(No Model.) 2 Sheets—Sheet 1.

P. B. DELANY.

PRINTING TELEGRAPH.

No. 378,437. Patented Feb. 28, 1888.

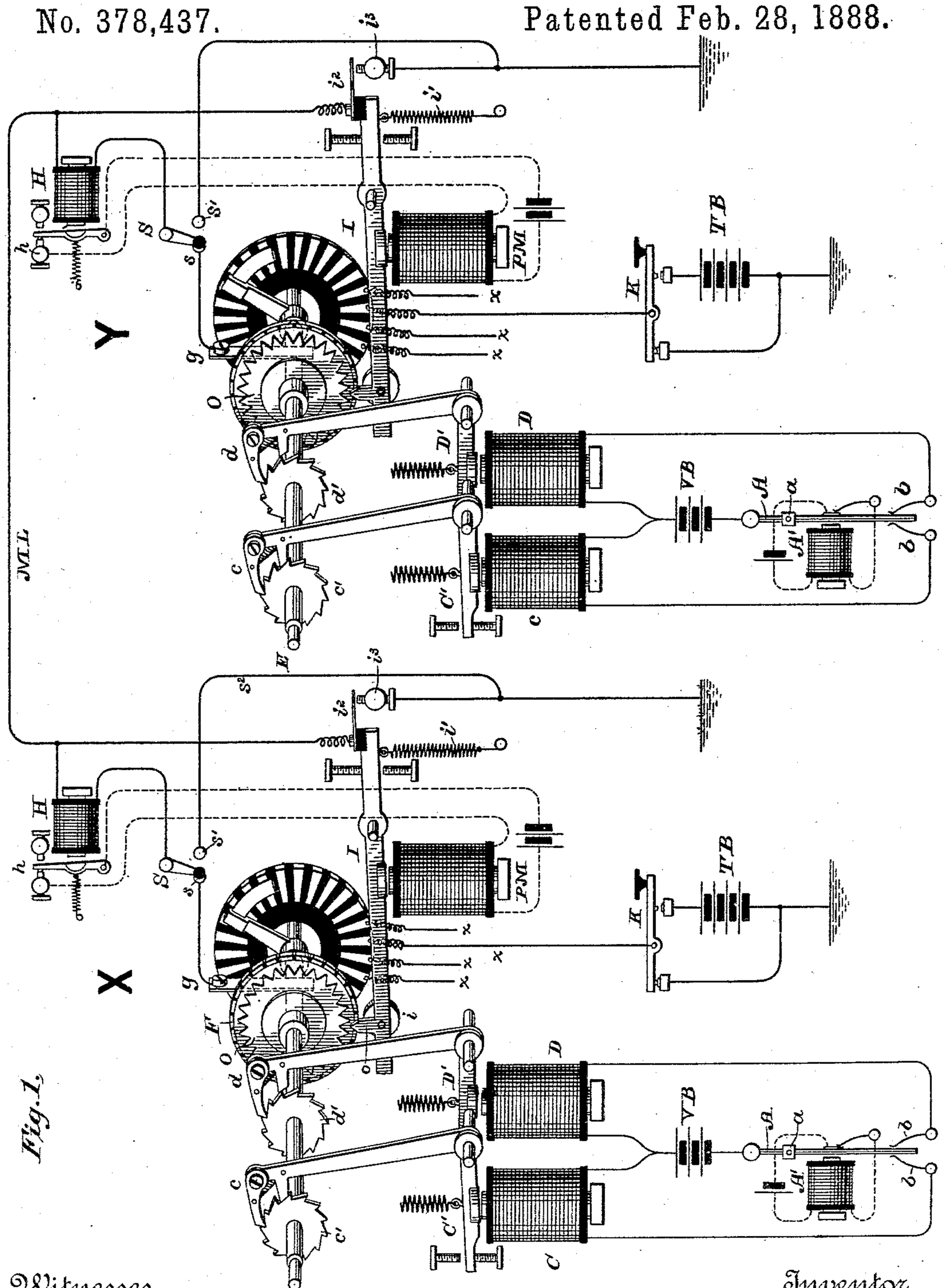

