(No Model.)

H. VAN HOEVENBERGH.

DYNAMO TELEGRAPHY.

No. 274,417. Patented Mar. 20, 1883.

Fig. 2.

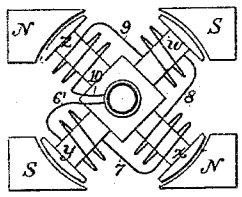

Fig. 1.

WITNESSES

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DYNAMO-TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 274,417, dated March 20, 1883.

Application filed December 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, a citizen of the United States, residing in the city of Elizabeth, county of Union, and State of New Jersey, have invented a new and useful improvement in the art of applying dynamo-electric machines as a substitute for galvanic batteries in a printing-telegraph system.

In Letters Patent No. 251,658, dated December 27, 1881, I have described and claimed a two-line printer whose type-wheels are impelled step by step by pulsations of alternate polarity, and whose press-lever is actuated by increasing the strength of the same pulsations which are employed to actuate the type-wheels. The mechanism for determining upon which of two type-wheels—one for letters and one for figures—printing shall be effected, and for operating the unison device, is controlled by momentary currents transmitted over the second line-wire. By depressing a letter-key a positive impulse is transmitted over the main line, which causes the printing of a letter, and upon the depression of a figure-key a momentary negative impulse is transmitted, which causes the printing of a figure, while if a space-key is depressed, the press-lever is subject to the action of an increased current on the line, though it is withheld from the type-wheel by a clutch.

My invention, more fully hereinafter described, consists of means for adapting a dynamo-machine to furnish one of the two lines with reverse pulsations of one strength to impel the type-wheel step by step, and a pulsation of an increased strength over the same line to actuate the press mechanism; also, of means for adapting a dynamo-machine, when desired, and before printing, to transmit upon the second line short pulsations of either polarity, according as letter or figure keys are depressed, to effect an impression, either of letters or figures, and to automatically transmit over said second line a periodical pulsation for the purpose of operating unison devices.

Figure 1 represents a to-and-fro-current dynamo-machine for charging one of two telegraph-lines, and a straight-current dynamo-machine for charging the second line, and devices whereby a current of either polarity may be sent over the second line at the pleasure of the transmitting-operator, and also devices whereby reverse currents may be normally and continuously transmitted from the to-and-fro-current machine upon the first of said lines. Fig. 2 is a diagram more fully showing the electrical connections of the armature-coils of the to-and-fro machine.

I will now describe my invention by reference to the accompanying drawings.

A and B are two main lines, upon which are situated a series of printing-telegraph instruments. The magnetizing-coils of the type-wheel and press-magnets of the receiving-instruments form a part of line A, while the coils of the electro-magnet governing the unison, and for determining upon which type-wheel printing shall be effected, are placed in line B. Proceeding from the main line A, the circuit is completed through line 11, brush k, metallic ring g, wire 10, the coils of the armature-wing z, wire 9, coils of wing w, wire 8, coils of wing x, wire 7, coils of wing y, wire 6′, ring h, brush j, wire 6, resistance R, to earth. From points 1 and 5 a short circuit around resistance R may be completed through wire 2, anvil n''', point o''', wire 3, and insulated section of the sunflower H, sunflower-arm J, shaft k', and wire 4. Normally the circuit of main line A is completed through the resistance R, in which case the resistance of said main line A is comparatively high, and electrical pulsations generated in the armature will be only of sufficient strength to actuate the polarized type-wheel magnets for the purpose of impelling the type-wheel step by step, though not of sufficient strength to actuate the press mechanism. Abnormally, and when it is desired to print a character, transmitting-key K or Q, according as it is desired to print a letter or figure, is depressed, which effects a short circuit of resistance R, thereby removing from the main line the resistance R and causing a pulsation of increased strength to pass over line A to actuate the press mechanism.

In the drawings, for convenience of illustration, I have shown only one letter and one figure key, which are normally supported upon a spring, T, attached to a cross-piece of the transmitter-frame. (Not shown.) Also, only one short circuit for resistance R is shown. However, in actual construction it is necessary to

have as many individual short circuits for R as there are characters upon each type-wheel, and likewise as many as there are insulated sections upon the sunflower. Upon depressing finger-key K a projection, m''', presses upon a small spring mounted at c''', having a lug, o''', thereby effecting contact between lug o''' and anvil n'''. Key K is likewise depressed by pressing the knob Q, whereby a short circuit of the resistance R is effected, either by directly depressing K or by depressing it through Q. Upon depression of K or Q depends the printing of a letter or figure, as will be more fully hereinafter described.

