

No. 775,054.

PATENTED NOV. 15, 1904.

I. G. WATERMAN.
ELECTROMAGNETIC VALVE.

APPLICATION FILED MAR. 9, 1903. RENEWED DEC. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

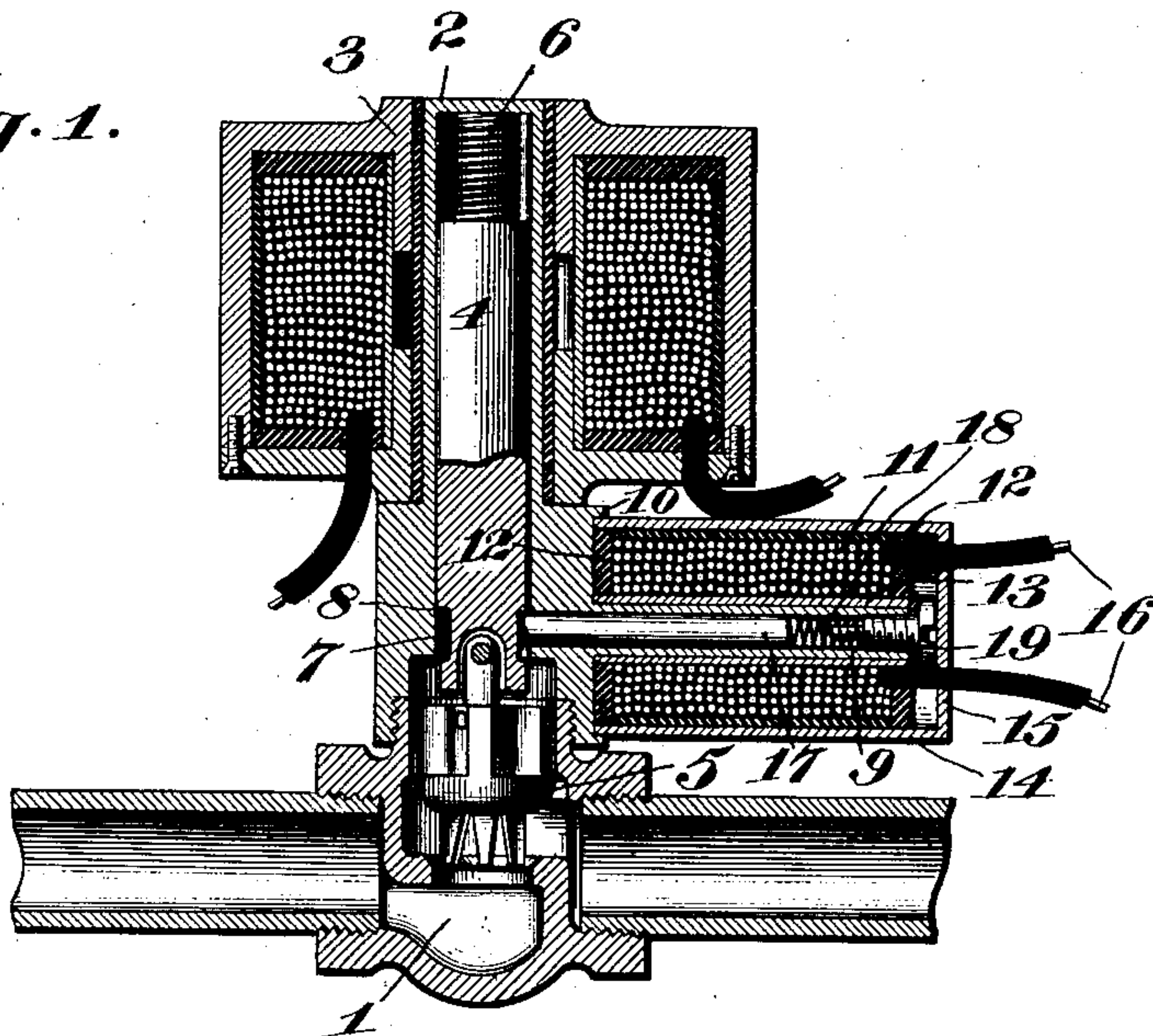
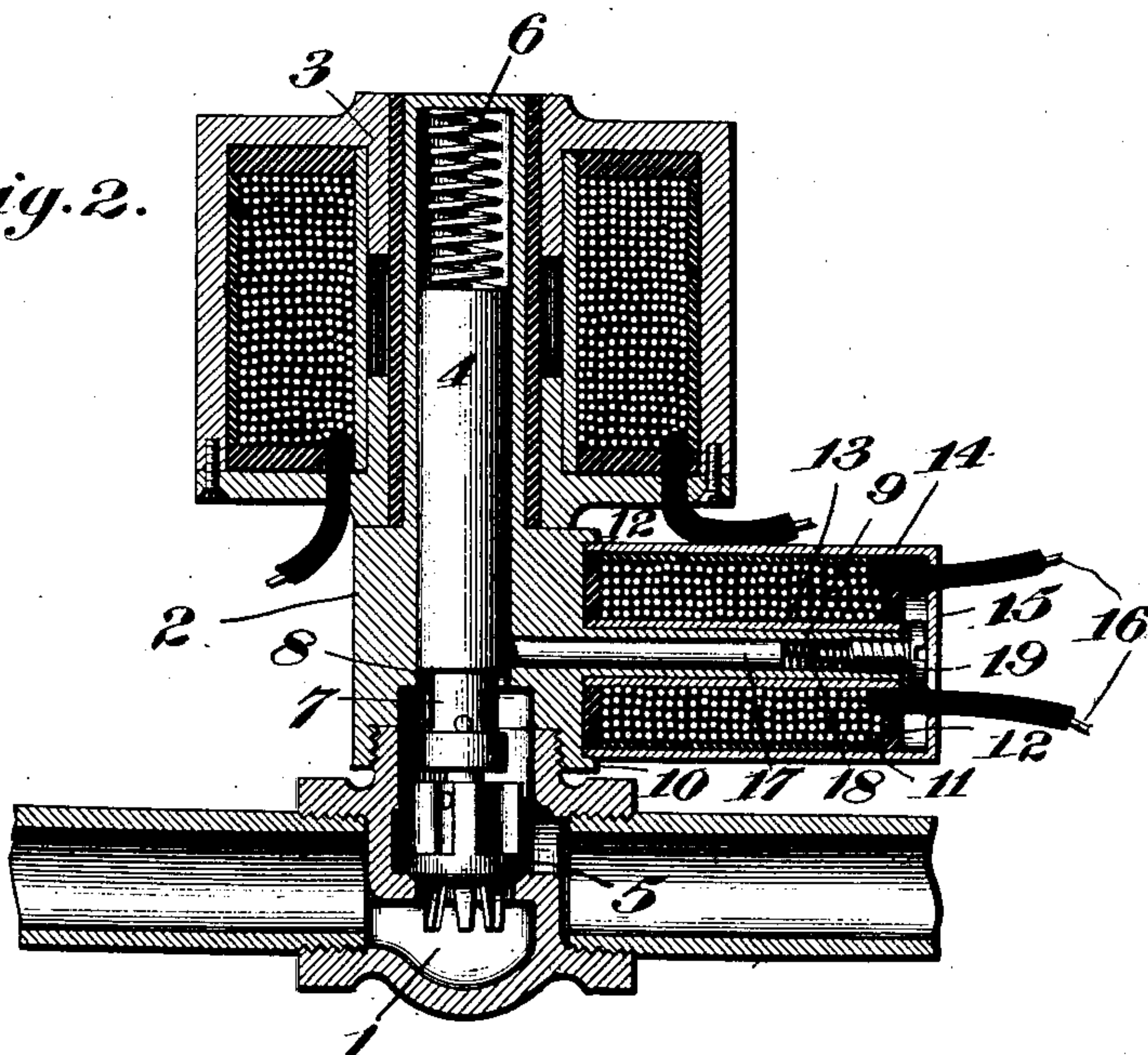


Fig. 2.



Inventor

Isaac G. Waterman

Witnesses

Elmer Seavey
Sarah V. Lockwood

By

Geo. W. Lusk
his Attorney

No. 775,054.

