

No. 765,686.

PATENTED JULY 26, 1904.

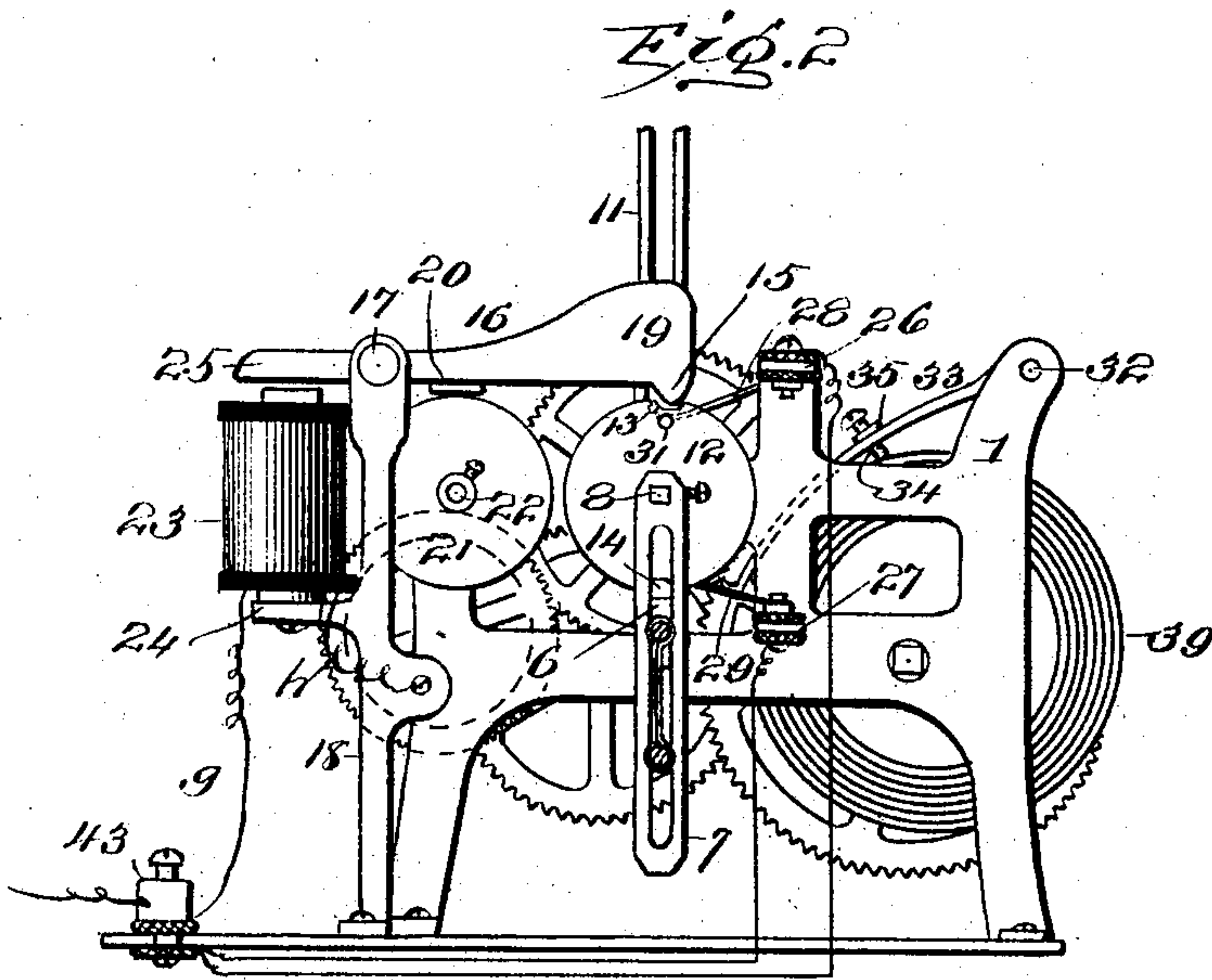
