L. I. Lindsey & H. H. Curtiss, 2 Sheets--Sheet 1.

Dial and Printing Telegraph.

No. 119,623. Patented Oct. 3, 1871.

Fig: 1.

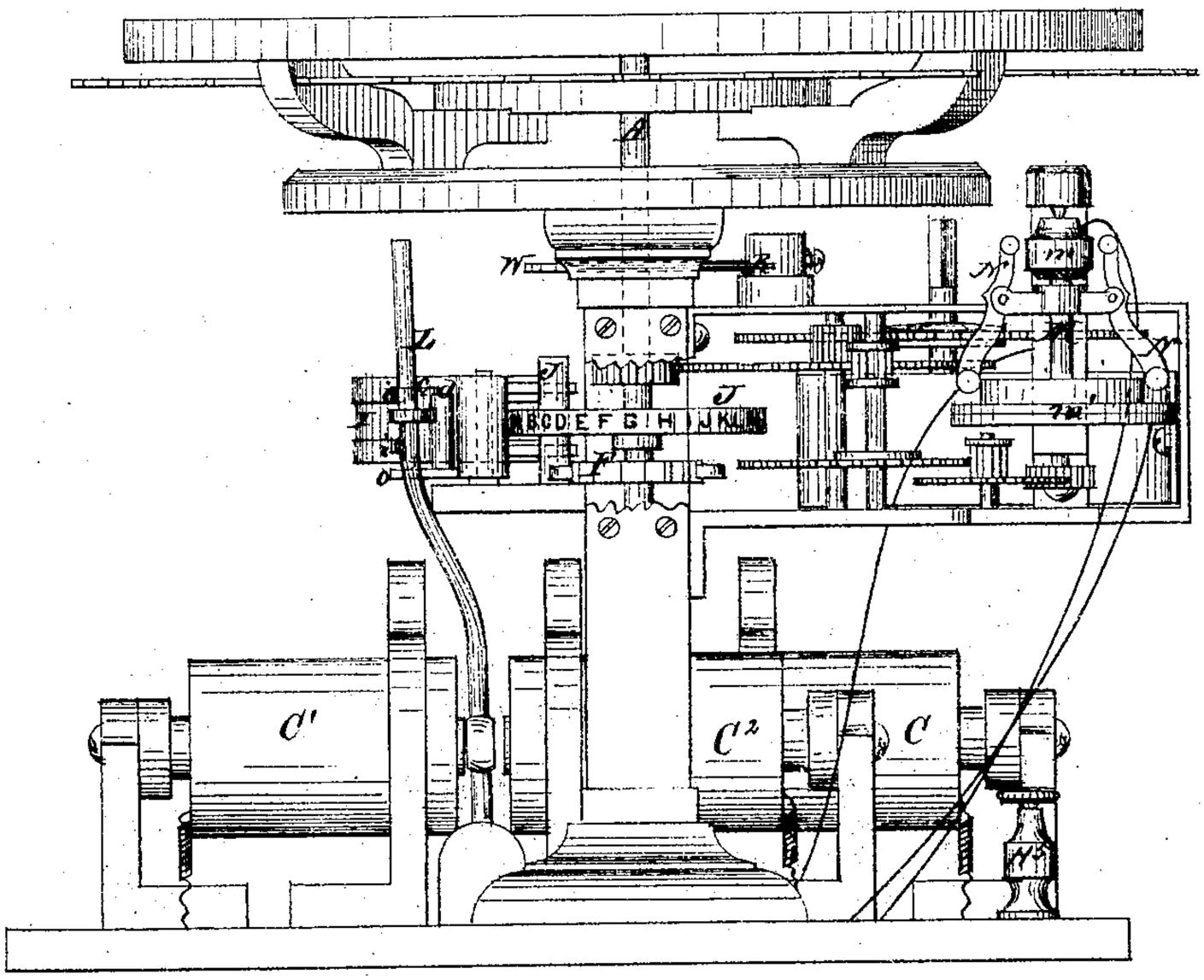
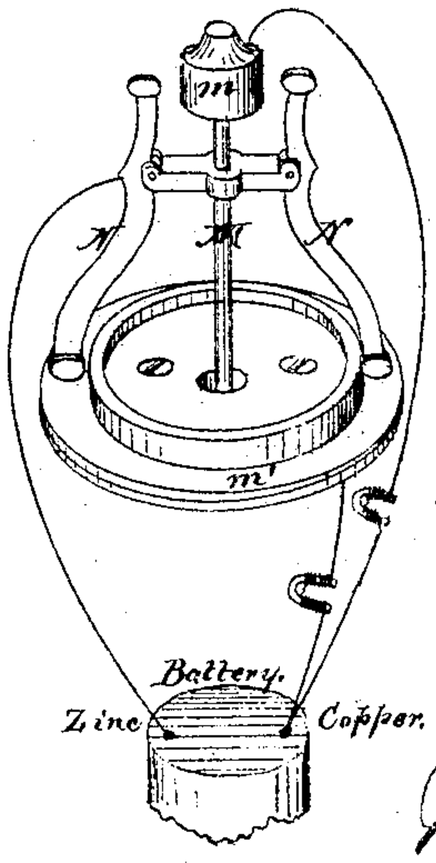


Fig: 3.



