

N^o 13,185



A.D. 1908

Date of Application, 20th June, 1908

Complete Specification Left, 21st Dec., 1908—Accepted, 21st June, 1909

PROVISIONAL SPECIFICATION.

Improvements in and relating to Devices for Operating Automatic Switches applicable for use with Electric Transformers.

We, LEO SUNDERLAND, and GILBERT CECIL PILLINGER, both of 39 Victoria Street, London, S.W., Electrical Engineers, do hereby declare the nature of this invention to be as follows:—

Our invention relates to devices for operating switches used with electric
5 transformers and has for its objects the provision of means for;—

(a) Automatically switching off the primary current of transformers when there is no load on the secondary, thus obviating the "no load" losses; and, reversely.

(b) Switching the primary current on again automatically the moment any
10 load is thrown on the secondary.

(c) Any other operation akin to (a) and (b).

The said device for operating the switch consists essentially of a rocking
beam, centrally pivoted, carrying the necessary switch contacts on one arm
and having a core for a solenoid, or an armature for an electro-magnet on the
15 opposite arm. Underneath the solenoid core or armature is a solenoid or
electro-magnet which draws the arm down and holds it down so long as
current flows through the solenoid or magnet. The beam is counterweighted
or provided with a spring so that the position of the switch is always open
when no current is flowing through the magnet or solenoid. The rocking
20 beam carries a make and break for the auxiliary circuit, this being closed
when the switch on the primary is open and *vice versa*, and the beam also
carries a switch for making and breaking the secondary or a shunt therefrom.

Our invention is carried into effect by operating a switch in the primary
circuit by an auxiliary circuit the current in which is drawn from a primary
25 or secondary battery. Imagine the condition of no load; as the electro-
magnet or solenoid no longer holds the arm down the counterweight or spring
tips up the beam, thereby opening the switches on both the primary and
secondary but closing the switch on the auxiliary circuit. The latter circuit
is however so connected that it is only completed when the secondary circuit
30 is closed at any point. Imagine, now, the secondary to be closed by some-
one, for example, turning on a lamp. Instantly current is supplied by the
auxiliary circuit; though comparatively feeble it is sufficient to draw down
the rocking arm thereby closing both the primary and secondary circuits, but
opening the auxiliary circuit. Simultaneously, however, with the cessation
35 of the current from the auxiliary circuit, which up to this point has energized
the magnet or solenoid, current from the secondary circuit takes up the duty
of energizing the magnets and continues to hold the rocking arm down and
the switches in contact so long as any load remains on the secondary. When
this ceases the magnet or solenoid is no longer energized; the arm tips up
40 breaking the primary and secondary circuits and closing the auxiliary circuit
ready for a repetition of the cycle now described.

[Price 8d.]



Improvements in and relating to Devices for Operating Automatic Switches.

Modifications of the device will suggest themselves to the skilled engineer to meet many conditions of an analogous nature in the various applications of electricity.

Dated the 20th day of June, 1908.

BENJ. T. KING (A.Inst.Mech.E.),
Patent Agent (Chartered) by Examination,
165 Queen Victoria Street, London, E.C.
Agent for Applicants.

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COMPLETE SPECIFICATION.

**Improvements in and relating to Devices for Operating Automatic
Switches applicable for use with Electric Transformers.**

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We, LEO SUNDERLAND, and GILBERT CECIL PILLINGER, both of 39 Victoria Street, London, S.W., Electrical Engineers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

15

Our invention relates to devices for operating switches used with electric transformers and has for its objects the provision of means for:—

(a) Automatically switching off the primary current of transformers when there is no load on the secondary, thus obviating the "no load" losses; and, reversely.

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(b) Switching the primary current on again automatically the moment any load is thrown on the secondary.

(c) Any other operation akin to (a) and (b).

In carrying the said invention into effect reference being had to the accompanying drawings in which:—

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Figure 1 is a plan view of the apparatus constructed in accordance with our invention;

Figure 2 is a side elevation thereof; and,

Figure 3 is a diagram showing the primary circuit P, the secondary circuit S, the transformer T and the auxiliary circuit X and the various switches for making and breaking the circuits.

