2 Sheets--Sheet 1.

L. T. LINDSEY.

Circuits for Printing Telegraphs.

No. 143,700. Patented Oct. 14, 1873.

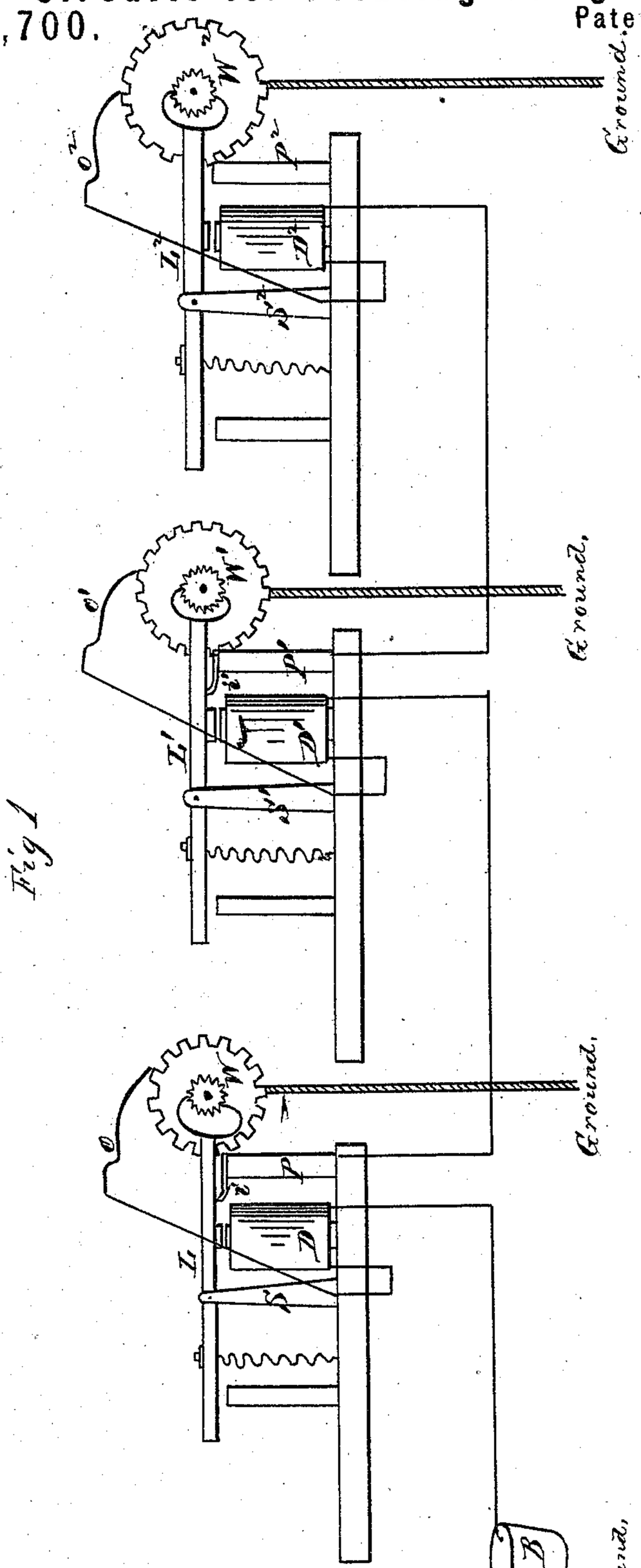

Fig 1

Witnesses:
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2 Sheets--Sheet 2.

