2 Sheets--Sheet 1.

C. T. CHESTER.

Dial Electric-Telegraph.

No. 165,063. Patented June 29, 1875.

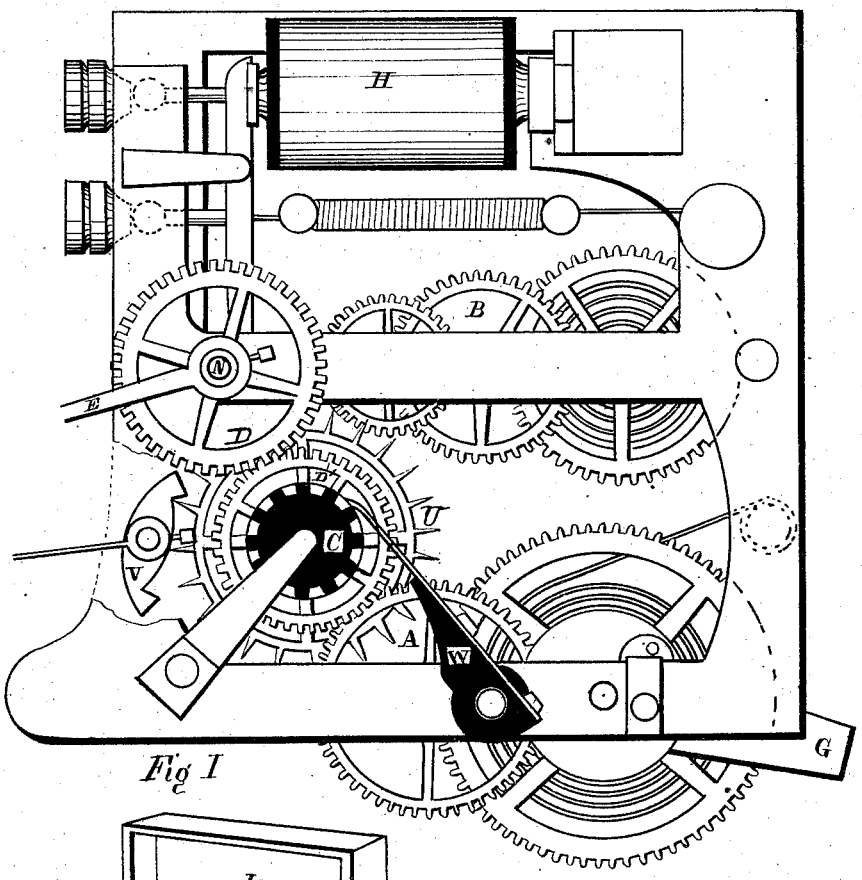

Fig I

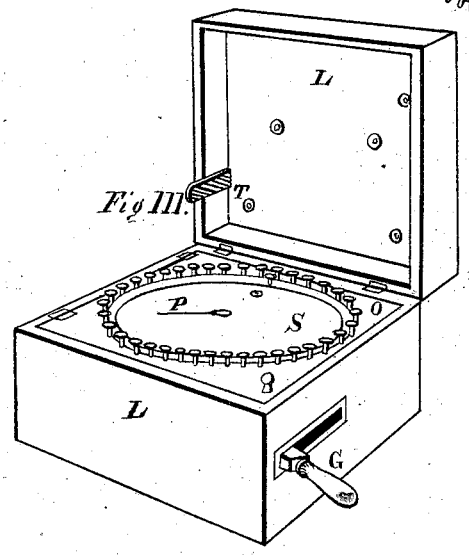

Fig III.

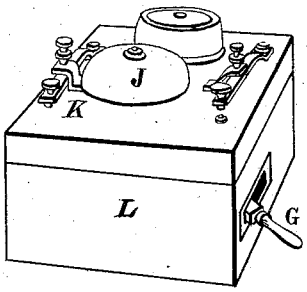

Fig II.

WITNESSES
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Thomas Fitch

INVENTOR
Charles T. Chester.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

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Fig. IV.

