2 Sheets—Sheet 1.

G. L. ANDERS.

Printing Telegraph.

No. 210,890. **Patented Dec. 17, 1878.**

Fig. 1

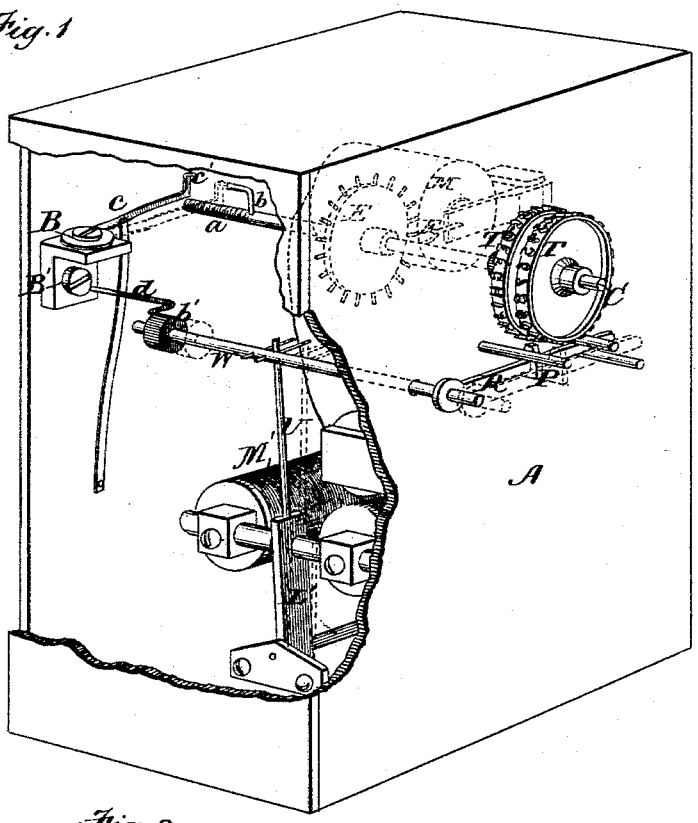


Fig. 2

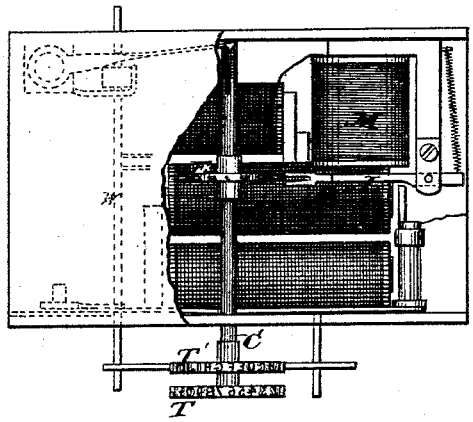
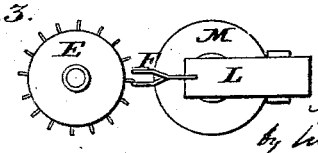


Fig. 3.



Witnesses.

David J. Hobart

Charles W. Hobart

Inventor.

George Lee Anders

by his attorney

Alex. L. Hayes

2 Sheets—Sheet 2.

G. L. ANDERS.

Printing Telegraph.

No. 210,890. Patented Dec. 17, 1878.

Fig. 4.

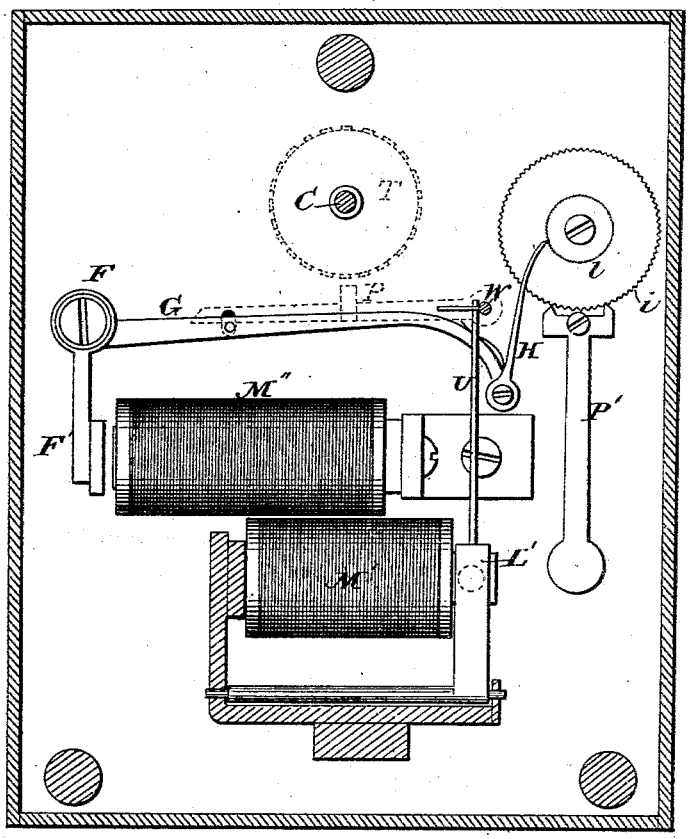


Fig. 5.

