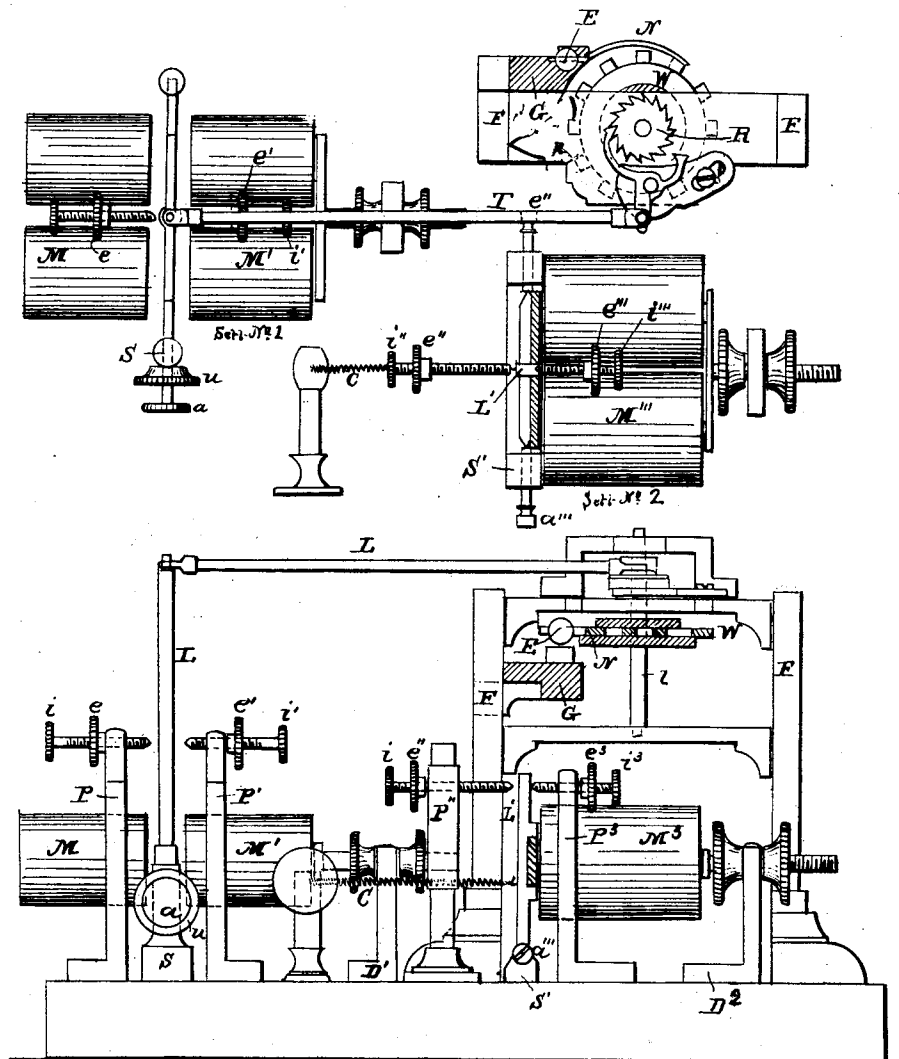


L. T. LINDSEY.
Electro-Magnetic Motor.

No. 106,493.

Patented Aug. 16, 1870.



Witnesses:

Joh. Torham
D. M. Stephens.

Inventor:

L. T. Lindsey

UNITED STATES PATENT OFFICE.

LANDY TUNSTALL LINDSEY, OF JACKSON, TENNESSEE.

IMPROVEMENT IN ELECTRO-MAGNETIC MOTORS.

Specification forming part of Letters Patent No. **106,493**, dated August 16, 1870.

To all whom it may concern:

Be it known that I, LANDY TUNSTALL LINDSEY, of Jackson, in the county of Madison and State of Tennessee, have made certain new and useful improvements in the manner in which I construct the mechanical part of my electro-magnetic motor; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

In the drawings, Figure 1 is a vertical projection of the instrument. Fig. 2 is a horizontal view and plan, divested of such parts as are not necessary to represent the working of the instrument.

