N° 7877 A.D. 1897

Date of Application, 26th Mar., 1897
Complete Specification Left, 17th Dec., 1897—Accepted, 12th Feb., 1898

PROVISIONAL SPECIFICATION.

[Communicated from abroad by Société Anonyme des Horloges Electriques Cauderay, of Lausanne, in the Republic of Switzerland.]

Improved Apparatus for Controlling and Registering the Time of Working of Electric Lamps.

I, Henry Harris Lake, of the Firm of Haseltine, Lake & Co., Patent Agents, 45, Southampton Buildings, in the County of Middlesex, do hereby declare the nature of this invention to be as follows:—

The controlling-apparatus heretofore used for the purpose of registering the time of lighting of electric lamps, are adapted for one lamp only or for a series of lamps burning simultaneously.

The object of the present invention is to register, by means of a very simple device, the lighting-time of several lamps, the latter being either lighted and put out at the same time or one after another.

The apparatus may be adapted for any number of lamps so as to have all the commutators of the said lamps arranged in the controlling apparatus, or so arranged that each lamp has its commutator somewhere else.

The device constituting the present invention is the same in both cases; I shall therefore describe the simplest construction that is to say, that in which the commutators of the lamps are combined with the controlling-apparatus itself.

The controlling apparatus is formed, on the one hand of a clock indicating the time and of a commutator which conveys the indication of the time, for each lamp, to corresponding hands only when the said lamp is burning, that is to say when it is electrically connected.

In carrying my invention into practice I provide behind the main plate of the apparatus a second-plate, fixed by means of pillars, and which bears the wheel-work.

The said wheel-work is formed of a balance-wheel the axis of which bears the anchor of an electro-magnet interpolated in the circuit. The axis of the balance wheel carries a tooth which is caused, by every oscillation of the said balance-wheel, to jump a tooth of the wheel intended to record the hour-indications. To that purpose the axis of the said record wheel is provided with, between the main plate and back plate, a bevil wheel meshing with another bevil-wheel secured on the axis of a barrel or drum. The number of oscillations of the balance-wheel acted upon by a spiral-spring, and the number of teeth of the bevil wheels, is such that the barrel or drum will always perform one revolution in a minute.

There are provided on the said barrel as many projections or notches as there are lamps to be controlled, in the present case, four. The projections are disposed so that there will always be only one of them upon the same generating line of the barrel.

A number of spring-levers corresponding to the number of lamps to be con-

[Price 8d.]

trolled are secured to the back plate. Each lever is pivoted on a shaft and bears at its free end a block intended to be acted upon by the projections or notches of the barrel. The shaft of each lever is provided with a fixed arm placed within reach of a suitable projection of one of the commutators. When at rest, that is to say when the lamp is not burning each lever bears, under the action of a spring against a stud; and while the lever lies in that position its block above-mentioned is out of reach of the corresponding projection or notch of the barrel or drum. But when the corresponding commutator is turned so as to have its projection acting upon the fixed arm of the lever, the latter is thus moved and its block comes within reach of its corresponding projection of the barrel, so that it will be pushed outward, with every revolution of the barrel (that is to say once in a minute).

A rocking-frame is pivoted between the front and back plates the said frame being forced in one direction by means of a spring. The frame bears a click or pawl gearing in a ratchet wheel. The cross-bar of the said rocking frame is so arranged that when one of the blocks is acted upon by one of the projections of the barrel, the corresponding lever is at same time pressed against the rocking frame and the latter will then rotate the ratchet wheel one tooth, by means of its click. It follows therefrom that as soon as the commutator of a lamp connects the latter it brings at the same time the corresponding lever, and consequently its block, within reach of a projection, and that, as soon as this has been performed the said lever will be pushed once every minute in, that is to say backwards, causing the ratchet wheel at the same time to be rotated, one tooth.

The projections of the barrel which correspond to the separate lamps, being moved with regard to one another so as never to come within reach of the blocks together but one after the other, the ratchet wheel will be rotated every minute a number of teeth equal to the number of lamps burning.

The axis of the ratchet wheel is provided with an endless screw, gearing in a helical wheel the axis of which bears the hand indicating the unities (hours) on a corresponding dial. The said axis is further provided with a pinion gearing in a wheel the axis of which has a hand intended to give the tens. A similar device conveys the motion of the above mentioned wheel to the hands of the wheels for the indications of the hundreds and thousands.