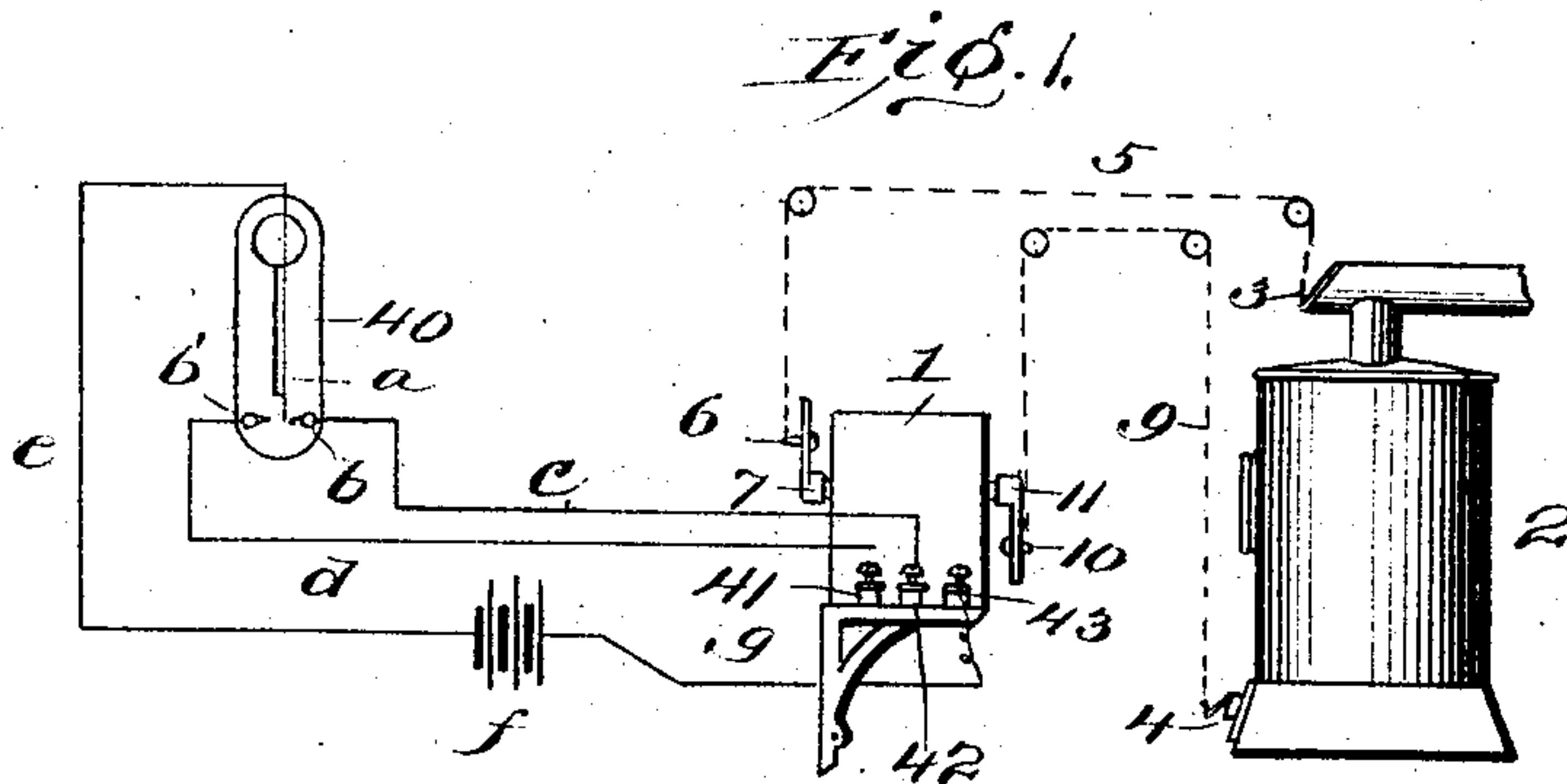
F. J. SPRAGUE.