Witnesses.
Isaac D. Sailer
E. B. Clark

L. I. Lindsey
H. H. Curtiss
Inventors.
By
their attorney.
Wm. A. Colburn

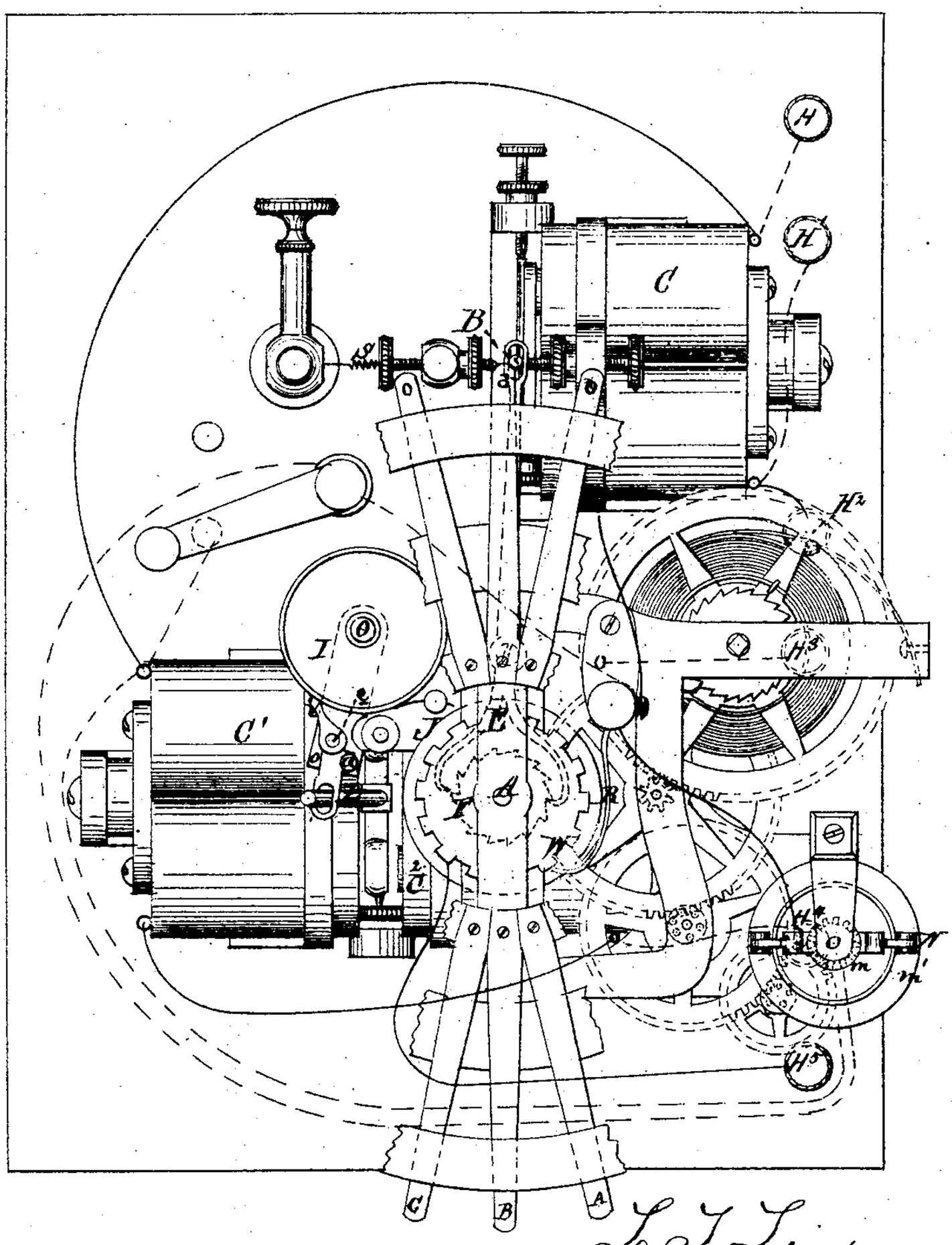
2 Sheets--Sheet 2.

L. T. Lindsey & H. H. Curtiss.

Dial and Printing Telegraph.