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The said device for operating the switch consists essentially of a rocking beam, centrally pivoted, or an arm 1 pivoted at its end 2, so as to form a lever carrying the necessary switch contacts A, A¹, A² at the end of one arm and having an armature 3 on the pivoted arm for an electro-magnet 4. Below the armature lever is another electro-magnet 5 which draws the arm 1 down and holds it down so long as current flows through such magnet 4. The pivoted beam or arm is counterweighted or provided with a spring 6 as shown so that the position of the switch is always open when no current is flowing through this magnet 4. The pivoted beam or arm carries a make and break 7 for the auxiliary circuit X, X, this being closed when the switch A¹, A² on the primary is open and *vice versa*, and the arm 1 also carries a spring contact 8 for making and breaking the secondary or the auxiliary shunt therefrom.

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Our invention as is customary with apparatus of this description is carried into effect by operating a switch in the primary circuit by an auxiliary circuit the current in which is drawn from a primary or secondary battery. Imagine the condition of no load; as the electro-magnet 4 no longer holds the arm

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Improvements in and relating to Devices for Operating Automatic Switches.

down the counterweight or spring 6 tips up the arm 1 thereby opening the switches on both the primary and secondary A, A¹, A² but closing the contact 7 and 8 on the auxiliary circuit X. The latter circuit is however so connected that it is only completed when the secondary circuit is closed at any point.

5 Imagine, now, the secondary to be closed by someone, for example, turning on a lamp 9. Instantly current is supplied by the auxiliary circuit; though comparatively feeble it is sufficient to draw down the pivoted arm 1 thereby closing both the primary and secondary circuits, but opening the auxiliary circuit X at the make and break 7. Simultaneously, however, with the cessa-
10 tion of the current from the auxiliary circuit, which up to this point has energised the magnet, the current from the secondary circuit takes up the duty of energising the magnets and continues to hold the arm down and the switches in contact so long as any load remains on the secondary. When this ceases the magnet is no longer energised; the arm tips up breaking the
15 primary and secondary circuits and closing the auxiliary circuit X at the make and break 7 and 8 ready for a repetition of the cycle now described.

Although we have described the apparatus in its application to alternating currents it is equally applicable for use with direct currents, where, for example, it is desired to cut off the electric supply from a building when no
20 lamps are in use.

We are aware that prior to the date of our invention it has already been proposed to employ an automatic cut-out by the internal energy of the system for cutting in and out transformers.

We are also aware that a switch has been designed to work by means of a
25 primary battery. This switch, however, merely opened the primary circuit and it was necessary to insert a condenser in the secondary circuit in order to prevent the primary battery becoming discharged through the secondary winding, but we make no claim in respect thereof.

Having now particularly described and ascertained the nature of our said
30 invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In an automatic switch applicable for controlling electric transformer circuits the combination of a spring or gravity retracted switch arm carrying
35 contacts which open and close the primary or supply and secondary or consumers' switches and also a contact which closes an auxiliary circuit to energise an electro magnet which directly operates the switch arm only during the closing of the switch, the switch being held on by a separate electro magnet in the secondary circuit substantially as described and shown in the drawings.

2. An improved automatic switch for controlling transformer circuits, or
40 direct current circuits substantially as herein described with reference to the appended drawings.

Dated the 18th day of December 1908.

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45 Agent for the Applicant.

[This Drawing is a reproduction of the Original on an unaltered scale.]