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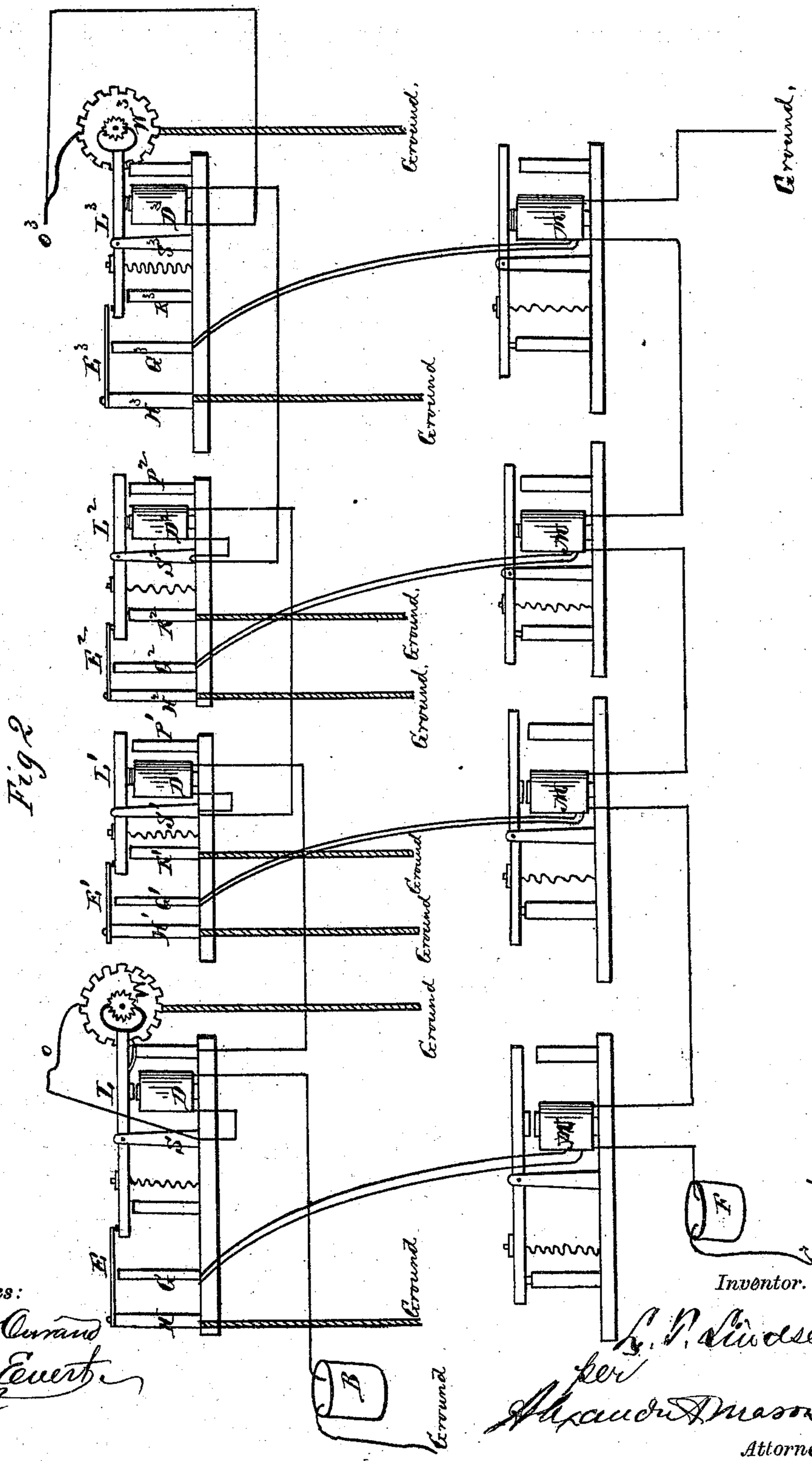

UNITED STATES PATENT OFFICE.

LANDY T. LINDSEY, OF JACKSON, TENNESSEE.

IMPROVEMENT IN CIRCUITS FOR PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **143,700**, dated October 14, 1873; application filed March 28, 1873.

To all whom it may concern:

Be it known that I, LANDY T. LINDSEY, of Jackson, in the county of Madison and in the State of Tennessee, have invented certain new and useful Improvements in Printing-Telegraphs; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

This invention relates to the class of printing-telegraphs which employ two wires extending the length of the main circuit, one of which includes the magnets which actuate or control the type-wheel mechanism, and the other including the magnets which actuate or control the printing mechanism.

The difficulty which has heretofore attended many of the local printing-telegraphs has been the lack of a reliable synchronism between machines, and many endeavors have been made to overcome this liability on the part of one instrument to get out of correspondence with another—such as devising unison-stops or other mechanical means whereby, at the expense of a loss of time sufficient to make a few revolutions of the type-wheel without allowing any printing to be done, the several instruments included in one circuit could be reliably regarded as having each reached and been halted at the unison-point, when the printing would again begin, to be followed continually at short intervals by a repetition of the timing process above described, thereby occasioning much loss of time, as no printing could be allowed while the adjustment of the several instruments was being made. Another class of similar instruments have no unison-stops, and depend entirely upon the pallets, which either directly propel or control the escapement of an instrument making a full and complete stroke, which, if it fails to do on any one instrument, will cause it to fall out of correspondence with the others to the extent of one letter for each time it so fails to complete a full stroke.

My invention consists in so running the circuits that a full stroke of the lever which governs or controls the type-wheel mechanism is absolutely insured, and no loss of time is occasioned by having to bring the several instruments to a unison-point, as above described, no unison-stop being necessary.

