2 Sheets—Sheet 1.

G. L. ANDERS.

Printing Telegraph.

No. 210,891. **Patented Dec. 17, 1878.**

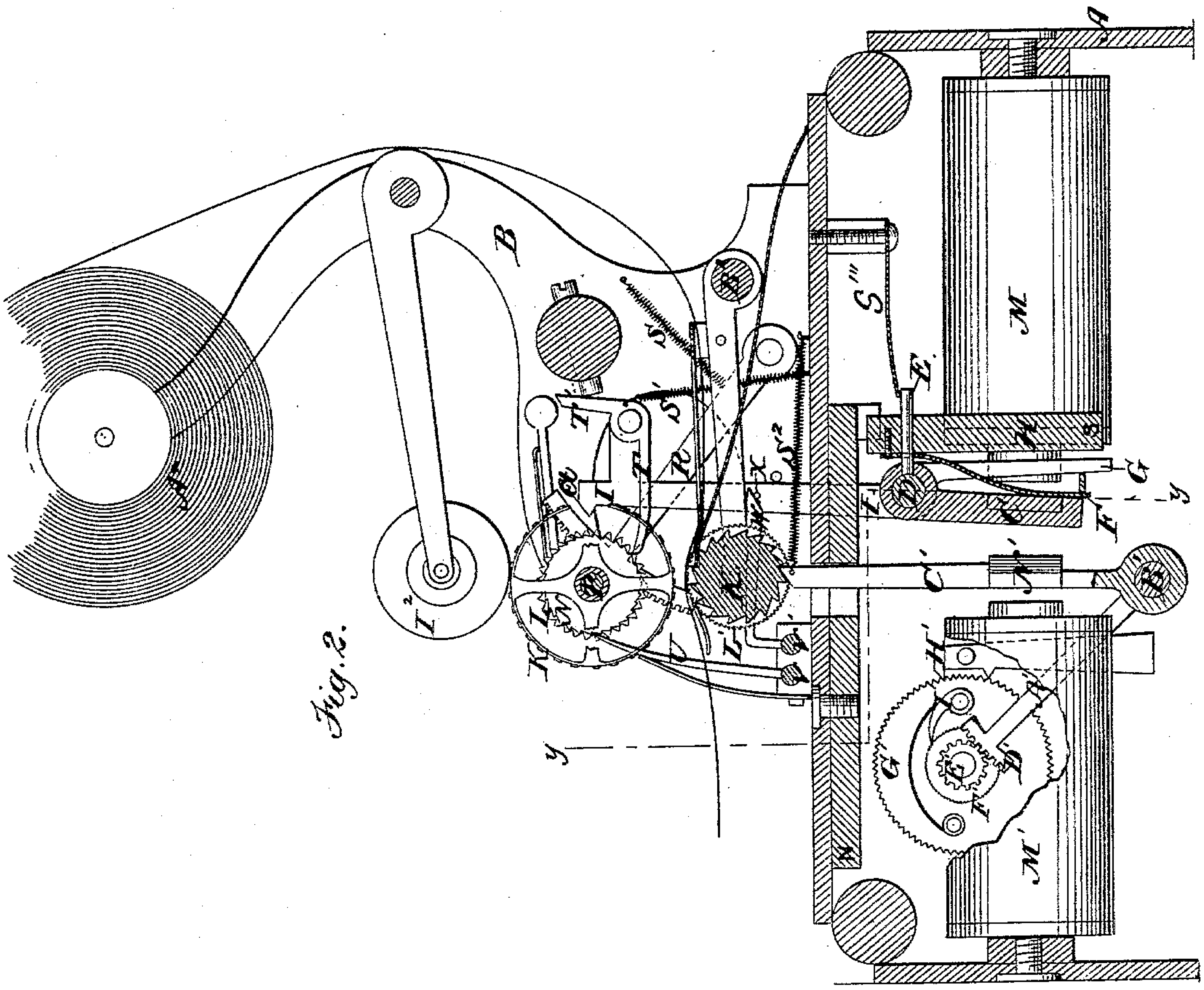

Fig. 2.