PATENTED NOV. 15, 1904.

I. G. WATERMAN.
ELECTROMAGNETIC VALVE.

APPLICATION FILED MAR. 9, 1903. RENEWED DEC. 24, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 3.

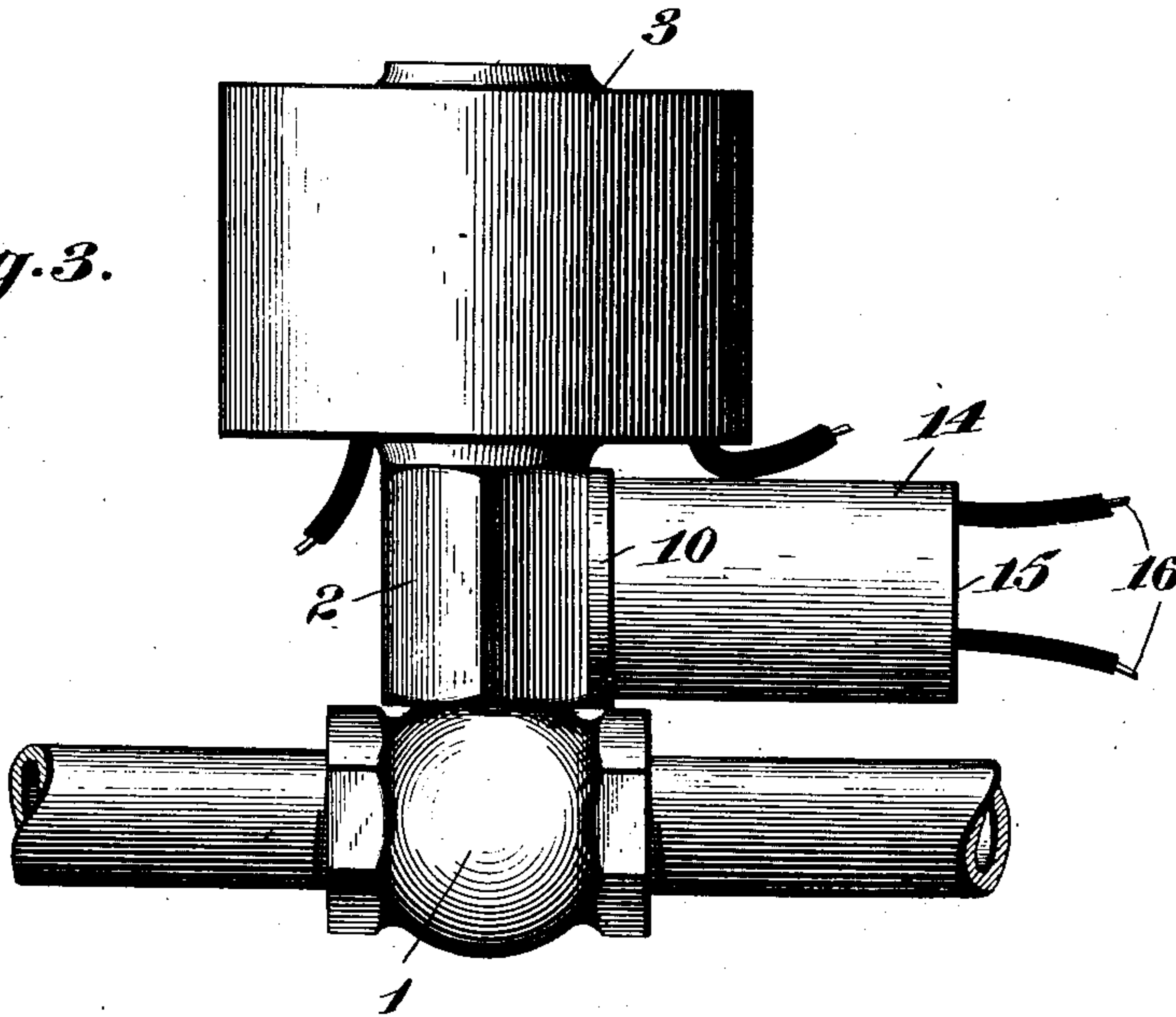


Fig. 4.

