

(No Model.)

J. D. C. CHATEAU.

VALVE CONTROLLING DEVICE FOR GAS BURNERS.

No. 602,696.

Patented Apr. 19, 1898.

Fig. 1.

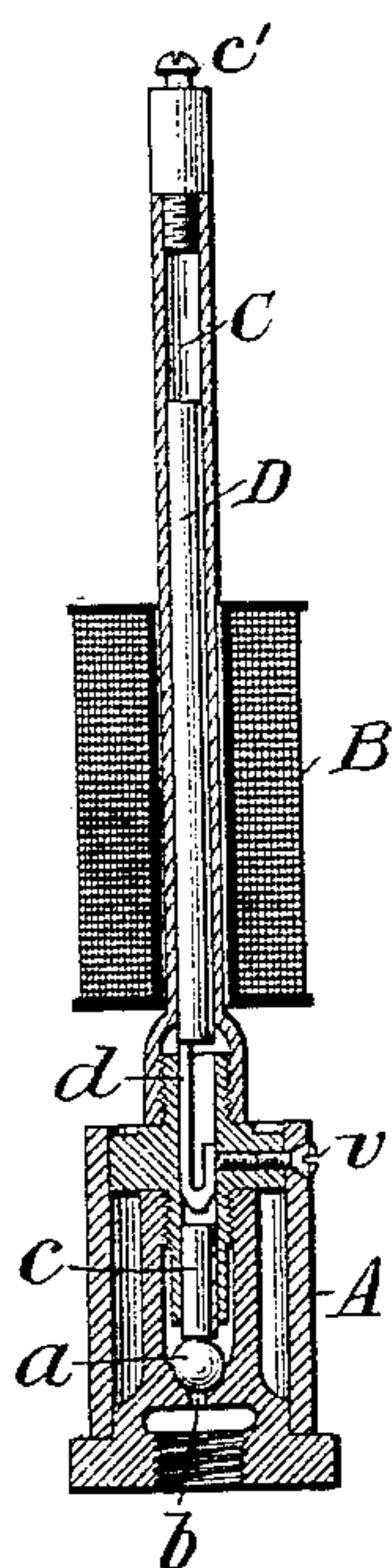


Fig. 2.

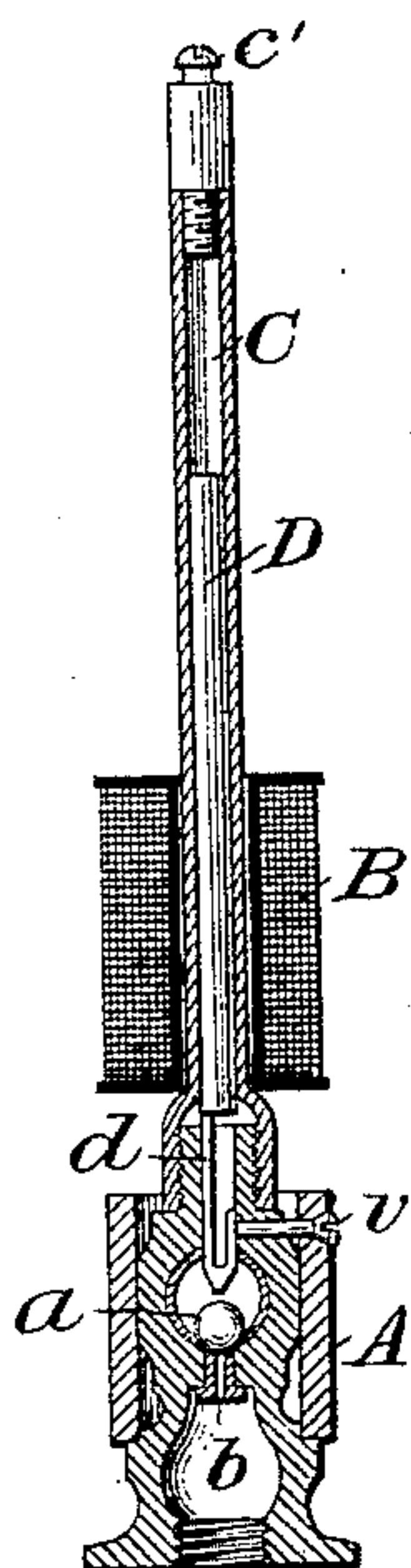


Fig. 3.