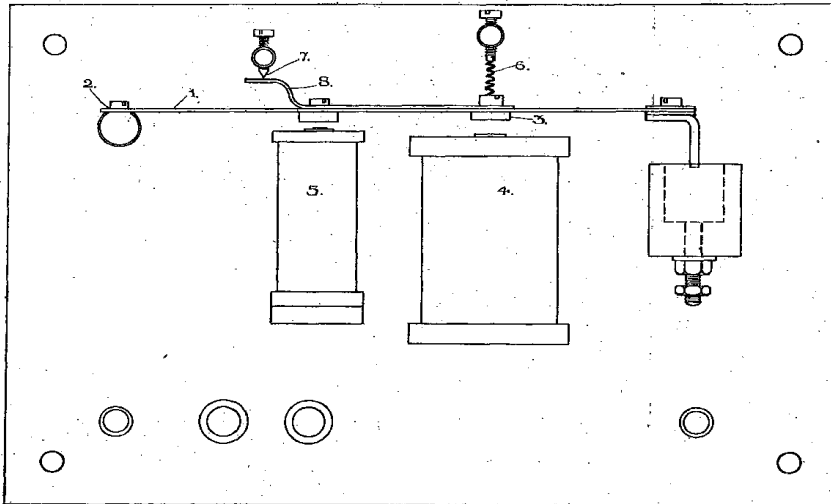


Fig 1

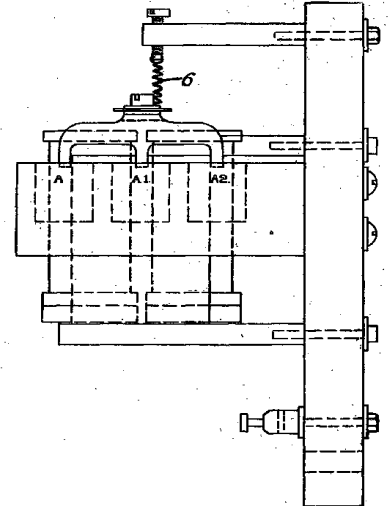
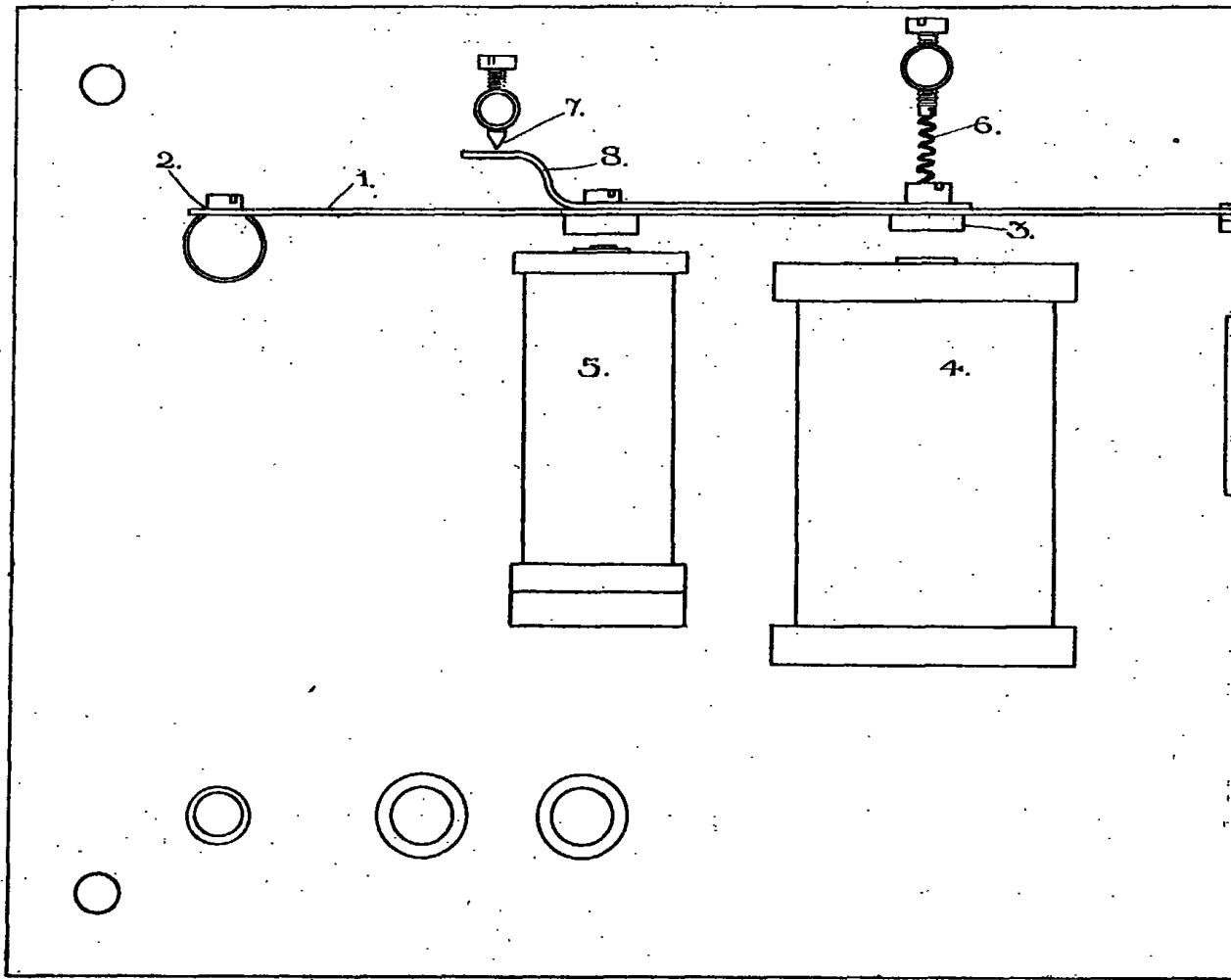