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2,

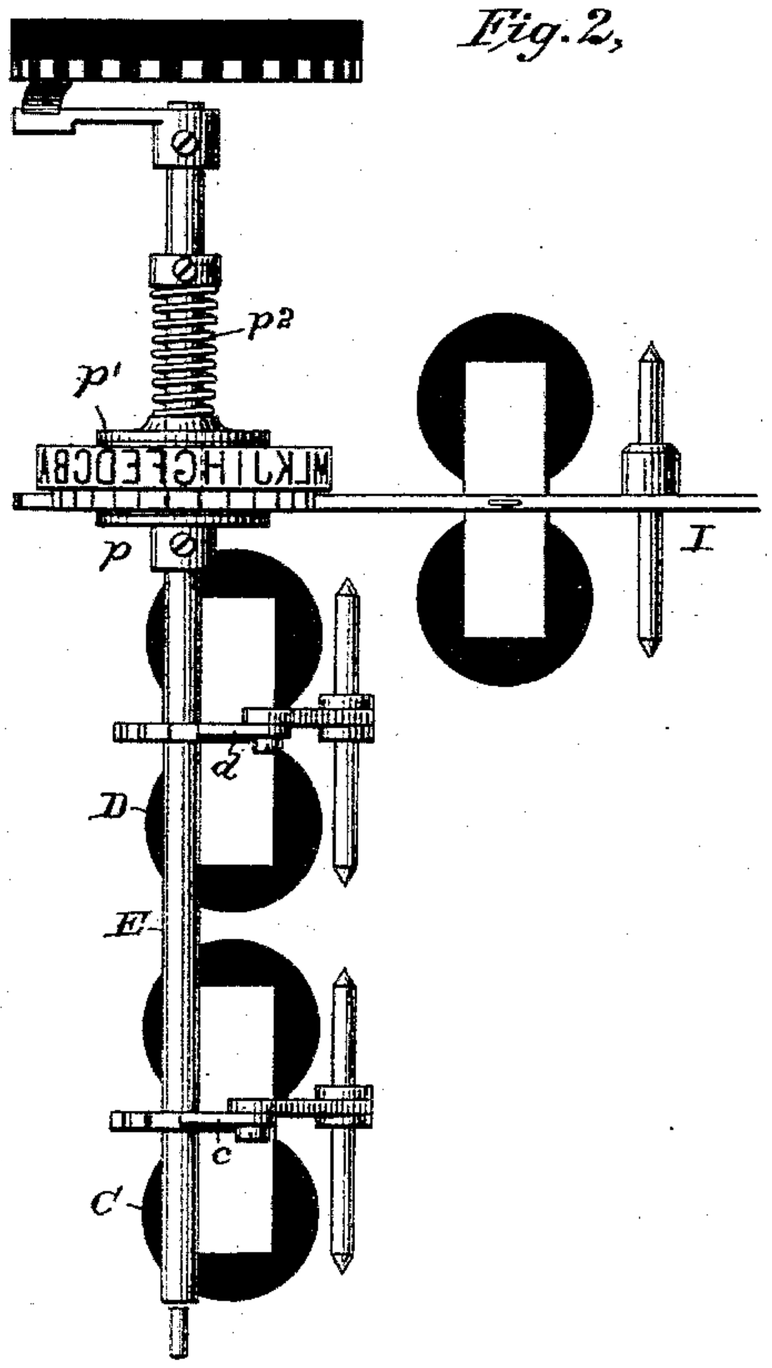


Fig. 3,

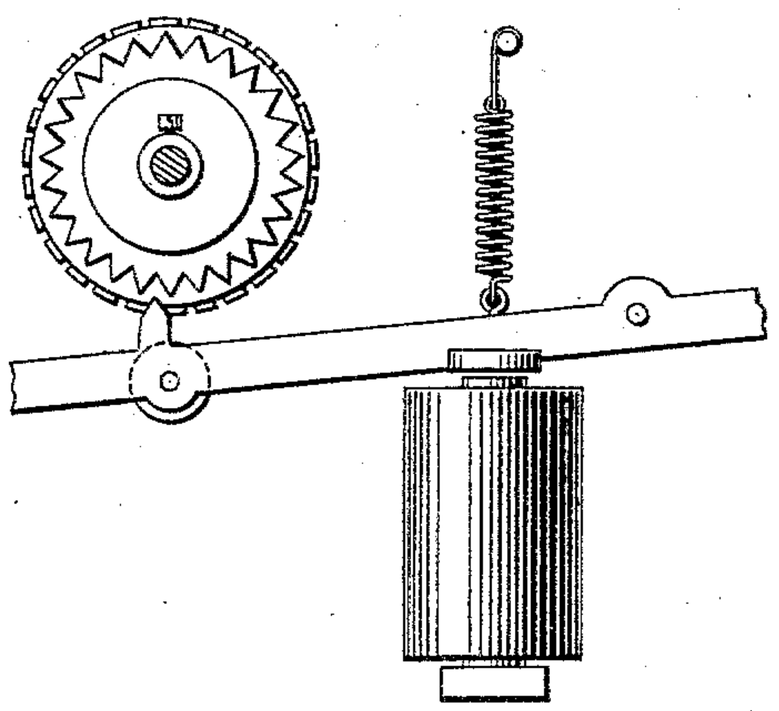


Fig. 5.