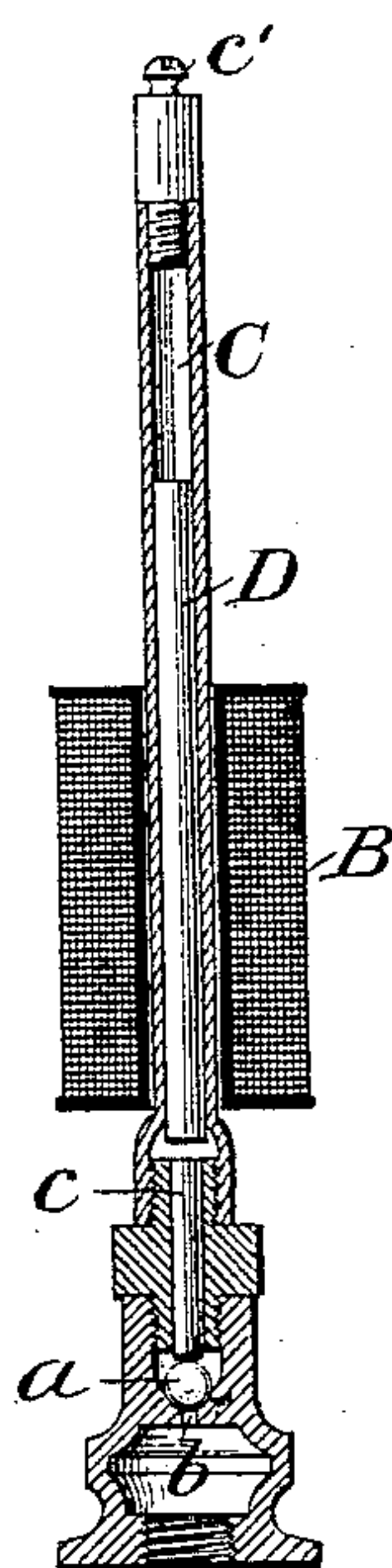


Fig. 4.

