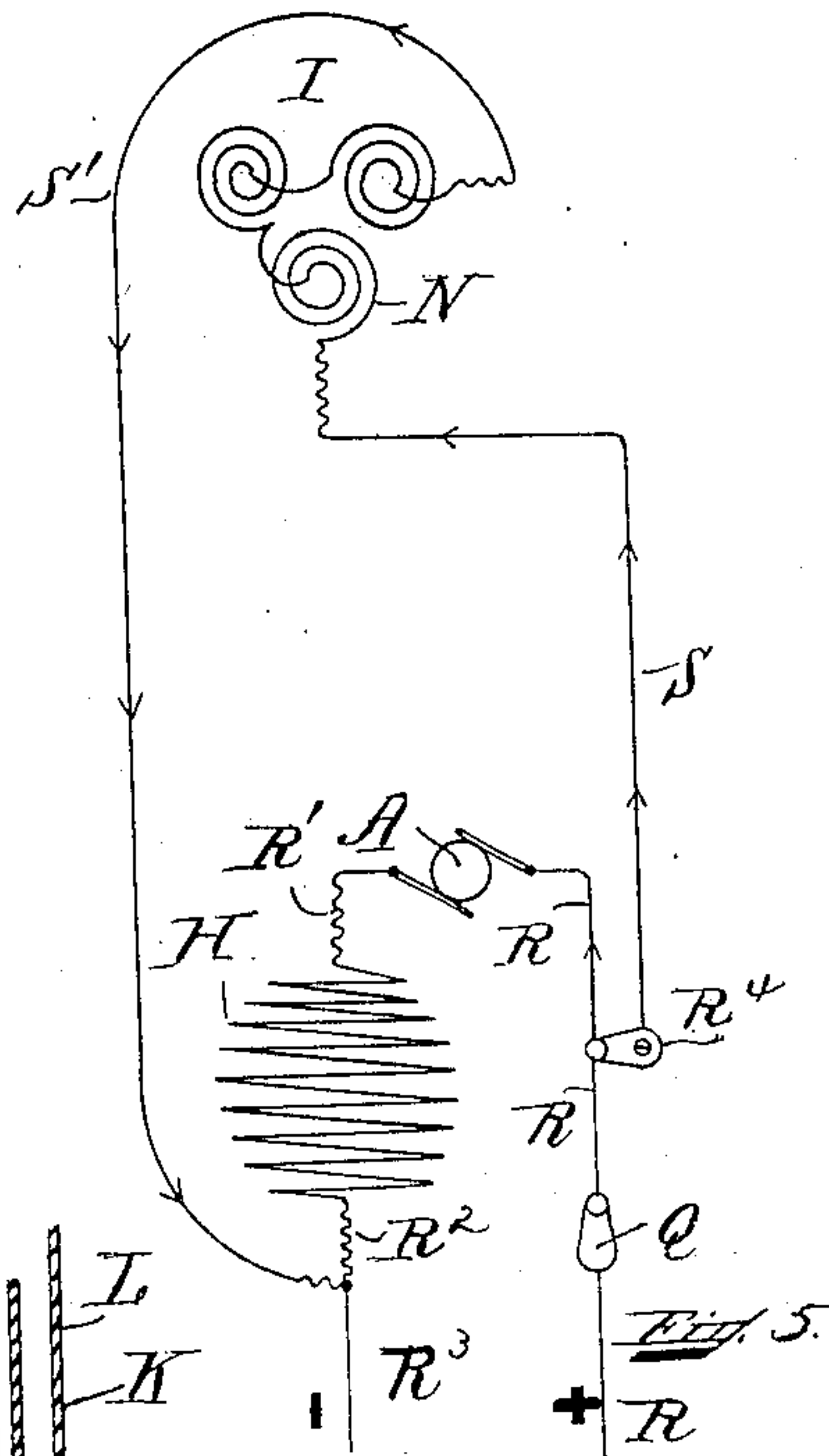
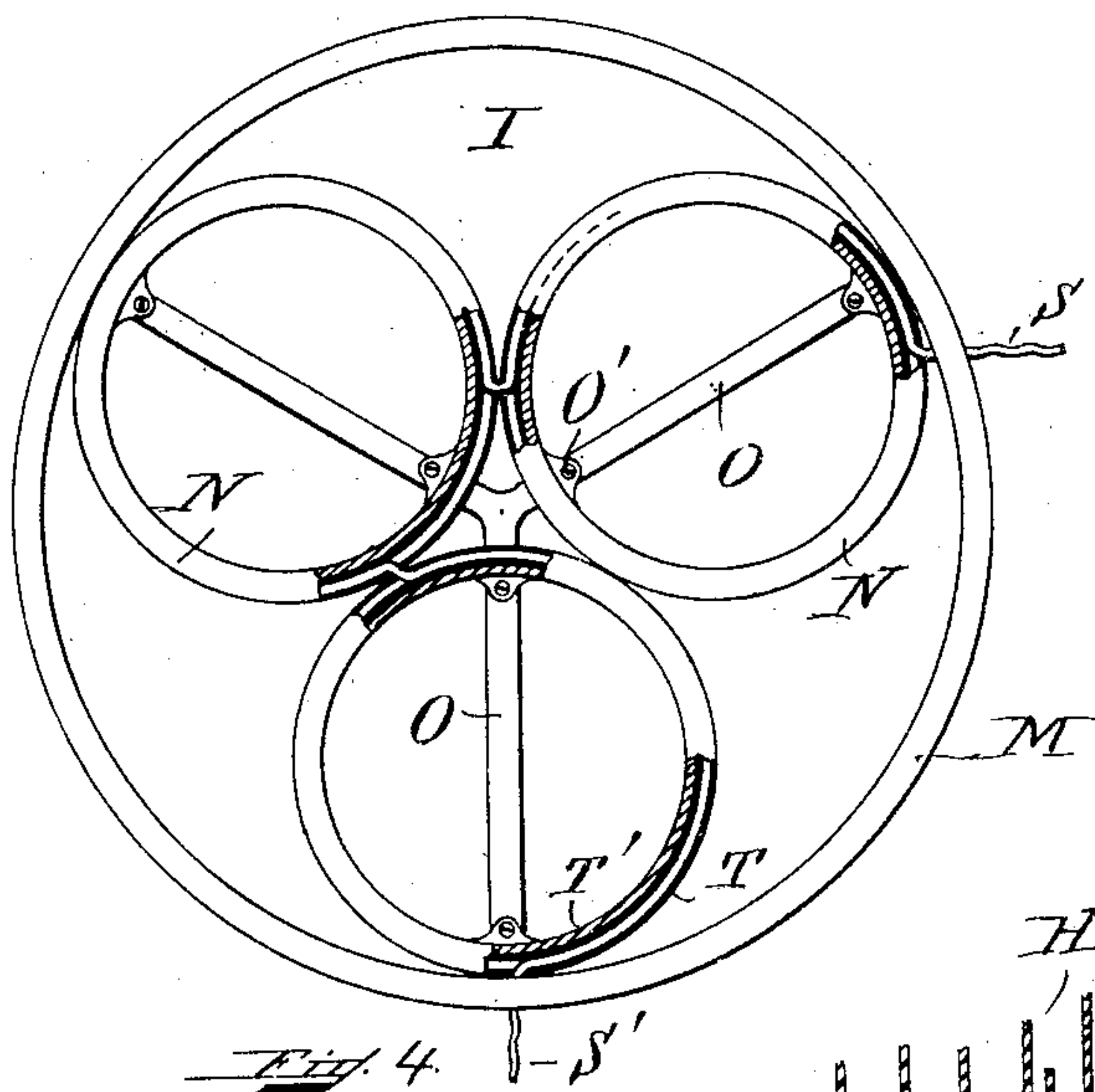