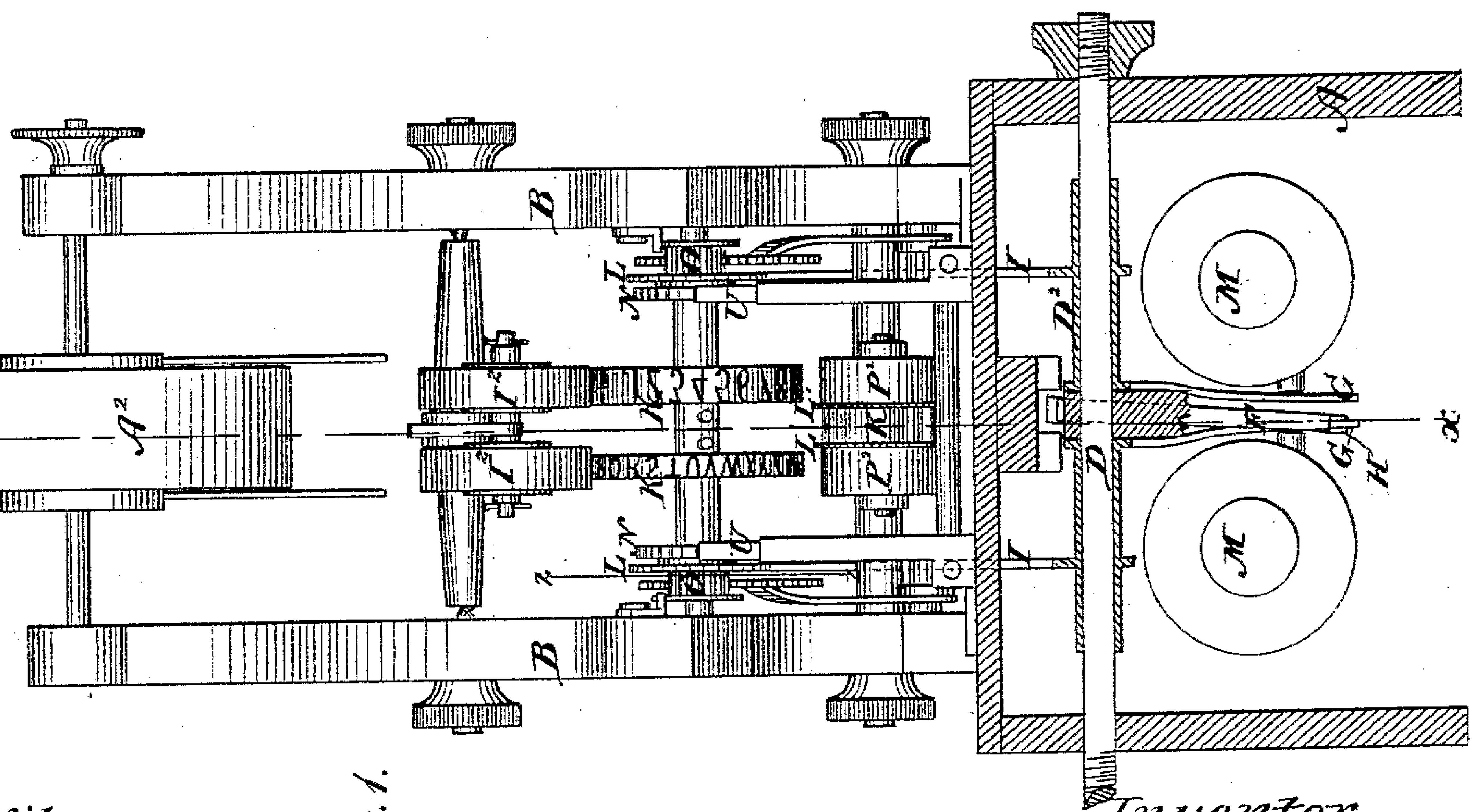

Fig. 1.

Witnesses.
Frank D. Shepherd
Henry N. Black

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

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

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Fig. 3.