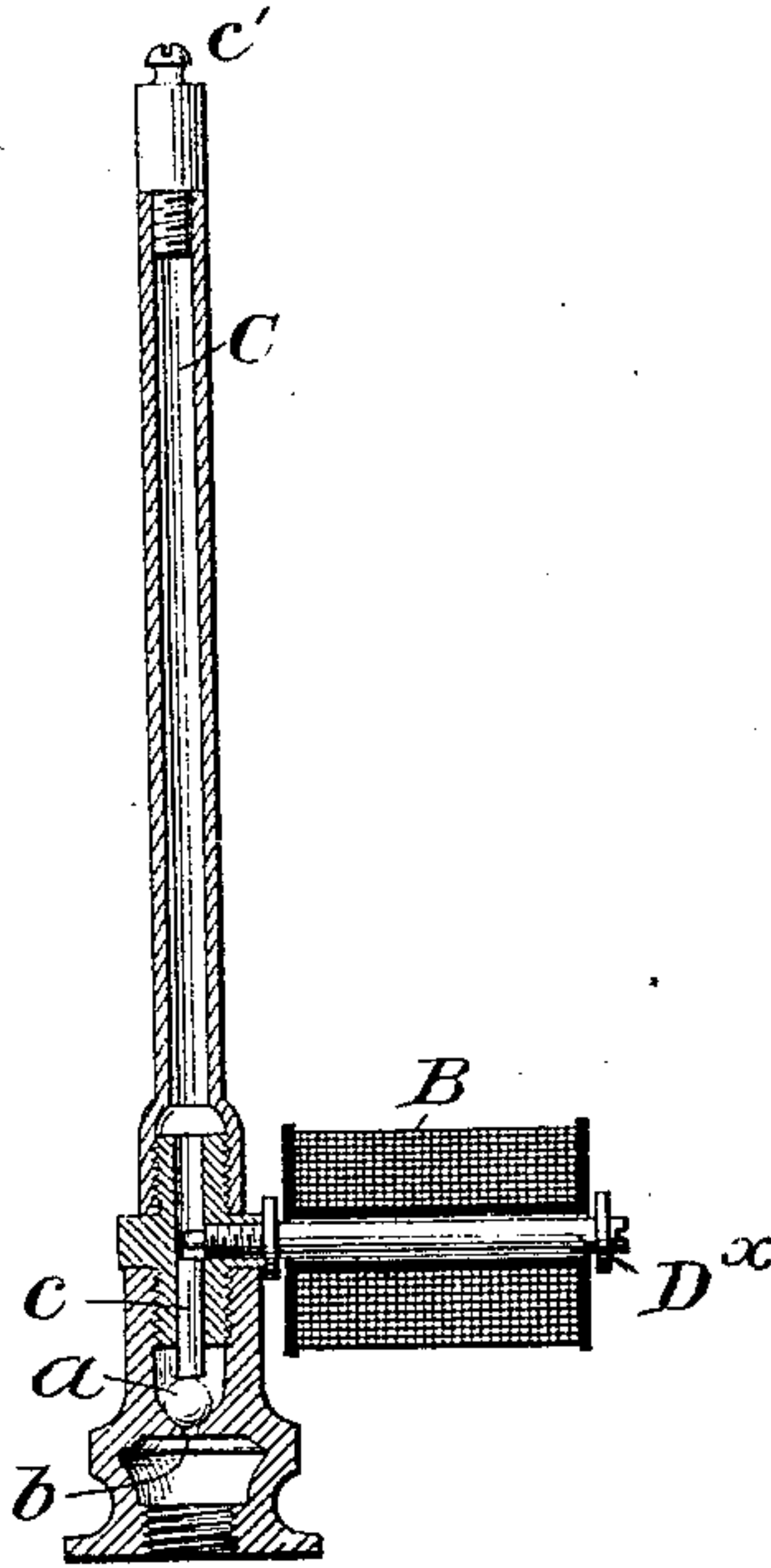


Fig. 5.

