N° 19,337 A.D. 1898

Date of Application, 12th Sept., 1898

Complete Specification Left, 12th June, 1899—Accepted, 12th Sept., 1899

PROVISIONAL SPECIFICATION.

Electric Apparatus for Regulating Clocks.

I, ROBERT JAMES RUDD, of 78, Sydenham Road, North Croydon, in the County of Surrey, Engineer, do hereby declare the nature of this invention to be as follows:—

My invention relates to an electric apparatus for adjusting the regulator of a clock, in order that the time indicated by the hands will always be correct.

The apparatus may be actuated by a periodic electric current, such as the Greenwich time signal; or by one of greater or less frequency, supplied by any standard clock.

For this purpose I attach a pin (or cam) to some part of the clock train, revolving a complete number of times during the signalling period; I also provide a lever to be brought into contact with the pin by the electric current; the lever at the same time acting on the regulator of the clock, adjusts it to correspond with the position of the pin. Thus if the clock gain, the pin will become in advance of its true position, and the lever will then set the regulator of the clock a corresponding distance towards slow; or if the clock lose, the reverse action will occur: and any alteration in the natural rate of the clock, will at once find the correct position of the regulator.

The form of the electro-magnetic apparatus will vary according to the kind of clock. The accompanying drawing represents the apparatus for a pendulum clock. R is the regulator of the clock, engaged with the pendulum at P, and held in position by the spring click K; the regulator may be otherwise arranged to adjust a small weight attached to the pendulum, instead of engaging with it at P. C is the cam mounted on the seconds arbor, in such a way that it can be set by the seconds hand on starting the clock. L is the lever, to be brought up to the cam by the electro-magnet M. S is a step on the lever, for the purpose of adjusting the regulator arm R: the lever L is mounted freely on the axle A, and connected with the releasing lever T, T, by the spring O. When the current passes, both the levers L & T are raised together by the armature Q; L then comes in contact with the cam C, and is thus held in a position determined by that of C, but the spring O allows the lever T to continue its course, and to strike the click K; thus releasing the regulator, so that it rests on the step S. The electric current being momentary, R is immediately locked in its new position by the click K; and the levers T and L drop to their original place as shewn. The step X on cam C would be formed on the lever when a pin is used; its effect is to concentrate the action to a small & sensitive arc, after the clock has been brought to time by the less acute portions of the cam.

Dated this 10th day of September 1898.

ROBERT JAMES RUDD.

[*Price* 8*d*.]

COMPLETE SPECIFICATION.

Electric Apparatus for Regulating Clocks.

I, ROBERT JAMES RUDD, of 78, Sydenham Road, North Croydon, in the County of Surrey, Engineer, 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:—

This invention relates to an electric apparatus for adjusting the regulator of a clock in order that the time indicated by the hands shall always be correct. The apparatus may be actuated by a periodic electric current, such as the Greenwich time signal, or by one of greater or less frequency supplied by any standard clock.

The form of the electromagnetic apparatus varies according to the kind of clock to which it is applied. When applied to an ordinary pendulum clock, I attach a pin or cam to some part of the clock revolving a complete number of times during the signalling period. I also provide a setting lever to be brought into contact with the pin or cam by the electric current, which lever at the same time, acting on the regulator of the clock, adjusts it to correspond with the position of the pin or cam. Thus if the clock gain, the pin or cam will become in advance of its true position and the lever will then set the regulator of the clock a corresponding distance towards "slow"; or if the clock lose, the reverse action will occur; and any alteration in the natural rate of the clock will at once find the correct position of the regulator.

In the accompanying drawings:—

Fig. 1 is an elevation of an electromagnetic regulating apparatus constructed according to this invention and suitable for an ordinary pendulum clock, and Figs. 2 and 3 are similar views of modified arangements of the same invention.

