferably of asbestus, which may be adjusted by the hollow nut R. In this modification there is but one yoke-piece E and two armatures F F, located as shown. In other respects this burner works similar to the one previously described.

Having described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a gas-burner and a valve for controlling the supply of gas thereto, of an armature connected with said valve, two pairs of electro-magnets arranged to act on said armature, one pair to open and the other to close said valve, and a frictional spring to hold open or to hold closed said valve, substantially as specified.

2. The combination, with a burner-case having an opening closable by a puppet-valve, of a puppet-valve connected by a socket-joint, an armature connected to said valve by said socket-joint, two pairs of electro-magnets arranged to act inversely on said armature, one pair to open and the other pair to close said valve by said armature, and a frictional spring capable of holding said valve and armature wherever placed, substantially as described.

3. The combination, with a burner-case, of internal electro-magnets extending through to the external surface, said electro-magnets operating an armature on the inside which opens a valve, an external armature carrying a vibrating electrode and operated by said electro-magnets, said external armature guided by pins extending into the burner-body or magnet-cores, and springs pressing said armature in a direction opposite to that of the attraction of the magnets, substantially as described, and for the purpose set forth.

ADOLPH WUNDERLICH.

Witnesses:
G. F. LAGANKE,
W. F. WUNDERLICH.