ELECTRICALLY CONTROLLED DAMPER FOR HEATERS.

APPLICATION FILED SEPT. 4, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
J. M. Fowler Jr.
F. T. Johnson

Inventor
F. J. Sprague
By *J. R. Nottingham*
Attorney

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2 SHEETS—SHEET 2.

FIG. 3.

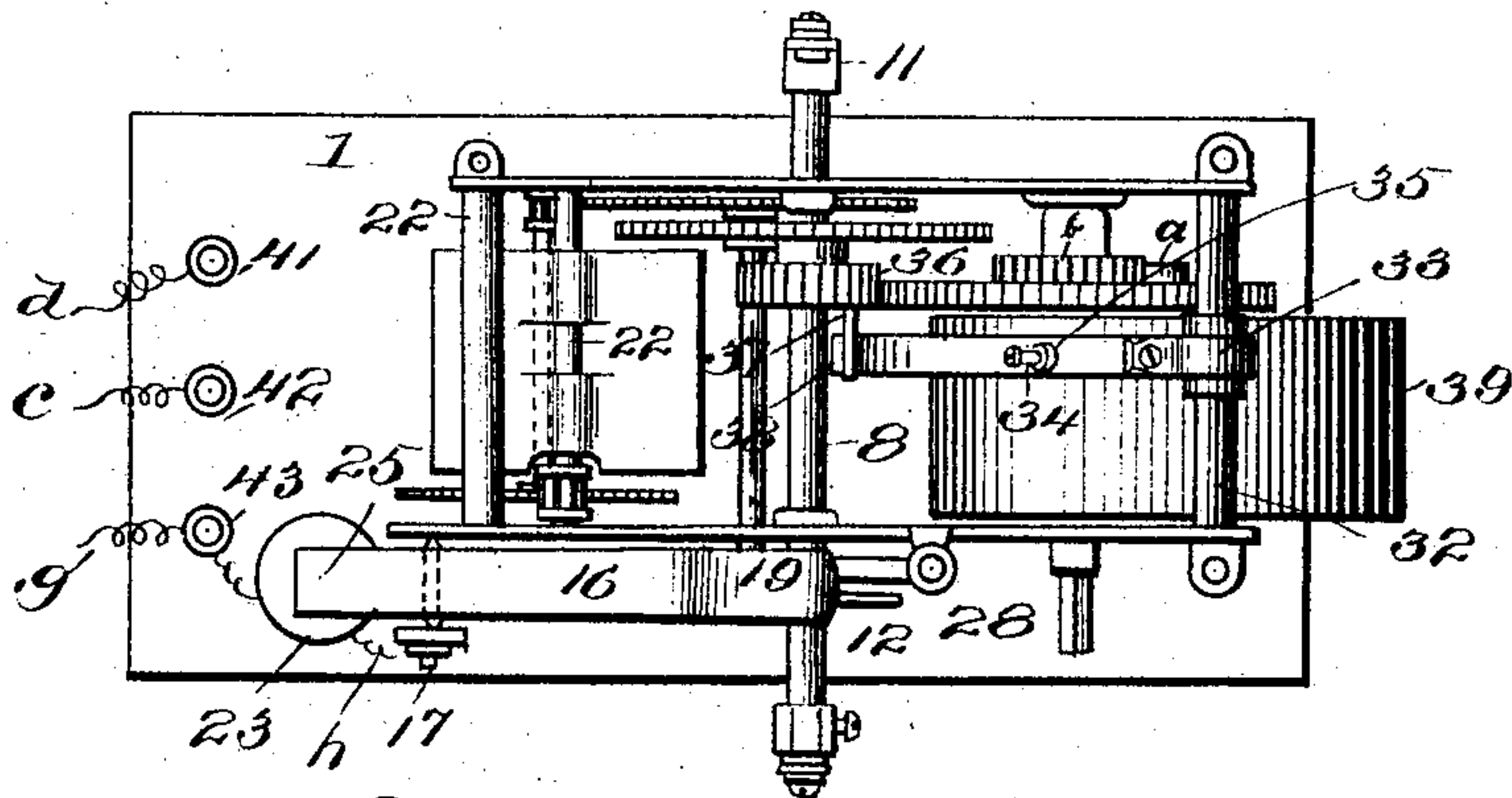


FIG. 4.