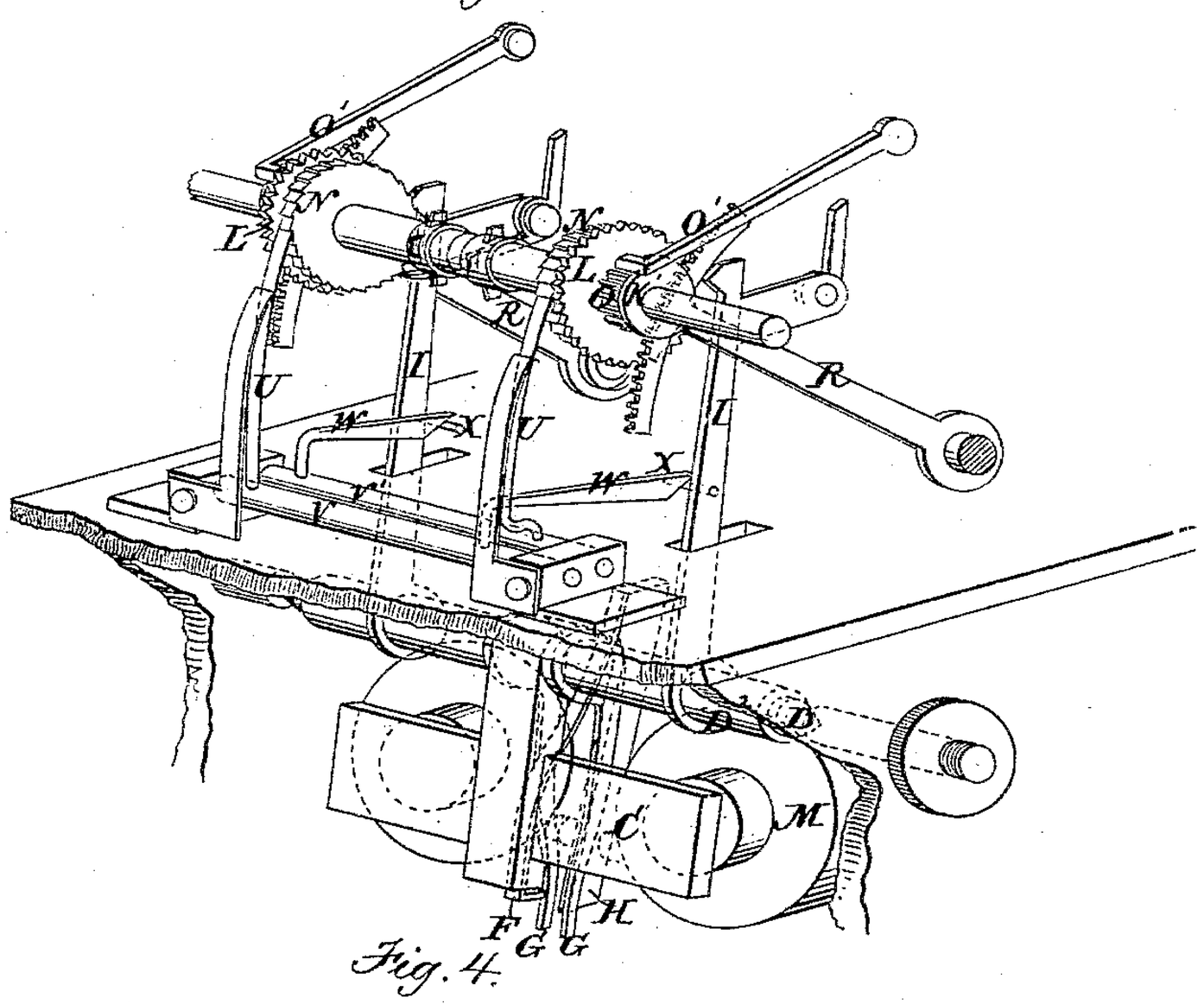


Fig. 4.

Fig. 5.

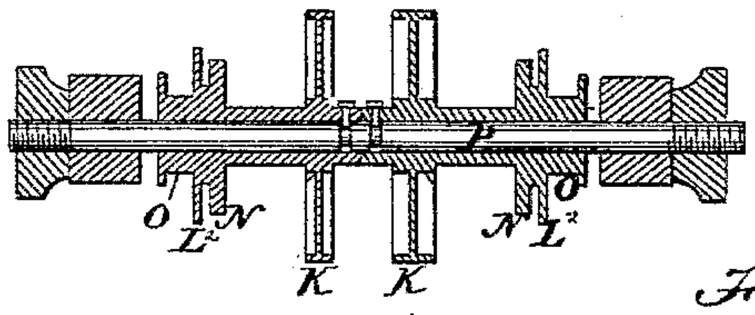


Fig. 6.

