

G. L. ANDERS.
PRINTING TELEGRAPH.

No. 173,750.

Patented Feb. 22, 1876.

Fig. 1.

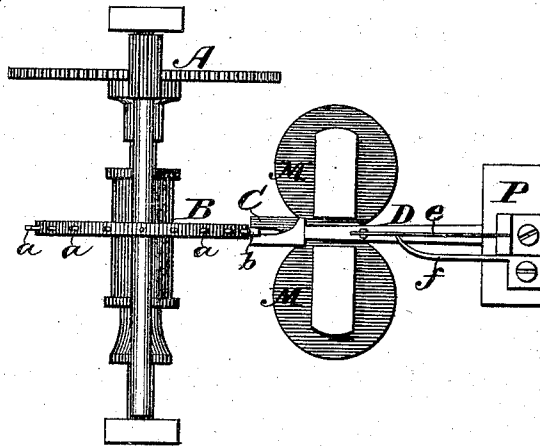


Fig. 2.

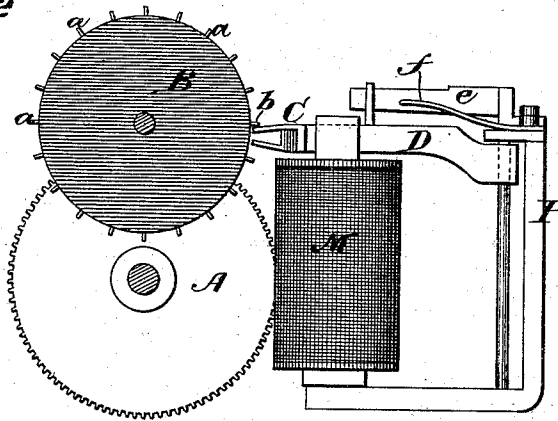


Fig. 4.

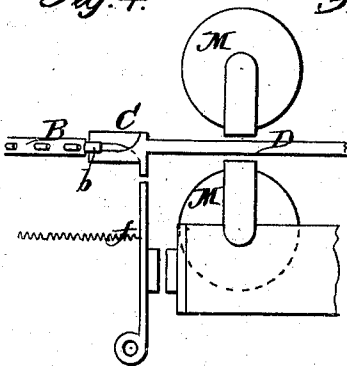


Fig. 3.

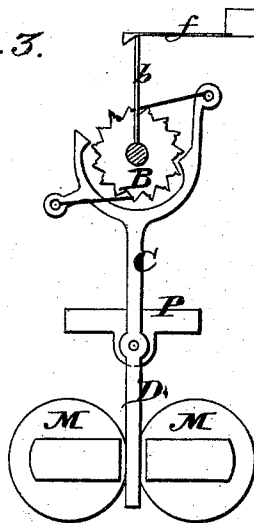
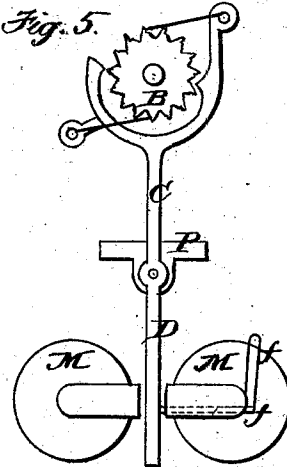


Fig. 5.



Witnesses.
Alec L. Hayes.
James Wallace

Inventor.
Geo. L. Anders.

UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **173,750**, dated February 22, 1876; application filed
January 24, 1876.

To all whom it may concern:

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

The invention relates to a method of setting or adjusting the pointer of a dial-telegraph, or the type-wheel of a printing-telegraph, to a certain determinate point, for the purpose of enabling two or more such instruments to work in unison.

The principle upon which the invention is made and operated is as follows: It is obvious that any machine which derives its motion from a constant source of power will cease to move whenever the force exerted by the power is reduced to a strength equal to the resistance offered by the machine, and that, therefore, the machine can be arrested at any determinate point by the interposition at that point of a resistance greater than can be overcome by the power.

In dial or printing telegraph instruments in which the pointer or type-wheel moves with a "step-by-step" motion these parts are either moved directly by the action of a propelling device operating intermittently upon a toothed wheel on their shafts by electro-magnetism, or by a train driven by any suitable power which imparts to the shaft a constant tendency to rotate, and the motion of which is controlled by a suitable escapement acting intermittently by electro-magnetism. It is obvious, therefore, that in order to move the mechanism the electric current must not fall below a certain strength; and it is also obvious that if an obstruction or resistance to the movement of the mechanism greater than can be overcome by the power of the current be interposed at a certain determinate point the movement of the mechanism will be arrested at that point.

My invention, therefore, consists in combining with the mechanism of a dial or printing telegraph instrument, either moved or con-

trolled in its movement by the action of an escapement operated by electro-magnetism and a toothed wheel, a stop or mechanical obstruction offering a resistance which is readily overcome by the power derived from currents of the strength ordinarily used in working the apparatus, but which cannot be overcome when these currents are weakened, and will, therefore, cause the movement of the mechanism to be arrested, arranged at a certain determinate point in relation to the movement of the pointer or type-wheel, and in providing a means for weakening the current, whereby two or more telegraph-instruments of the kind referred to, working together on the same line, can be stopped at any determinate point as often as may be necessary to keep their pointers or type-wheels moving in unison.