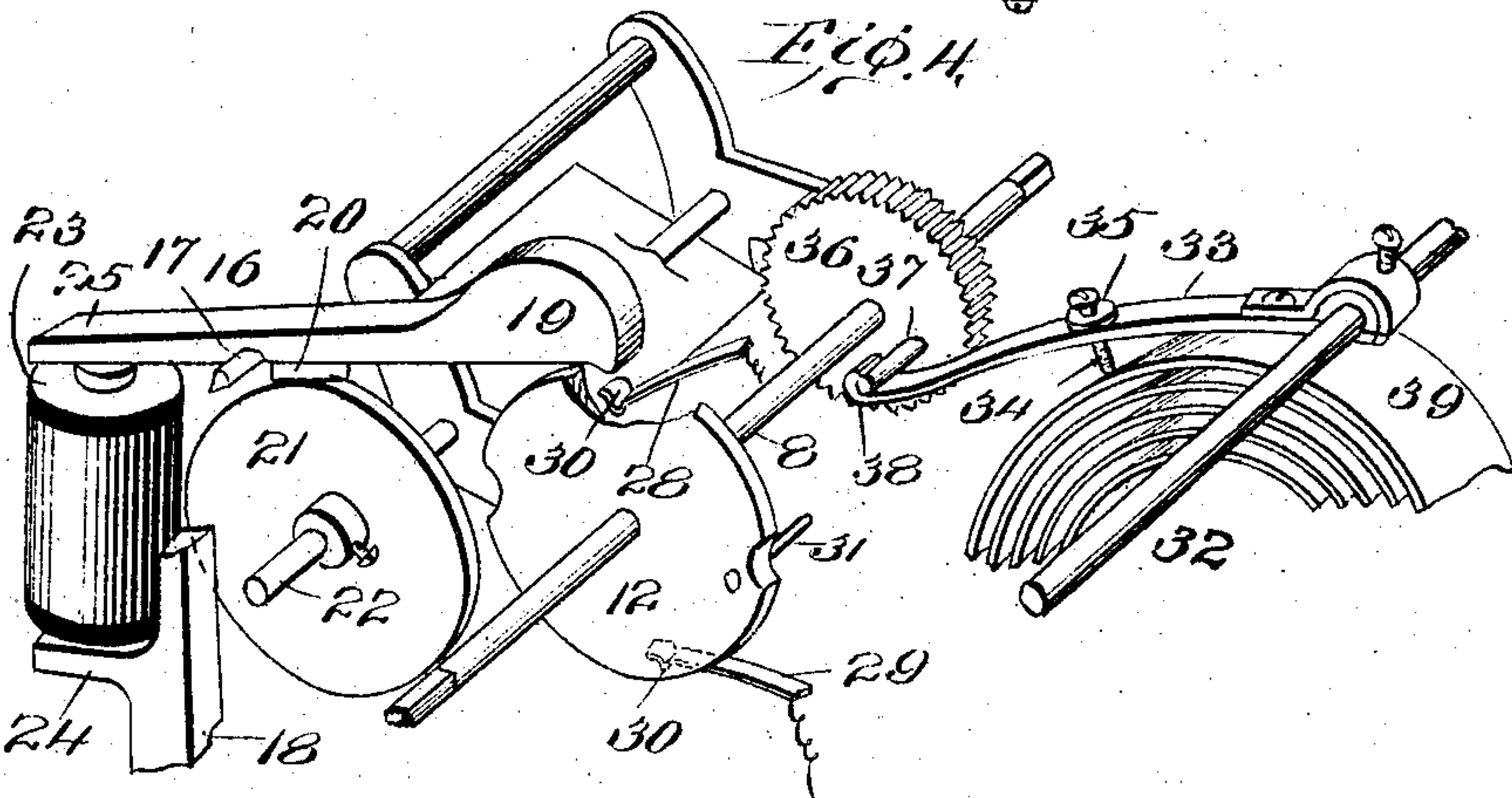