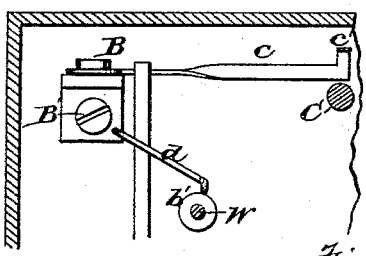


Fig. 6.

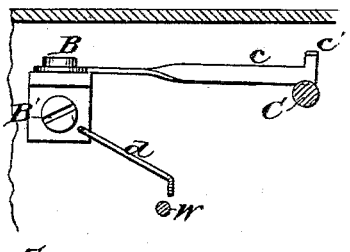
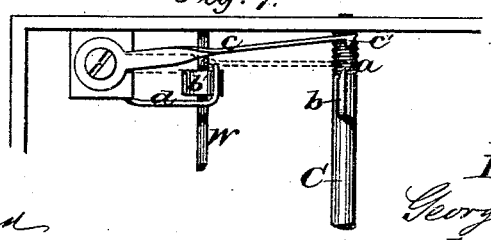


Fig. 7.



Witnesses.
Frank H. Shepherd
C. E. Gram.

Inventor.
George L. Anders
by his Atty.
Alex L. Hayes

UNITED STATES PATENT OFFICE.

GEORGE L. ANDERS, OF BOSTON, ASSIGNOR TO E. BAKER WELCH, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **210,890**, dated December 17, 1878; application filed February 23, 1877.

To all whom it may concern:

Be it known that I, GEORGE LEE ANDERS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Printing-Telegraphs, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

This invention relates to certain improvements in that class of printing-telegraphs in which the type-wheel is operated and controlled by electro-magnetism so as to rotate step by step; and these improvements consist, first, in a mechanical unison device for arresting the rotation of the type-wheel arbor, or its equivalent, at a certain fixed point, brought into action by currents of one polarity and disconnected by a current of opposite polarity; second, in printing-telegraphs having two contiguous type-wheels on the same arbor and rotated step by step, a unison device brought into action and disconnected by the mechanism which shifts the printing-pad or type-wheels, for the purpose of obtaining an impression from either of the type-wheels; third, in the combination, with a retarding device, of a printing-magnet placed in the main-line circuit, whereby the printing is effected by a prolongation of the main-line current; fourth, in a printing-telegraph having two contiguous type-wheels rotated step by step, a type-wheel magnet, a printing-magnet, and a shifting-magnet operated by reversals of the current, all placed in the main-line circuit, a retarding device which prevents the operation of the printing mechanism unless a prolonged current is transmitted through the printing-magnet, and a unison device, which is brought into action by a current of one polarity and disconnected by a current of opposite polarity; fifth, in a new device for moving the printing-pad.

In the accompanying drawings, Figure 1 is a view, in perspective, of a printing-telegraph containing my improvements, a portion of the framing being broken away. Fig. 2 is a plan view of the same. Fig. 3 is a view of the type-wheel escapement and type-wheel magnet. Fig. 4 is a side view, partly in section. Figs. 5, 6, 7 are views of the unison device.

In these several figures the same letters refer to the same parts.

Referring to the drawing, A is the framing of the instrument. C is the type-wheel arbor, having upon it two type-wheels, S S′, one having letters and the other having figures; E, the escapement-wheel; F, the escapement, and M an electro-magnet for operating this escapement.

The clock-work for imparting a tendency to rotate to the type-wheel arbor is not shown; and F may represent propelling-pawls, which act directly to rotate the type-wheel.

P is the printing-pad, which is attached to a frame having a transverse horizontal movement from one type-wheel to the other. I can use any suitable device for moving the printing-pad to effect an impression, or I can use the device hereinafter to be described.

M′ is a polarized electro-magnet, placed on the main-line circuit, passing through the type-wheel magnet, and has its armature L′ provided with an extension, U, which is connected to the frame of the printing-pad by the bar W. It will be obvious that on reversing the polarity of the main-line current the armature L′ of this polarized magnet will move from one pole to the other of the said magnet, and that consequently the printing-pad will be shifted from one type-wheel to the other on said reversal of the current.

Instead of a polarized magnet, two electro-magnets acting on the same armature may be made use of, and instead of the printing-pad being shifted, the type-wheels themselves may be shifted.