The accompanying drawing shows the means which I adopt for carrying my invention into effect in both classes of dial or printing telegraph instruments referred to, Figures 1, 2, and 4 showing the improvement applied to that class of such telegraphs in which a train of wheels is used, and Figs. 3 and 5 showing the improvement applied to that class of such telegraphs in which motion is given by propelling mechanism.

In these drawings similar letters refer to similar parts.

Referring to Fig. 1, A is a train which moves the shaft of the pointer or type-wheel. B is the escape or toothed wheel, which is constructed in the usual manner, with the exception that one tooth, *b*, at the zero or unison point is slightly wider than the other teeth, *a a a*. C is the escapement, also constructed in the usual manner. M M is an ordinary polarized magnet for operating the escapement, and D its armature; *e*, a spring attached to the controlling-armature, of such strength that it will be bent over the extremity of the arm *f*, forced to the side of the magnet when the currents are of the ordinary force, so as to permit the escapement to have sufficient movement to permit all of the teeth to pass one by one, the wide tooth *b* as well as the smaller teeth *a a a*, but will not be bent sufficiently when the current is weakened to permit any

but the small teeth to pass, and consequently the wide tooth, not being able to go by the type-wheel or pointer, will be arrested at zero.

The obstruction which determines the unison in this class of telegraph-instruments; it will thus be seen, consists of two elements—one a spring or any constantly-acting force, which is overcome by every current of full working strength, the other a stop on the toothed wheel at some determinate point, which will not pass the escapement when the current is weakened; and it is obvious that the form of these elements may be varied without departing from the principle of the invention. For example, the tooth at the zero or unison point may be longer, rather than wider, than the other teeth; or, instead of a wide tooth, a stop may be placed on the wheel near one of the teeth. The spring may be attached to the armature in a different manner, or may be a spiral spring encircling a pin sliding in or on the magnet, and arranged so as to abut against the armature, or may be attached to one of the teeth of the wheel, and so adjusted that it will yield to the escapement when operated by strong currents, but not when the escapement is operated by weak currents; or, in place of a spring alone, an auxiliary magnet may be used for limiting the movement of the pallets, as shown in Fig. 4, the spring of the auxiliary magnet in this case being the mechanical obstruction, which cannot be overcome by weak currents; or the stop on the toothed wheel may be under the control of an auxiliary magnet.

The manner of constructing these various methods of carrying my invention into effect will be apparent to those skilled in the art to which it belongs.

In Figs. 3 and 5 my invention is shown as applied to a dial or printing telegraph, in which the shaft of the pointer or type-wheel is directly driven by propelling mechanism operated by electro-magnetism.

B is the toothed wheel on the shaft of the pointer or type-wheel. C is the propelling-escapement. M M is the magnet; *b*, an arm attached to the shaft of the pointer or dial at the zero-point; *f*, a spring bearing against the extremity of the arm *b* with force sufficient as not to allow the arm to pass when the strength of the current is weakened.

In this form of the invention the resistance is opposed by only one current on the line during one revolution of the type-wheel or pointer, which will overcome the resistance if the current is strong, but will not overcome it when weakened; and this principle of construction may be applied in various ways—as, for instance, instead of the arm *b* and spring *f*, one of the teeth of the wheel may be slightly larger than the others, and a spring may be attached to the propelling mechanism, the tension of which will not be overcome when the current is weakened, and, consequently, the escapement will then stick on the large

tooth. This form is shown in Fig. 5; or, instead of the spring *f*, a stop controlled by an auxiliary magnet, which, when acted upon by currents of the ordinary strength, keeps the stop clear of arm *b*, may be used.

The invention may also be applied to the form of printing-telegraph in which there is a type-wheel moving synchronously with a transmitter, as in the telegraph described in the English Patent No. 2,373 of 1858, the stop acting to arrest the type-wheel at a certain determinate point only when the current is weakened, substantially as has before been described.

The invention is applicable to any form of printing or dial telegraph in which the magnets moving or controlling the movement of the pointer or type-wheel are in the main-line circuit, whether the printing-magnet is in the same circuit as the type-wheel magnets or in an independent circuit, or whether the printing mechanism is operated by increasing, prolonging, or interrupting the line-current, or by mechanical means.

The weakening of the current may be effected either by reducing the strength of the battery, or by the interposition of a resistance in the circuit. The manner in which this is done is well known, and any method now used may be adopted. It may be automatically effected at the transmitter, or may be under the control of the operator, so as to be effected at any desired time, not only for the purpose of making a unison, but also for calling the attention of the receiving-operator to any inaccuracy in the printing, by stopping the action of his type-wheel at the unison or zero point.

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

1. In a dial or printing telegraph instrument, in which the pointer or type-wheel controlling magnets are in the main-line circuit, the combination, with the mechanism controlling the movement of the pointer or type-wheel, of a mechanical obstruction, substantially as described, fixed at a certain determinate point in relation to the movement of the pointer or type-wheel, and offering a resistance which is readily overcome by the currents ordinarily used for working the apparatus, but cannot be overcome when the currents are weakened below their ordinary strength, and a means for weakening the line-current, as described, substantially as and for the purpose set forth.

2. The combination of the toothed wheel B, having a wide tooth, *b*, or its equivalent, the escapement C, the magnet M M, and spring *e* and arm *f*, or their equivalents, substantially as and for the purpose set forth.

GEORGE L. ANDERS.

Witnesses:

ALEX. L. HAYES,
JAMES WALLACE.