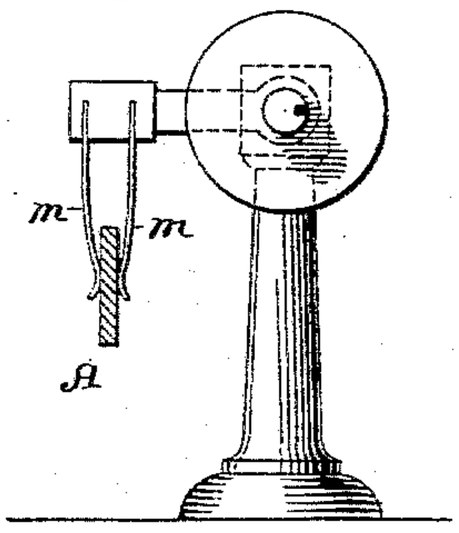
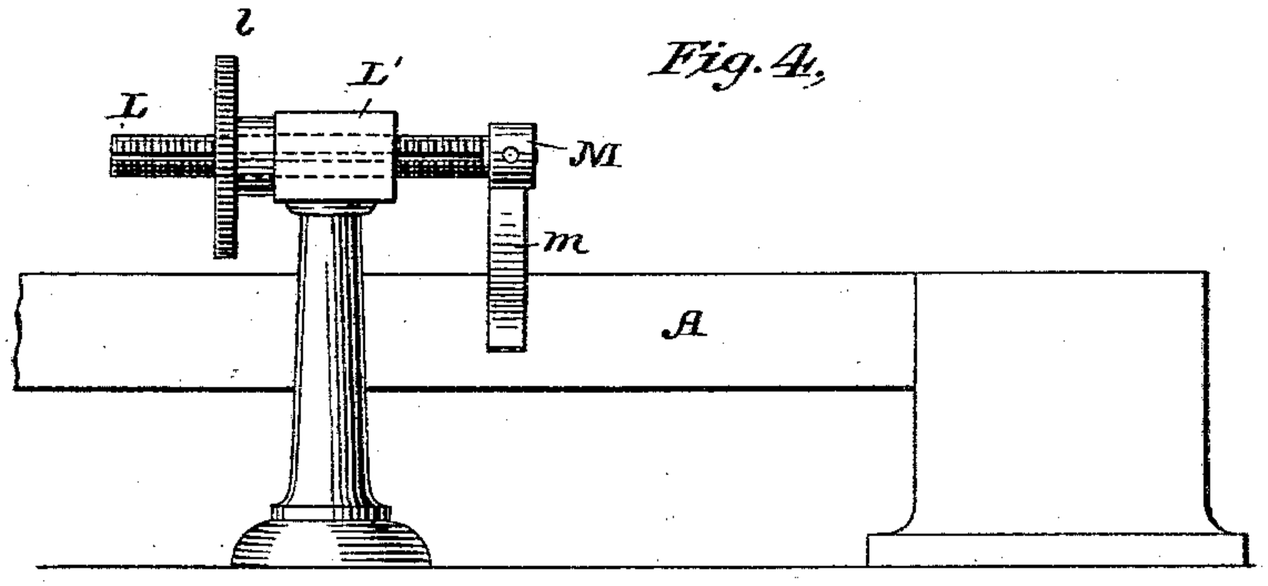


Fig. 4,



Witnesses

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UNITED STATES PATENT OFFICE.

PATRICK BERNARD DELANY, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 378,437, dated February 28, 1888.

Application filed March 17, 1887. Serial No. 231,301. (No model.)

To all whom it may concern:

Be it known that I, PATRICK BERNARD DELANY, of New York, in the State of New York, have invented certain new and useful Improvements in Printing-Telegraphs or Electrical Movements, of which the following is a specification.