Fig 2

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Fig 1

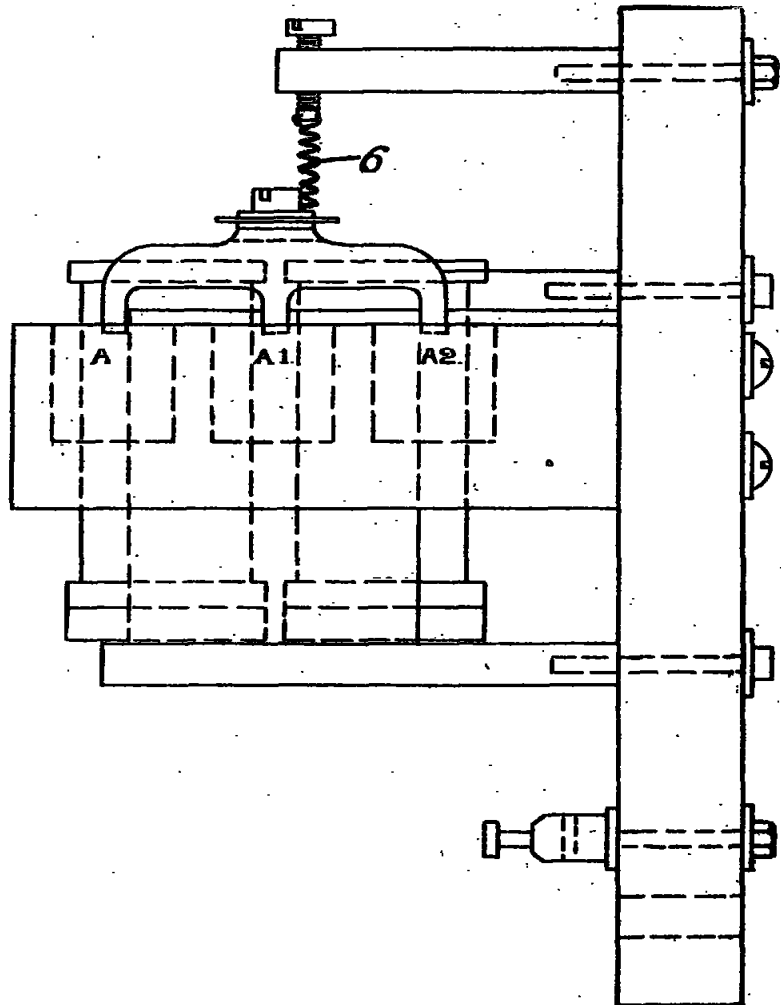