The device just described is interpolated in the circuit of the source of electricity and of the lamps.

The commutators are each formed of an axis with contact-rod. The latter is intended to connect electrically the contact pieces.

The axis of the commutator is in contact with the metal front or main plate with which a screw is also in electrical contact, the latter being connected by means of a wire with the notched bearing against which the contact spring engages in the well known manner used in several electric clocks under the influence of the balance-wheel, when the arc of oscillation of the latter lessens, that is to say when the current must be conveyed into the electro-magnets in order to impart the required impulse to the balance-wheel. The said spring is similarly connected by means of a wire 6 with the electro-magnets and with one of the poles of the supply of electricity.

A wire leads from the other pole to the contact pieces by means of suitable branchings. The contact-pieces are connected, by means of wires with one of the poles of the lamps, the other pole of which is connected by means of wires with the conductor leading back to the supply of electricity.

It will be understood that as long as none of the commutators connect, by means of its rod, the contact-pieces with one another, no current reaches the screw above mentioned, so that the electrical wheel-work remains motionless; but that if even one alone of the commutators touches with its rod the contact-pieces, the current will arrive, on the one hand, from said pieces and to the back plate and from there on to the screw and on the other hand from the said contact pieces and to the lamp. At same time the corresponding lever is moved so as to have

the corresponding projection of the barrel causing, at each revolution of the latter, the ratchet wheel to rotate one tooth.

If the commutators, intended to place the lamps in and out of circuit, are not to be arranged in the controlling-apparatus, the device above described can however be used, as instead of each commutator there will simply be provided in the controlling-apparatus an electric magnet, so that, when the corresponding lamp is placed in circuit, it will act upon the fixed arm of the lever as is done in the manner above described by means of the projection of the commutator.

Dated this 26th day of March 1897.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicant.

COMPLETE SPECIFICATION.

Improved Apparatus for Controlling and Registering the Time of Working of Electric Lamps.

I, HENRY HARRIS LAKE, of the Firm of Haseltine, Lake & Co., Patent Agents, 45, Southampton Buildings, in the County of Middlesex, 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:—

The controlling apparatus heretofore used for the purpose of registering the time of lighting of electric lamps, are adapted for one lamp only or for a series of lamps burning simultaneously.

The object of the present invention is to register, by means of a very simple device, the lighting-time of several lamps, the latter being either lighted and put out at the same time or one after another.

The apparatus may be adapted for any number of lamps so as to have all the commutators of the said lamps arranged in the controlling apparatus, or so arranged that each lamp has its commutator at some other place.

The device constituting the present invention is the same in both cases; I shall therefore describe the simplest construction that is to say that in which the commutators of the lamps are combined with the controlling apparatus itself.

In the accompanying drawings I have shown by way of example a controlling apparatus adapted for four lamps, the apparatus being enclosed in a box of suitable shape, which is not shown in the drawing.

Fig. 1 is a front view of the apparatus showing a portion of the same in section.

Fig. 2 is a back view of the said apparatus.

Fig. 3 is a side-view from right to left of Fig. 2 also showing some parts in section and

Fig. 4 is a diagram of the electrical connections of the apparatus showing the source of supply of electricity and the lamps intended to be controlled by the said apparatus.

The controlling apparatus is formed, on the one hand of a clock indicating the time and of a commutator which conveys the indication of the time, for each lamp, to corresponding hands only when the said lamp is burning, that is to say when it is electrically connected.

A is the main plate of the apparatus behind which a second plate B is fixed by means of pillars *a*, and which carries the wheel-work.

The said wheel-work is formed of a balance-wheel C the axis *c* of which bears the anchor c^1 of an electro-magnet D interpolated in the circuit. The axis *c* carries a tooth c^2 which is caused, at every oscillation of the said balance-wheel, to move the wheel E one tooth which wheel is intended to record the hour-indications. For

that purpose the axis of the wheel E is provided between the plates A and B with a bevel wheel F gearing into a bevel-wheel G secured on the axis of a barrel or drum J. The number of oscillations of the balance-wheel C acted upon by a spiral-spring H, and the number of teeth of the bevel-wheels F and G, is such that the barrel or drum J will always perform one revolution in a minute.