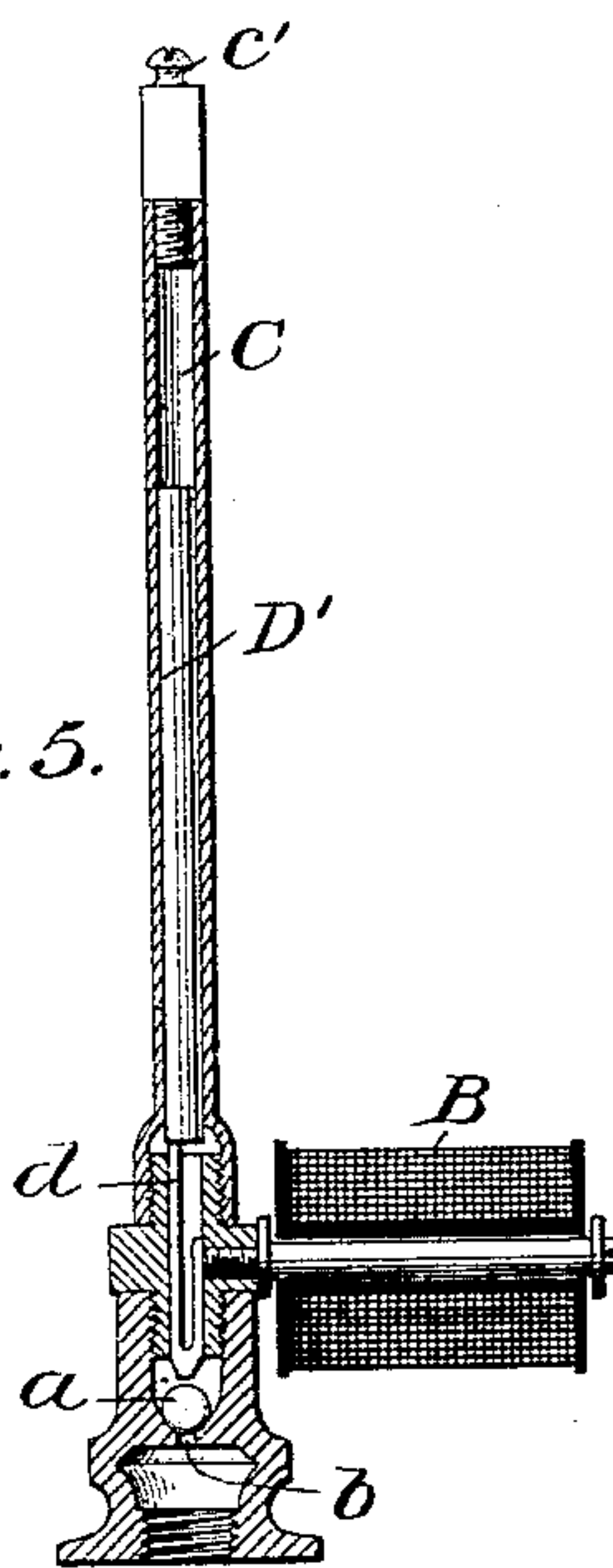
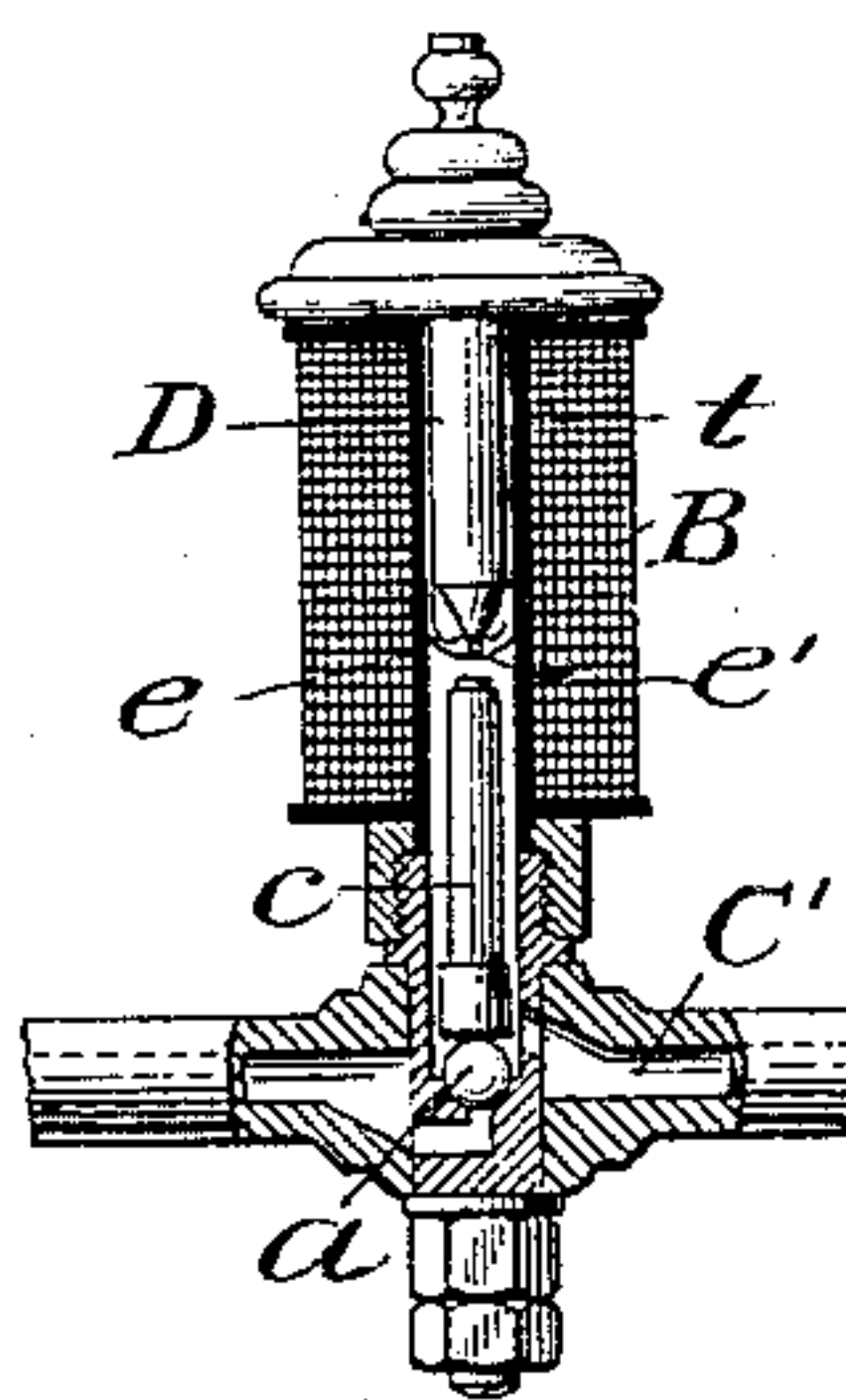


Fig. 6.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JOSEPH DENIS CYPRIEN CHATEAU, OF PARIS, FRANCE.

## VALVE-CONTROLLING DEVICE FOR GAS-BURNERS.

SPECIFICATION forming part of Letters Patent No. 602,696, dated April 19, 1898.