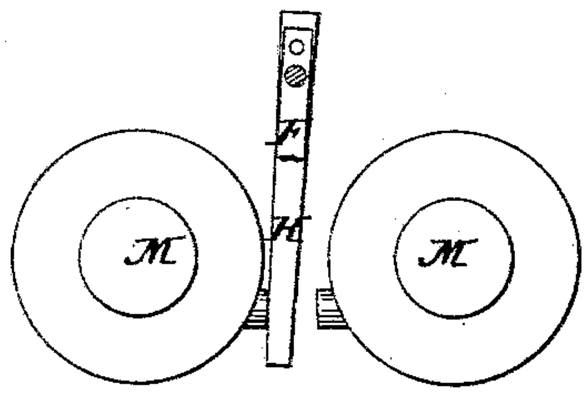
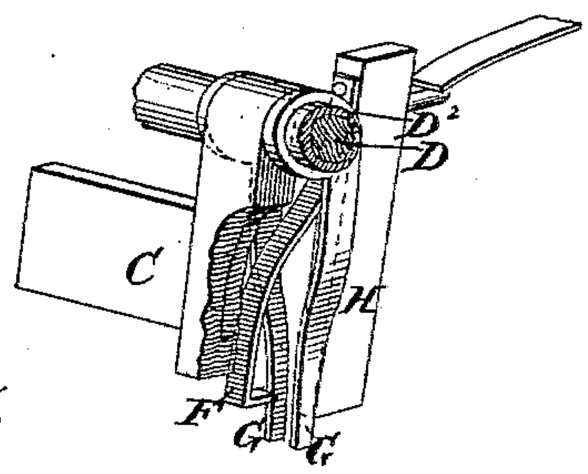


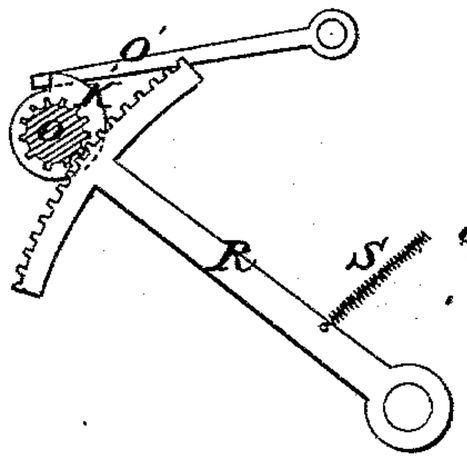
Fig. 7.



Witnesses.

Frank H. Sheplard

Henry N. Black



Inventor:

George L. Anders

by his attorney

Alby 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. **210,891**, dated December 17, 1878; application filed June 18, 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 that class of printing-telegraphs in which there are two contiguous type-wheels, which are used, respectively, for printing letters and figures, and which are rotated step by step by the action of a suitable escapement or propelling device actuated by an electro-magnet excited by intermittent currents, and in which class of printing-telegraphs the printing mechanism is operated by an electro-magnet placed in the same circuit with the type-wheel magnet, and is moved so as to effect an impression when the succession of currents through the type-wheel magnet is interrupted and a prolonged current is transmitted.

The invention consists, first, in a printing-telegraph having two contiguous type-wheels independently rotated step by step by an electro-magnet, one type-wheel being rotated when the current is of one polarity, and the other when the polarity of the current is reversed, substantially as and for the purpose hereinafter set forth; second, in the combination of the contiguous and independently-rotated type-wheels, suitable releasing-escapements or propelling-pawls for each type-wheel for giving a step-by-step movement to the same, a single electro-magnet and armature, acting to move the escapements or propelling-pawls, and a polarized tongue, pivoted between the poles of the electro-magnet, and so arranged in connection with the armature and the mechanism for rotating the type-wheels that the movement of the armature will cause the rotation of either one of the two type-wheels, according as the said prolonged tongue rests against one or the other pole of the electro-magnet, the position of said tongue being determined by the polarity of the current; third, in so mounting the said type-wheels upon their shaft and connecting them with certain mechanism (to be hereinafter described) that when one type-wheel is rotated the other type-wheel will return to the unison-point, whereby perfect unison between a series of instruments is effected; fourth, in a new and simple device for feeding the paper strip operated by the movement of the impression-pad.