There are provided on the said barrel J as many projections or notches *j* as there are lamps to be controlled, in this the present case four. The projections *j* are disposed so that there will always be only one of them upon the same generating line of the barrel J.

A number of spring-levers K corresponding to the number of lamps to be controlled are provided as shown. Each lever K is pivoted on a shaft *k* and bears at its free end a block k^1 intended to be acted upon by the projections *j* of the barrel J. The shaft *k* of each lever K is provided with a fixed arm k^+ placed within reach of a suitable projection *l* of one of the commutators L. When at rest, that is to say when the lamp is not burning each lever K bears, under the action of a spirng k^2 against a stud k^3; and while the lever K lies in that position its block k^1 is out of reach of the corresponding projection *j* of the barrel J. But when the corresponding commutator L is turned so that its projection *l* acts upon the fixed arm k^+ of the lever K, the latter is thus moved and its block k^1 comes within reach of the projection of the barrel J, so that it will be pushed in the sense of the arrow 1 of Fig. 3, with every revolution of the barrel J that is to say, once in a minute.

A rocking-frame M is pivoted between the plates A and B in bearings *m* the said frame being acted upon by means of a spring m^+ which tends to keep it in the position shown in Fig. 3. The frame M carries a click or pawl M^+ engaging a ratchet wheel N. The crossbar M^1 of the said rocking frame M is so arranged that when one of the blocks k^1 is acted upon by one of the projections *j* of the barrel J, the corresponding lever K is at same time pressed against the rocking frame M and the latter will then rotate the ratchet wheel N one tooth, by means of its click or pawl M^+. It follows therefrom that as soon as the commutator L of a lamp connects the latter it brings at same time the corresponding lever K, and consequently its block k^1, within reach of a projection *j*, and that, as soon as this has been performed the said lever K will be pushed once every minute in the direction of the arrow 1 (that is to say backwards), causing the ratchet wheel N at same time to be rotated one tooth.

The projections *j* of the barrel J which correspond to the separate lamps, being moved with regard to one another so as never to come within reach of the blocks k^1 together but one after the other, the ratchet wheel N will be rotated every minute a number of teeth equal to the number of lamps burning at the time.

The axis of the ratchet wheel N is provided with an endless screw O, gearing in a helical wheel P the axis of which bears the hand or pointer *p* indicating the units (hours) on a corresponding dial. The said axis is further provided with a pinion p^1 gearing with a wheel Q the axis of which has a hand or pointer intended to indicate the tens. A similar device conveys the motion of the above mentioned wheel Q to the hands or pointers *r* and *s* of the wheels R and S for indicating hundreds and thousands.

The device just described is arranged in the circuit of the source of electricity and of the lamps in the manner shown in Fig. 4.

T is the source of electricity. The commutators L are each formed of an axis l^+ with contact rod l^1. The latter is intended to connect electrically the contact pieces l^2 and l^3.

The axis l^+ of the commutator is in contact with the metal plate A with which a screw *x* is also in electrical contact, the latter being connected by means of a wire 5 with the notched bearing *y* against which the contact spring *z* engages in the well known manner used in electric clocks under the influence of the balance-wheel C, when the arc of oscillation of the latter lessens, that is to say, when the current is conveyed into the electro-magnets D D in order to impart the required

impulse to the balance-wheel. The said spring z is similarly connected by means of a wire 6 with the electro-magnets D D and with one of the poles of the supply T of electricity.

A wire 1 leads from the other pole to the contact pieces l^2 by means of suitable branchings 2. The contact-pieces l^3 are connected, by means of wires 3, with one of the poles of the lamps the other pole of which is connected by means of wires 4 with the conductor leading back to the supply of electricity.

It will be seen by referring to Fig. 4 that as long as none of the commutators L connect, by means of its rod l^1, the contact-pieces l^2 l^3 with one another, no current reaches the screw x, so that the electrical wheel-work remains motionless; but that if only one of the commutators L, for instance L^2 touches with its rod l^1 the contact-pieces l^2 and l^3, the current will flow, on the one hand, from l^2 to $l+$ and to the plate B and from there on to the screw x and on the other hand from l^2 to l^3 and to the lamp U^2. At same time the corresponding lever K is moved so that the corresponding projection j of the barrel J causes, at each revolution of the latter, the ratchet wheel N to rotate one tooth.