Referring to Fig. 1 of the drawings:—

A regulating lever arm *a* pivotted or flexibly connected at one end to the base plate *b* engages the suspension spring *c* of the pendulum rod by means of a jaw or opening formed of two stud pins *d* so that the effective length of the pendulum is varied according to the position of the arm A. The arm A has pivotted to it at *e* one end of a bar *f* whose other end when free can be slid in a guide lug *g*; but which, together with the connected regulating arm *a*, is normally held in any position by a brake or friction block *h* pressed against it by a spring *i* as is clearly shown. A snail cam *l* is adjustably mounted on the seconds arbor *m* so that it can be set in its proper position by means of the seconds hand when starting the clock. On the base *b* is mounted an electro magnet M in electrical connection with a standard clock or time signal and whose armature *n* is flexibly secured at one end to a lug *o* while its other end engages with one arm *p* of a bell crank lever *p q* mounted on an arbor *r* and flexibly connected by a spring *s* to a lever *t* loosely mounted on the said arbor *r*.

On the passage of a current through the coils of the magnet M the armature *n* is attracted and rotates the levers *p q* and *t* together until the lever *t* strikes the cam *l* or rod *f* when the further rotations of the arm *q*, permitted by the spring connection, causes the tail *v* of the arm *q* to engage the tail *w* of the spring brake block *h* and release the block from the rod *f*. The rod *f* and regulating lever *a* then take up a position determined by that of the cam *l* and on the cessation of the momentary current the tail *v* is disengaged from the tail *w* and the block *h* presses on the rod *f* locking it in the position thus determined while the levers *p q t* and armature *n* return to their normal position as shown. A step *x* is formed at or about a point on the periphery of the cam *l* where the end of the lever *t* would strike when the controlling and regulating clocks were working in unison, its effects being to concentrate the action to a small and sensitive arc

corresponding with one beat of the pendulum, the inclination of the step being adapted to the impulse motion, so that the clock will be kept within one beat of the pendulum after the clock has been brought to time by the more or less acute portions of the cam. The height of the cam *l* may be made to correspond with the effective action of the regulator so that the first automatic adjustment will bring the clock to time during the following interval. The scope of the regulator in Fig. 1 is one minute.

When the clock has no seconds hand the cam may be placed on the centre arbor carrying the minute hand, so that in setting the clock in time after a stoppage, the cam will also be set in position by the adjustment of the minute hand. The regulating scope of the apparatus in this case is an hour, and the degree of sensitiveness requisite for accuracy is obtained by the step *x*.

In some clocks the minute hand is connected with the centre arbor by friction, so that when setting the hand the centre arbor would not rotate with it and some independent method of setting the cam or pin would be desirable. Fig. 2 shows an arrangement for this purpose. The cam *l* Fig. 1 is replaced by a pin wheel l^1 mounted friction-tight preferably on the third arbor *a g* revolving in six minutes. If the third wheel revolves at any other rate, the number of pins to correspond would be provided thus 5 pins for a minute wheel, 9 for a $4\frac{1}{2}$ minute or any number that would bring a pin into position at the time of signalling. A lever *a h* is provided for setting the pin wheel in a determinate position, corresponding with any minute at which the minute hand may be placed. The lever *a h* has a counterbalance N and can be depressed on one of the pins, thus pushing the wheel forward until the next pin abuts against the end of the lever; the counterbalance then raises the lever out of action. The end of the setting lever *t* forms a cam which strikes one of the pins *a i* when setting the regulator, and may have a step *x* for the same purpose as the step *x* on cam *l* Fig. 1.

In the modified arrangement shown in Fig. 3 a short regulating pendulum *a a* provided with adjusting weights W acts in conjunction with the regulating lever *a* and is connected to the pendulum rod *y* by the spring connection *a b* as clearly shown. As shown the lever *t* is provided with a rod t^1 which strikes the cam *l*.

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

1. An electric apparatus for regulating clocks comprising a regulating device, an electromagnet electrically connected with a controlling source, a cam or equivalent on the wheel train, a setting lever capable of being pressed against the said cam or equivalent by the armature of the said electromagnet so as to set the regulating device, and a locking device normally closed but capable of being operated by the said armature so as to release the regulating device and permit of its being reset, substantially as described and for the purpose set forth.

