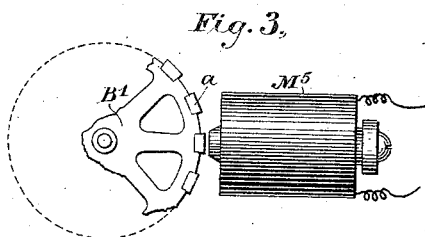
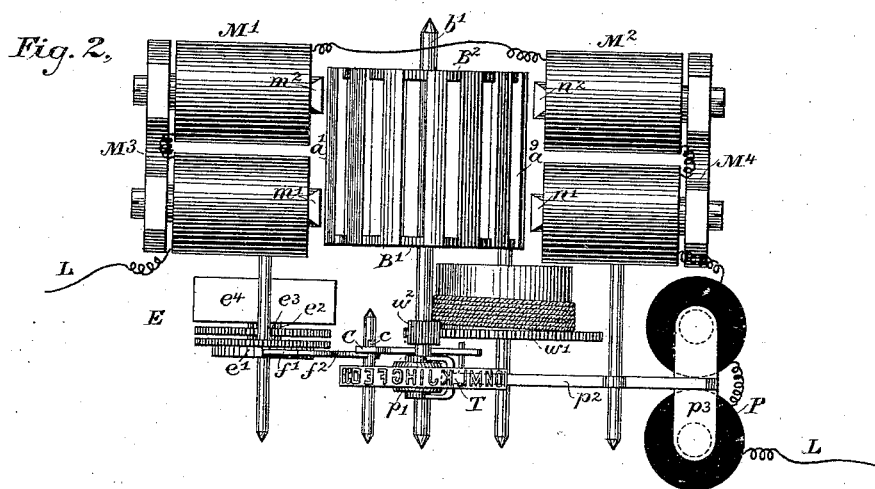
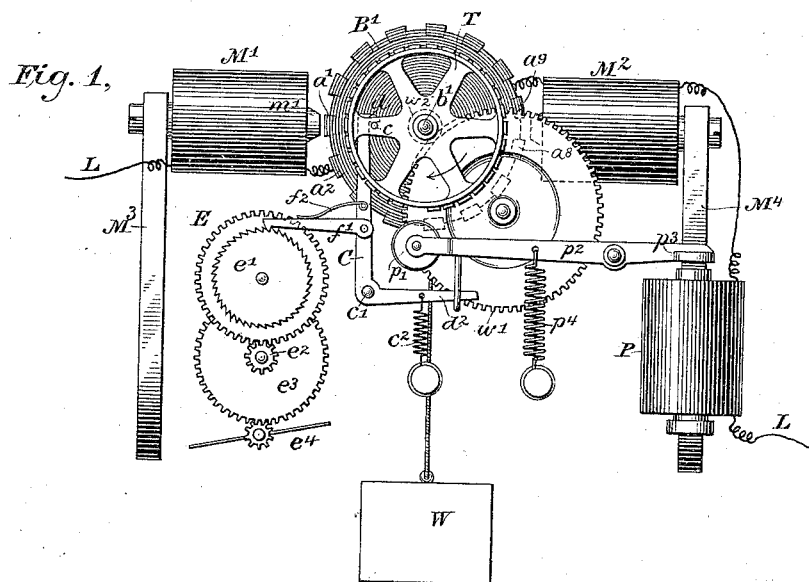


(No Model.)

H. VAN HOEVENBERGH.
PRINTING TELEGRAPH.

No. 306,297.

Patented Oct. 7, 1884.



WITNESSES

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PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 306,297, dated October 7, 1884.

Application filed August 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is a specification.

My invention relates to certain improvements in the construction of printing-telegraph instruments.

The principal object of the invention is to improve the escapement mechanism for controlling and arresting the movements of the type-wheel. In my improved mechanism these operations are effected silently and without the aid of the usual scape-wheel and its associated mechanism.

My invention consists, generally, in effecting the escape and control of the type-wheel through the agency of magnetism, instead of the usual mechanical means.