Similar reference-letters denote the same parts in vertical or horizontal outline.

W is a toothed wheel fixed on the spindle I, which is supported in the frame F. The teeth of this wheel are made of platina or other non-corrosive metal, and have a space of equal width between each.

N is a metal spring tipped with a platina-surface, and is suitably supported in a post, E, which rests on an insulated shelf, G, of the frame F.

T is a connecting-rod extending from the lever L to the arm of the pawls which act upon the ratchet-wheel R, by which means the motion of the lever L communicates rotation to the spindle I.

The ratchet-movement herein employed is the same as described and claimed in my Patent No. 102,561.

C is a spring substituted in the place of one of the magnets of that set used as the governor, which has been removed, and its office is to withdraw the lever L', to which it is attached, from the poles of the magnet M''' when there is no magnetism in this magnet to overcome the resistance its tension offers.

As the remaining parts and reference-letters correspond to those in my first patent they require no further reference here.

My electro-magnetic motor, for which I was granted Letters Patent No. 92,066, consists of two sets, arranged, connected, and operated substantially as therein shown. Subsequently I obtained Letters Patent No. 102,562 for an improvement in the mechanical construction

of the motor by using a metal slide, the advantages derived from the use of which are therein explained.

The accompanying drawings represent a further improvement in the mechanical construction of the motor when it is employed to impart rotation to a spindle, and enables me to dispense with the use of the metal slide, but retain all the benefits claimed as derived from it.

By reference to my first patent it will be seen that the lever of one set at the completion of its stroke forms contact with the point of an adjusting-screw, and thus directs the movement of the lever of the other set, and vice versa. When the lever of the propelling set is properly connected to impart rotation to a spindle by means of a ratchet or similar motion the breadth of its stroke is restricted to such limit as the motion employed allows, and as this lever by the original arrangement would have to form a contact with an adjusting-screw at the termination of each stroke to direct the movement of the lever of the other or governor set, its use in the above connection would require a most delicate adjustment of the screws between which it vibrated; for it is obvious that if these screws contracted the extent of its stroke it would fail to throw the ratchet the required distance to insure a sufficient advance of the spindle, while it is equally clear that if either adjusting-screw was beyond the reach of the lever when it had finished its stroke, no connection would be made therewith to cause the lever of the governor set to act, and the working of the instrument would cease. The proper adjustment of the screws to insure a reliable working of the instrument would therefore have to be very exact and delicate, and its liability to become non-operative at any time, either from bad or inexperienced manipulation or accidental moving of either of the screws, is apparent.

My present improvement is to avoid the danger above pointed out by dispensing with the use of the adjusting-screws entirely in that set used as the propelling-power, leaving the lever thereof free to always make a full stroke in either direction, and substituting, to direct or control the flow of the electric current, so as to give motion to the lever of the governor set, a toothed wheel, W, fixed on the spindle

l, and operating in combination with a spring, N, supported in a post, E, which sets on an insulated shelf, G, of the frame F.

The circumference of the wheel W is divided into alternate teeth and spaces, the teeth being of platina or other con-corrosive metal; and the spring N is so adjusted as to operate on the surface of the teeth when the revolution of the wheel brings them successively in contact therewith. They are both included in same circuit, and alternately open and close it when the wheel is in motion. In order that their combined action may be made to direct the movement of the lever of the governor set, it is necessary that one magnet of this shaft be removed and a spring, C, substituted instead, to withdraw the lever thereof when the remaining magnet shall have lost its magnetic influence.