2. An electric apparatus for regulating clocks arranged constructed and operating substantially as described and shown in Fig. 2 of the drawings.

3. An electric apparatus for regulating clocks arranged constructed and operating substantially as described and shown in Fig. 2 of the drawings.

4. An electric apparatus for regulating clocks arranged constructed and operating substantially as described and shown in Fig. 3 of the drawings.

Dated this 12th day of June 1899.

WHEATLEY & MACKENZIE,
40, Chancery Lane, London, W.C., Agents.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1899.

ERRATUM.

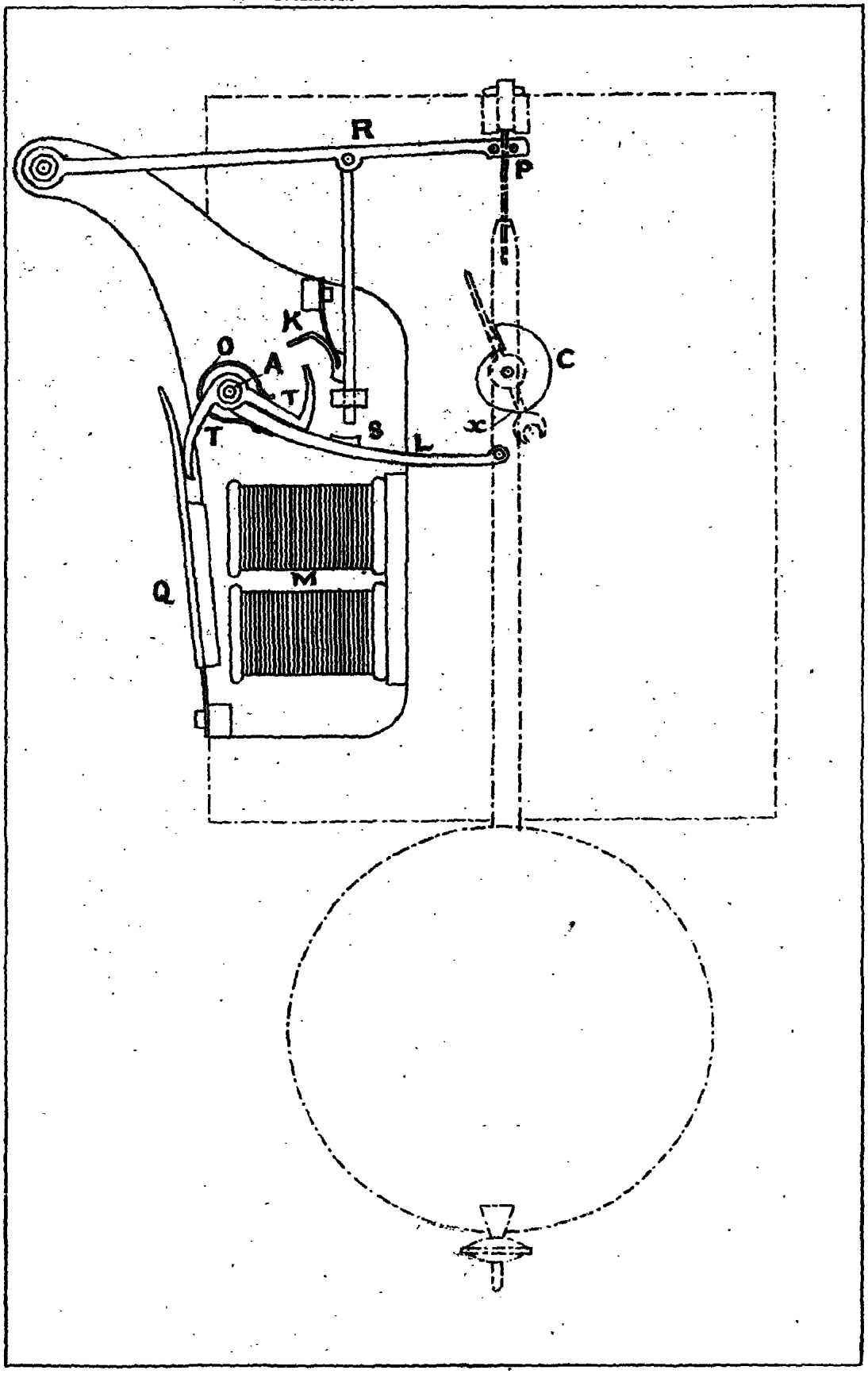
SPECIFICATION No. 19,337, A.D. 1898.