If the commutators, intended to place the lamps in and out of circuit, are not to be arranged in the controlling apparatus, the device above described can however be used, as instead of each commutator L I may simply provide in the controlling apparatus an electro-magnet, so that, when the corresponding lamp is placed in circuit, it will act upon the fixed arm $k+$ of the lever K as is done in the manner above described by means of the projection l of the commutator L.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, as communicated to me by my foreign correspondents, I declare that what I claim is:—

An improved apparatus for controlling and registering the time during which current is supplied to electric lamps, characterized by the combination of a suitable time-piece with a barrel J having as many projections or notches j as there are lamps to be controlled, and with levers, acted upon by the commutators of the separate lamps, and conveying or not, the action of the said projections or notches j to a registering device, according as the separate lamps corresponding to the said projections or notches are put in or out of circuit.

Dated this 17th day of December 1897.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicant.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1898

A.D. 1897. March 26. N°. 7677.
LAKE'S Complete Specification.

[2 SHEETS]
SHEET 1

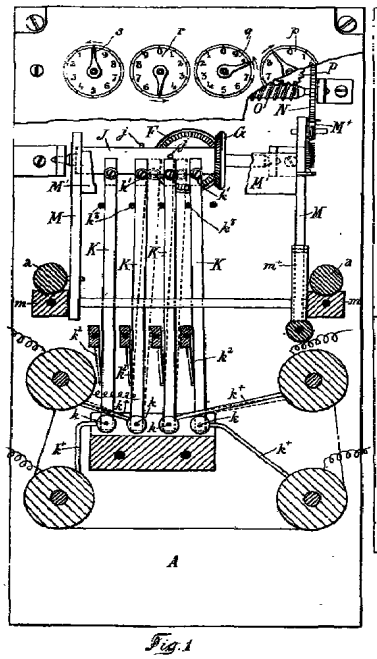


Fig. 1

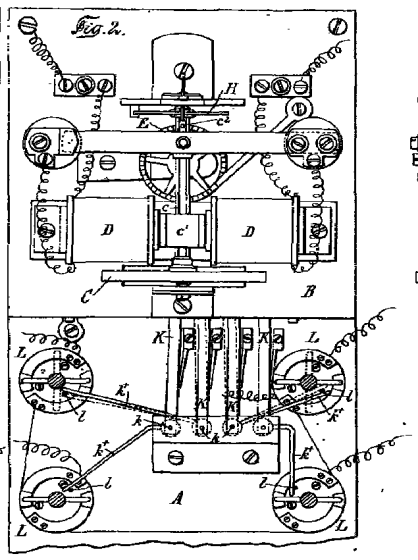


Fig. 2.

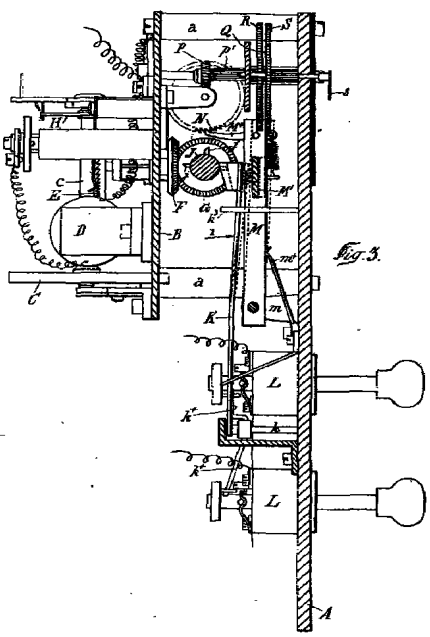


Fig. 3.