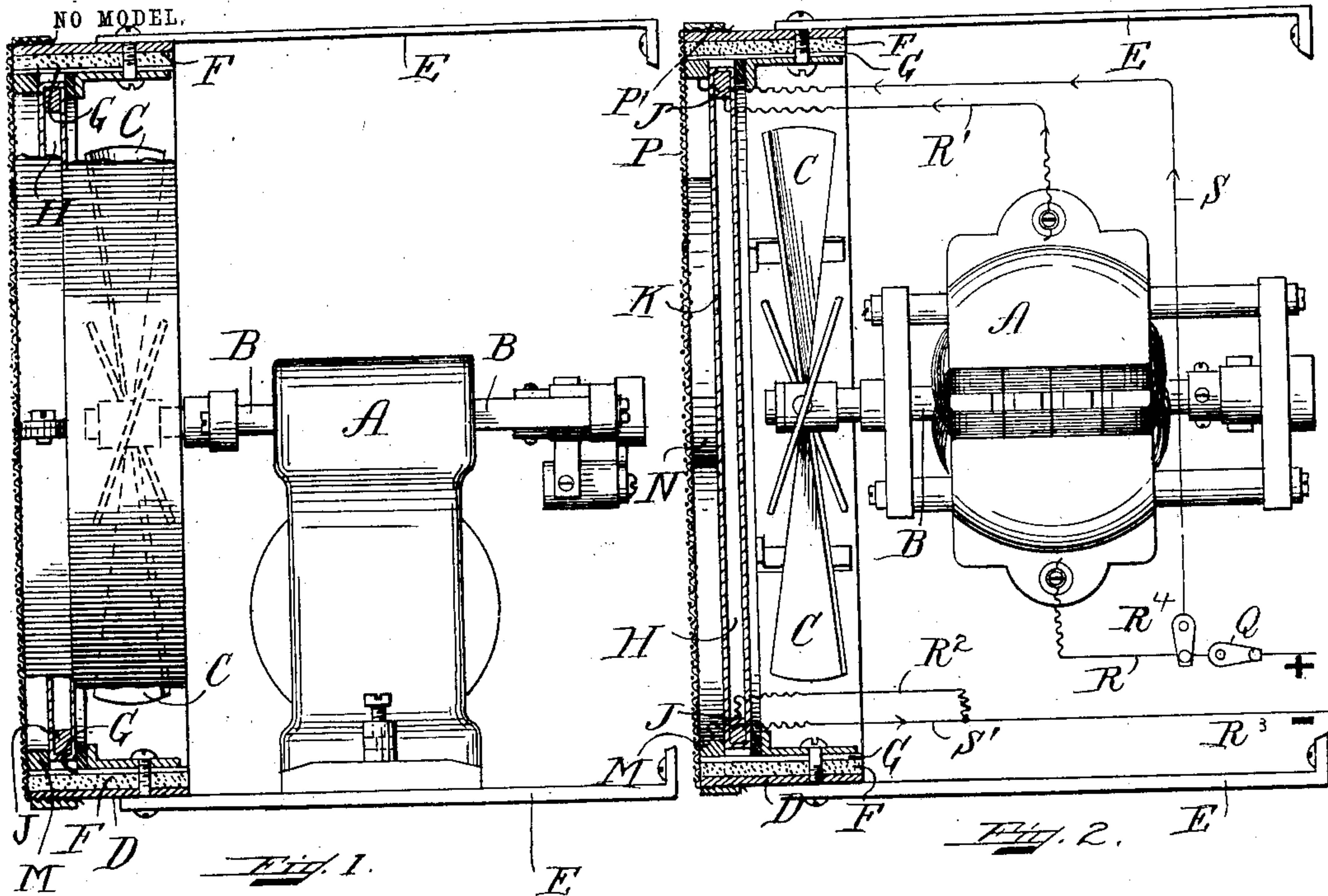