Briefly, my invention may be carried out as follows: Between the confronting poles of two permanently-polarized electro-magnets a series of armatures are arranged upon a cylindrical support or barrel, which is normally impelled in a given direction through the instrumentality of a weight or spring. The permanent polarization of the cores of either electro-magnet is sufficient to prevent the movement of the cylindrical series of armatures, by reason of the attraction exerted upon any armature which chances to confront it. When, however, an electrical impulse of the character requisite to neutralize the magnetism of the cores of one of the electro-magnets is transmitted through its coils, the series of armatures will be allowed to advance in response to the force exerted by the said weight or spring. The electro-magnets are preferably so arranged with reference to the armatures in the cylindrical series that when one of said armatures is in front of one of said electro-magnets the other electro-magnet will confront the open space intervening between two other armatures. The coils of the electro-magnets are so connected in the same circuit that a current which neutralizes one magnet will strengthen the other, and vice versa. If, therefore, a cur-

rent of the proper polarity for neutralizing the cores of one of the electro-magnets be transmitted over the main line, the cylinder, acting under the influence of the weight, will advance until one of the armatures confronts the poles of the strengthened magnet, and a space intervening between the two armatures is in a corresponding position with reference to the poles of the then neutralized magnet. If now an electrical current be transmitted upon the main line in the reverse direction, the magnetic conditions of the two magnets will be reversed and the cylinder will advance a second step. A type-wheel of any suitable construction is mounted upon the arbor of the cylindrical armature and revolves therewith. This wheel is preferably provided with twice as many type as there are armatures upon the cylinder. Thus by transmitting electrical impulses of alternating polarity the armature may be advanced step by step, and by prolonging any impulse it may be arrested with any required type above the printing-platen.

For the purpose of taking the impression of a type that has been brought into position in the manner described, a second electro-magnet is provided, the coils of which are included in the circuit of the main line. This electro-magnet may be adjusted to respond to electric impulses of greater strength than those required for permitting the advancement of the type-wheel; or it may be constructed to respond to a prolonged impulse. In either case it causes a platen to move in the direction of the type-wheel and effect an impression in the usual manner. The type-wheel is brought to the unison-point by means of a lever acting to intercept a pin carried upon the type-wheel whenever a pause of any considerable duration intervenes between the printing of two characters. This lever is impelled from the path of said pin at each movement of the printing-lever; but as it tends continually to return the type-wheel will come to unison whenever a comparatively long pause occurs in the printing.

Devices have often been employed for securing the unison of the type-wheel which depend for their operation upon the movement of the actuating mechanism of the type-wheel.

The device which I employ, however, is in no way dependent upon the movement of the type-wheel, but continues to advance into position to intercept the same, even though the type-wheel remains at rest. It will be understood, therefore, that no unnecessary movement of the type-wheel will be required when it is desired to secure its unison, for the reason that it may be held at rest, in whatever position it chances to occupy, until sufficient time may have elapsed to permit the unison-stop to move into its path, a sufficient number of impulses being then transmitted to advance the wheel to unison. Instead of employing two electro-magnets for effecting the escapement of the type-wheel, a single electro-magnet may be applied to the armature, and it may be either provided with a polarized or with a soft-iron core. When a polarized electro-magnet is employed, it is arranged to retain the armature so long as it remains unneutralized, but immediately upon the transmission through its coils of an impulse of proper character to neutralize the permanent magnetism of its core the armature will be liberated. Such impulses should be short enough to permit the escape of only one armature at a time. With such a construction it would be necessary to employ a number of armatures equal to the number of type carried upon the type-wheel. In case an electro-magnet having a soft-iron core is employed, the step-by-step movement is effected by successively interrupting or reversing a current transmitted through its coils, the demagnetization at the instant of reversal permitting a single armature to pass.

In the accompanying drawings, which illustrate my invention, Figure 1 is a side elevation of such parts of a printing-telegraph receiving-instrument as are essential to illustrate my invention. Fig. 2 is a plan, and Fig. 3 represents a modification in the organization of the apparatus.

Referring to the drawings, M' and M'' represent two electro-magnets included in the circuit of the main line of a printing-telegraph system. The cores m' m'' and n' n'' are polarized, preferably by means of the permanent magnets shown at M^3 and M^4 . The coils surrounding said cores are so connected with reference to each other that if a current of electricity be transmitted through the circuit it will tend to neutralize the cores of one electro-magnet and to increase the magnetic force manifested by those of the other.