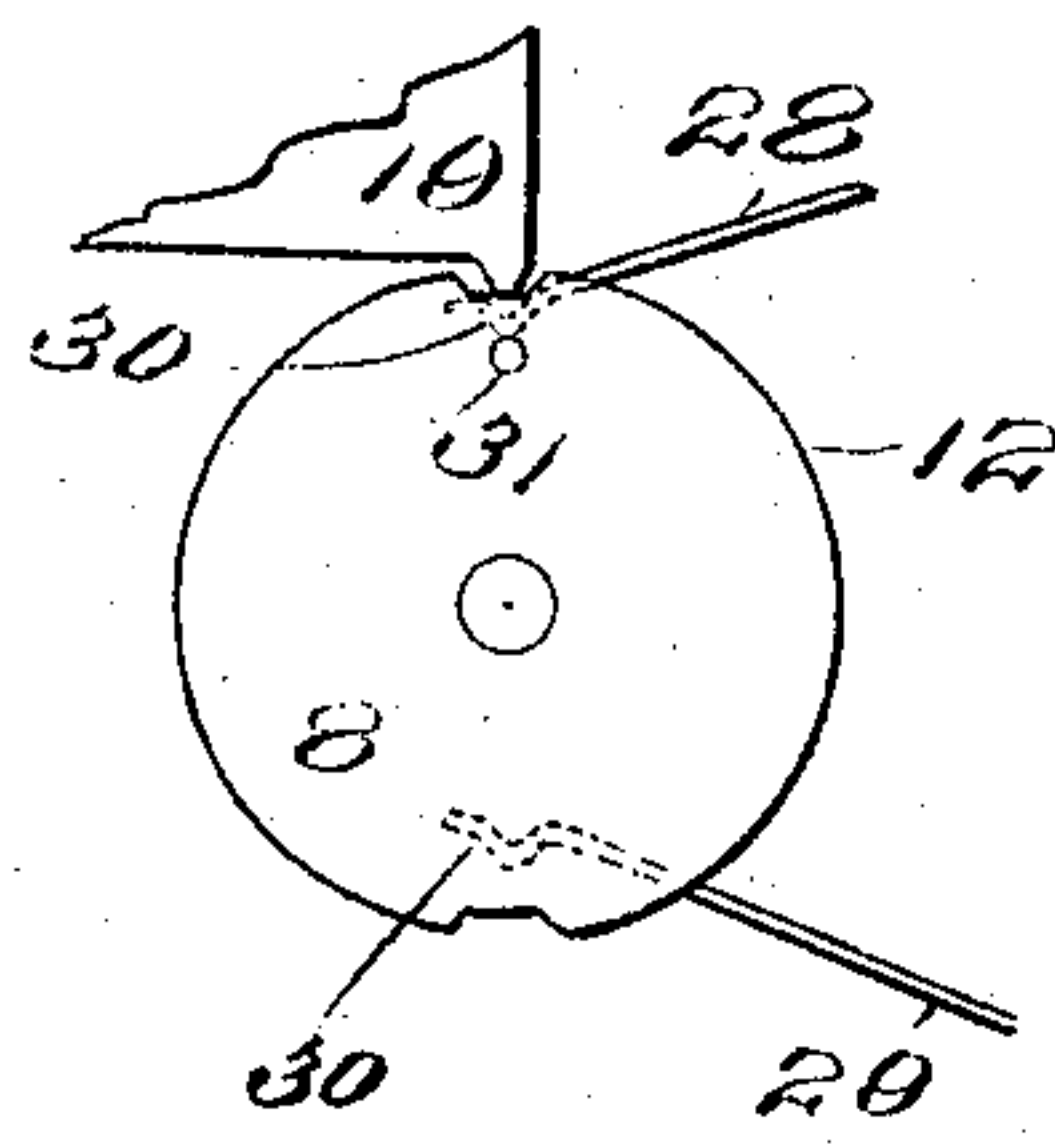


