(No Model.) 3 Sheets—Sheet 1.

R. J. SHEEHY.

TELEGRAPHY.

No. 506,274. Patented Oct. 10, 1893.

Fig. 1.

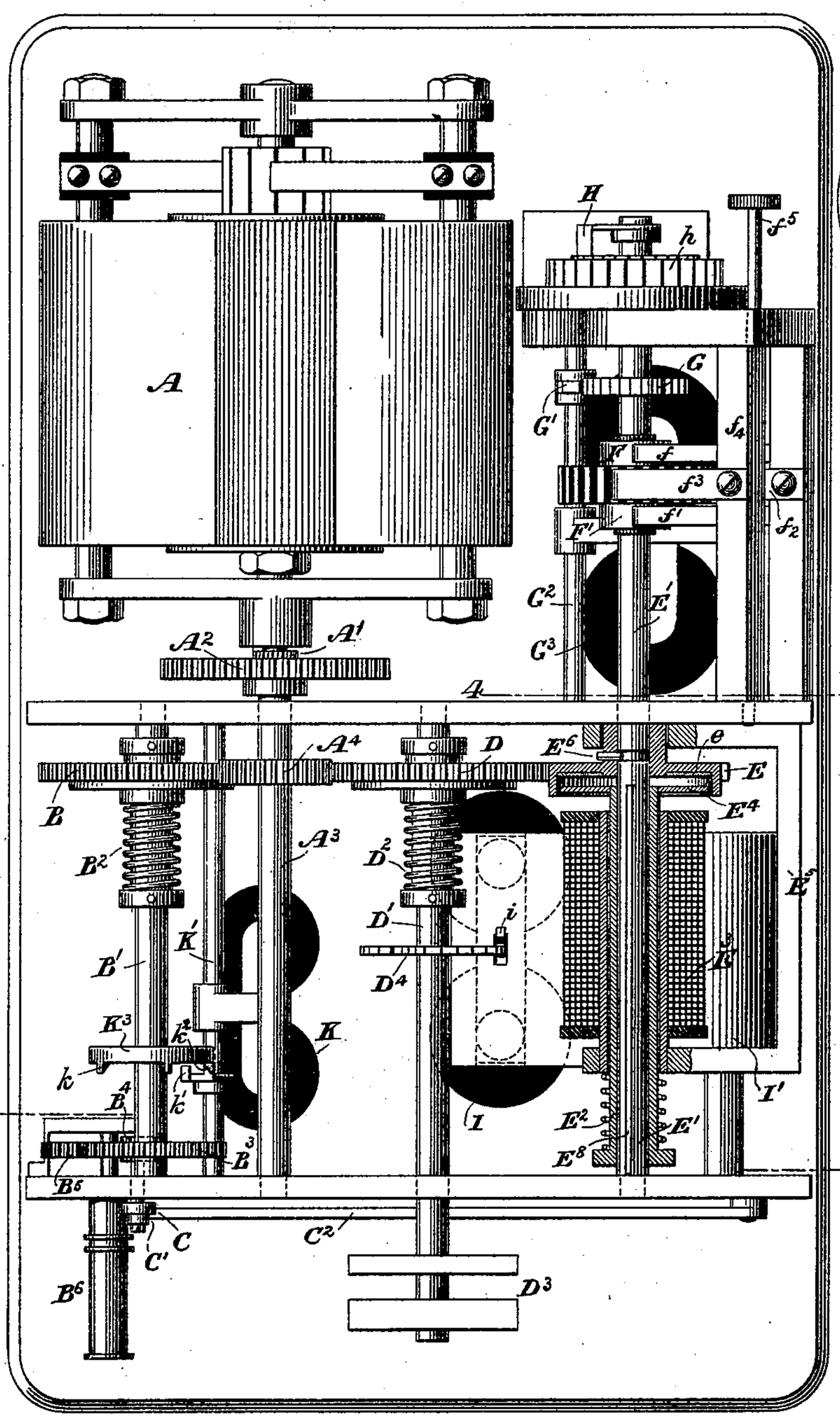
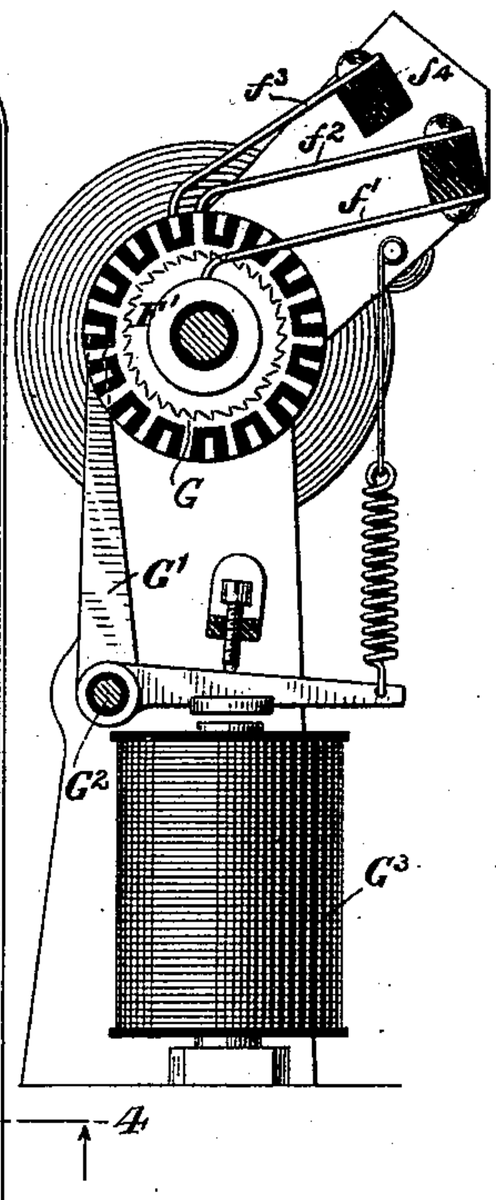