Between the electro-magnets M' and M'' is placed a cylinder consisting of a series of soft-iron bars, a' a'' a''' , &c., carried upon two non-magnetic rings or cylinder-heads, B' and B'' . The entire armature is carried upon an arbor, b' , upon which the armature revolves, and the soft-iron bars a are successively presented to the poles of the magnets. A weight, W , acting through a gear-wheel, w' , and pinion w'' , normally tends to advance the cylindrical ar-

mature in the direction indicated by the arrow. The attraction of the cores of either magnet for any bar upon the armature is sufficient, however, to retain the cylinder against the action of the weight. The soft-iron bars are so disposed that when one bar, as a' , confronts the poles of one of the electro-magnets, as M' , the poles of the other magnet, M'' , will not face any bar, but will confront the space intervening between two adjacent bars, as a'' and a''' . When an electric current of the proper character to neutralize the magnet confronted by the bar a' is transmitted through the main line L , the cylinder will be permitted to advance until the bar a'' confronts the poles of the electro-magnet M'' . The polarization of the cores of this magnet is increased by the same current which tends to neutralize the cores of the electro-magnet M' . The cylindrical armature will thereupon be arrested, the increased strength of the electro-magnet M'' assisting to overcome the momentum acquired by the same. Whether the impulse transmitted be continued or allowed to decrease, the cylindrical armature will be retained in this latter position until a current of opposite polarity be transmitted through the line—that is to say, a current of the proper character to neutralize the magnetic force of the cores of the electro-magnet M'' . When such a current is transmitted, the cylindrical armature will be allowed to advance another step of the same length. An advance step of the cylinder is thus produced with every change in the polarity of the main-line current. A type-wheel, T , of ordinary construction, is carried upon the arbor b' and revolves therewith. It is provided preferably with twice as many type as there are soft-iron bars a , so that for each movement of the cylinder one type will be brought into the field of the printing-platen p' . The platen is carried upon the lever p'' of a printing-magnet, P . The coils of this magnet are included in the circuit of the main line L ; but its armature p'' is adjusted, by means of the spring p''' , so as not to respond to currents of the strength required for causing the step-by-step movement of the cylindrical armature, but only to currents of increased strength. When, therefore, the type-wheel has been allowed to revolve until the required type is above the platen, an impression may be effected by simply increasing the current last transmitted to the proper strength. The electro-magnet P will thereupon be vitalized, the platen actuated, and the impression effected in the usual manner.

For the purpose of arresting the type-wheel at its unison-point I provide an arm, C , which, whenever a pause of any considerable length occurs in the printing, is projected into the path of a pin or stop, c , attached to the side of the type-wheel; or, if preferred, it may be attached to the cylinder or to the arbor b' . The arm C is pivoted at a point, c' , and provided with a spring, c'' , which tends to draw

the same forward, causing a catch or hook, *d*, to project into the path of the pin *c*.

The hook *d* is thrown out of the path of the pin *c* with every actuation of the printing mechanism in the following manner: Each upward movement of the printing-lever *p*', as in the act of printing, causes the end of the printing-lever to engage the extension *d* of the arm C and throw back the hook *d*. As the spring *c*² would, however, immediately cause the arm C to move forward after the lever *p*² had resumed its normal position, retarding mechanism E is employed for preventing an immediate return of the arm C. This mechanism may consist of a series of toothed wheels, *e*² *e*³, provided with a fan-escapement, *e*⁴, and geared with a ratchet-wheel, *e*⁵. A pawl, *f*', is pivoted to the arm C, and is normally pressed by means of a spring, *f*², against the periphery of the ratchet-wheel *e*⁵. Each time the arm C is thrown back by the movement of the printing-lever *p*' the pawl *f*' slides over the teeth of the wheel *e*⁵ and engages a tooth at the limit of its backward movement. The tension of the spring *c*² acts, through the arm C and pawl *f*', to cause a continuous forward movement of the wheel *e*⁵, thereby permitting the arm to gradually move into the path of the pin *c*. The fan *e*⁴, however, prevents a rapid movement of the same.

It will be evident that to bring the type-wheel to its unison-point it is only necessary to permit enough time to elapse after effecting an impression to allow the arm C to move into the path of the pin *c*, and then to cause the type-wheel to advance in the usual manner until arrested.

To release the type-wheel an impulse is transmitted of sufficient strength to actuate the lever *p*', which throws back the arm C. A blank space is preferably left upon the type-wheel in such a position as to be above the platen when arrested by the above-described mechanism, and no impression will therefore be made.