In the accompanying drawings, Figure 1 is an end view of my improved telegraph-instrument, showing the type-wheel magnet and its polarized tongue in section. Fig. 2 is a side view of the instrument, a portion of the press-magnet being shown as broken away for the purpose of exhibiting the retarding device used with the printing mechanism. Fig. 3 is a perspective view of the mechanism for rotating and releasing the type-wheels. Fig. 4 is a sectional view of the type-wheel and type-wheel shaft. Fig. 5 is a detail view, showing the poles of the type-wheel magnet and the polarized tongue. Fig. 6 is a detail view, showing the arrangement of the polarized tongue in connection with the armature of the type-wheel magnet and the mechanism for rotating the type-wheels, and Fig. 7 shows the device causing the reverse movement of the type-wheel when released.

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

Referring to the drawings, A is a suitable frame supporting and inclosing the type-wheel and press-magnets, and B B are two suitable uprights or standards, attached thereto and supporting the paper roll, the inking-pads, the printing-pad, and the moving parts of the instrument. M is an ordinary electro-magnet, and C is its soft-iron armature, which is pivoted upon a shaft, D, supported in the frame A. H is a permanently-magnetized tongue, lying between the poles of the magnet M, as shown in Fig. 5, and pivoted to an arm, E, attached to the armature-lever. It is so attached in order that it may move with the armature. This tongue I entitle the "director." Attached to this polarized tongue, and lying between it and the soft-iron armature C, is a bent piece of brass or other suitable metal, the function of which will be hereinafter explained.

P is a shaft, supporting the type-wheels and having its bearings in the standards B B, and K K are the type-wheels, one having letters upon it and the other figures. These type-wheels rotate freely and independently upon the shaft P. Concentric and turning with each type-wheel is a ratchet-wheel, N, a toothed wheel, h L^2, a pinion, O, and a disk, K′. The ratchet-wheel N is acted upon by the propelling-pawl T to cause the rotation of the type-wheel, and the pawl U prevents the type-wheel from rotating backward.

The propelling-pawl T is attached to a lever, I, fixed upon the sleeve D^2 upon the shaft D. Attached also to this sleeve is an arm, G, which extends downward, so that its extremity lies between the soft-iron armature C and the magnet M.

T′ is a stop for arresting the movement of the propelling-pawl. The mechanism for rotating each type-wheel is a duplicate of the other, and the arms G G lie side by side, so that the piece or foot F will be opposite one or the other of these arms, according to the position of the polarized tongue or director to which the foot F is attached, and when the armature C is attracted by the electro-magnet M this foot F will strike against that one of the arms G G to which it is opposed, and cause the vibration of the lever I and pawl T and the rotation of the type-wheel operated thereby. At the extremity of the lever I is a point, a, which engages with the locking-wheel h when the lever I and propelling-pawl T are brought against the wheel N, and prevents the said wheel from moving more than the distance of a single tooth.

A retracting-spring, S′, is attached to the lever I, and the armature-lever is also provided with a retracting-spring, S‴.

The position of the polarized tongue or director depends upon the polarity of the current, and thus either type-wheel can be rotated at will.

The pinion O rotating with each type-wheel gears with a toothed segment, R, pivoted on the standard, and to this arm is attached a retracting-spring, S′.

When the type-wheel is rotated the pinion O engages with the segmental rack R, and draws it down so as to stretch the spring S, while the pawl U, by engaging with the ratchet-wheel N, prevents the type-wheel from being drawn back; but on the disengagement of this pawl from the ratchet-wheel N, the retracting force of the spring S will cause the type-wheel to rotate backward at one bound until the notch upon the snail-disk K′ strikes the end of an arm, O′, which rests upon its periphery. This notch is so situated that when the rotation of the type-wheel is arrested it stops at the zero or unison point.