Page 3, Claim 2, *for* "Fig. 2" *read* "Fig. 1."

PATENT OFFICE,
12*th October*, 1899.

A.D. 1898. Sep. 12. N° 19,337.

RUDD'S Provisional Specification. (1 SHEET)

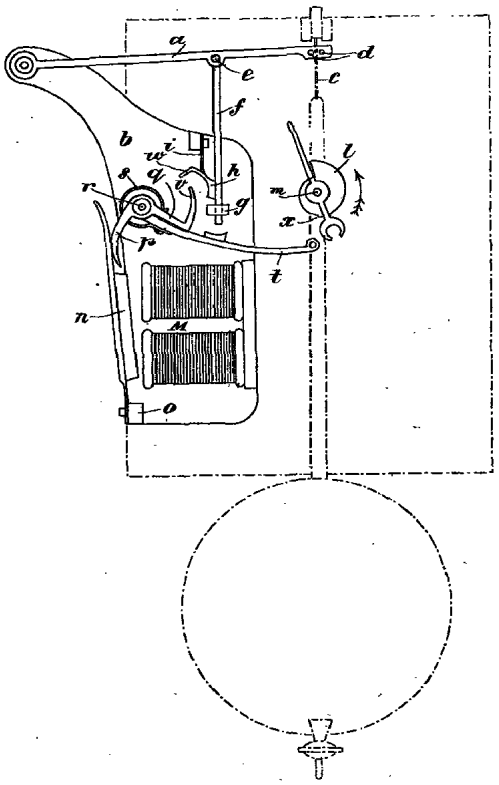


[This Drawing is a reproduction of the Original on a reduced scale.]

A.D. 1898. Sep. 12. N° 19,337.
RUDD'S Complete Specification.

(3 SHEETS)
SHEET 1

Fig.1.



SHEET 2

Fig.2.

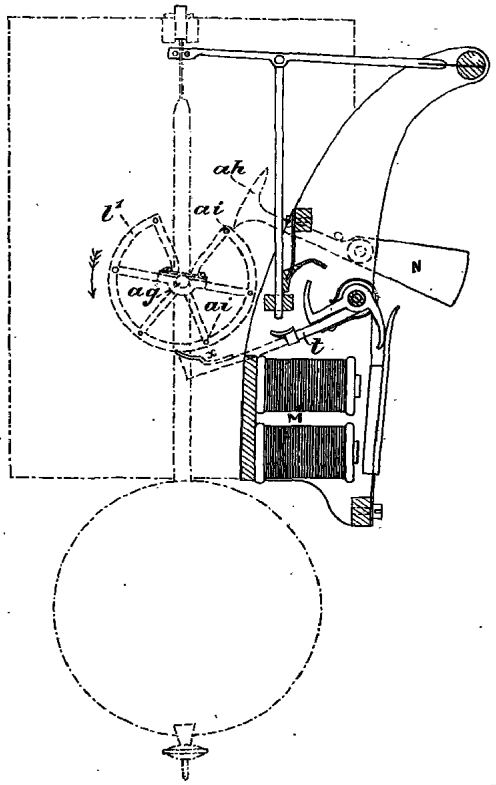


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Fig. 1.