FIG. 5.



Witnesses
J. M. Fowler Jr.
F. J. Johnson

Inventor
F. J. Sprague
By
J. R. Nottingham
Attorney

UNITED STATES PATENT OFFICE.

FRANK J. SPRAGUE, OF OSWEGO, NEW YORK.

ELECTRICALLY-CONTROLLED DAMPER FOR HEATERS.

SPECIFICATION forming part of Letters Patent No. 765,686, dated July 26, 1904.

Application filed September 4, 1903. Serial No. 172,011. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. SPRAGUE, a citizen of the United States, residing at Oswego, in the county of Oswego and State of New York, have invented certain new and useful Improvements in Electrically-Controlled Dampers for Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to electrically-controlled devices for automatically regulating dampers or valves, and is especially designed to operate the dampers or valves of a heater, so as to control the temperature in a room or rooms; and it consists generally of the peculiar arrangement and novel combination of certain mechanism for closing and breaking an electric circuit which operates to set in motion a motor to open a damper or valve to the passage of a fluid or to close the same against said passage.

One of the principal objects of the invention is to provide automatic means for mechanically preventing a permanent circuit through the battery when the motor is run down.

Another and important object of the invention is to minimize the amount of time in which the battery shall be in use, and thereby effect a saving in power.

Still another object of the invention is to provide for regulating or limiting the number of revolutions of the crank-arm shaft in order to accommodate extra heavy, medium, and light weight dampers.

Other objects will become apparent upon a more detailed description of the same.

In the drawings, Figure 1 is a diagrammatic view of my improved apparatus; Fig. 2, a side elevation of the motor and electrical connections; Fig. 3, a top plan view of the same; Fig. 4, a perspective view of a portion of the motor, showing the arrangement of the automatic adjustable-stop mechanism and circuit making and breaking device, a portion of the notched wheel being broken away to show the ends of the contact-finger; and Fig. 5 a side elevation of the notched wheel and cir-

cuit making and breaking device, showing the relative position of the parts at one of the times when the circuit is complete.

Referring to the several views, the numeral 1 indicates a suitable motor, preferably such as is shown and described in Letters Patent granted to me November 14, 1899, and numbered 637,175, and 2 a heater provided with a check-damper 3 and a draft-damper 4. The check-damper is connected by a chain or cord 5 with an adjustable slide 6, adapted to operate in a crank-arm 7, secured on one end of the main or operating shaft 8 of the motor, and the draft-damper is connected by a chain or cord 9 to a similar slide 10, operating in a crank-arm 11, secured on the other end of the shaft 8.

Secured on the shaft 8 is a disk wheel 12, provided with oppositely-placed peripheral notches 13 and 14, which notches are adapted to be engaged by a lip or projection 15 of an armature-lever 16, said armature-lever being pivoted on a shaft 17, journaled in suitable bearings, preferably of the cone type, made in a standard 18 and one side of the frame of the motor. The forward end 19 of the armature-lever is weighted, and said lever is provided with a brake-shoe 20, which frictionally engages the periphery of a brake-wheel 21, secured on one end of the fan-shaft or fly-arbor 22 to gradually check the operation of the motor and stop said motor when the lip 15 enters either of the notches 13 or 14.

The brake device forms an important feature of my invention, as by gradually checking the speed of the motor all undue strain on the motor mechanism and shock or jar thereto is prevented and a positive stopping means provided.

The numeral 23 indicates an electromagnet supported on a bracket 24, projecting from the standard 18, and is arranged to contact with the free end 25 of the armature-lever.