The vibration of the lever of the governor set being only to direct the movement of the lever of the set used as the propelling-power, it has no resistance to overcome or mechanism to move, and it is not essential that the power which attracts it in either direction should be very great or equal, as is necessary in the case of the lever of the propelling set, which is required to overcome resistance in giving motion to mechanism, in addition to forming the requisite electrical connections to insure the movement of the lever of the governor set. Hence it will be seen that the utility of the instrument will not be affected by substituting a spring in the place of one magnet of the governor set, the tension of which will always be weak enough to yield to the overpowering influence of the remaining magnet thereof when it attracts the lever to its poles, and at all times strong enough to withdraw this lever when the magnet just alluded to has lost its power. This insures the vibration of this lever, which is the only mechanical effect it has to produce. The wires of the remaining magnet in the governor set, which heretofore extended to the lever and an adjusting-screw in the propelling set, are transferred from this lever and screw to a connection with the toothed wheel W and spring N operating thereon. The toothed wheel W is the equivalent of the lever of the propelling-set, receiving its motion from and representing the electrical connection before attached to it. The spring N is the equivalent of that adjusting-screw in the propelling set which was heretofore included in the circuit of the remaining magnet of the governor set. When the spring N and a tooth of the wheel W are in contact they close the circuit through the coils of the governor-magnet, causing it to preponderate over the strength of the spring C and attract the lever L' to its poles, holding it there until the magnetic influence is withdrawn, which will not be until the propelling-lever has completed its stroke, and thereby severed the contact of the spring N with the tooth above mentioned. The lever L' of the governor set is then with-

drawn by the spring C, and so held until the stroke of the propelling-lever, when finished in the contrary direction, has advanced the wheel sufficiently far to re-form contact of the spring with another tooth thereof, the repetitions being thus continued.

It requires a full stroke in one direction to move the wheel W the breadth of a space and bring a tooth thereof in contact with the spring N, the circuit being open until this contact is made, and a full stroke in the opposite direction to carry the tooth beyond and cause it to sever its contact with this spring, the circuit remaining closed until this contact is broken.

The toothed wheel W receives its motion from the lever of the propelling set, and, in combination with the spring N, operating thereon, directs the motion of the lever of the governor set, and the latter lever, by its vibration and alternate contact with adjusting-screws, directs the motion of the lever of the propelling-set, which makes the automatic motion complete.

The electrical connections and circuits being the same as shown in my first patent, require no further allusion here. I have only discontinued those connections necessary for the magnet removed from the set used as the governor and transferred those of the remaining magnet of that set from their connection with the lever and an adjusting-screw of the set employed as the propelling-power to the toothed wheel W and spring N, operating thereon, which are equivalent representatives.

Another advantage I claim, arising from the present manner in which I construct my motor is, that it can be placed within the control of the circuit of a telegraph-line by removing the wires of the remaining magnet of the governor set from the toothed wheel W and spring N and connecting them with the armature-lever and adjusting-screw of an ordinary relay-magnet, just as the wires leading from the magnet of a sounder or register do. The vacated toothed wheel W and spring N must be included in the circuit of the telegraph-line to open and close it; and any number of the motors connected with relay-magnets and the telegraph-line, as above indicated, may by the vibrations of the armature-lever of these magnets be operated simultaneously and in unison. The lever of the governor-magnet may also, in such instance, occupy the place of a sounder to indicate signals, the position of the lever made horizontal and magnet vertical, if desired. The ordinary transmitting-key may with propriety be used to open and close the circuit of the main line to transmit signals, or otherwise.

Having described my improvement, what I claim therein is—

1. The combination of the magnets M M', lever L, connecting-arm T, pawls P, ratchet-wheel R'', toothed wheel W, and spring N, for directing the vibratory motion of the lever of

the governor set, arranged, connected, and operated substantially as set forth.

2. The manner, as described, of utilizing the motor for telegraphic purposes by a combination of the line-wire with spring N and toothed wheel W, and the use of a relay-magnet, substantially as set forth.

In testimony whereof I have hereunto subscribed my name, in the presence of two subscribing witnesses, this 17th day of May, 1870.
L. T. LINDSEY.

Witnesses:

J. L. PARHAM,
D. M. STEPHENS.