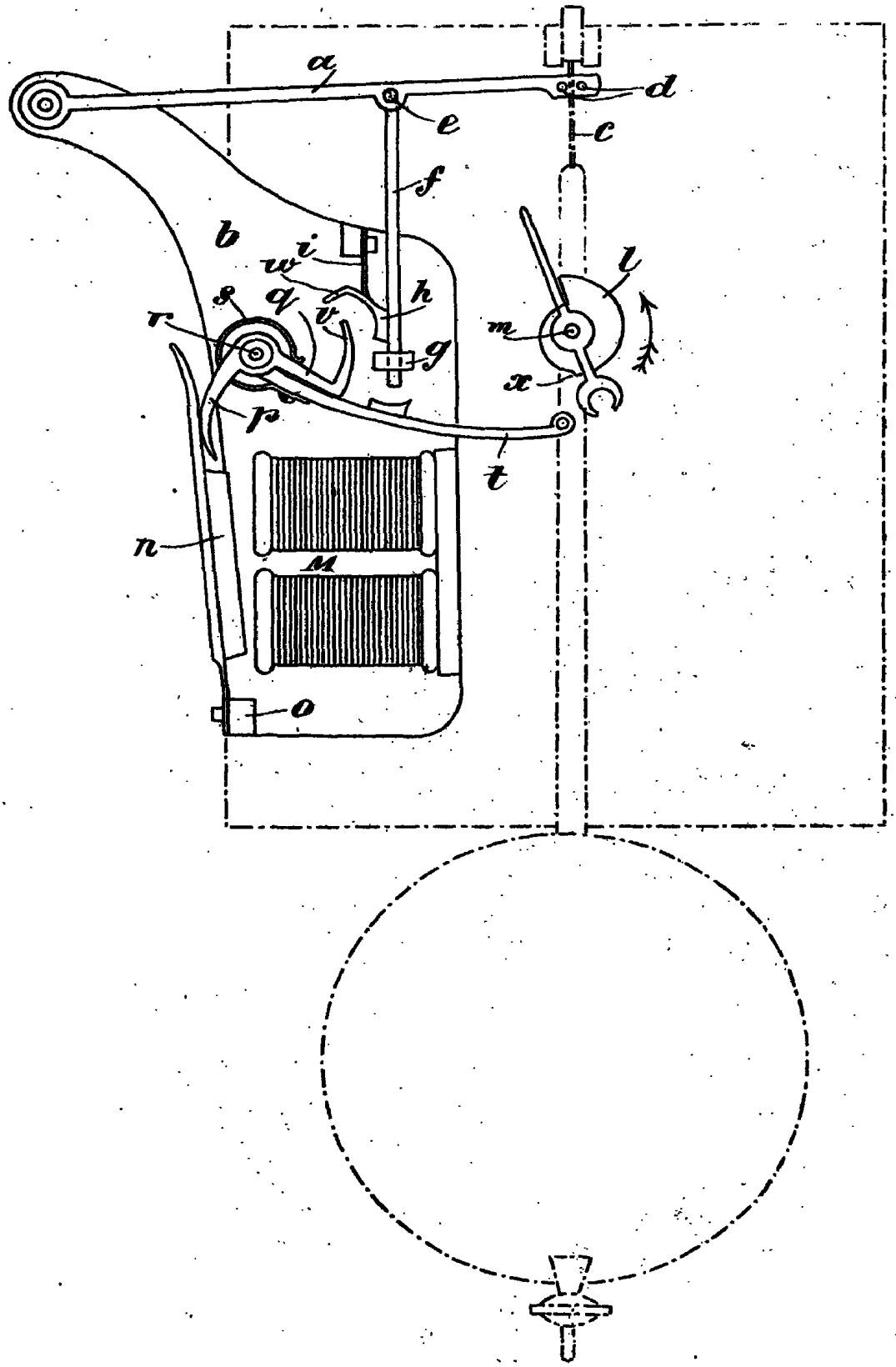

Fig. 2.