The unison device is constructed as follows: A part of the type-wheel arbor, near its end, has a screw-thread cut upon it at *a*, and near the screw-thread is placed a pin, *b*. The end of a lever, *c*, pivoted at B to a bracket pivoted at B′ in the frame, and having a hook, *c′*, at its extremity, bears upon this screw when the printing-pad is under the type-wheel upon which figures are placed, and when in that position, upon the rotation of the type-wheel arbor, will be moved along by the action of

the screw until the hook *c'* strikes the unison-pin *b*, when the rotation of the type-wheel will be arrested; but when the printing-pad is shifted under the letter-wheel, a projection upon the bar B strikes against the lever *d*, and throws up the lever *c* out of engagement with the screw-thread, thus permitting the type-wheel arbor to be rotated without effecting the unison as long as the printing-pad is under the letter-wheel.

In printing-telegraphs of this class, which are principally used for giving stock and market quotations, letters and figures are alternately printed, and consequently the action of this unison arrangement will be to bring the type-wheel to unison after the figure-wheel has made two or three complete rotations, but to cause the release of this unison every time the pad is shifted to print a letter.

In operation, the letter-wheel is always used before the figure-wheel has made a complete rotation, and thus printing may be kept up for any length of time until the instrument gets out of unison, when, by rotating the figure-wheel once or twice without shifting the pad, unison will be effected.

It is obvious that this screw can be attached to any arbor connected with the type-wheel arbor.

For effecting the printing, I propose to use a magnet in connection with a retarding device which will prevent the printing-pad being brought against the type-wheel until the succession of currents through the type-wheel magnet is arrested, when time will be afforded to enable the magnet to attract the armature.

I can use any suitable retarding device, but I prefer to use that shown, being the same as described in another application for a patent.

M'' represents the printing-magnet, which is placed in the main-line circuit passing through the type-wheel magnet; F', the armature, pivoted to the frame at F; and G is a lever connected to the pawl H, which engages with the toothed wheel *l*, upon the axis of the serrated wheel *i*. P is the pendulum and escapement, which retards the movement of the wheel I.

By the action of this retarding device the armature is prevented from completing its full movement unless the step-by-step movement of the type-wheel is arrested and a prolonged current of some duration is transmitted through the magnet, when the printing-pad attached to the lever will be brought against the type-wheel, for the reason that time is afforded for the retarding device to act.

Printing-telegraphs have been patented in which the printing-magnet does not become sufficiently energized to attract the armature and move the press until a prolonged current has been passed through the said magnet; but it will be obvious that this is different from my device, in which the armature is retarded mechanically.

This form of printing-magnet may be applied to any form of printing-telegraph having a polarized type-wheel magnet, as well as to the printing-telegraph shown, in which the type-wheel escapement is operated by interruptions instead of by reversals of the current.

The lever G is connected by a pin to the bar R, upon which the printing-pad P is attached; and when the current sent through the printing-magnet is sufficiently prolonged to permit the retarding device to allow the armature to be fully attracted, the pad is brought against the type-wheel.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a printing-telegraph, a mechanical unison device acting independently of the press mechanism, and brought into action by currents of one polarity, and disconnected by a current of opposite polarity.

2. In a printing-telegraph having its type-wheel operated or controlled by electro-magnetism, so as to rotate step by step, a mechanical unison device acting independently of the press mechanism, and brought into action by main-line currents of one polarity, and disconnected by a main-line current of opposite polarity.

3. In a printing-telegraph having two contiguous type-wheels fixed upon the same arbor and operated or controlled by electro-magnetism, so as to rotate step by step, a unison device which is brought into action when one type-wheel is used for printing, and disconnected on moving the printing-pad or type-wheels so that an impression can be taken from the other type-wheel, substantially as and for the purpose set forth.

4. In a printing-telegraph, the combination, with the type-wheel arbor or its equivalent, of the screw *a* and pin *b* upon said arbor, the hooked lever *c*, the lever *d*, shifting-bar W, and projection *b'* upon the same, substantially as and for the purpose set forth.

5. In a printing-telegraph, the combination, with the printing-magnet placed in the main-line circuit, of the printing mechanism and a retarding device, which prevents the printing mechanism from moving sufficiently to effect an impression unless a prolonged current is transmitted through the printing-magnet, substantially as and for the purpose set forth.

6. In a printing-telegraph, the combination of the printing-magnet M', armature F', lever G, pawl H, wheel *l i*, and pendulum-escapement P', substantially as and for the purpose set forth.

7. In a printing-telegraph, the combination, with the lever G, of the lever R and printing-pad, substantially as and for the purpose set forth.

8. In a printing-telegraph having two contiguous type-wheels fixed upon the same arbor, and operated or controlled by electro-magnetism so as to rotate step by step, the combination, substantially as described, of the type-

wheel magnet, a magnet for shifting the printing-pad from one type-wheel to the other, or for shifting the type-wheels themselves, operated by reversals of the current, and a printing-magnet, all placed in the same main-line circuit, and a retarding device acting to prevent an impression unless a prolonged current is transmitted, and a unison device acting independently of the press mechanism, and brought into action and disconnected by currents of opposite polarity.

In witness whereof I have hereunto signed my name to this specification in presence of two subscribing witnesses.

GEORGE LEE ANDERS.

Witnesses:

FRANK H. SHEPHERD,

ALEX. L. HAYES.