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

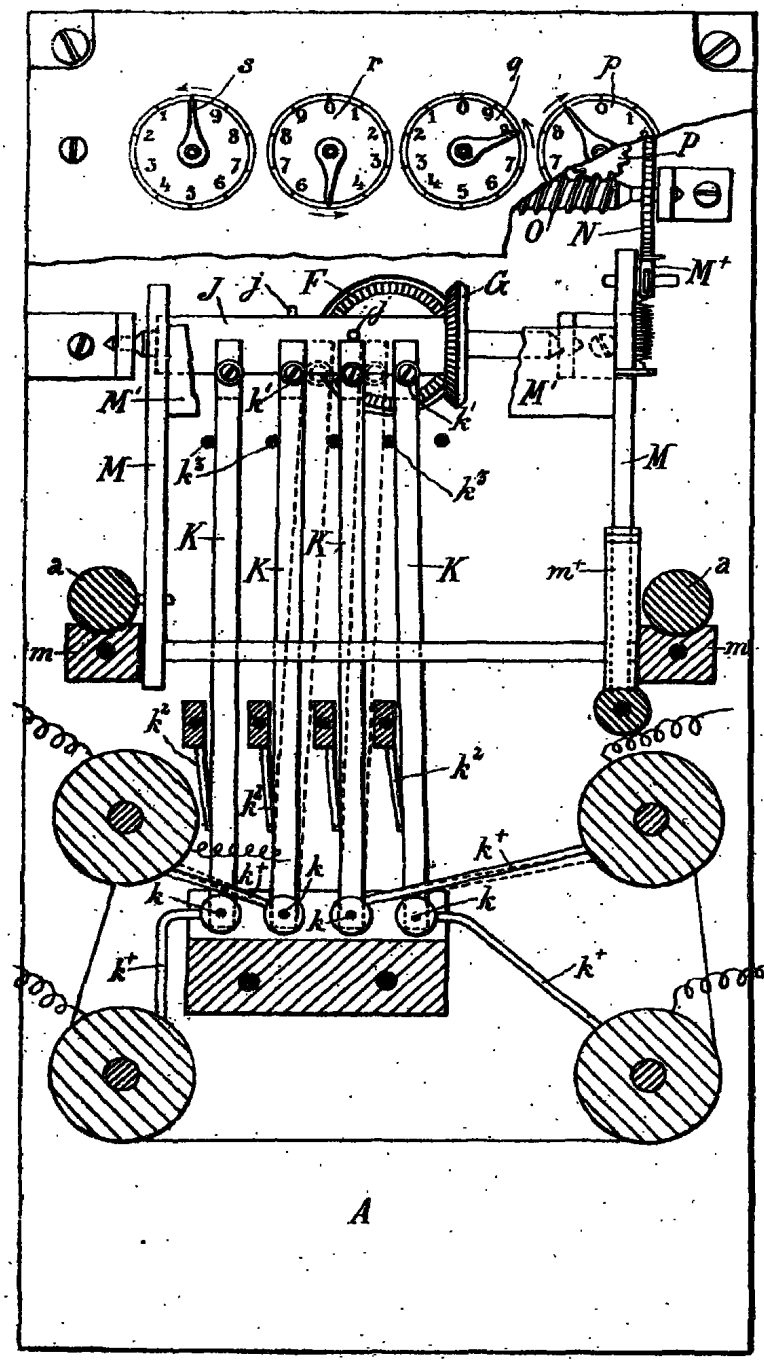
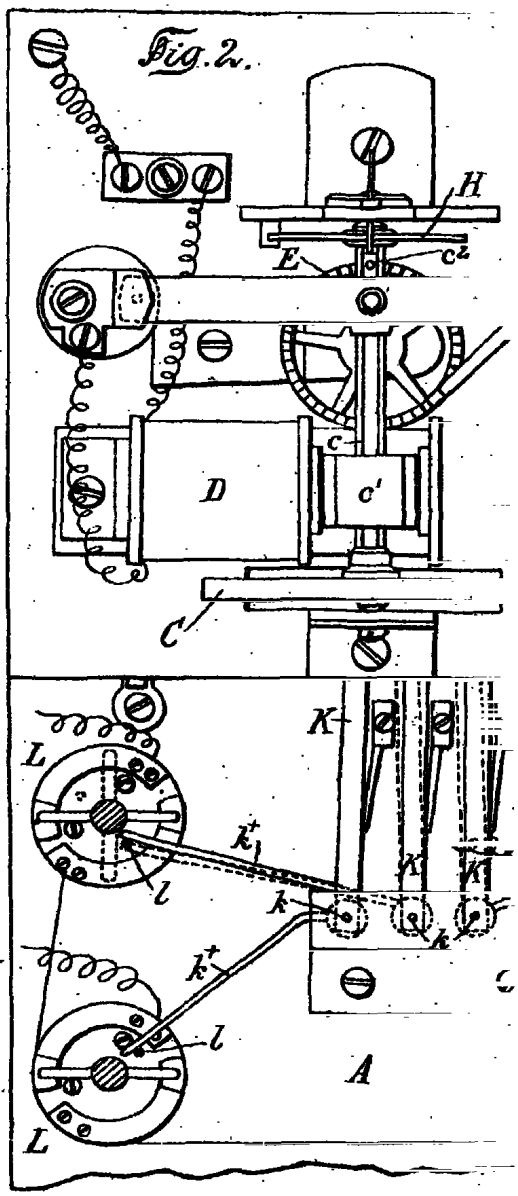