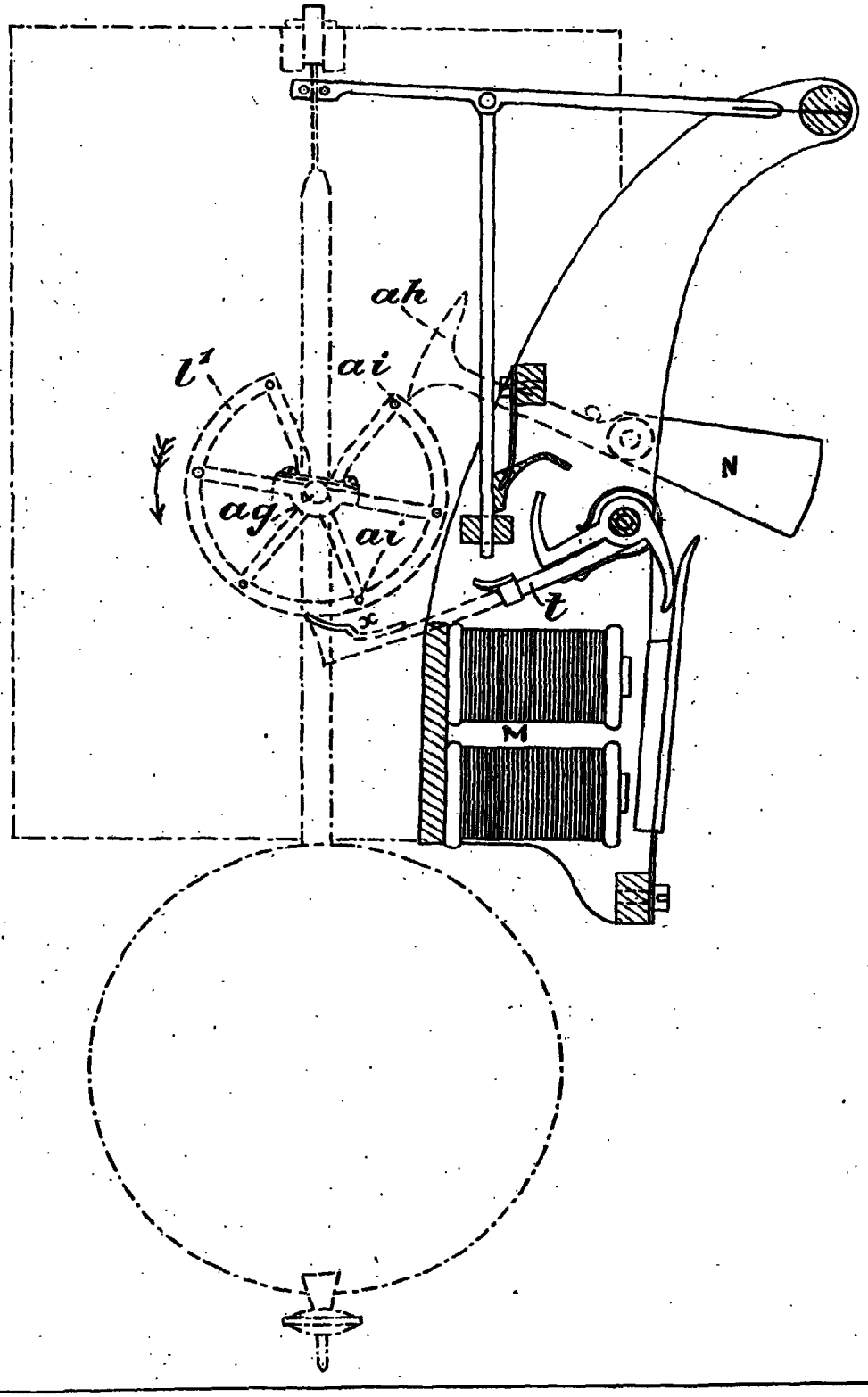

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