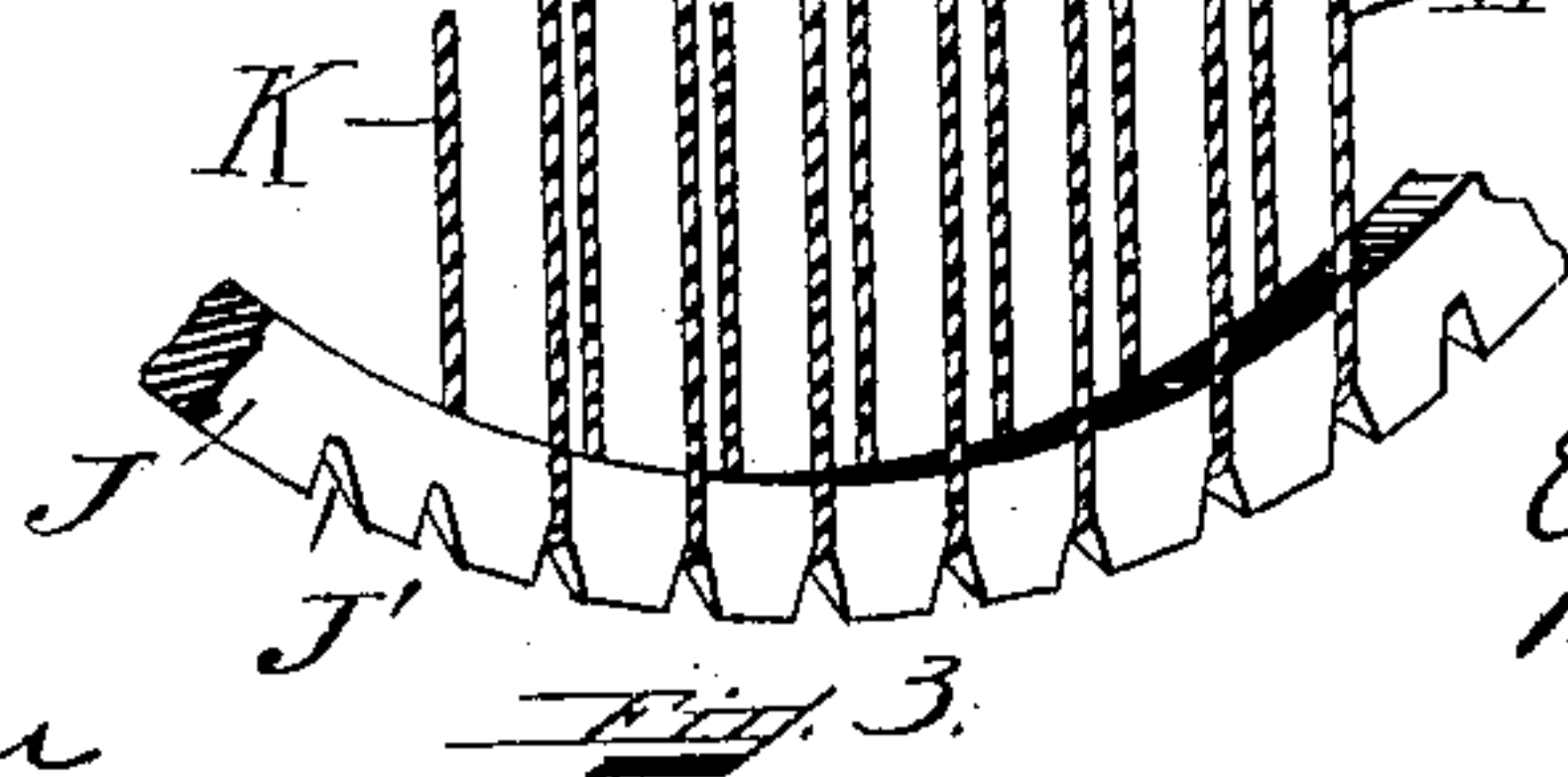
No. 741,927.