In Fig. 3 I have shown a modification of the electro-magnetic escapement device. This modification consists in dispensing with one of the electro-magnets shown in Fig. 1—the electro-magnet M², for instance—and controlling the movements of the cylindrical armature through the instrumentality of a single electro-magnet, M³. This electro-magnet may be constructed with a permanently-polarized core, or with a soft-iron core. If the polarized core is used, the step-by-step movement may be effected by transmitting through the coils of the magnet successive impulses adapted to momentarily neutralize the normal magnetism of the core, and thus release the armature. These impulses, however, should be of sufficient duration only to permit the escape of a single armature at each impulse—that is to say, one soft-iron bar, *a*, having been released the core should be allowed to resume its normal condition, and thus arrest the cylindrical

armature with the succeeding soft-iron bar opposite the poles of the magnet. If the cores of the electro-magnet M³ are of soft iron, they may be kept in a polarized condition by means of an electric current. The step-by-step movement may then be effected by successive interruptions of the current, and consequent momentary demagnetizations of the core. For the purpose of accelerating the action of the electro-magnet in this organization alternating currents may be employed, each succeeding current or impulse acting to overcome the magnetism existing in the core and to immediately induce magnetism of opposite polarity.

In the two modifications last described it is evident that the number of soft-iron bars *a* should be equal to the number of type carried by the type-wheel.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a type-wheel, mechanism tending to rotate said type-wheel, a cylindrical series of armatures mounted upon a non-magnetic support revolving with said type-wheel, and the electro-magnet acting therewith as an electro-magnetic escapement for controlling and arresting the progressive movement of said type-wheel.

2. The combination, substantially as hereinbefore set forth, of the type-wheel, the circular series of magnetically-independent soft-iron bars, the mechanism for rotating said type-wheel and bars about a common axis, and the polarized electro-magnets acting under changes in the direction of the currents traversing their coils to allow the escapement of said bars.

3. The combination, substantially as hereinbefore set forth, of a type-wheel, a cylindrical armature moving therewith, and comprising a series of soft-iron bars or simple armatures, and a non-magnetic support for the same, means for revolving said cylindrical armature upon its longitudinal axis, one or more magnets normally acting to prevent such rotation, and means, such as described, for overcoming or withdrawing the effect of such magnets from said armature.

4. The combination, substantially as hereinbefore set forth, of a type-wheel, two permanently-polarized electro-magnets, a cylindrical support constructed with a series of magnetically-isolated soft-iron bars, and having a bar presented to one electro-magnet when a space midway between two other bars is presented to the other magnet, means for revolving said support in a given direction when unopposed by the attraction of said electro-magnets for said bars, and means for simultaneously neutralizing the effect of either magnet while increasing the force of the other.

5. The combination, substantially as hereinbefore set forth, of a type-wheel, a cylindrical series of magnetically-separated armatures, independent means for revolving said series of armatures, and one or more electro-mag-

nets acting through their successive magnetization and demagnetization to permit the step-by-step advancement of said type-wheel.

6. The combination, substantially as hereinbefore set forth, of a cylindrical series of magnetically-independent armature-bars, means for rotating said series about a common axis, one or more electro-magnets acting to normally retain said series in any of several successive positions which it may chance to assume, and means whereby the effect of said electro magnet or magnets may be neutralized or withdrawn.

7. The combination, substantially as hereinbefore set forth, with a type-wheel, and means for actuating the same and effecting impressions therefrom, of a unison device for mechanically arresting said type-wheel, mechanism actuated independently of the type-wheel-actuating mechanism for controlling the action of said unison device and permitting the same to operate while the type-wheel is at rest, and mechanism actuated by the impression device tending to throw said unison device out of engagement with said type-wheel.

8. The combination, substantially as hereinbefore set forth, of the type-wheel, an electro-magnetic escapement, a printing mechanism, unison mechanism for arresting the type-wheel in position to print blank, and means

controlled by independent mechanism for permitting said unison mechanism to move into the path of said type-wheel independently of the movement of the latter, and means for preventing it from intercepting said type-wheel during rapid printing.

9. A unison device for arresting the type-wheel of a printing-telegraph instrument, which is prevented from intercepting the path of the unison-stop during the continuous operation of printing by mechanism independent from the actuating mechanism of the type-wheel.

10. The combination, substantially as hereinbefore set forth, with a type-wheel, and means, substantially such as described, for actuating the same, of a unison-stop normally tending to intercept the path of said type-wheel, means independent of the type-wheel for actuating mechanism for retarding the operation of said stop, and means, substantially such as described, for effecting impressions from said type-wheel, and forcing said stop out of the path of said type-wheel.

In testimony whereof I have hereunto subscribed my name this 31st day of July, A. D. 1883.

HENRY VAN HOEVENBERGH.

Witnesses:

DANIEL W. EDGECOMB,
CHARLES A. TERRY.