Fig. 4.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

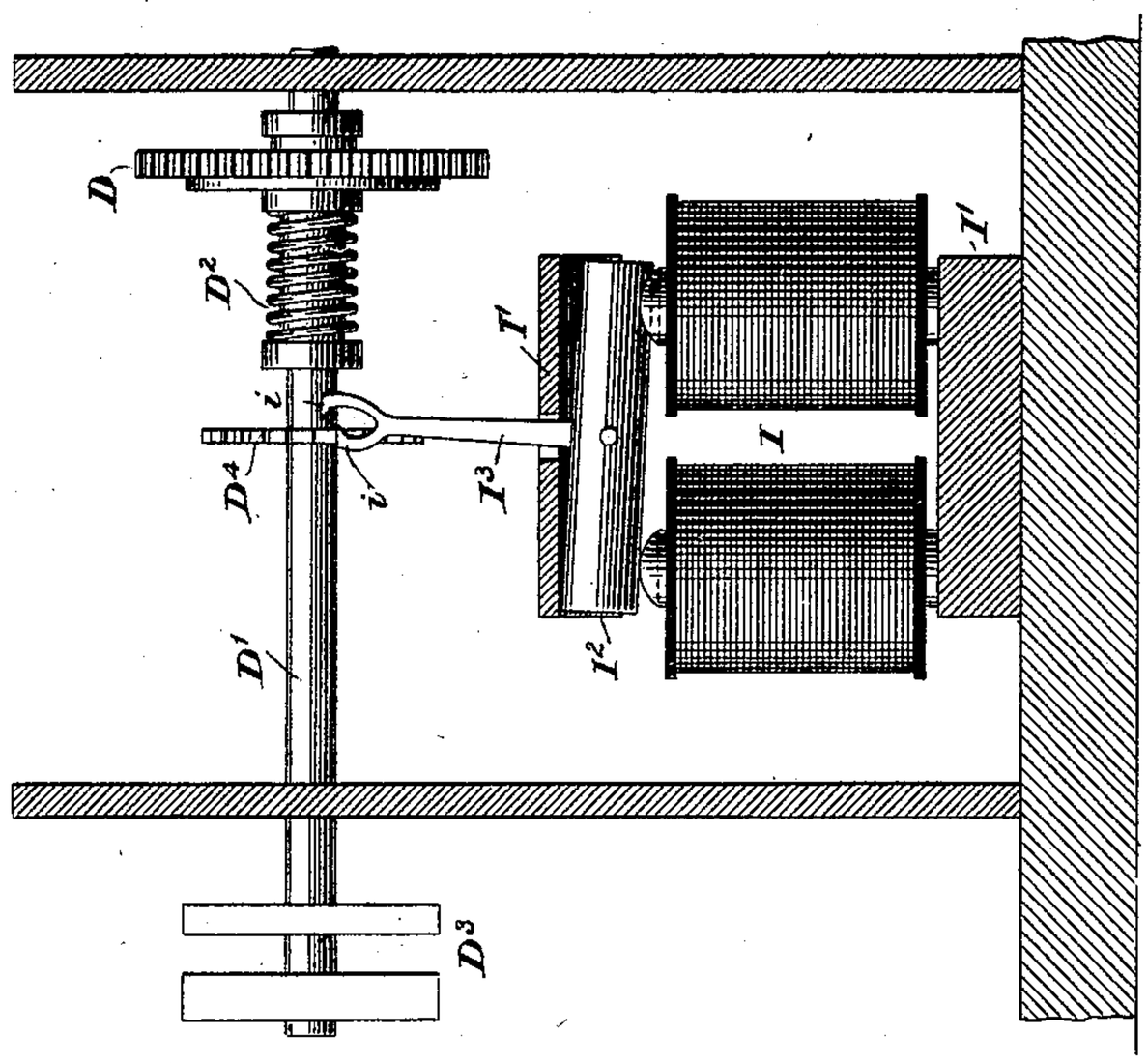
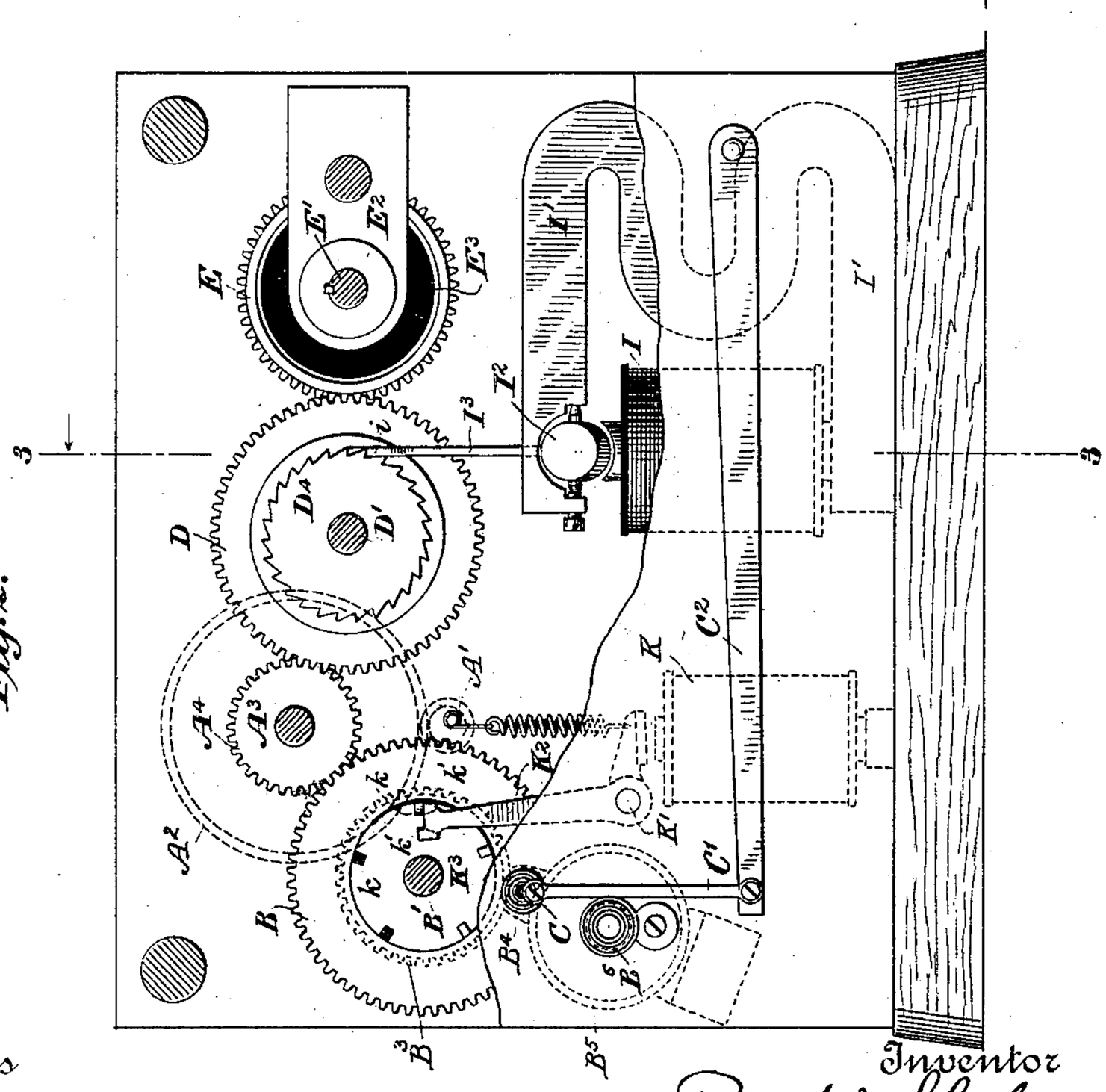