In my improved system at each instrument or station an electrically-vibrated reed or automatic circuit-interrupter is actuated locally, and serves to work the printing-instruments or revolve the type-wheel locally, printing or message currents only being sent over the line. In this system the electrical apparatus or printing-instruments are connected directly in the main line without the intervention of synchronously-moving distributing apparatus, as set forth in various patents heretofore granted to me.

The novel features of my invention appear fully from the following specification and claims.

The accompanying drawings illustrate a practical and desirable organization for carrying out my invention, and I will now describe specifically the particular construction shown. I do not, however, wish to limit myself to details of construction, which may readily be varied by those skilled in the art.

Figure 1 is a diagrammatic perspective view illustrating two connected stations or instruments arranged according to my invention. Fig. 2 is a detail plan view showing a manner of driving the type-wheel shaft and means for effecting the correction or synchronizing of the rotating type-wheels whenever a message impulse is transmitted or a letter printed. Fig. 3 is a detail side elevation of such correcting or synchronizing mechanism. Fig. 4 is a detail side elevation showing devices for adjusting the rate of vibration of the automatically electrically-actuated reed, and Fig 5 is an end view of the same.

In Fig. 1 two instruments or stations, X Y, are shown as connected by a main line, ML. Each instrument is actuated independently, the particular arrangement for this purpose shown in the drawings being as follows: At each station a vibrating reed, A, is automatically and continuously actuated by a local circuit in which the coil or coils of the vibrator-magnet A′ are included. A sliding adjustable weight, *a*, on the reed for adjusting its rate of vibration is shown in Fig. 1. The particular arrangement, however, for this purpose which I prefer to employ is that shown in Figs. 4 and 5, which are presently fully described. As the reed vibrates on each side, it makes contact with a finger, *b*, thereby successively completing and breaking the circuit of the battery VB through the coil or coils of the magnets CD. Each magnet has an armature, C′ D′, which carries a vibrating lever and push-pawl, *c d*, which respectively engage ratchet-wheels *c′ d′* on the type-wheel shaft E. By this construction I obtain an easy, accurate, and rapid rotation of the type-wheel F.

So far as I am aware I am the first to employ an arrangement of this character whereby the shaft receives a rotating impulse as the circuit-interrupter vibrates on each side of a central position. The same effect may be produced if a vibrating bar or contact maker and breaker of any character were substituted for the reed, and the same effect could be produced by employing one driving-magnet and lever only and causing the magnet to be energized successively as the circuit-breaker moves from one side of the central position to the other. These suggested modifications are more fully set forth in another application by me filed simultaneously herewith, and serially numbered 231,302, and therefore need no specific description here.

Concentrically with the type-wheel shaft is arranged a sunflower-disk, having conducting-segments thereon, about equal in width to the intervening spaces, of insulating material. These contacts may be connected by the wires *x x* with letter-keys K, by means of which a transmitting-battery, TB, may be connected with any of the sunflower-segments when its key is depressed. In the drawings only one connected key at each station is illustrated. Upon the type-wheel shaft, and in electrical connection therewith, is a trailer or conducting arm, which traverses in contact with the face of the sunflower as the type-wheel shaft is rotated. The type-wheel shaft is, by means of a brush, *g*, connected with one button, *s*, of a switch, S, the heel or pivot of which is connected through the coil of a relay, H, to the main line. The other button, *s′*, of the switch S is connected by a line, s^2, to earth.

The armature *h* of the magnet H is normally drawn by a spring against its back-contact, thereby normally completing the circuit (shown by dotted lines) of the print-magnet PM. An ordinary platen roller, *i*, over which the paper passes, is carried on one end of the armature-lever I, and is normally drawn away from the type-wheel by the attraction of the print-magnet acting against the strain of the spring *i'*.

The rear end of the print-lever carries an insulated contact-finger, i^2, which is in direct electrical connection with the main line. When the lever is drawn down into the normal position, (shown in Fig. 1,) the contact-finger i^2 will be lifted from an adjustable ground contact, i^3; but when the platen-roller is thrown up against the type-wheel by the action of the spring *i'* the contact-finger i^2 will be drawn against the earth-contact, and the main line grounded.

In order that both instruments may be run as nearly as possible at the same speed, the rate of vibration of the reeds or automatic circuit-interrupters A should be approximately the same, and in order that they may be properly adjusted I provide a new and improved device for the purpose.