PATENTED OCT. 20, 1903.

E. F. PORTER.
ELECTRIC HEATER.
APPLICATION FILED JAN. 21, 1899.



Witnesses:
A. L. Munn
V. M. MacLellan



Inventor:
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By J. H. Runk

UNITED STATES PATENT OFFICE.

EDWIN F. PORTER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE BAY STATE ELECTRIC HEAT & LIGHT COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 741,927, dated October 20, 1903.

Application filed January 21, 1899. Serial No. 702,915. (No model.)

To all whom it may concern:

Be it known that I, EDWIN F. PORTER, a subject of the King of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

My invention relates to improvements in electric heaters, and is especially adapted for car-heating.

The object of my invention is to generate heat from electric current drawn from the source used for running the cars and to supply a heater of convenient construction and size to be used for that purpose.

In the use of a heater in cars it is convenient to arrange the different operating parts so that they may be controlled by the motion of one switch, and it is also necessary where a circuit of a high voltage is used, as in electric railroading, to provide a motor of a small and compact form. This is effected by placing the motor in series with the heater, and this feature is substantially the same as that disclosed in a previous application filed by me October 17, 1898, Serial No. 693,714. In addition this car-heater has another feature of novelty, which is the throwing in of an auxiliary heater in shunt with the motor and in parallel with the heater, thereby increasing the heat without varying the speed of the fan, which displaces the heat from the heating-surfaces and diffuses it throughout the car. This combination of a primary heater in series with the motor and one or more secondary heaters in shunt therewith constitutes the main feature of my invention.

I have shown in the drawings a difference in the construction of the primary and the secondary heaters, as the construction of the primary heater has already been disclosed in an application filed by me December 27, 1898, Serial No. 700,324; but the construction of the secondary heater consists of one or more rings upon which the resistance-wire is wound, embedded in enamel for the purpose of compactness, the rings being so arranged that the inner and outer surfaces receive the im-

pect of the outflowing air, which is thereby heated.

My invention consists of certain novel features hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate a construction embodying my invention, Figure 1 is a side view, partly in section, of my apparatus. Fig. 2 is a plan view, also partly in section. Fig. 3 is a detail view showing the construction of the primary heater. Fig. 4 is a front view, partly in section, of the secondary heater. Fig. 5 is a diagrammatic view illustrating the circuit through the motor and the primary and secondary heaters.

Like letters of reference refer to like parts throughout the several views.

A represents a motor of any desired construction provided with a shaft B, on which is fixed fast at its front end the fan C.