Fig. 2.



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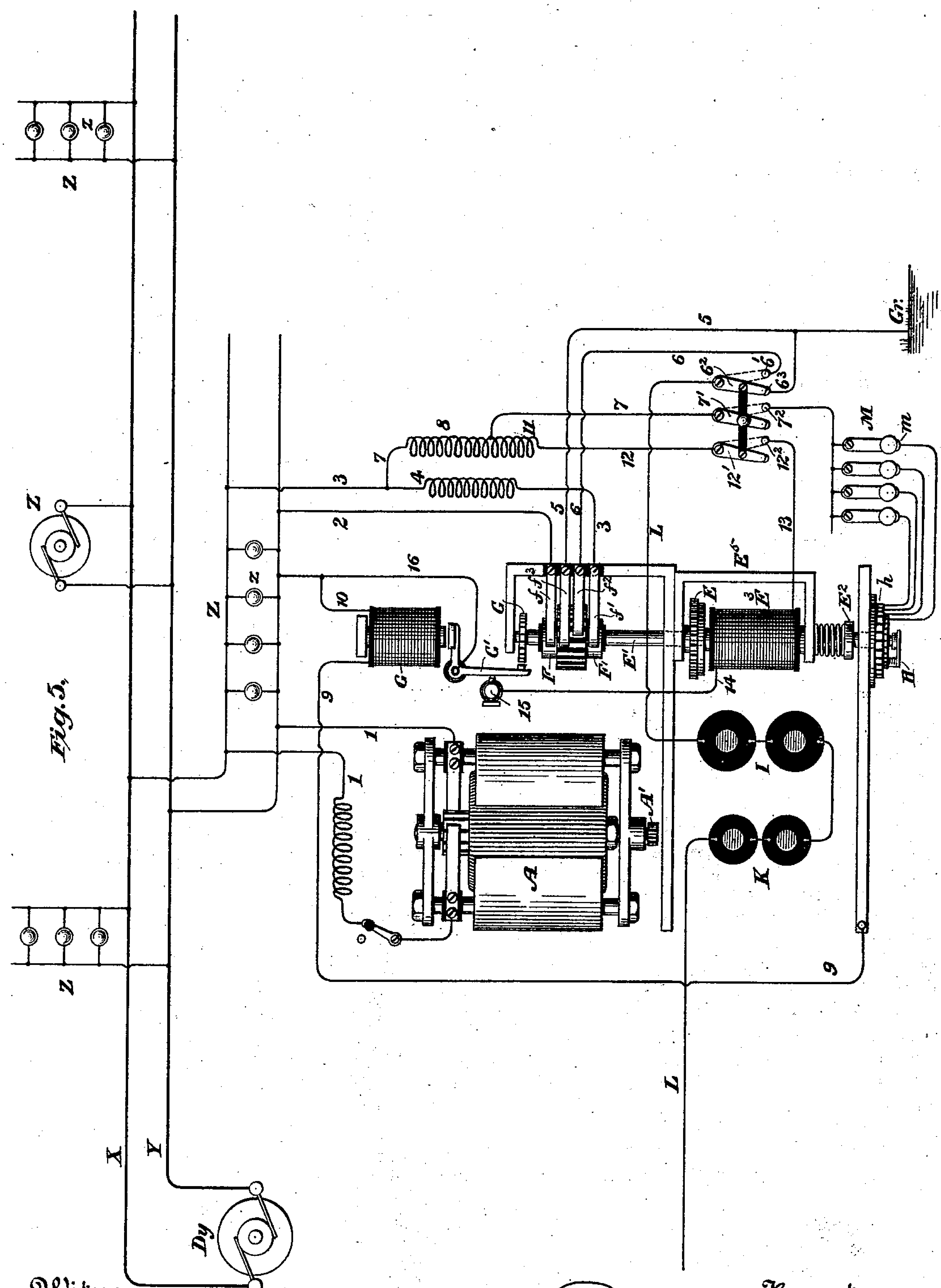

Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT J. SHEEHY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO WENDELL GOODWIN, OF SAME PLACE.

TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 506,274, dated October 10, 1893.

Application filed December 23, 1890. Renewed March 15, 1893. Serial No. 466,178. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. SHEEHY, a citizen of the United States, residing in New York, State of New York, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention comprehends certain improvements in printing telegraph instruments, and also an improved organization wherein printing telegraph instruments are connected with and are operated by current derived from a system of electrical distribution for light and power.

The motor for operating the instrument may be an electric motor actuated by current derived from a continuous current system of distribution. The motor through suitable connections operates a type wheel shaft, and a pole changer by which current derived from the distribution system is reversed on the telegraph line to permit the advancement of the type wheel or wheels through the medium of an escapement lever operated by a polarized magnet and acting upon an escapement wheel to permit the movement of the type wheel shaft step-by-step by the power of the motor. The paper feed and impression devices may also be actuated by the motor and are herein shown as controlled by escapement devices that are operated by a neutral magnet vitalized by prolonged impulses of current of either polarity. The connections between the driving motor and the pole changer, type-wheel shaft, and the platen and paper feed actuating shaft are all friction or yielding connections, so that the motor runs continuously while the various parts of the instrument are stopped or permitted to move to effect the operations for transmission and reception.

The current for transmission and for effecting the arresting of the different parts or for permitting the movement or partial rotation of the others, may be derived from a single source that may, as stated, be an electrical distribution system.

In the accompanying drawings, Figure 1 is a plan view with some of the parts of the instruments in section; Fig. 2 a transverse section on the line 2 2 of Fig. 1; Fig. 3 a detail longitudinal section on the line 3 3 of Fig. 2; Fig. 4 a detail transverse section on the line 4 4 of Fig. 1; and Fig. 5 a diagrammatic view illustrating an electrical distribution system as well as the general organization of the instrument and its connection with the system.

The instrument may be constructed, substantially as follows: A motor A, of any suitable construction, is rotated by a current derived from a suitable source and a pinion A' on its armature shaft gears with and drives a wheel A^2 fast on a shaft A^3. A gear wheel A^4 on this shaft drives a gear B connected with the rotating shaft B' by an ordinary friction connection B^2. When the shaft B' is released and permitted to make a partial revolution, as hereinafter described, it effects the following operations: A gear wheel B^3 on the shaft B' gears with and during one partial revolution imparts one full revolution to a pinion B^4 on a short shaft mounted in suitable bearings. The pinion B^4 gears with a pinion B^5 on a shaft carrying the paper feed roll B^6; and each time, therefore, that the pinion B^4 revolves the paper is advanced the proper distance. A crank C on the shaft of the pinion B^4 is connected by a pivoted link C' with the free end of a pivoted platen lever C^2. If a single type-wheel is used the platen may be mounted directly upon the lever and each time that the lever is lifted by the crank an impression will be taken from the type wheel; or where two type-wheels are used, devices shown in patents heretofore granted to me and others for effecting an impression from either type-wheel may be employed.

It has been considered unnecessary to illustrate any platen devices as various forms of such devices are well known and their application to the lever C^2 and their manner of operation will be perfectly obvious to those skilled in the art.