No. 119,623. Patented Oct. 3, 1871.

Fig. 2.



L. T. Lindsey
H. H. Curtiss
Inventors.

Witnesses.
Isaac D. Sailer.
E. B. Clark.

By

their attorney.
Wm. A. Colburn

119,623

UNITED STATES PATENT OFFICE.

LANDY TUNSTALL LINDSEY AND HORACE HORATIO CURTISS, OF JACKSON, TENNESSEE.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. 119,623, dated October 3, 1871.

To all whom it may concern:

Be it known that we, LANDY TUNSTALL LINDSEY and HORACE HORATIO CURTISS, of Jackson, in the county of Madison and State of Tennessee, have invented certain new and useful Improvements in the manner of constructing Printing-Telegraph Instruments; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters and figures of reference thereon.

In the drawing, Figure 1 is a vertical view of the instrument. Fig. 2 is the plan, with such portion cut away from the transmitting-plate as is necessary to show the essential parts beneath. Fig. 3 shows the mechanical circuit-changer, (divested of its connection with the instrument,) and the electrical circuit which it forms or governs.

Our invention herein consists in a mechanical circuit-changer, which is composed of a vertical axis, M, on which is suspended two movable arms, N, the axis and arms representing one pole of a battery. The axis M has an insulated section in its upper extremity, upon which is fitted a metallic rim, *m*, and at its lower extremity is situated (concentrically around said axis) an insulated stationary ring, *m'*. The insulated rim *m* on the axis M above, and the stationary insulated ring *m'* below, each represents the other pole of the battery, which has two wires leading therefrom and connecting with these points. Upon these points (the rim *m* and ring *m'*) the arms N alternately close the circuit, the current flowing through such helices as are included in the circuit of either of the two wires, which lead from the same pole, upon which the arms may have closed the circuit. (See Fig. 3.) The preponderance of weight of the arms N being below the point at which they are attached to the axis, when put in rapid motion they have a tendency to fly off in obedience to the mechanical law of centrifugal force, the arms rising until they are stopped by contact of their upper extremities with the rim *m* on the insulated section of the axis M, thereby completing the circuit through one of the two wires which lead from the same pole of the battery. When, however, the motion of the axis ceases, the arms fall by reason of gravity, breaking their contact with the insulated rim *m* above, and also the circuit there formed, and coming to rest upon the stationary insulated ring *m'* below, reforming the circuit at this point through the other of the two wires which lead from the same pole of the battery. When the motion of the axis is resumed the arms again rise, forming the connection and circuit first stated, breaking loose from and severing the contact just formed below and destroying the formation of the circuit at that point until the arms again fall. It will be seen, by reference to Fig. 3, that when the circuit is formed through the top extremity of the arms N and the insulated rim *m*, all the helices included in the route of the wire which leads to this point from that pole which has two wires leading therefrom will be included in the circuit, while those helices embraced in the route of the other wire leading from the same pole and extending to the insulated ring *m'* will not be in any circuit, and vice versa. With equal propriety the connections represented by the arms and the insulated rims might be used in connection with a continuously-closed circuit to cut off the current from its passage through the coils of a magnet, thereby annulling and restoring its power as the arms rise and fall. We also employ a toothed wheel, W, actuated by a weight or spring, in combination with a spring, R, for opening and closing the circuit which includes therein the magnet C, and thereby insures the vibration of the armature-lever B of this magnet. The toothed wheel W is fixed on an axis, A, which is propelled by a weight or spring, as above expressed, and governed by an escapement, E, operating on a ratchet-wheel, F, on the axis A, the escapement E being controlled by the operation of the magnet C and its armature-lever B. The magnet C may be included in either a primary or secondary circuit. When used in a primary circuit, when a tooth of the wheel W and the tip of the spring R are in contact, they close the circuit and direct the current through the helices of the magnet C, causing it to attract its armature-lever B, which lever will in turn move the escapement E, the pallets of which will allow one tooth of the ratchet-wheel F to escape, and thus allowing the axis A to revolve sufficiently far to bring a space