The holding-pawl U of each type-wheel is disengaged from its corresponding ratchet-wheel N by the movement of the propelling-pawl of the other type-wheel, and thus as soon as the rotation of one type-wheel is commenced the other type-wheel will be released, and will return to the unison-point and remain so until the rotation of the other type-wheel has ceased. All the type-wheels on a series of instruments start always from zero or unison point, and thus two or more instruments are kept in unison.

This disengagement of the holding-pawls is effected by the following device: V V′ are two rock-shafts properly supported upon the frame A, to which shafts the holding-pawls U U are, respectively, attached. To each of these rock-shafts is also attached a horizontal arm, W, having one end beveled off and resting upon a pin, X, upon the lever I. When either of these levers is moved for the purpose of rotating its type-wheel, the pin X will strike against the beveled end of the arm W and cause the oscillation of the rock-shaft attached thereto, and the consequent release of the connected holding-pawl from the ratchet-wheel upon the axis of the other type-wheel.

In connection with the printing mechanism of this instrument I use a device for retarding the movement of the printing-pad, so that it does not move far enough to effect an impression except when a prolonged current is transmitted through the printing-magnet, which retarding device I have described and claimed in another application for a patent. This device is shown clearly in Fig. 2, a portion of the printing-magnet being shown as broken away for this purpose.

M′ is the printing-magnet, and N′ its armature, attached to a rock-shaft, B^1, properly supported in the frame A. Attached to this shaft is an arm, A^1, terminating in a segmental rack, D^1, which gears with a pinion, E′, and ratchet F′, turning on a suitable bearing on the side of the frame A. Upon the axis of this wheel, and connected with it by means of the pawl I^1, is a serrated wheel, G′; and bearing against the teeth of this serrated wheel is a pendulous escapement, which oscillates when the wheel G′ rotates in one direction, but, being a pendulum, can oscillate at a certain rate only, and therefore will retard the rotation of the serrated wheel and the movement of the armature N′ of the magnet M′.

C′ is the armature-lever, the end of which engages with a ratchet-wheel, K, upon the axis of the printing-pad P^2, which pad is mounted upon a swinging arm attached to a rock-shaft, B^2, properly supported between the standards B B. The movement of the armature causes the printing-pad to be thrown up against the type-wheels by the engagement of the end of the arm C′ with one of the teeth of the ratchet-wheel K; but the printing-pad will not be moved sufficiently to effect an impression unless the armature is brought against the poles of the printing-magnet M′, and, owing to the action of the retarding device, this movement of the armature will not be fully accomplished unless the current through the printing-magnet is continued sufficiently long to overcome the action of the retarding device. When

the printing-pad is thrown up against the type-wheel it is also rotated one tooth by the action of the arm C′ upon the ratchet-wheel K, and the paper strip is fed by the action of the finely-notched wheels L L¹ upon the axis of the printing pad.

I² is the inking-pad, and A² the paper roll, both of which are of the usual construction, and are attached to the standards B B.

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

1. A printing-telegraph having two contiguous type-wheels independently rotated step by step by separate levers, in combination with a single electro-magnet, actuating one or the other of the type-wheels and their respective unison devices, according to the polarity of the current transmitted through said actuating-magnet, substantially as and for the purpose set forth.

2. The combination of two contiguous and independently-rotated type-wheels and their respective propelling devices, the electro-magnet M, and polarized director H, substantially as and for the purpose set forth.

3. The combination of the shaft D, carrying two levers, I I, acting upon independent type-wheels, and two arms, G G, the armature C, polarized tongue H, and foot F, substantially as and for the purpose set forth.

4. A printing-telegraph having two contiguous and independently-rotated type-wheels, each of which is released and returns to the unison-point when the other commences to rotate, substantially as and for the purpose set forth.

5. The combination of the ratchet-wheels N N, pawls U U, rock-shafts V V′, arms W W, levers I I, and pins X X, substantially as and for the purpose set forth.

6. The combination of the pinion O, segmental rack R, notched disk K′, and arm O′, substantially as and for the purpose set forth.

7. The combination of the magnet M′, armature U, arm C′, toothed wheel K′, printing-pad P², and notched wheels L² L², substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand on this 13th day of June, 1877.

GEORGE LEE ANDERS.

Witnesses:

DAVID J. HOBART,

CHAS. W. HOBART.