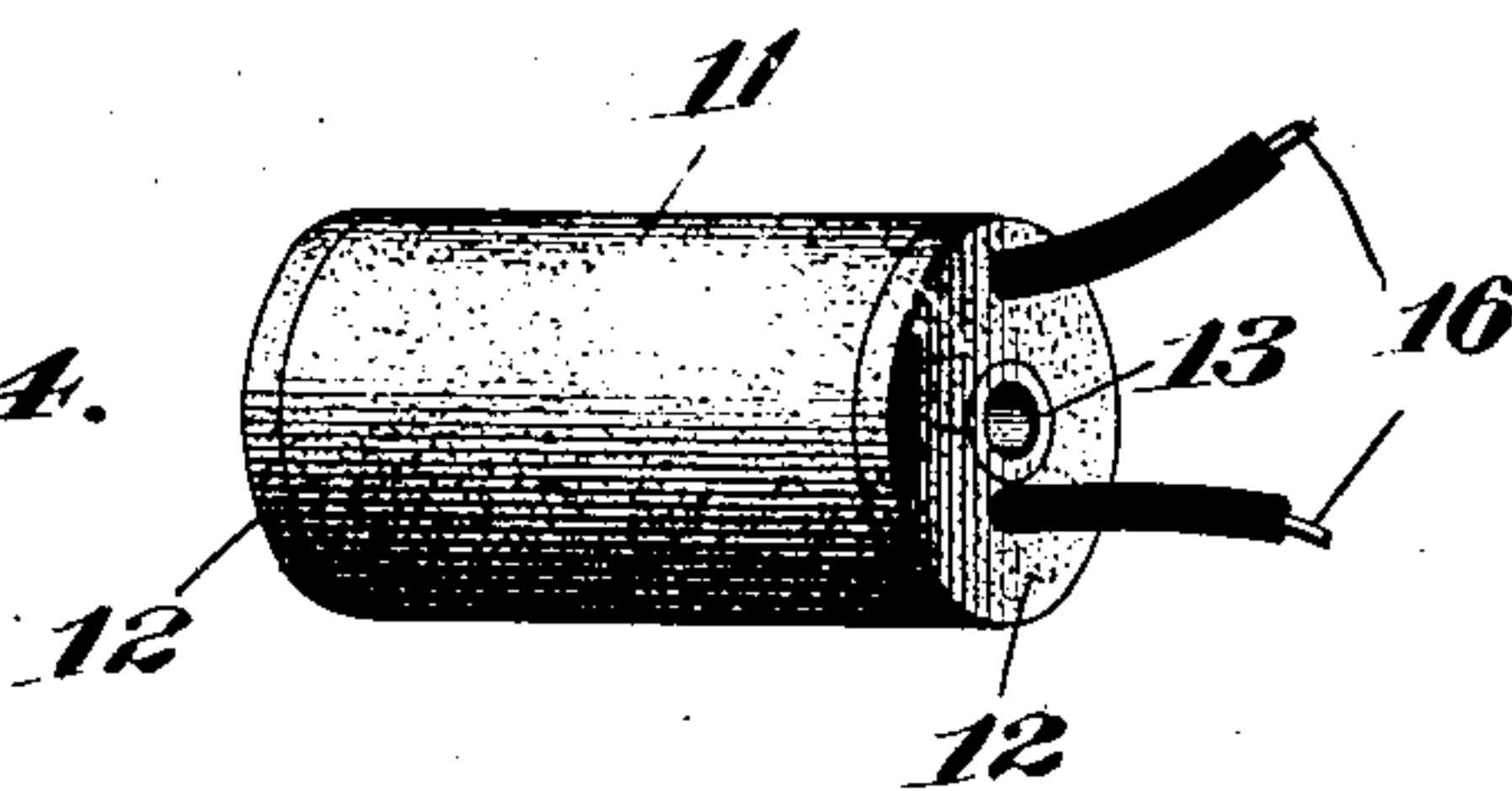
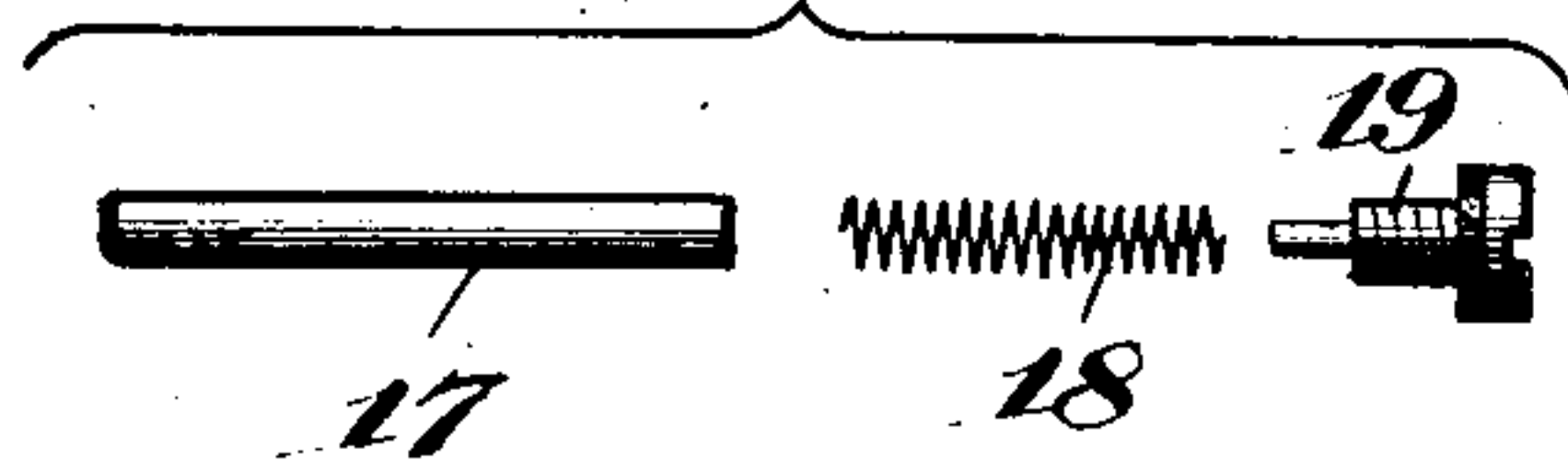