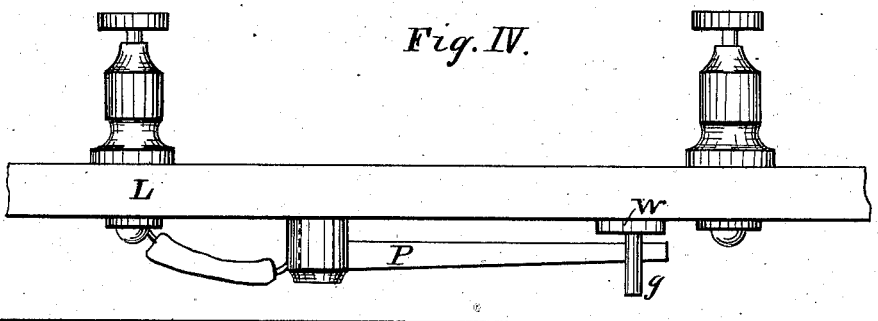
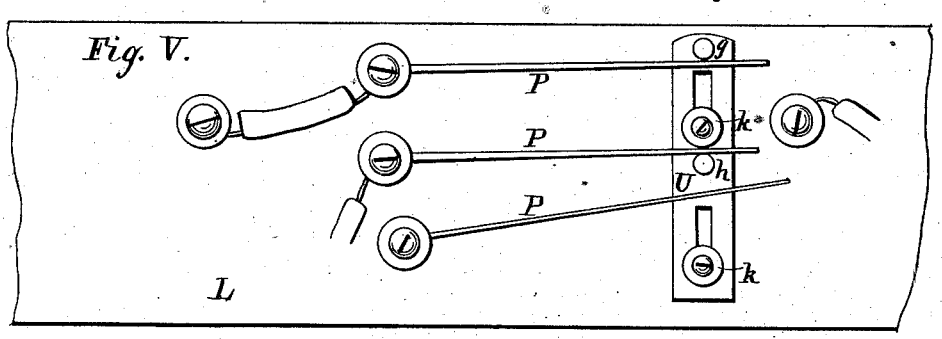


Fig. V.



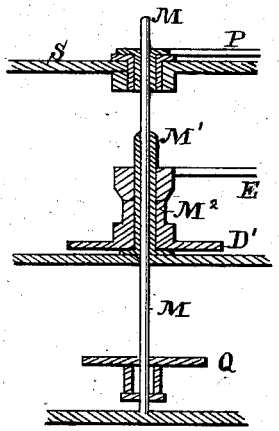


Fig. VI.

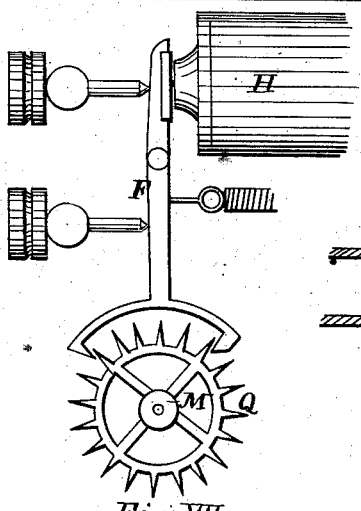
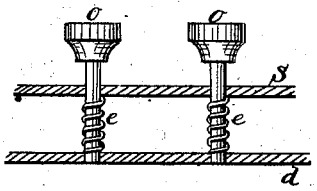


Fig. VII.

Fig. VIII.



Witnesses:

Stephen Chester

Thomas Fitch

Inventor:

Charles T. Chester

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UNITED STATES PATENT OFFICE.

CHARLES T. CHESTER, OF ENGLEWOOD, NEW JERSEY.

IMPROVEMENT IN DIAL ELECTRIC TELEGRAPHS.

Specification forming part of Letters Patent No. **165,063**, dated June 29, 1875; application filed March 30, 1875.

To all whom it may concern:

Be it known that I, CHARLES T. CHESTER, of Englewood, State of New Jersey, have invented an Electric Telegraphic Dial-Instrument, of which the following is a specification:

My invention consists in the combination of several mechanically-driven machines, one of which is governed and controlled, but not driven, by magnetic force, in one machine, for the purpose of causing hands or pointers on one or more separate machines to indicate on dial-faces letters, characters, or figures corresponding to keys or buttons touched upon another similar machine situated in a distant place.

The following is an exact description of the devices employed and the manner of their combination with each other, and with telegraph-lines and batteries, to produce the required effect, reference being had to the accompanying drawings and the letters and figures written thereon.