In my invention I establish in each instrument a ground-connection with that circuit which actuates or controls the movement of the type-wheel mechanism. This ground-connection is formed so as to leave the magnet of such instrument between the same and the battery—or, in other words, the current from the battery will pass through the magnet before reaching the ground-connection. Its passage through the coils of the magnet, however, will cause the same to attract its armature-lever thereto, which will have the effect to destroy the ground-connection there formed. The circuit will remain unbroken, finding its ground in the next instrument in the succession, which, in turn, will destroy its ground by the action of its magnet on its armature-lever, the circuit being prolonged to and finding its ground in the next succeeding instrument, where a repetition of the effects above described will ensue, and so on throughout the series, the various instruments consecutively lifting and destroying their respective grounds as the circuit reaches and passes through a magnet thereof, until the last one is reached, where the circuit of the line is automatically broken, causing all of the levers to be simultaneously released from their respective magnets and the ground-connections re-established, to be again destroyed in rotation, as above described. Thus the series of establishing and obliterating the ground-connections will be regularly and automatically kept up.

As the ground-connection in each instrument has to be destroyed before the succeeding instrument can be effected, it can be clearly seen that it is impossible for one instrument to get out of correspondence with another, as the lever which controls the ground in each has to quite or very nearly complete its stroke before the magnet to be affected in the next instrument in rotation derives any benefit from the current. This system, therefore, begins with a short circuit, which is successively lengthened until the end thereof is reached, when the circuit, being destroyed, is re-formed on the instrument nearest the battery, and thence prolonged by degrees

until the end is again reached, when it will be again broken, and a repetition of the above results again ensue, and so on automatically throughout.

It is to be understood that the battery is only to be connected with the line when it is to be brought into operation. This may be effected by the use of a circuit-breaking bar, which will keep the circuit broken and the line "open," except when required to be brought into use.

In the drawings I have only represented the general circuits and magnets therein and levers affected thereby, together with the manner of forming and destroying the ground-connections, as these levers may be applied in any of the ordinary ways to propel a type-wheel, either by direct action or by controlling an escapement actuated by any independent power.

In Figure 1 the arrangement of the circuit requires absolutely that one lever shall finish its stroke before another lever can begin. By reference thereto it will be seen that the current leaves the battery B and proceeds direct to the magnet D; thence through this magnet into the support S of the lever L; thence to the spring O, finding its ground through the toothed wheel W. As this establishes a current at once through the magnet D, the lever L is attracted thereto, and, by actuating or releasing the wheel W, either moves or allows it to escape the width of one of its teeth, which drops the spring O into a space thereof, and thus destroys the ground-connection there formed. The circuit, however, is maintained unbroken by finding its way, as soon as the ground at W is removed, through the lever L, spring *i*, and post P, to the magnet D^1; thence through this magnet to the support S^1 of the lever L^1; thence to the spring O^1, and to the ground through the toothed wheel W^1, with which this spring is in contact. Here a repetition of the effects just described follow. The wheel W^1 is made to revolve until the tooth whereon the spring O^1 is resting passes from under it, leaving this spring in one of the interdental spaces, and destroying the ground there formed. The circuit, however, is maintained and prolonged, as before, via the support S^1, lever L^1, spring *i'*, and post P^1, to the magnet D^2; thence through this magnet to the support S^2 of the lever L^2; thence to the spring O^2, and to the ground through the toothed wheel W^2, as before described. The wheel W^2 in turn is now actuated, and revolves sufficiently far to release a tooth from its contact with the spring O^2, leaving this spring in the space succeeding the tooth, and destroying the ground there formed, and in this instance the circuit also. As this represents the terminal of the line, it is necessary to interrupt the circuit here, which is done by having no spring corresponding with those marked *i i'*, and no connection with the post P^2. As this breaks the circuit the levers L L^1 L^2 are released from their magnets simultaneously, carrying another tooth of their respective wheels W W^1 W^2 to contact with springs O O^1 O^2, which re-establishes the ground-connections, which now require to be again successively overcome, as above described.

The use of the springs *i i'* is to make sure that the levers L L^1 form contact with the posts P P^1 before the springs O O^1 break contact with their toothed wheels W W^1, respectively, as otherwise the circuit would be broken. The springs *i i'* can be so adjusted that they will always make contact with their respective posts just before the springs O O^1 sever contact with their respective wheels.

A modification of this plan may be made, however, which will, apparently, accomplish the same results, and somewhat simplify the foregoing, where many instruments are in a single circuit, and by which means more speed will possibly be obtained. This is represented in Fig. 2, and consists in dispensing with the toothed wheels W and springs O operating thereon, except at the beginning and end of a circuit, the intervening instruments having their ground established by the contact of their respective levers with the posts, against which they are held by spiral springs when not attracted by their respective magnets.

Referring to Fig. 2, the circuit, leaving the battery B, proceeds until it reaches the magnet D^1, exactly as described thus far in Fig. 1. Here, however, there being no toothed wheel corresponding to W^1, or spring corresponding to O^1, the circuit continues unbroken, after passing through the magnet D^1, and connecting with the stand S^1, on, to, and through the magnet D^2; thence, after connecting with the stand S^2, on, to, and through the magnet D^3, when it unites with a spring, O^3, and finds its ground through the wheel W^3, as described in the foregoing figure. This being the end of the line, the office of this wheel is now to break the circuit, causing the several levers to be simultaneously released.