Fig. 1



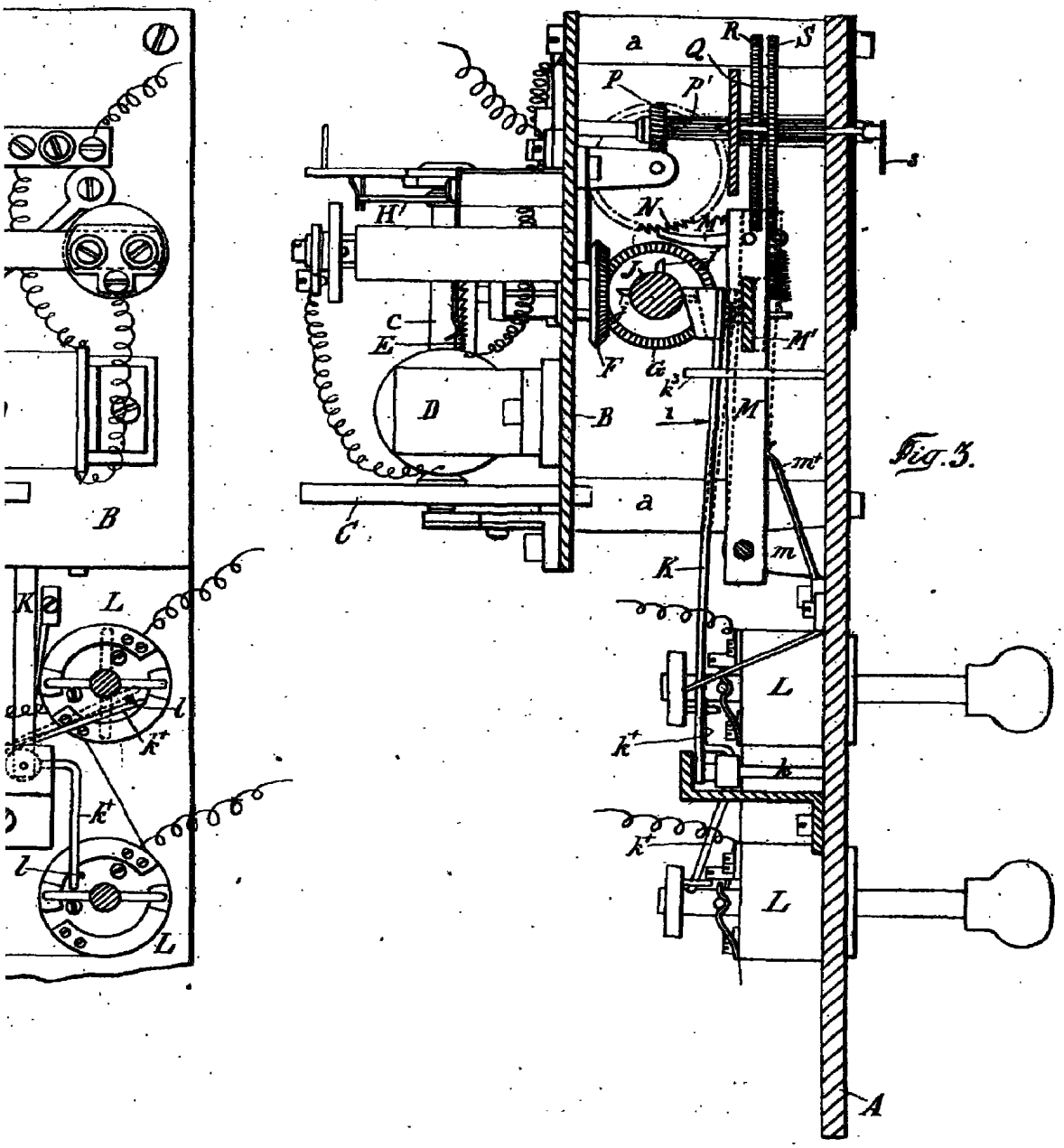


Fig. 3.