of the toothed wheel W opposite the tip of the spring R, thereby breaking the circuit of the magnet C. The armature-lever B being then no longer influenced by magnetic attraction is withdrawn by a spiral spring, S, moving, also, the pallets of the escapement E, which allows another tooth of the ratchet-wheel F to escape and the axis A to revolve sufficiently far to bring another tooth of the wheel W in contact with the spring R and a reclosing of the circuit through magnet C; a repetition of these alternations continuing automatically, the toothed wheel W and spring R operating the magnet C, and the magnet C (through the escapement) operating the toothed wheel and spring. In the drawing, Fig. 2, I have employed the magnet C in a secondary circuit, its operation to be controlled by an ordinary relay-magnet, which is to be included in the primary circuit with the toothed wheel W and spring R. By reference it will be seen that the circuit is continuous. If the current is supposed to enter at binding-screw H^2 it will proceed to and pass through the helices of magnet C, thence to and through the helices of magnet C^1 thence to and through the helices of magnet C^2, thence to binding-screw H^3, where it returns to the other pole of the battery. The mechanical circuit-changer, in this instance, is employed by suitable "cut-off" connections therewith, to exclude the current from its passage through the coils of the magnets C^1 or C^2, as may be necessary. The dotted lines represent the cut-off connections. By following their course it will be seen that when the upper extremity of the arms N are in contact with the metallic rim *m* of the insulated section of the axis M the current will be excluded from any passage through the coils of the magnet C^2, and as the magnet C^1 has no such restrictions it retains its power and will attract the lever L, intervening and alternately commanded by both. As the purpose of this lever is to press a strip of paper to a type-wheel, J, on the axis A, and impring a letter thereon, it will be seen by further examination of the "cut-out" connections that when the rotation of the axis M ceases and the arms N drop to a contact with the stationary insulated rim *m'* the coils of the magnet C^1 will be excluded from the current, and the obstacle to its passage through the coils of the magnet C^2 being now removed, the latter magnet will immediately attract the lever L, and thus give the impression of the type to the paper interposed. The dotted lines leading from the terminal wires of magnet C to binding-screws H H^1 are cut-off wires which extend to and connect with the armature-lever and adjusting-screw of a relay-magnet. The vibration of the armature-lever and adjusting-screw of the relay-magnet (in the primary circuit) is caused by the toothed wheel W and spring R opening and closing that circuit, and the effect of the contact of this lever and screw is to alternately cut off the current from its passage through the coils of the magnet C, which is included in the secondary circuit. This insures the vibration of the lever B and the escapement E which it controls. The escapement E in turn allows the axis A to revolve, carrying with it at each step a tooth of the wheel W, to or beyond a contact with spring R; the effect of which alternate contact of the toothed wheel and spring causes the vibration of the armature-lever of the relay-magnet, which in turn repeats the connection, as above explained, and insures a repetition automatically of all the motions throughout, which will so continue uninterruptedly.

Our invention further consists in an improved device for feeding the paper, which may be described as follows: A vertical stud, fixed firmly on a horizontal table or shelf which is fastened to and supported by the frame of the instrument, has fitting over it a sleeve or cap, O, with an arm, *o*, projecting at a right angle therefrom at its lower extremity, and all turning freely on the stud. Fitted on the sleeve O, and resting on the right-angle arm *o* is a wheel or roller, I, with a surface on its periphery sufficiently broad to receive the paper, which is pressed against its surface by the action of a feed-hand, *i*, connected to the printing-lever L. On the end of the right-angle arm *o*, outside the diameter of the roller I, are set two vertical studs, *c d*. On the stud *c* is fitted the feed-hand *i*, so arranged that as the printing-lever L recedes from the type-wheel, the hand *i* turning on its axis (the stud *c*) first closes up the space between its points and the feed-roller I, pressing the intervening paper to the surface of this roller, and then continuing its receding course, carrying the arm, roller, and paper with it to the terminus of the stroke of the lever L which is impelling it, and where it will remain until this lever is again actuated and moves to the type-wheel. In the latter case the feed-hand *i*, turning again on its axis *c*, releases the paper, strikes against the stud *d* on the arm *o*, which arrests its further movement alone and causes the arm *o* to advance with it, the entire arrangement moving into the proper position to return with the paper when the lever L shall recede again after giving the impression of the type to the paper. More than one type-wheel may be put on the axis A if desired.

We are aware that a toothed wheel and spring for opening and closing a circuit has been used in the "House printing-instrument," but in that case it was not employed to assist in producing an automatic motion, or in connection with the kind of magnets used in this instrument.

Having described our invention, what we claim therein is—

1. The mechanical circuit-changer, composed of the vertical axis M, arms N, insulated rims *m m'*, and the electrical connections therewith, as described, the arrangement acting upon the principle of centrifugal force for changing the direction of an electrical current.

2. The combination of the magnet C, armature-lever B, escapement E, ratchet-wheel F, axis A propelled by a weight or spring and bearing the

toothed wheel W, in conjunction with the spring R and electrical connections described, for acquiring an automatic movement of the instrument.

3. The device consisting of the sleeve O, arm *o*, roller I, feed-hand *i*, studs *c d*, lever L, for insuring the movement of the paper in the manner as described.

In witness whereof we have hereunto signed our names this the 15th day of February, 1871.

L. T. LINDSEY.
H. H. CURTISS.

Witnesses:
JNO. T. STARK,
I. S. CONGER.