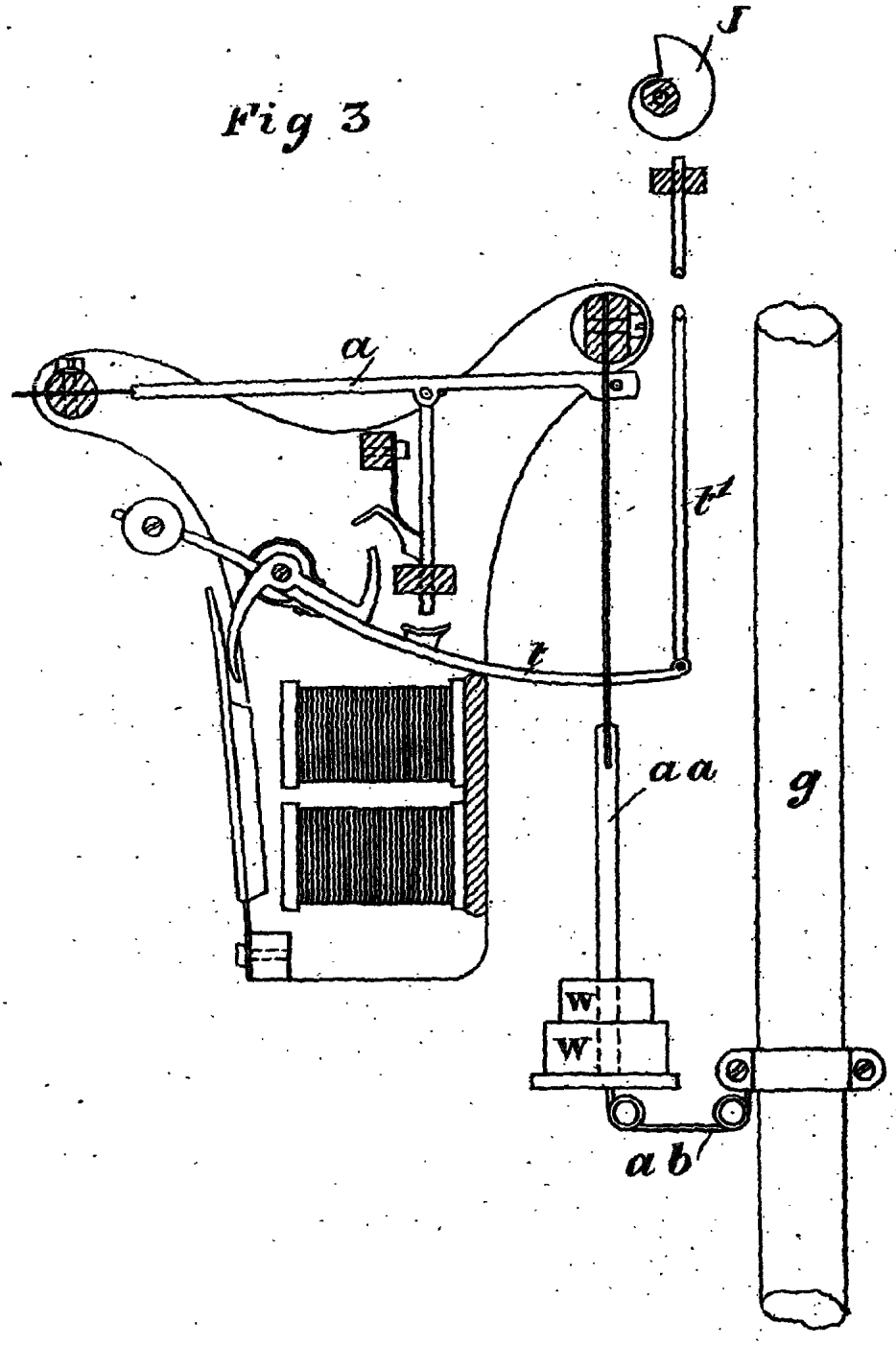
Fig 3



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