Figure I represents the combined machinery, exclusive of the containing-box, dial, call-bell, &c. This consists, first, of two separate and independent trains of wheels, each driven by separate weights, springs, or other motive power, but terminating in concentric shafts having a common axis. The terminal wheel of the transmitting-machine (A, Fig. I) has for its shaft a sleeve or tube fixed upon the frame-work, upon which the terminal wheel of A revolves, (see Fig. VI,) M^1 representing fixed tube; M^2, the sleeve forming part of terminal wheel D′. The terminal wheel Q, Figs. VI and VII, of the receiving-machine B, Fig. I, is fixed upon the shaft M, Figs. I and VI and VII, which passes through and projects beyond the tube M^1. Hence, though the terminal wheels of the two machines A and B have a common center of revolution, they move independently, and are unaffected one by the other. Upon the terminal sleeve-shaft M^2 of machine A is fixed a projecting arm or needle, E, Figs. I and VI, at such height that it will revolve in a plane just below the dial-plate. Upon the terminal shaft M of machine B is fixed a needle or arm, in such position that it will revolve in a plane just above the dial-plate, when the whole machinery is placed in the containing-box. The motion of machine A is controlled by a pendulum-pallet, V, releasing escapement-wheel U, Fig. I; and the rapidity of vibration of this pallet may be regulated by adjusting the length and weight of an attached projecting fan or wire. The motion of machine B is controlled by the pallet, forming part of armature-bar F, Figs. I and VII, releasing escape-wheel Q, which terminates the train of machine B. Hence, every electric impulse communicated to magnet H, either by breaking or closing the circuit, permits one tooth of Q to escape. C, Fig. I, is a circuit-breaking wheel, in which teeth and insulating surfaces or spaces alternately come in contact with the insulated springs W, Fig. I, thus opening and closing an electric circuit, when the necessary connections are made therewith. The wheels D and D′, Fig. I, are equal wheels, so that the revolution of circuit-wheel C and of shaft M^2 is the same, and the hand E may be regarded as revolving upon the same shaft with circuit-wheel C. The escape-wheels U and Q and the circuit-wheel C have the same number of teeth, and these teeth and spaces correspond with the number of characters or indications surrounding the dial-plate. Hence, if the springs W, circuit-wheel C, and magnet H be placed in one electric circuit, and machine A be permitted to run, then every tooth of wheel U escaping will cause an electric impulse to pass through magnet H; and, in consequence, a corresponding escapement of wheel Q of machine B and the two arms or needles E and P, Figs. I, III, and VI, will simultaneously move through the same arc, which will indicate just the distance between one and another of the characters or indications placed upon the dial-plate. If the two arms be originally placed upon their respective shafts pointing in the same direction, and machine A be permitted to run, then both needles will commence revolving in unison, their motion being a series of pulsations corresponding to the beats of pallet V, in such manner that the two needles, one above and one below the plate, will successively indicate, by an instant's pause, each character upon the dial-plate. Now, if the lower needle-machine

A be mechanically arrested pointing in the direction of any character, it is evident that the upper needle P, machine B, will cease to move at the same point, and will visually indicate upon the dial-plate the character opposite which the needle E has been arrested.

Referring to Fig. III, the buttons or keys surrounding the dial-plate O, and corresponding to the characters or indications placed thereon, are pistons, retained in their normal positions by spiral springs. These are more clearly shown in Fig. VIII, where O represents the button and piston-shaft; S, the dial-plate, through which they pass; *d*, a lower guiding-plate attached to dial-plate, and *e* is the spiral spring. The needle E revolves in such manner as just to escape the lower plate *d*. Now, if any one of the keys or buttons O be pressed upon, the lower end of the shaft O will be caused to project below the lower plate *d* in such manner as to present an obstacle to the revolution of arm or needle E. Hence, by depressing successively buttons corresponding with characters, forming in their succession words, sentences, or intelligible signals, the lower needle can be arrested in such manner as to successively pause opposite the several characters, which, in turn, will be visually indicated by the successive pauses of the upper needle, pointing at their respective characters. Now, if several of these combined machines be placed in the same electric circuit, and their several hands or needles be originally placed in unison, pointing to the same character; then if the transmitting portion (machine A) be allowed to run, all the upper needles of the several machines will move in exact correspondence with the movements of needle E of the then transmitting-instrument; and if this arm E be interrupted by the buttons, as above described, at any characters—as, for instance, D J A L—all the upper or indicating needles will, on their respective dials, indicate or point out D J A L.

Unison.—When two or more instruments are operating in the same circuit, I have adopted this device to enable the several operators—transmitting or receiving—to place their several instruments in unison with each other.

It is evident that, the transmitter of any machine being in motion, the upper needles of this and of the other instruments may be mechanically arrested, pointing in any chosen direction, when, although the liberating-pallets may continue to move to and fro, the shafts M will not revolve.

One vacant or unlettered space is reserved at the top of the dial. This has its button, as do all the lettered spaces. In the same radial line, but within a smaller circle, is a second button, which, when depressed, does not interpose any obstacle to the revolution of arm E, but, depressing one end of a short lever-bar, causes the other end to thrust upward and through the dial-plate a pin, within the circle described by the indicating end of needle P, in such manner that it will thereby be arrested, pointing at the blank space, although the lower needle may continue to revolve.