The circuit from main line B, which is normally broken, is completed at the transmitting-station through wire 15, spring s', conducting-block c, wire 13, brush u, armature Y, brush t of dynamo-machine C, wire 14, conducting-piece a' of lever L, which is pivoted at o, projection b, spring s, wire 12 to earth; or it is completed through spring s', point b', wire 14, brushes and armature of dynamo-machine C, wire 13, conducting-block c, spring s, wire 12, according to the position of lever L. If the armature m is attracted to the cores of M and the armature m' is raised from the cores of M′, the lug b' will raise spring s' from the conducting-block c. Again, in the opposite position of lever L lug b will press spring s from conducting-block c. The lugs b and b' are both normally in a position slightly removed from their respective springs s and s'. Upon a movement of the armature-lever L a current of either positive or negative polarity will be sent from dynamo-machine C to main line B. The means for actuating lever L are two electro-magnets, M M′, having armatures m and m', situated upon opposite sides of the pivot o, upon which lever L moves.

The local battery L B, for energizing electro-magnets M or M′, may be connected from one pole by a wire, 16, common to magnets M and M′, through wire 18, spring e''', lug i''', anvil h''', wire 19, and the other through wire 22, spring j'', lug p'', anvil x'', wire 21. Upon depressing key K, which effects a short circuit of the resistance R, the lug d''' touches the spring e''', causing lug i''' to touch h''', and to thereby cause the attraction of armature m' of M′, and thus to effect contact between lug b and spring s, thereby separating conducting-block c from spring s and sending a current of a determined polarity to line. On the other hand, if knob Q be depressed, its spindle e'' will strike the spring j'', causing the lug p'' to strike anvil x'', and to cause a current from local battery L B to close a circuit through the coils of the magnet M, thereby effecting contact between lug b' and spring s', and the separation of spring s' from conducting-block c, by which means a current of opposite polarity is transmitted over line B.

In the transmitting apparatus the spring e''' must be so adjusted in respect to lug d''' that upon depressing knob Q contact will be effected between lug p'' and anvil x'' without causing contact between lug i''' and anvil h''', while at the same time contact must be effected between o''' and anvil n'''. If such were not the adjustment, a depression of knob Q might cause the branches of both magnets M M′ to be simultaneously closed, from which it is apparent that lever L would not be operated to send a current of either polarity upon line B. The arrangement must be such that upon the depression of knob Q the circuit cannot be completed through the coils of M′.

P is an armature-shaft, upon which are mounted the four wings w x y z, which rotate in a cylindrical space between the field-poles F F′ F″ F‴. The armature-wings are so arranged that upon each quarter-rotation of the armature the poles of said wings will be directly opposite the respective field-poles, and the cores are so wound that the currents set up in the coils around the several cores always conspire together—that is, the current set up in the coils surrounding wing z re-enforces that set up in wings w y x. A current of one polarity is induced in the armature-coils while the wings are each passing from one pole to the next succeeding one, and the current is reversed as the wings pass the field-poles. Thus in the case of the armature shown there will be four reversals for each rotation of the armature. If an armature having six wings were employed in connection with six field-poles, there of course would be six reversals of polarity for each rotation of the armature, while any number of armature-wings might be used in connection with a corresponding number of field-poles without departing from my invention. I prefer employing four only, as herein shown.

Upon the armature-shaft P is mounted a small pinion, O, which meshes with a gear-wheel, N, upon a shaft, K′, carrying an arm, I, which in the course of its rotation causes a point, f, thereon to strike a lug, e, upon the lever L; also, upon the shaft K′ is mounted the sunflower-arm J, which rotates in contact with the insulated sunflower-sections. The pinion O and gear-wheel N are so proportioned that each rotation of the wheel N, and consequently the sunflower-arm, shall be accompanied by as many reversals of current as there are characters upon the type-wheel; or, if there be two type-wheels, of either of them, each having the same number of characters. Thus if there are twenty-eight characters upon a type-wheel, the armature must make seven rotations to one of the sunflower-arm; and once during each rotation of the type-wheel, pin f of the arm I will strike the lug e of lever L, thereby causing line B to be momentarily connected through any suitable battery to earth for operating the unison device.

I have herein shown a dynamo-machine, C, for the purpose of furnishing current to line B, whose rotating armature Y is also mounted upon shaft P. Armature Y is provided with commutator and brushes of the ordinary form capable of producing a continuous current.

Instead of maintaining the field-magnetism of dynamo-machines A and C by means of a galvanic battery, I may employ an ordinary continuous-current dynamo-machine, in which case the armature of said machine may be placed upon the shaft P, and the field-coils of said machine, together with the field-coils of the other machines, may be placed in one circuit from the brushes r r' thereof, c' being a commutator consisting of a cylindrical series of insulated strips respectively connected with the coils of the armature of machine B. The circuit from brush r is completed through wire 30, coils of field-magnets of machine C, wire 31, coils of field-magnets F'' F''' of machine A, wire 32, coils of field-magnets F F', wire 33, coils of field-magnets of machine B, wire 34, to brush r', through the coils of the armature of said machine B, back to brush r.