Sliding weights *a*, such as indicated in Fig. 1, are of course common, and serve more or less imperfectly to control the vibration of the reeds; but it is difficult to adjust them with any nicety, and it is necessary to stop the vibrator when the weight is moved.

In Figs. 4 and 5 my improved arrangement is shown. An adjustable screw-threaded rod, L, having a longitudinal groove therein, passes loosely through a support or post, L', the longitudinal groove engaging with a feather or projection in the socket. By means of a thumb-nut, *l*, working on one end of the threaded rod, the rod, which is arranged parallel with the vibrator, may be moved back and forth in its support. The opposite end of the rod carries an arm, M, from which depend two light spring-fingers, *m*. These fingers embrace the vibrator A, Fig. 5, and affect its rate of vibration. Should the vibrator be running too fast, the operator, by manipulating the thumb-nut *l*, so as to move the spring-fingers toward the fixed end of the reed, may cause the reed to vibrate more slowly; or, if he finds that his instrument is running slowly, by adjusting the fingers toward the free end of the reed it may be caused to vibrate more rapidly.

Assuming that when the instruments at both stations are started, and the key for letter A at station X is depressed during a number of revolutions, it is found that "A" is printed two or three times at Y, and then "B" is printed a few times, and then "C," and so on. It will be at once evident to the operator in charge of station Y that his instrument is running too fast, and he accordingly retards it by manipulating the adjusting-screw. If the sequence in which the letters are printed runs in the opposite direction, the operator knows that his instrument is running too slowly, and he adjusts it for acceleration. When his instrument prints letter "A," say, from six to twelve times in succession, he will know that it is in a proper adjustment with the instrument at station X. This manner of adjustment affords the means of arriving at the proper speed very readily and accurately without stopping the instruments.

The driving-pawls *c d* act upon the type-wheel shafts in such manner that each push of a pawl produces a partial rotation of the shaft sufficient to cause the trail-finger of the sunflower to cross a key-segment, and then pause upon an intervening insulating space. Assuming that the instruments are running in unison when the trailer at one of the stations crosses a key-segment, the key of which is depressed during the passage of the trailer across the segment, an impulse will be sent from the transmitting-battery TB through the wire *x*, key-segment, brush *g*, switch S, coil of magnet H to the main line and distant station. The magnet H at each station, being energized, will attract its armature, thus opening the circuit of the print-magnet and permitting the spring *i* of its armature-lever to throw the platen up against the type-wheel and take an impression of the letter. This operation occurs while the trailer pauses upon the insulating-space above mentioned. In this way communication may readily be had between the two instruments. Since it is impossible to maintain two independently-operated instruments in practical synchronism without correcting one by the other, I employ the following well known manner of bringing the instruments to unison whenever a letter is printed:

A toothed correcting-wheel, O, is loosely mounted upon the type-wheel shaft and connected with the type-wheel, which is also loose on the shaft. The two wheels are held frictionally between a fixed disk, *p*, on one side and a movable disk, *p'*, on the opposite side, the latter disk being pressed against the side of the type-wheel by a spring, p^2. Between the face of the type-wheel and the disk *p'* and between the corrector-wheel and the disk *p* are preferably interposed pieces of cloth well oiled. By adjusting the pressure of the spring upon the disk *p'*, any desired amount of friction may be obtained. When the print-lever I is thrown up by the action of its spring, a wedge-shaped post or finger, *o*, thereon enters a correspondingly-shaped notch in the periphery of the wheel and brings the type-wheel into the proper position of unison. As in practice two or three letters at least will be printed during each revolution, and as the two instruments may readily be adjusted to such an approximately uniform rate of rotation that an entire notch in the correcting-wheel will not pass out of the path of the wedge *o* when the printing action takes place, if the wheel is in advance of its proper position it will be drawn back by the action of the wedge *o;* or, if it is

tardy it will be moved forward into exact position before the platen strikes the face of the type-wheel.

In order that the line may be thoroughly discharged from any secondary static or disturbing electrical influences at each end of the line, when the print-lever I is thrown up by its spring the contacts i^2 i^3 are brought together and the line is grounded.

When the instruments are not in use, the switch S may be put over to the ground-line s^2, in which a call-bell or suitable signaling apparatus, CB, may, if desired, be placed.

I claim as my invention—

1. The combination of the main line, two or more telegraphic-printing instruments having their printing-relays permanently connected directly with the main line, each of said instruments having an automatically electrically-actuated vibrator or circuit-interrupter, through the medium of which it is advanced step by step, means for adjusting the speed of said vibrator, whereby the several instruments may be brought to an approximately uniform rate of rotation, message-transmitting devices whereby a message may be sent from one station to another, and print mechanism at each station by which the message is recorded.