When two or more operators, at distant points, desire to place their respective instruments in unison, they severally depress the inner or unison button, and hold it thus until the following operation is complete. The transmitting operator, holding his unison-button depressed, suffers the transmitter of his instrument to make more than one revolution, and then arrests the arm of transmitter by depressing button-blank, and releases unison-button. Meanwhile the needles of the distant receivers will, by this operation, be carried forward to where they are arrested by their several unison-pins. The several operators will release their unison-pins when the cessation of movements of their respective armature-bars indicates to them that the transmitting operator has arrested his transmitter. All the indicating-needles will then be in unison and in readiness to respond. Hence any one of several operators may cause needles or pointers on several distant instruments to indicate successive characters, letters, or figures, composing words, sentences, and messages.

In connection with all dial or visual telegraphs it is convenient to have means of communicating short-hand stereotyped signals other than those communicated by spelling out letter by letter.

In this instance the plan of sending numeric signals upon a bell-magnet has been adopted, and for greater convenience the bell-magnet key, &c., is placed upon the cover of the box. (See Fig. 2.) Thus when the cover is closed the bell-signaling apparatus is exposed and in circuit. When the cover is raised, so as to expose the dial, the bell apparatus is thus thrown out of the way, and the dial apparatus is in circuit. The change of connections—from the bell-magnet in one case and the dial-magnet in the other—is thus made automatically by the simple opening and closing of the box.

The device employed to change connections is shown in Figs. III, IV, and V.

Fig. IV shows a section of one side of containing-box, looking down upon it and upon the three springs P P P, which are again shown in the elevated view of the same section, Fig. V.

W is a flat bolt, which slides up and down upon the screws K K, passing through slots. From this bolt project the pins *g h*, in such manner that the pin *g* rests upon the upper spring P, and the bolt is supported thereby, and the pin *h* is in contact with the lower side of the middle spring, and the lower spring P is not in contact with any part of the bolt, and therefore the upper and middle springs are connected. Now, if this bolt be depressed, bending the upper spring downward, the pin *h* will leave the middle spring and come in

contact with the lower spring, thus connecting the upper and lower springs and disconnecting the middle spring. When the upper and middle springs are connected the circuit passes through the dial-magnet. When the upper and lower springs are connected the circuit passes through the bell-magnet. In Fig. III, T is an insulated plug fastened upon the inside of one side of the box-cover, and projecting therefrom in such position that when the cover is closed the projecting end will strike the top of sliding bolt W, and push it downward to the position before described, to cause change of circuits. When the cover is raised, removing the pusher T, the upper spring P will raise the bolt to the position before described, as connecting upper and middle springs. Hence, when the box is closed and bell-magnet exposed, the circuit passes through the bell-magnet. When the cover is thrown back, exposing the dial apparatus, the circuit will be through the magnet of this latter.

I do not confine myself to the device of depressing-springs. Various other methods may be used. For instance, a circular arc of metal may be attached to the cover in lieu of the pusher T, its free end passing through the dial-plate, as does T, in such manner that it shall slide over stationary buttons, thus connecting with each other different buttons, as the box may be shut or open.

In the apparatus above described I have, for convenience, described how controlled motions of an indicating-needle may be produced by an independent motor carrying a circuit-breaking wheel, but which has one shaft concentric with and revolving in the same axis, with one shaft of another motor, whose escapement is controlled by said revolving circuit-breaker. But it is evident that a type-wheel could be substituted for the needle, and its revolution so controlled as to print upon paper the letters and characters by the buttons depressed, or letters and characters upon the surface of a revolving wheel may be disclosed through a prepared opening. I do not, therefore, confine myself to the application of the above-described machine to indicating letters upon a dial-plate by the motions of a needle, but to all telegraph purposes to which such motion is adaptable.

I do not claim the application of a circuit-wheel driven by machinery controlled by a pallet for the above purposes, nor the controlling the escapement of another bar, as more fully described in my own patent, No. 40,324, of 1863; but

I do claim—

1. The combination of a shaft turning within a fixed tube or sleeve, and another hollow or tubular shaft turning without the said fixed tube, with mechanically-driven trains of wheels, for the purpose of causing independently-driven shafts, wheels, or devices to revolve upon a common axis of motion.

2. In connection with electric telegraphic circuits, the combination of two independent motors, carrying, respectively, a circuit-breaking device, and recording or receiving devices controlled by a magneto-escapement, and so arranged that the shaft governing the motion of the circuit-breaking device and the shaft causing the recording devices shall have a common axis of motion for the purpose of electro-telegraphy, substantially as set forth.

3. In combination with any electro-telegraphic apparatus contained in a box, wherein two or more devices having separate magnets may be alternately called into use, an attachment fastened to and moving with the lid of the box, and a switch or commutator within the box, so that the movement caused by the opening or closing of the box shall cause connections with the circuit to be made alternately with one or the other magnets, substantially in the manner and for the purposes hereinbefore described.

CHARLES T. CHESTER.

Witnesses:

STEPHEN CHESTER,

THOMAS FITCH.