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

Malby&Sons, Photo-Litho.

[This Drawing is a full-size reproduction of the Original.]

(2 SHEETS)
SHEET 2.

A.D. 1897. MARCH 26. No. 7677.
LAKE'S COMPLETE SPECIFICATION.

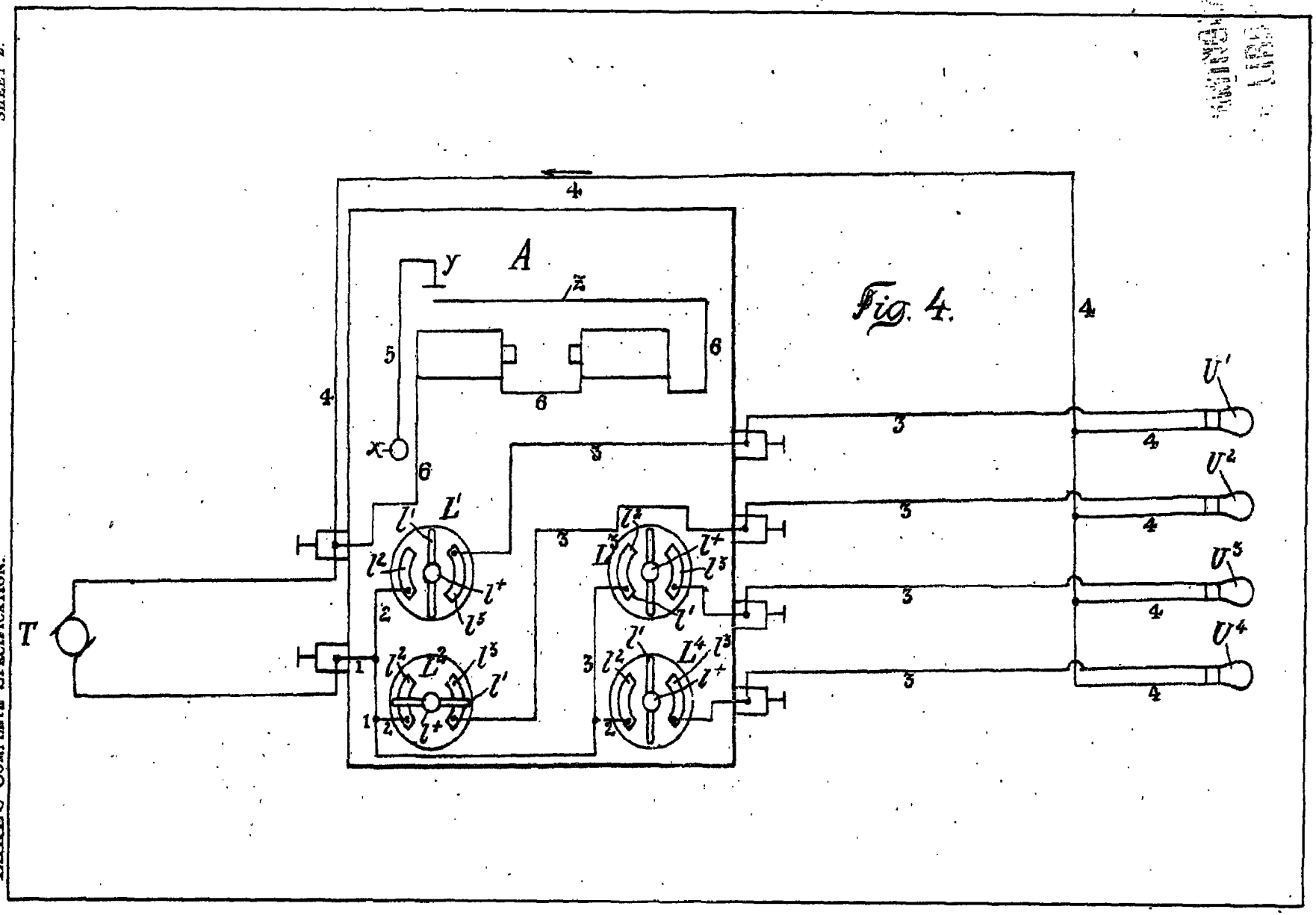


Fig. 4.

Malby & Sons, Photo-Litho.