2. The combination of the main line, two or more telegraphic-printing instruments having their printing-relays permanently connected directly with the main line, each of said instruments having an automatically electrically-actuated vibrator or circuit-interrupter, through the medium of which it is advanced step by step, means for adjusting the speed of said vibrator, whereby the several instruments may be brought to an approximately uniform rate of rotation, message-transmitting devices whereby a message may be sent from one station to another, print mechanism at each station by which the message is recorded, and correcting or synchronizing mechanism which is thrown into action at each instrument when a signal or letter is made or printed.

3. The combination of the automatically electrically-actuated vibrator, duplicate driving-magnets CD, their battery, circuits, and contacts, whereby the circuit of one magnet is completed when the vibrator is on each side of its normal central position, the actuating levers or armatures of said magnets, and a driving-shaft, E, substantially as set forth.

4. The combination of the electrically-actuated automatic vibrator or reed, electro-magnetic driving devices controlled thereby, a type-wheel shaft driven by said electro-magnetic devices, the type-wheel thereon, the corrector-wheel connected with the type-wheel, a frictional connection between the type-wheel and corrector-wheel and the shaft, the sunflower and its segments and key-circuits, the main line electrically connected with the sunflower-trailer, the magnet H in the line, the print-magnet and its circuit controlled by the magnet H, the print-lever, the correcting-wedge thereon, and the main-line grounding-contacts which are brought in contact when the print-lever is actuated by an impulse sent into or received from the line.

5. The combination, in a printing-telegraph, of a type-wheel, its correcting or synchronizing devices, a print-lever and its print-magnet, a main line, and circuit-connections and grounding-contacts operated by the print-lever to ground the line immediately after the printing of each character.

6. The combination, in a printing-telegraph, of a type-wheel, a print-lever and its print-magnet, a main line, and circuit-connections and contacts operated by the print-lever to ground the line immediately after the printing of each character.

7. The combination of a main line, a printing-instrument having its relay connected directly in the line, a ground-connection connected to the line on the outside or line side of said relay, and normally-open grounding-contacts connected with earth and with said ground-connection, through which the line is grounded immediately after each actuation of the printing devices.

8. The combination, in a printing-telegraph, of the print-lever, the insulated elastic grounding-finger thereon, an electrical connection extending from the main line outside of the printing-instrument to said finger, and a stop or contact permanently connected with the earth against which the elastic finger is drawn to ground the line upon the actuation of the print-lever.

9. The combination, with a continuously-actuated vibrator, of a contact-finger bearing thereon and means for adjusting the finger lengthwise of the vibrator to regulate its rate of vibration.

10. The combination of the vibrator, the two elastic fingers which embrace it, and means for adjusting the fingers lengthwise of the vibrator to regulate its rate.

11. The combination of a main line, printing-instruments, a type-wheel, sunflower, keys and key-circuits for each printer, local devices for continuously and regularly operating the printer step by step independently of main-line currents, message-transmitting devices, and circuit-connections, whereby the depression of any one or more keys at any printer sends a message-transmitting impulse or impulses over the line, and printing devices which are thrown into operation by said impulse or successive impulses to take impressions from the type-wheels corresponding to such depressed key or keys during the momentary pauses of the type-wheels without interrupting their regularity of movement, the step-by-step motion of the instruments being automatically regularly continued irrespective of the release of the depressed key or keys, substantially as set forth.

12. The combination of a main line, printing-instruments, the sunflower and trailer, the segments of the sunflower, their circuits and keys, and the type-wheel and printing devices

of each printer, local means whereby the type-wheel of each printer is actuated step by step irrespective and independently of main-line currents and its trailer at each movement caused to cross a key-segment and pause between it and the next key-segment, message-transmitting devices and circuit-connections, whereby the depression of a key at any printer sends a message-transmitting impulse over the line, and printing devices which are thrown into operation by such impulses to take impressions from the type-wheels during the ordinary momentary pauses of the type-wheels without interrupting their regularity of movement, the step-by-step motion of the instruments being automatically regularly continued irrespective of the release of the depressed transmitting-key.

In testimony whereof I have hereunto subscribed my name.

PATRICK BERNARD DELANY.

Witnesses:

MARTIN B. WALLER,

T. WEIGONT.