Fig. 5.



Witnesses

Elmer Seavey
Sarah V. Lockwood

Inventor

Isaac G. Waterman

By

Geo. N. L. L. L.
his Attorney

UNITED STATES PATENT OFFICE.

ISAAC G. WATERMAN, OF SANTA BARBARA, CALIFORNIA.

ELECTROMAGNETIC VALVE.

SPECIFICATION forming part of Letters Patent No. 775,054, dated November 15, 1904.

Application filed March 9, 1903. Renewed December 24, 1903. Serial No. 186,507. (No model.)

To all whom it may concern:

Be it known that I, ISAAC G. WATERMAN, a citizen of the United States, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Electromagnetic Valves, of which the following is a specification.

My invention relates to electromagnetic valves.

The present invention is designed as an improvement on the electromagnetic valves set forth in my copending applications, filed June 24, 1902, Serial No. 113,002, and filed June 24, 1902, Serial No. 113,003, and has for its object the provision of improved and novel means for locking the valve in open position when opened by the electromagnetic action and for electromagnetically releasing the valve to permit closing thereof when desired.

In my copending applications aforesaid, it is necessary, in order to hold the valve open, to maintain a current in the coil, for on the cessation of the current the valve closes by gravity. The continuance of a current in the coil for some time causes heating effects which are prejudicial to the coil; and the purpose of the present invention is to provide means for automatically locking or securing the valve after it has been opened by sending a current through the coil, thereby obviating the necessity of maintaining a current in the coil, and to make provision for electromagnetically releasing the valve to allow it to seat itself.

To accomplish the foregoing objects, I provide certain improvements and novel combinations, set forth in detail hereinafter and recited in the appended claims.