D represents the outer ring for the support of the heaters and their insulation, and said ring is supported by suitable brackets E, secured to the wall of the car. The lower bracket E (shown in Fig. 1) supports the motor A in its position. Within the outer ring D is a ring of asbestos F, reinforced by a ring of mica G, for the purpose of insulating the primary and secondary heaters H and I, respectively.

J is a supporting-ring of insulating material, such as slate, of the primary heater II, which consists of asbestos cords K, wound with the resistance-wire L and stretched around said ring J in the grooves J'.

M represents a supporting-ring of metal which carries the three heating-rings N of the secondary heater I. Within said ring is a spider O, which is connected to the ring M. The rings N are attached to the spider O by screws O', and said rings may be elongated to increase the heating-surface.

It is advisable to protect the exposed face of the fan-heater, and for this purpose a wire-gauze screen P is stretched over the front of the ring D and held in place by the retaining-ring P'.

In Fig. 2 the switch Q is shown, which when closed causes the current to pass along the wire R, through the motor A, and along to the primary heater H, through the wire R', out through the wire R² and R³. When it is necessary to increase the heat, the switch R⁴ is thrown in, which causes a branch of the current to pass through the wire S to the secondary heater I and out through the wires S' and R³. It will be seen by this arrangement that the primary heater H is in series with the motor, while the secondary heater I is in shunt with the motor, the switch Q making and breaking both circuits when the switch R⁴ is thrown in and the switch R⁴ making and breaking only the shunt-circuit.

Fig. 5 represents in diagram the circuits through the primary and secondary heaters and through the motor. The circuit enters through the wire R, passes through the switch Q, through the motor A, through the wire R', through the primary heater H, and out through the wire R² and R³. When the switch R⁴ is closed, as shown in the diagram, a branch of the current passes through the wire S to the secondary heater I, which is shown in three sections N in series, through the wire S' to the wire R³, and out.

In the construction of the secondary heater, Fig. 4, the wire is embedded in the enamel T, which is placed on the cast-iron ring T', fastened to the spider O, as shown, whereby mechanical strength is obtained and short-circuiting of the wires is entirely prevented, and the rings by this construction are so placed that their axes are in line with the direction of the flow of the air from the fan. Both heaters may be constructed similar to the primary or to the secondary heater, as desired.

I do not limit myself to the arrangement and construction shown, as the same may be varied without departing from the spirit of my invention.

Having thus ascertained the nature of my invention and set forth a construction embodying the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an apparatus of the character specified, one or more heat-developing electric conductors forming a primary heater, movable means as a fan for removing or displacing the heat from said heater, a motor for operating said movable means, an electric conductor continuously in series with both heater and motor while the circuit is closed through the motor and adapted to energize both the heater and motor coincidently, a secondary electric heater in parallel with said motor and said primary heater and from which the heat is removed or displaced by said fan, a switch controlling the circuit to the primary heater and motor and the shunt-circuit, and a switch

independent of the switch in the primary-heater circuit for controlling the circuit to the secondary heater.

2. In an apparatus of the character described, one or more heat-developing electric conductors forming a primary heater, movable means as a fan for removing or displacing the heat from said heater, a motor for operating said movable means, an electric conductor continuously in series with both heater and motor while the circuit is closed through the motor and adapted to energize both the heater and motor coincidently, a secondary electric heater in parallel with said motor and said primary heater and from which the heat is removed or displaced by said fan, a manually-operated switch controlling the circuit to the primary heater and motor and the shunt-circuit, and a manually-operated switch independent of the switch in the primary-heater circuit for controlling the circuit to the secondary heater.

3. In an apparatus of the character described, one or more heat-developing electric conductors forming a primary heater, movable means as a fan for removing or displacing the heat from said heater, a motor for operating said movable means, an electric conductor continuously in series with both heater and motor while the circuit is closed through the motor and adapted to energize both the heater and motor coincidently, a secondary electric heater in parallel with said motor and said primary heater and from which the heat is removed or displaced by said fan, a switch controlling the circuit to the primary heater and motor and the shunt-circuit, and a switch controlling the circuit to the secondary heater.

4. In an apparatus of the character described, one or more heat-developing electric conductors forming a primary heater, movable means as a fan for removing or displacing the heat from said heater, a motor for operating said movable means, an electric conductor continuously in series with both heater and motor while the circuit is closed through the motor and adapted to energize both the heater and motor coincidently, a secondary electric heater in parallel with said motor and said primary heater and from which the heat is removed or displaced by said fan, means controlling the circuit to the primary heater and motor and to the secondary heater and means controlling the shunt-circuit independent of the main circuit.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 13th day of January, A. D. 1899.

EDWIN F. PORTER.

Witnesses:

A. L. MESSER,

V. M. MACLELLAN.