Instead of employing machine B, it is obvious that dynamo-machine C could be provided with a constantly-closed shunt joining its opposite poles, said shunt embracing the coils of the field-magnets of machines C and A. Z is a pulley mounted upon shaft P for driving the same.

The mode of operation is as follows: Normally as the shaft P is rotated reverse pulsations are being constantly sent over line A, and at the same time, periodically for each rotation of the type-wheel driven by said pulsations, the rotating arm I automatically causes a momentary pulsation of electricity to be sent from dynamo-machine C over the line B, which magnetizes an electro-magnet and gives a momentary movement to an arm which dodges a rotary arm upon the type-wheel shaft of the receiving-instrument. If the type-wheel is in unison, the arm momentarily moved by the current over line B is removed from the path of rotation of the arm upon the type-wheel shaft at the instant they would otherwise come in contact with each other. If the type-wheel is not moving in unison with the type-wheels of other instruments upon the same line, the radial arm of the type-wheel shaft will be held until the other type-wheels upon the line have come to the zero-point. Whenever it is desired to print a letter a finger-key K must be depressed, which will cause contact between points o''' and n''' to close one of two breaks in the shunt around resistance R. The second break is closed by the sunflower-arm when it is rotated to that sunflower-section connected by wire 3 with the point o'''; and when the said shunt is closed at both breaks a pulsation of increased strength will be sent over line H to effect printing. At the same time that points o''' and n''' are brought in contact, or shortly thereafter, points i''' and h''' are brought in contact and an impulse of, say, positive polarity, is sent over line B, which will cause the press mechanism to print from the letter-type wheel. If it is desired to print a figure, the knob Q must be depressed. The depression of knob Q likewise causes pins o''' and n''' to be closed, and upon a sufficient rotation of the sunflower-arm J resistance R will again be short-circuited, and a pulsation of increased strength will be sent over the line A; but while the depression of knob Q will cause points o''' and n''' to come in contact, there must be such an adjustment that points i''' and h''' will not be closed; but contact must be effected between p'' and x'', which will cause a current of opposite or negative polarity to be sent over line B.

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

1. A dynamo-machine havine an armature in which reverse currents are generated, a main telegraph-line embracing the coils of said armature, an artificial main-line resistance, transmitting devices, and means whereby said resistance is short-circuited to effect the transmission of a signal.

2. A dynamo-machine having an armature in which are generated reverse currents, whose coils are included in a main telegraph-line, a sunflower-arm geared with said armature, an artificial resistance in said main line, a series of transmitting-keys, and a sunflower.

3. The combination of two main telegraph-lines, a reverse-current dynamo-machine for charging one of said lines, and an automatic commutator for momentarily closing the second of said lines by the rotation of said armature-shaft.

4. A normally-open main telegraph-line in combination with an automatic commutator for automatically and periodically closing the same, a series of letter-transmitting keys, a series of figure-transmitting keys, and means whereby, upon the depression of a letter-key, a current of one polarity is sent over said line, and upon the depression of a figure-key a current of opposite polarity is transmitted.

5. The combination of a series of letter and figure transmitting keys, local battery L B, sunflower H, local electro-magnetic device for vibrating arm L, and means for connecting either pole of a main-line battery to line, and an automatic device for periodically and momentarially causing said commutator to send a current to line.

6. The combination of two main telegraph-lines, one of said lines being constantly closed and provided with a reverse-current dynamo-machine, and an artificial resistance which may be short-circuited from said line, a continuous-current dynamo-machine for said second main line, which is normally open, and a commutator device for periodically connecting said dynamo-machine to line, and also for reversing the poles of said dynamo-machine for sending different polarities of current to line by means of the transmitting-keys.

7. The combination of two main telegraph-lines, a reverse-current dynamo-machine for one of said lines, a separate current-generator, and a pole-changing commutator for the second line.

8. The combination of two main telegraph-lines, a reverse-current dynamo-machine for

charging one of said lines, a straight-current dynamo-machine for charging the second of said lines, and an auxiliary continuous-current dynamo-machine for maintaining the field-magnetism of said machines.

9. The combination, in a printing-telegraph, of two main telegraph-lines, dynamo-machine A, dynamo-machine C, transmitting devices K and Q, sunflower H, arm J, and automatic switch-bar L, having magnets M M'.

New York, December 1, 1882.

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Witnesses:
WM. B. VANSIZE,
WM. ARNOUX.