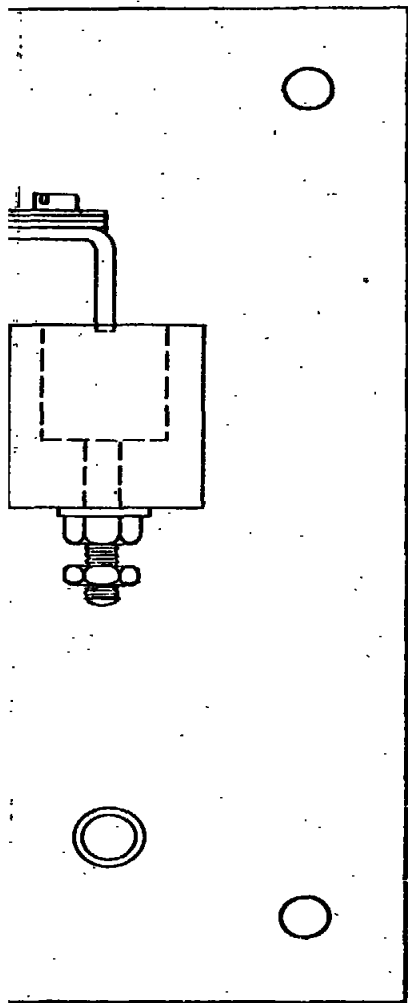
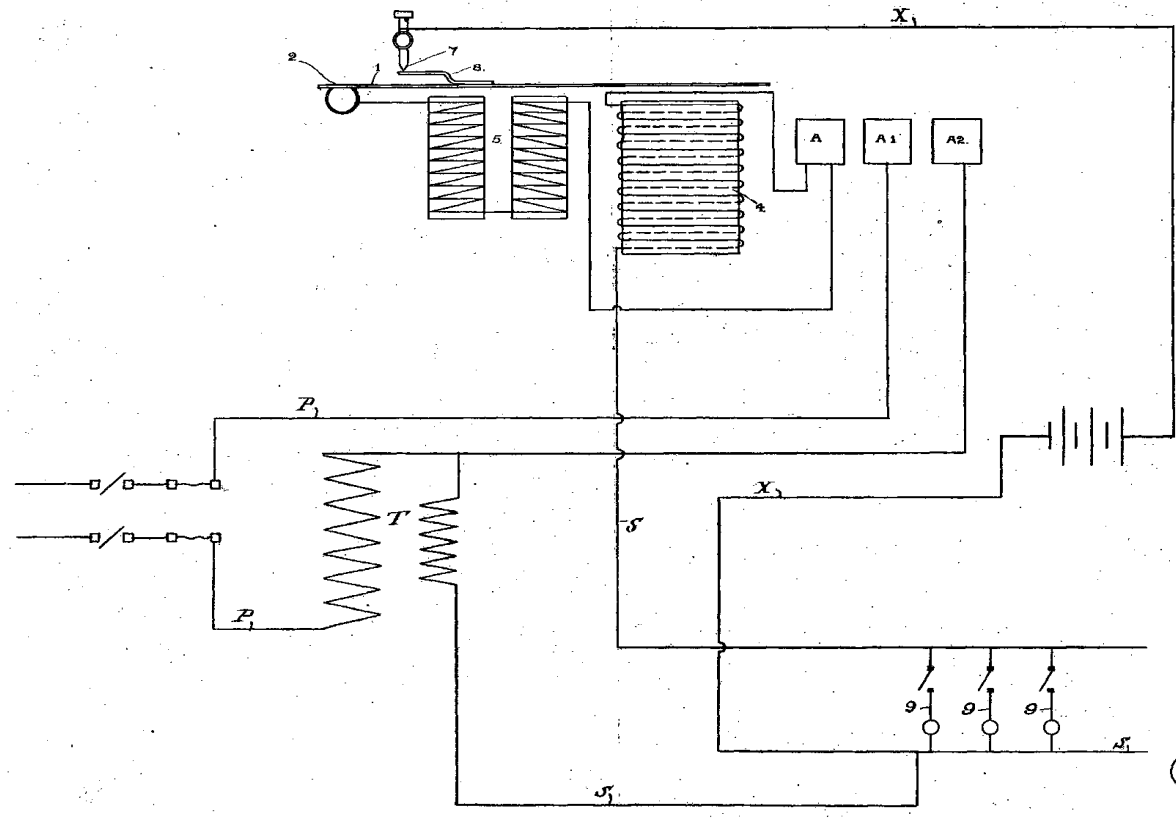


FIG. 2.