The circuit through the intervening magnets D^1 D^2 finds its ground, in each instance, through the supports S^1 S^2, levers L^1 L^2, and posts R^1 R^2, which latter are connected with the ground, and correspond, in their office here, to that of the toothed wheel shown elsewhere. This arrangement will be somewhat faster than that first described, inasmuch as the lever L^1 no sooner severs its contact with the post R^1, in response to the influence of the magnet D^1, than the current is instantaneously prolonged to and through the magnet D^2 by destroying the ground formed on the post R^1; and the magnet D^2 no sooner attracts its lever L^2, and causes this lever to sever its contact with the post R^2, than the ground there formed is destroyed, and the current is continued, with the same rapidity, to and through the magnet D^3, not requiring one magnet to wait until the lever of the preceding magnet has completed its stroke before the circuit could be lengthened to include the next magnet, as in the first-mentioned case.

Provision has also been made to compel the

levers which directly or indirectly actuate the printing mechanism not to respond to the impulse to print by vibrating simultaneously; but the lever of each particular machine cannot act until such machine has acted in its order of succession, and brought the desired letters into proper position. The demand for this is obvious; for, if the circuit of the printing-magnets was closed through all those magnets simultaneously, the levers thereof would act with one accord; whereas, in the consecutive order of rotation of the type-controlling magnets, some of these latter might not yet have been reached, and a wrong letter would thereby be produced. In order to insure this I add certain connections, which are controlled by the magnet and lever of the type-moving mechanism, which interposes a ground-connection before each of the printing-lever magnets, which cannot be removed until the magnet and lever first named have acted in their turn. This will be explained by reference to Fig. 2, an explanation of one sufficing for all. By reference thereto it will be seen that I add, near one end of the lever L, two posts, H G. The post H is connected directly with the ground, and has a right-angled horizontal spring, E, resting upon the post G, and projecting beyond the same, so as to overlap the lever L, which has an insulated projection thereon. The post G has a wire communicating therefrom to the magnet M of the printing-lever series. If the circuit, which includes the printing-lever magnets, be now closed, it will be seen that, until the lever L has completed its stroke, no current can go through the magnet M, but, leaving the battery F, it will go at once, via the wire leading from the magnet M, to the post G; thence, via the spring E and post H, to the ground. When, however, the magnet D attracts the lever L to its poles, this lever will, just at the conclusion of its stroke, lift the spring E from the top of the post G, destroying the ground-connection via the post H, and extending the circuit through the magnet M to a similar arrangement in the succeeding instrument, when the ground will be in turn likewise removed, and so continue throughout.

Suitable switches may be introduced into the route of the ground-connections in either circuit, to permanently disunite said connections, if so desired. As the operation of these circuits and the magnets contained therein have direct reference to insuring a reliable succession in the movement of the levers controlled thereby, no special application is claimed for said levers, either in their application to actuating the type-wheel or controlling the printing; but they may, in either instance, be adapted to act directly by propelling or giving a blow to make the impression, or indirectly by controlling an escapement actuated by any form of independent power, either for revolving the type or causing the printing to be done.

All the advantages derived from stopping to print a letter are insured by the natural application of this instrument, while, at the same time, the motion is continuous and automatic. This follows from the fact that the instruments nearest the battery are first affected by the current, and pause after their movement, during the time the succeeding instruments are being successively included in the circuit, until the last is reached, when the circuit will be broken, and their respective levers will be released by the magnets controlling them. This pause will have its maximum of time in the instrument at the beginning of the circuit nearest the battery, and its minimum in the last instrument at the termination of the circuit, the intervening instruments being halted in proportionate ratio.

It will, of course, be understood that any equivalent mechanical device answering the same purpose may be used, in lieu of the toothed wheels W and the springs O, for alternately forming and destroying the ground-connections.

If it is so desired, relay-magnets may be introduced in the circuit in place of the type-wheel magnets, and these latter magnets included each in a local circuit which can be closed by the action of said relay-magnets. Likewise relay-magnets may be made to take the place of the printing-lever magnets in that circuit, and these latter magnets included in local circuits and controlled as in the above instance.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a line of printing-telegraph having a series of instruments arranged in one circuit, the combination of a ground-connection with each and every instrument of the series, substantially as and for the purposes herein set forth.

2. In a line of printing-telegraph having a series of instruments for operating the type-wheels, and a series of instruments for operating the printing mechanisms, the combination of a ground-connection with each and every printing-instrument through its type-wheel instrument, in such a manner that, as the lever of the type-wheel instrument completes its stroke, the said connection between the printing-instrument and the ground will be temporarily broken, for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of March, 1873.

L. T. LINDSEY.

Witnesses:

C. L. EVERT,

A. N. MARR.