Application filed December 31, 1896. Serial No. 617,623. (No model.) Patented in France May 30, 1896, No. 256,784.

*To all whom it may concern:*

Be it known that I, JOSEPH DENIS CYPRIEN CHATEAU, a citizen of the Republic of France, residing at Paris, France, have invented an Improved Valve-Controlling Device for Gas-Burners, (for which I have obtained a patent in France, dated May 30, 1896, No. 256,784,) of which the following is a specification.

My invention relates to means for electrically controlling the admission of gas to burners; and it consists in the novel construction hereinafter described and claimed.

Reference is to be had to the accompanying drawings, in which—

Figure 1 shows, by way of example, partly in vertical section and partly in horizontal section, a gas-burner constructed according to my invention. Fig. 2 is a similar view to Fig. 1, showing another form of such burner. Fig. 3 shows, by way of example and in vertical section, a burner of a somewhat different type. Figs. 4, 5, and 6 are vertical sections showing other constructions of this kind of burner.

Burners constructed according to one form of my invention comprise, as shown in Fig. 1, a valve *a*, which may be of ball shape, as shown, or of other suitable shape, is made of magnetic material, and is placed on a gas-outlet orifice *b* in a suitable non-magnetic casing *b'*, adapted to be secured, as by a screw-threaded socket-shaped part, to a gas-supply pipe; a mass or armature *c*, of soft iron, (hereinafter called the "iron" plunger,) that is capable of moving vertically in a non-magnetic guide and is situated above the valve *a*; a hollow magnet or magnetized tube *A*, fixed, by means of a screw *v*, to an approximately V-shaped part *d*, of magnetic material, situated in line with and above the valve *a* and iron plunger *c*; a solenoid *B*, arranged on the "candle" or stem *C* of the burner, which is provided at its upper end with the burner proper or nib *c'*, and a steel rod *D*, arranged within the stem *C*, but so as not to prevent the flow of gas through the stem.

The power of the magnet *A* is so designed that under ordinary conditions it is not able to support the iron plunger *c* and the valve *a*, which then closes the outlet *b*. When, however, an electric current is passed through the solenoid *B* in the proper direction, the

steel rod *D* is magnetized and acts to aid the action of the magnet *A* in such a manner that by means of the part *d* the iron plunger *c* and the valve *a* are raised; but when, on the contrary, a current is passed through the solenoid *B* in the reverse direction the magnetized rod *D* acts in the reverse direction and the V-shaped point of the part *d* becomes a consequent point of the whole of the magnets and soft-iron parts, and consequently the valve *a* falls onto its seat, thereby cutting off the further supply of gas. The iron plunger *c* then bears upon the valve, so as to cause it to effect a more complete closure of the exit-opening *b*.

As a modification of this kind of gas-burner there may be used the arrangement shown in Fig. 2, in which the iron plunger *c*, used in the first arrangement, is dispensed with, the part *d* acting magnetically directly upon the valve *a*, whose seat is formed by a screw having a central gas-exit passage therethrough.

I may also construct somewhat different burners, which comprise, as shown in Fig. 3, a hardened-steel rod *D*, arranged inside the burner-stem *C*, a solenoid *B*, arranged around the said stem, a valve *a* of magnetic material, and an iron plunger *c*. With this arrangement, if a current be passed through the solenoid *B* in either direction, the rod *D* will be magnetized and the iron plunger *c* will be attracted and become itself magnetized and will in its turn attract and raise the valve *a*, which will then allow the gas to pass to the stem *C* and burner-nib *c'*. In order to shut off the gas, alternating currents of decreasing strength are sent through the line-wire, and consequently through the solenoid *B*. The rod *D* thereby becomes an inert or demagnetized piece of steel, so that the valve *a* falls back onto its seat and the iron plunger *c* drops onto the valve and insures the complete closure of the orifice *b*. As modifications of this kind of gas-burner there may, for instance, be employed the arrangements illustrated by Figs. 4, 5, and 6.

In Fig. 4 the solenoid *B*, instead of being slipped onto the burner-stem *C*, is arranged horizontally on one side, and its core *D* is arranged to act magnetically upon the iron plunger *c*.

In Fig. 5 the iron plunger *c* of Fig. 4 is re-



placed by a fixed magnetic part *d*, upon which rests a steel rod *D'*, as in the arrangements shown in Figs. 1 and 2.