The gear wheel A^4 on the driven shaft A^3 also gears with and drives a gear D mounted on the type-wheel shaft D' and connected therewith by an ordinary friction connection D^2.

D^3 represents two type-wheels on the end of the shaft D'. An escapement wheel D^4 fast on the type-wheel shaft and controlled by a vibrating escapement lever, as herein-

after described, permits the step-by-step advancement of the type-wheels.

The gear D on the type-wheel shaft drives a gear E on the pole changer shaft E′. This wheel E might be connected with its shaft by an ordinary friction connection such as B^2, D^2, but I prefer to connect it therewith by an electro magnetic clutch, which may be constructed as follows: The shaft E′ should be of non-magnetic material, and is surrounded by an iron sleeve E^2 (connected therewith by a spline E^8) constituting the core or armature of a solenoid coil E^3 suitably supported in a frame formed by a permanent magnet E^5. One end of the sleeve E^2 has thereon an iron friction disk E^4 that works against the side of the gear wheel E, the side of the wheel being preferably recessed as shown and provided with a felt or other suitable friction washer *e*. The iron sleeve and its disk are polarized by the permanent magnet E^5, and so also is the iron gear E which is formed with a hub E^6 that rotates within a socket in the opposite end of the permanent magnet, the gear being prevented from moving endwise on the shaft by a pin passing through the hub and traveling in an annular groove in the shaft. The friction plate E^4 is, when no current passes in the solenoid coil, held out of engagement with the wheel E by a coiled spring applied to the opposite end of the sleeve. When the instrument is transmitting the normal condition is for the solenoid coil to be charged with current and consequently the pole changing shaft E′ is rotated. This shaft carries two insulated contact hubs F F′ having laterally projecting teeth which interlock or alternate with each other, the spaces between them being preferably filled with insulating material, as shown. A brush *f* connected with one side of the source of electrical energy, for instance with one lead of a distribution system, bears upon the hub F; and a brush *f′* connected with the opposite side of the source of electrical energy bears upon the hub F′. Two other brushes f^2, f^3 make contact with the interlocking teeth of the two hubs, one of said brushes being arranged ahead of the other a distance of one tooth, so that when the brush f^2 is on a tooth connected with the hub F, the current from one side of the source of electrical energy will be sent through the instrument and when said brush is on a tooth connected with the hub F′ current from the opposite side of the source will be sent through the instrument, the brush f^3 in each instance serving to ground the other side of the source of electrical energy, as will hereinafter appear. The arrangement is an ordinary pole changing device. All the brushes are suitably mounted upon blocks of insulating material and the block or strip f^4 on which the brush f^3 is mounted may be rocked by means of a thumb piece f^5 to throw the brush f^3 out of contact with the pole changing contacts. A toothed wheel G fast on the pole changing shaft is engaged as hereinafter described, by a stop G′ on a rock shaft G^2 with which the armature lever of a magnet G^3 is connected, and when the stop is thrown into engagement with the wheel the pole changing shaft is arrested. The sunflower trailer H is shown as mounted on the end of the pole changing shaft though it might, as is usually the case, be mounted on the type-wheel shaft.

h indicates the insulated segments of the sunflower.

The escapement devices for controlling the type-wheel shaft may be of the following ordinary construction. The cores of the escapement magnet I I are mounted upon one end of a permanent magnet I′ and in the opposite end of the permanent magnet which is arranged over the cores is pivoted a rocking armature I^2, the opposite ends of which are alternately attracted as the current in the coils of the magnet I is alternated. An escapement lever I^3 carried by the armature has at its ends two pallets *i* that alternately engage the teeth of the escapement wheel D^4 and permit the step-by-step rotation of the type-wheel shaft.

The escapement devices for controlling the movement of the paper feed and platen actuating shaft may be as follows: A neutral magnet K has applied thereto an armature connected to a rock shaft K′ that also carries an escapement lever K^2 which engages laterally projecting pins or lugs *k* on a disk K^3 fast on the shaft B′. The end of the lever K^2 is formed with lateral projections *k′* arranged on different planes and projecting toward each other. In the normal condition that is when the armature of the magnet K is not attracted, one of the lugs *k* on the disk passes between the two projections on the lever and the shaft B′ is permitted to revolve until the next projection *k* abuts against the higher projection *k′* on the lever. This movement is sufficient to produce one revolution of the pinion B^4 and accomplish the operations hereinbefore described. When the armature of the magnet K is released the lug *k* abutting against the higher projection *k′* merely passes to the lower one and the normal position is re-established.