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FIG. 3.



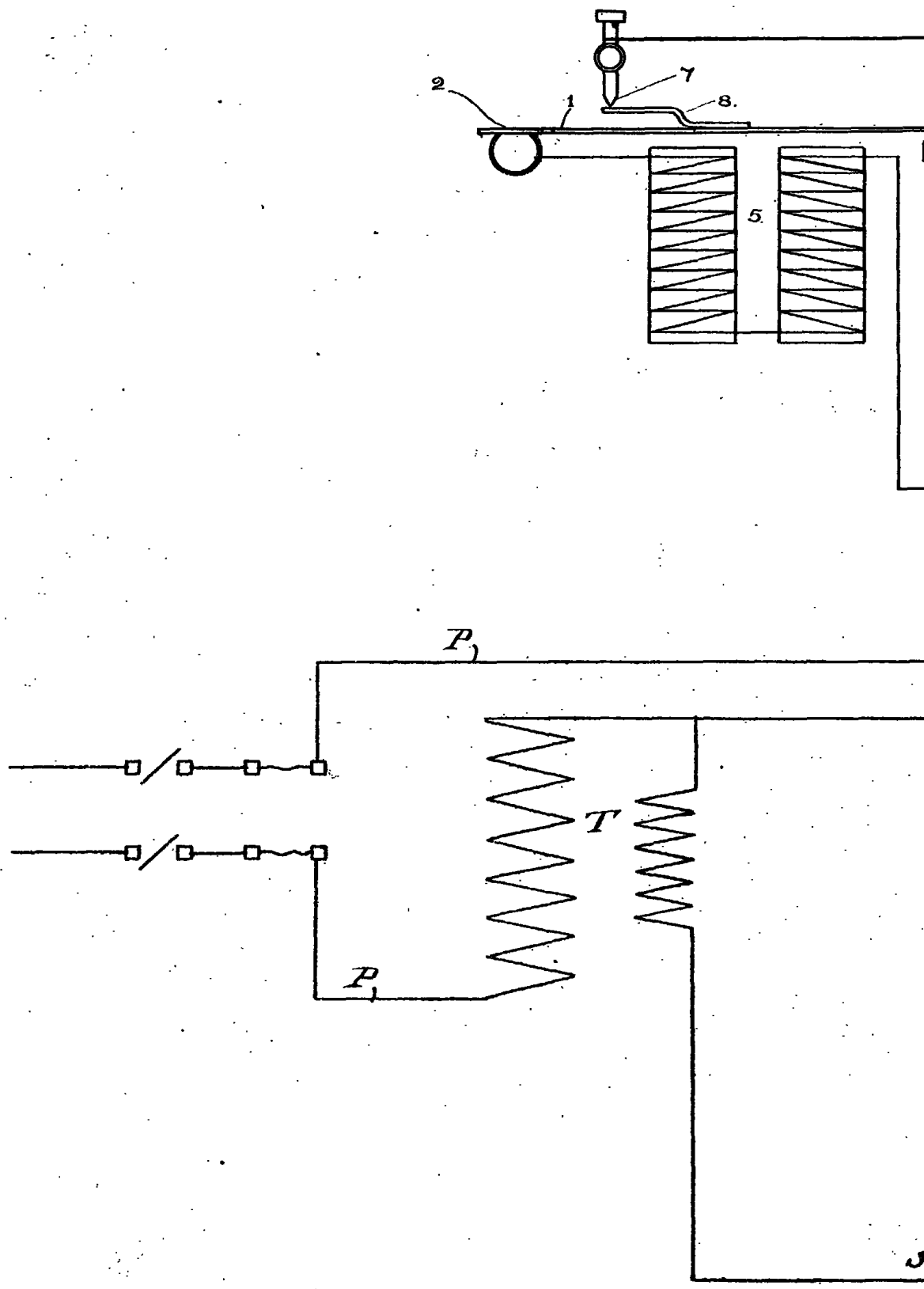
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