In Fig. 6 gas that passes the valve *a*, instead of flowing through a burner-stem direct to a burner proper, passes through a pipe *C'*, and the solenoid *B* is slipped upon a tube *t*, secured to the valve-case and provided with a copper cap *e*, suitably soldered or brazed in place and in the center of which is a small iron rivet *e'*. The tube *t* receives the hardened-steel rod *D*, the magnetism of which, when the rod is excited, is transmitted to the iron plunger *c* by the rivet *e'*, while the cap *e* prevents all escape of gas through the tube *t*.

What I claim is—

1. A burner comprising a valve-case adapted to be connected to the gas-service piping; and having a gas-exit passage, a valve formed of magnetic material, arranged loosely on its seat, and adapted to control said exit-passage, a piece of soft iron arranged above said valve and adapted to lift the same when sufficiently excited, a permanent-magnet facing arranged so as normally to magnetize said piece of soft iron but not to a sufficient extent to lift said valve; and an electromagnet comprising a steel rod surrounded by a solenoid through which electric currents can be passed, said electromagnet serving when suitably excited to modify the magnetism of the armature produced by the first magnet and vary the effect thereof so as to depress or raise the same according as the magnetism of the electromagnet assists or is in opposition to the magnetism of the permanent magnet, substantially as hereinbefore described.

2. A gas-burner comprising a valve-case having a passage for exit of gas and a burner-stem *C* with burner proper, a valve *a* controlling said gas-exit passage, a soft-iron plunger *c*, a V-shaped part *d* of magnetic material, a magnet *A* surrounding said armature and V-shaped part, a solenoid *B* surrounding said burner-stem, and a steel rod *D* located within said stem, the whole constructed, arranged and operating substantially as described and shown for the purpose specified.

3. A burner comprising a valve-case having a gas-exit passage and a hollow stem with burner proper, a loose valve of magnetic material controlling said exit-passage, a magnetic part adapted when sufficiently magnetized to raise said valve, a solenoid surrounding said stem, and a rod of magnetic material arranged as a core to said solenoid and adapted to magnetize said magnetic part and raise said valve when the solenoid is traversed by a continuous current and to demagnetize said movable part and permit said valve to fall into its closed position when said solenoid is traversed by an alternating current of decreasing strength, substantially as herein described.

4. The combination of the valve-casing, the magnetic valve controlling a port in said casing, a steel rod alining longitudinally with

said valve, a solenoid or coil arranged to influence said steel rod magnetically, the valve being located without the coil, and a hollow permanent magnet surrounding the valve, substantially as described.

5. The combination of the valve-casing, the magnetic valve controlling a port in said casing, a tubular permanent magnet surrounding the valve and extending above the same, and a solenoid or coil located above said magnet and arranged to influence the same, substantially as described.

6. A gas-burner consisting of a valve-case *a'* with exit-passage *b'* and stem *C* carrying the burner proper *c'*, a valve *a* of magnetic material controlling said gas-exit passage, a soft-iron plunger located above said valve, a steel rod *D* located above said plunger and within the stem, and a solenoid surrounding said stem and rod, substantially as described.

7. The combination of a valve-casing, a valve capable of actuation by magnetism and operating within the valve-casing, an electromagnet, and a stationary magnetic member interposed between the valve and the core of the electromagnet and coacting with the magnet to operate the valve, substantially as described.

8. The combination of a valve-casing, a valve capable of actuation by magnetism and located within the valve-casing, an electromagnet, a magnetic member interposed between the valve and electromagnet and transmitting magnetism from the electromagnet to the valve, and a permanent magnet adjacent to the valve and influencing the same in conjunction with the electromagnet, substantially as described.

9. The combination of a casing, a valve capable of actuation by magnetism and located within the valve-casing, a magnetic member normally rested on the valve, a second magnetic member located above the first magnetic member, and an electromagnet with whose core the said second magnetic member is engaged, substantially as described.

10. The combination of a casing, a valve capable of actuation by magnetism and located within the valve-casing, a magnetic member normally rested on the valve, a second magnetic member located above the first magnetic member, a permanent magnet embracing the valve-casing and influencing but not entirely operating the magnetic parts therein, and an electromagnet coacting with the permanent magnet and operating the valve through the medium of the magnetic members within the valve-casing, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH DENIS CYPRIEN CHATEAU.

Witnesses:

LÉON FRANCKEN,  
EDWARD P. MACLEAN.