Any usual form of unison device may be employed.

The details of construction of this instrument having now been described, its operation and connection with the leads of a distribution system will be plain from the diagram Fig. 5.

D*y* represents a source of electrical energy at the central station of a distribution system and Z, Z, represent cross-connections or consumption circuits containing translating devices. With one of these circuits the motor A of the instrument is connected by wires 1, 1, containing a suitable resistance and switch. One of the leads of the distribution system is connected by a wire 2 with the brush *f*. The other lead is connected by a wire 3, through

a suitable resistance 4, with the other brush f'. The brush f^3 is connected by a wire 5 with the earth, and brush f^2 is connected by a wire 6 with one of the points 6′ of a multiple or gang switch, one switch lever 6^2 of which bears upon the contact point 6′ when the switch is thrown to the right, as indicated by the dotted lines, that being the position when the instrument is transmitting. The line L after passing through the coils of the magnets K and I, is connected with the switch lever 6^2. It will be obvious that with the switch in position for transmission that the current from the distribution system will be reversed or alternated over the line L, which is grounded at the distant station, and that both instruments will therefore, be permitted to operate step-by-step as the escapement lever I^3 is vibrated.

The distant instrument may either be equipped with batteries or be connected with the distribution system as shown in Fig. 5.

A prolonged impulse of either polarity will arrest the type-wheel and throw the paper feed and platen actuating devices into operation and an impression from the type wheel will be taken.

When the multiple switch is in position for transmission, the circuit connections are as follows: A wire 7 from one side of the distribution circuit includes a resistance 8 and is then connected with the switch arm 7′, of the multiple switch, bearing upon the contact 7^2 which is connected with all the transmitting keys M. The contacts m of these keys are connected with their respective segments of the sunflower and by the sunflower trailer H to the frame of the instrument, from whence the circuit extends by wire 9 through the coils of the magnet G′, and thence by wire 10 to the opposite side of the distribution circuit. Whenever, therefore, a key M is depressed and the sunflower trailer reaches the corresponding segment the magnet G is energized and attracting its armature stops the wheel G and the pole changing shaft. A prolonged impulse of current then passes by brush f^2 and wire 6 to line L through the polarized escapement magnet I and neutral magnet K and the type-wheel is arrested and an impression taken therefrom. As before remarked the connection between the gear wheel E and the pole changing shaft E′ might be an ordinary friction connection that would permit this operation. I prefer, however, to employ the electro-magnetic clutch before described and which is released when the toothed wheel G is arrested. This is accomplished in the following manner: Current from one side of the distribution circuit is taken as shown through the resistance 8 and also through the resistance 11 and then by wire 12 to the switch arm 12′ of the multiple switch, the contact 12^2 of the switch, and wire 13, through the solenoid E^3 and by wire 14 to an insulated stop 15 against which the stop lever G′ operated by the magnet G is normally drawn by its retractile spring. This lever is insulated from its rock shaft as indicated in the diagram, and is connected by wire 16 with the opposite side of the distribution circuit. When, therefore, the magnet G is energized and its armature is attracted the circuit of the solenoid is interrupted at the contact 15, the clutch is released and the gear E runs loose on its shaft.

When the instrument is not in use, or is receiving, the switch is thrown to the left as indicated by the full lines, and the line L is then grounded through the switch arm 6^2 and contact 6^3, all the other contacts of the switch being open.

The various resistances are adapted to the character of current taken from the distribution system, or other source and the requirements to effect the operations described.

With this invention location of batteries at the different instruments, is rendered unnecessary. The system is therefore particularly well adapted for private line use in cities wherever there are appropriate systems of electrical distribution. In private line systems, where the batteries are located at the instruments, there is always more or less trouble arising from the lack of care of, and attention to the batteries, that can only be remedied by some system of constant inspection.