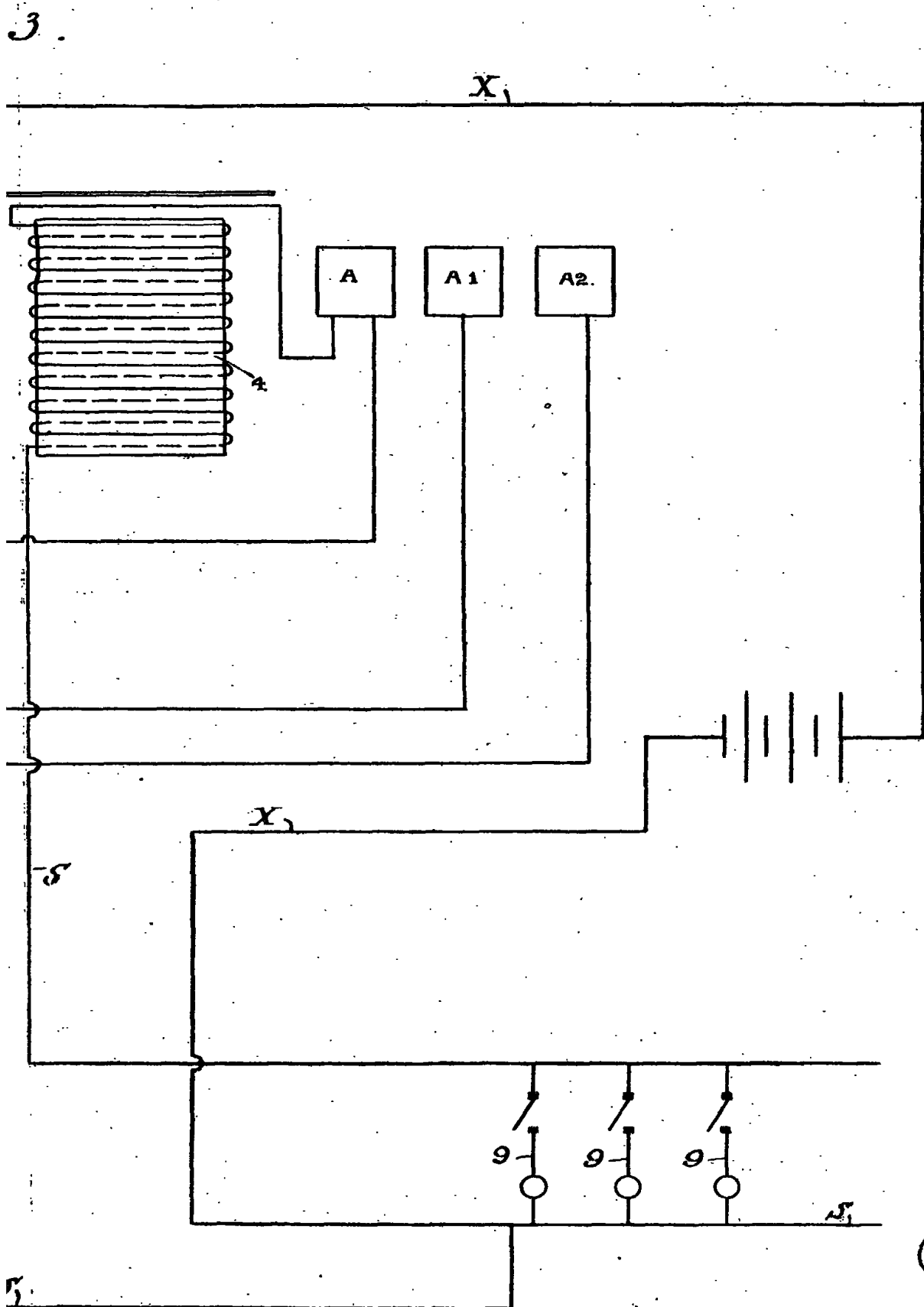
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FIG. 1.



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