Suitably secured to brackets 26 and 27 and properly insulated therefrom are contact-fingers 28 and 29, formed, preferably, with V-shaped or curved ends 30, adapted to contact with a circuit maker or breaker attached to the inner face of the notched wheel 12 when the motor is stopped by the lip 15 of the ar-

mature-lever entering one of the notches in said wheel.

Pivoted on a connecting-rod 32 of the motor-frame is an automatic adjustable stop-arm 5 33, provided with a set-screw 34 and a jam-nut 35, and projecting from the inner face of the heavy pinion-wheel 36 of the motor is a pin or stud 37, adapted to be engaged by the curved end 38 of the stop-arm 33 when the 10 power-spring 39 of the motor is nearly or completely run down. By adjusting the set-screw the free end of the stop-arm may be caused to assume either a high or low position with relation to the pin 37, so that the motor may be 15 put out of operation before the spring has lost all of its driving power, or said motor may be continued in operation until the spring has run down and needs rewinding. In other words, the adjustment of the set-screw serves 20 to regulate the number of revolutions of the main or operating shaft 8 for each winding of the spring. The inward adjustment of the set-screw tends to lessen the number of revolutions made by the shaft 8, as the end of the 25 stop-arm will engage the pin 37 before the spring has become run down, and the outward adjustment of the end of said screw will increase the number of revolutions of said shaft. If the dampers or valves should be extra 30 heavy, the set-screw would be set to reduce the number of revolutions of the shaft 8; but if they were very light the set-screw would be set to allow a greater number of revolutions of said shaft. It will be noted that this auto- 35 matic stopping mechanism forms an important feature of my invention, as it serves not only to regulate the force of the spring for heavy or light dampers, but to prevent a permanent circuit when the motor runs down, and I do 40 not wish to be understood as limiting myself to any particular construction of stop mechanism, as various forms or modifications of the same may be employed. The thermostat 40 may be of any approved type, having its 45 bar or tongue *a* constructed of two materials having different coefficients of expansion, preferably like the triangular plate shown and described in Letters Patent granted to C. D. Howard December 27, 1902, and numbered 50 488,895. The thermostat is provided with suitable contact-points *b* and *b'*, and a wire *c* connects contact-point *b* with contact-finger 28, and a wire *d* connects contact-point *b'* with contact-finger 29. A wire *e* connects the 55 thermostat with one pole of a battery *f*, and a wire *g* connects the other pole of said battery with the electromagnet. A wire *h* connects the magnet with the motor-frame and other parts of the apparatus not insulated 60 therefrom. Binding-posts 41, 42, and 43, properly insulated from the frame or base of the motor, are employed as a convenience in wiring and are therefore of no other electrical value.

65 The operation of the device is as follows:

Assuming that the motor is ready to start, the spring being fully wound and acting on gear-wheel 36 through the medium of ratchet-wheel *b*, pawl *a*, and intermediate gear-wheel and the contact-finger 28 in contact with 70 the circuit maker or breaker 31, as shown in Figs. 2 and 5, a rise in the temperature above the degree fixed in the apartment in which the thermostat is situated will cause the free end of the thermostatic bar or tongue 75 to make contact with contact-point *b* and establish a circuit through the magnet by way of the wires *e* and *c*. Circuit being established the armature end 25 of the lever 16 will be attracted by the magnet, causing the 80 weighted end of said lever to rise sufficiently to release the brake-shoe 20 from frictional contact with the brake-wheel 21 and incidentally raise the lip 15 out of the notch 13 of the wheel 12. At the instant the brake-wheel 85 and notched wheel are released the motor starts, and the contact between the circuit maker or breaker 31 and the contact-finger 28 is immediately broken. Thus it will be seen that the battery is in use but a very lim- 90 ited portion of time. After the connection between the circuit maker and breaker 31 and finger 28 is broken the current through the magnet is immediately cut off, the armature is released, and the weighted end of the lever 95 drops and rides on the periphery of the notched wheel 12 until the lip 15 engages the notch 14, the brake-shoe in the meantime being prevented from engaging the brake-wheel by the riding action of the lip 15. When the notched 100 wheel has made a half-revolution, the lip 15 will engage the notch 14 and the brake-shoe 20 again be in frictional contact with the brake-wheel 21, and the motor will be put out of operation with the contact-finger 29 in con- 105 tact with the circuit maker and breaker 31, ready for the motor to be set into operation by the fall of the temperature below the degree previously fixed, as in the meantime the draft-damper will have been closed and the 110 check-damper opened.