I claim as my invention—

1. The combination, substantially as set forth, of a continuously running motor, the type-wheel or wheels, and pole changer driven thereby through clutch connections, the line L, a source of electrical energy, the current from which is alternated over the line L by the pole changer, a polarized escapement magnet and escapement devices, the transmitting keys and circuit connections and contacts, and a pole changer arresting magnet in a circuit common to the transmitting keys.

2. The combination, substantially as set forth, of a continuously running motor, a type-wheel, or wheels and pole changer driven thereby through clutch connections, a line L, a source of electric energy, the current from which is alternated over the line L by the pole changer, the keys and sunflower, and their circuit connections, a pole changer arresting magnet included in a circuit common to all the keys, a polarized escapement magnet in the line L, and its escapement devices controlling the type-wheel or wheels, the normally stationary paper feed and platen actuating lever, and their driving connection with the motor, a magnet K in the line L and its escapement devices that permit the intermittent movement of the paper feed devices and platen lever.

3. The combination, substantially as set forth, of a shaft B′ normally tending to rotate, a disk K^3 thereon, lugs or projections on the disk, an escapement lever having projections extending toward each other, and one below the other, engaging the lugs, a magnet

controlling the escapement lever to permit a partial revolution of the shaft on each vitalization of the magnet, a wheel rotated once for each partial revolution of said shaft, and paper feed devices and a platen lever actuated by said wheel in its revolution.

4. The combination, substantially as set forth, of a driving motor, the paper feed and platen actuating shaft driven thereby, the friction clutch and gearing connection between the motor and said shaft, the type wheel shaft and its friction clutch and gearing connection with the motor, the pole changer shaft and its clutch and gearing connection with the motor, the escapement magnets and devices controlling the paper feed shaft and type wheel shaft, the stop magnet and devices for the pole changer shaft, the sun flower, keys, and circuit connections and contacts for the purpose set forth.

5. The combination, substantially as set forth, of a motor, the type wheel shaft and the clutch and gearing connection with the motor, the pole changer shaft, its loose gear driven by the motor, an electro-magnetic clutch for clutching the pole changer shaft with the motor, a pole changer arresting magnet that also controls the circuit of the electro-magnetic clutch, the keys and sun flower and circuit connections.

6. The combination of the leads of an electrical distribution system, an electro motor, connected therewith, a type wheel driven by the motor, a pole changer also driven by the motor, a line L, a polarized escapement magnet in the line and its escapement devices controlling the type wheel, and connections between the pole changer and leads and the pole changer and line L, the keys and sun flower and their circuit connections, and a pole changer arresting magnet in the circuit common to the keys, substantially as and for the purpose set forth.

7. The combination, substantially as set forth, with the leads of an electrical distribution system, of a printing telegraph instrument, its message line, an electric motor for driving the instrument operated by current taken from said leads, a pole changer connected with said leads and operated by the motor; and circuit connections and devices for sending alternating impulses of current from the leads through the pole changer into the message line to control the type wheel of the instrument and effect impressions therefrom.

8. The combination, substantially as set forth with the leads of an electrical distribution system of a printing telegraph instrument, a motor operated by current from the leads for driving the type wheel, a pole changer connected with said leads and operated by the motor; the message line, an escapement magnet therein and its escapement controlling the type wheel, and circuit connections and devices for transmitting alternating impulses of current from said leads through the pole changer over the line to permit the step-by-step movement of the type wheel and effect impressions therefrom.

9. The combination, substantially as set forth, with the leads of an electrical distribution system, of an electric motor connected therewith, a type wheel driven by the motor, a pole changer connected with the leads and driven by the motor; a message line, a type wheel arresting magnet therein, and circuit connections and devices whereby alternating impulses of current from said leads may be transmitted through the pole changer over the line to arrest the type wheel and effect impressions therefrom.

10. The combination, substantially as set forth with the leads of an electrical distribution system, of a printing telegraph instrument whose type-wheel is driven by current from said leads, a message line, a polarized magnet therein for arresting the typewheel, a pole changer also driven by current derived from said leads that alternates or reverses current from the leads over the message line, and circuit connections and devices for arresting the pole changer and sending a prolonged current of either polarity over the line to arrest the type wheel.

In testimony whereof I have hereunto subscribed my name.

ROBERT J. SHEEHY.

Witnesses:
EDWARD C. DAVIDSON,
AUSTIN PARDEE.