In the accompanying drawings, Figure 1 is a vertical section showing the valve raised and locked; Fig. 2, a similar view showing the valve closed; Fig. 3, a side elevation; Fig. 4, a perspective detail of the coil; Fig. 5, a detail of the locking-core, spring, and screw.

The valve-casing 1, shell 2 rising therefrom, the magnet 3, and the core or armature 4, connected to the valve 5, are, by preference, of substantially the same construction as fully shown and described in my copending applications heretofore referred to; but to insure

perfect and quick seating of the valve I prefer to employ a pressure-spring 6 within the shell 2 and bearing on the upper end of the core 4, and for the purposes of the present invention I provide an annular groove 7 on the core, which defines a shoulder 8.

Projecting laterally from the lower portion of the shell 2 is a tube 9, at whose base is a stationary circular flanged disk 10. A coil 11, provided with suitable heads 12 and wound on a brass tube 13, is fitted over the tube 9 and seated at one end against the disk 10. The coil is inclosed by an iron shell 14, closed at its outer end 15 and having its inner end fitted against the disk 10, within the flange thereof. This shell 14 can be held by fastenings, if desired, or by frictional contact only. The shell 14 increases the magnetic action of the coil 11, according to well-known principles. The wires 16 from the coil are led out through suitable openings in the end of the shell 14.

Movable within the tube 9 is a core or armature 17, whose end is positioned to project into the groove 7 and engage the shoulder 8 and hold the valve raised off its seat after the core 4 has been drawn upwardly on sending a current through the coil or magnet 3. To accomplish the projection of the core 17 for this purpose, I provide a spring 18, interposed between the end of the core 17, and a screw 19, which is threaded into the end of the tube 9. The head of the screw 19 bears on the outer head of the coil and keeps it on tube 9.

The wires of the coil or magnet 3 can be included in any suitable electric circuit and the wires of coil 11 in any other suitable electric circuit, and in this connection I have invented an improved switch, forming the subject-matter of an application filed of even date herewith, which is adapted to first send a temporary current through the coil, and afterward at option to be manipulated to send a current through coil 11 to retract the core 17 and permit the valve to close.

A temporary current of electricity having been sent through coil 3 the core 4 is attracted and the valve opened, whereupon the core 17 is projected by its spring into engagement

with shoulder 8, and though the current in coil 3 has ceased the core 4 is held up and the valve is open. Whenever a current of electricity is sent through coil 11, the core 17 is retracted, and the core 4 and valve drop, assisted by the pressure of spring 6. Thus it becomes unnecessary to maintain a current in coil 3 in order to keep the valve open, and I thereby avoid injurious heating effects.

10 The present invention is intended for use in any connection where such a device would be serviceable, but is particularly designed as a valve for controlling the water-supply to lavatories, bath-tubs, and hot-water radiators, 15 and the steam-supply to steam-radiators.

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

1. In an electromagnetic valve, the combination with a hollow electromagnet-coil, a core or armature adapted to be drawn into said coil, and a valve operated by said core, of a hollow electromagnet-coil, and a spring-pressed core or armature therein adapted to automatically lock the valve in open position. 25

2. In an electromagnetic valve, the combination with a valve-casing, of a valve and a slidable magnet-core, a magnet-coil for at-

tracting the core, a slidable locking-core disposed substantially at right angles to the magnet-core aforesaid, and adapted to automatically engage the same, and a magnet-coil for retracting said locking-core. 30

3. The combination with an electromagnetically-opened valve, and a valve-casing, of a tube secured to the valve-casing, a core movable in the tube, a coil on said tube, and a spring interposed between the end of the tube and the core, said core being adapted to lock the valve. 35 40

4. The combination with an electromagnetically-opened valve, and a valve-casing, of a disk or seat on the valve-casing, a tube secured to the valve-casing, a coil on the tube, a shell over the coil and bearing against the disk or seat, a core in the tube adapted to lock the valve, a screw in the end of the tube and holding the coil on the tube, and a spring interposed between the screw and the core. 45

In testimony whereof I have signed my name to this specification in presence of two witnesses. 50

ISAAC G. WATERMAN.

Witnesses:

E. S. PILLARD,

P. M. HAMMOND.