It will be noted that the motor itself is used as a part of the electric circuit each time the apparatus is changed by a rise or fall in the 115 temperature of the apartment and that the apparatus complete is automatic in its operation, requiring the smallest possible amount of battery-power consistent with its operation.

I do not wish to be limited to any particular shape or construction of contact-finger and 120 circuit maker or breaker, as any construction that will enable the circuit to be instantly broken after the motor starts may be employed.

The fiber brake-shoe is an important fea- 125 ture of my invention, as its braking qualities are greatly superior to the frictional brakes used in devices of this character and by the use of which I am able to dispense with extra weight or strongly-spring-restrained arma- 130

ture-levers which require excessive battery-power to raise them.

Various other changes or modifications may be made in the details of construction without departing from the spirit or scope of my invention or sacrificing the principle thereof.

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

10 1. In an automatic damper or valve operating mechanism, the combination with a spring-actuated motor, of an electromagnet, and a pivotally-mounted armature for said magnet, said armature being provided with a brake-
15 shoe and a stop, said brake-shoe being adapted to frictionally engage a rotatable member of the spring-actuated motor and said stop adapted to engage a different rotatable member of said motor.

20 2. In an automatic damper or valve operating mechanism, the combination with a spring-actuated motor, of an electromagnet, a pivotally-mounted armature having a weighted end, said end being provided with a stop adapted
25 to engage a notched rotatable member of the spring-actuated motor, and a brake device, so arranged that when the stop of the armature enters a notch of the rotatable member, said brake will be brought into action to stop said
30 motor.

3. In an automatic damper or valve operating mechanism, the combination with a spring-actuated motor, of an electromagnet, a pivotally-mounted armature having a weighted end,
35 said armature being provided with a brake-shoe and an engaging stop, a brake-wheel and a notched wheel, said brake-shoe adapted to frictionally engage the brake-wheel and said stop adapted to enter one of the notches in the
40 notched wheel, whereby the motor is stopped.

4. In an automatic damper or valve operat-

ing mechanism, the combination with a spring-actuated motor, of an electromagnet and a pivotally-mounted armature therefor, said armature being provided with a brake-shoe and
45 a stop, said brake-shoe adapted to frictionally engage a rotatable member of the motor and said stop adapted to engage a different rotatable member of said motor, one of said members being rotatable faster than the other. 50

5. In an automatic damper or valve operating mechanism, the combination with a spring-actuated motor, of a controlling device therefor comprising an electromagnet, its armature, a source of electrical energy, connections
55 adapted to form an electric circuit including said magnet and source of electric energy, an engaging or contact device arranged on one of the wheels of the motor, and a pivoted arm actuated by the motor-spring and adapted to
60 engage said contact device, whereby the motor is stopped and a permanent circuit prevented.

6. In an automatic damper or valve operating mechanism, the combination with a spring-
65 actuated motor, of a controlling device therefor comprising an electromagnet, its armature, a source of electrical energy, connections adapted to form an electric circuit including said magnet and said source of electrical en-
70 ergy, a gear-wheel carrying an engaging or contact device, a pivoted arm actuated by the motor-spring, and means for adjusting said arm to stop the motor, before the power of the spring is exhausted, at a point to prevent
75 a permanent circuit.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANK J. SPRAGUE.

Witnesses:

FRANK HALE,

ALBERTINA T. SPRAGUE.