

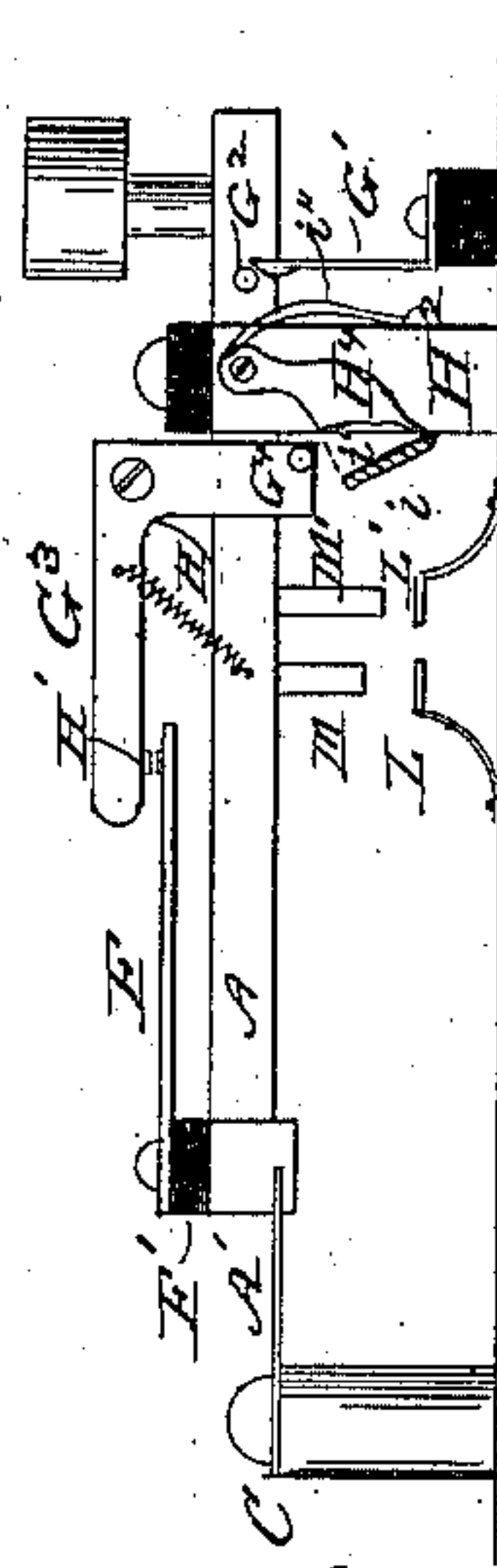
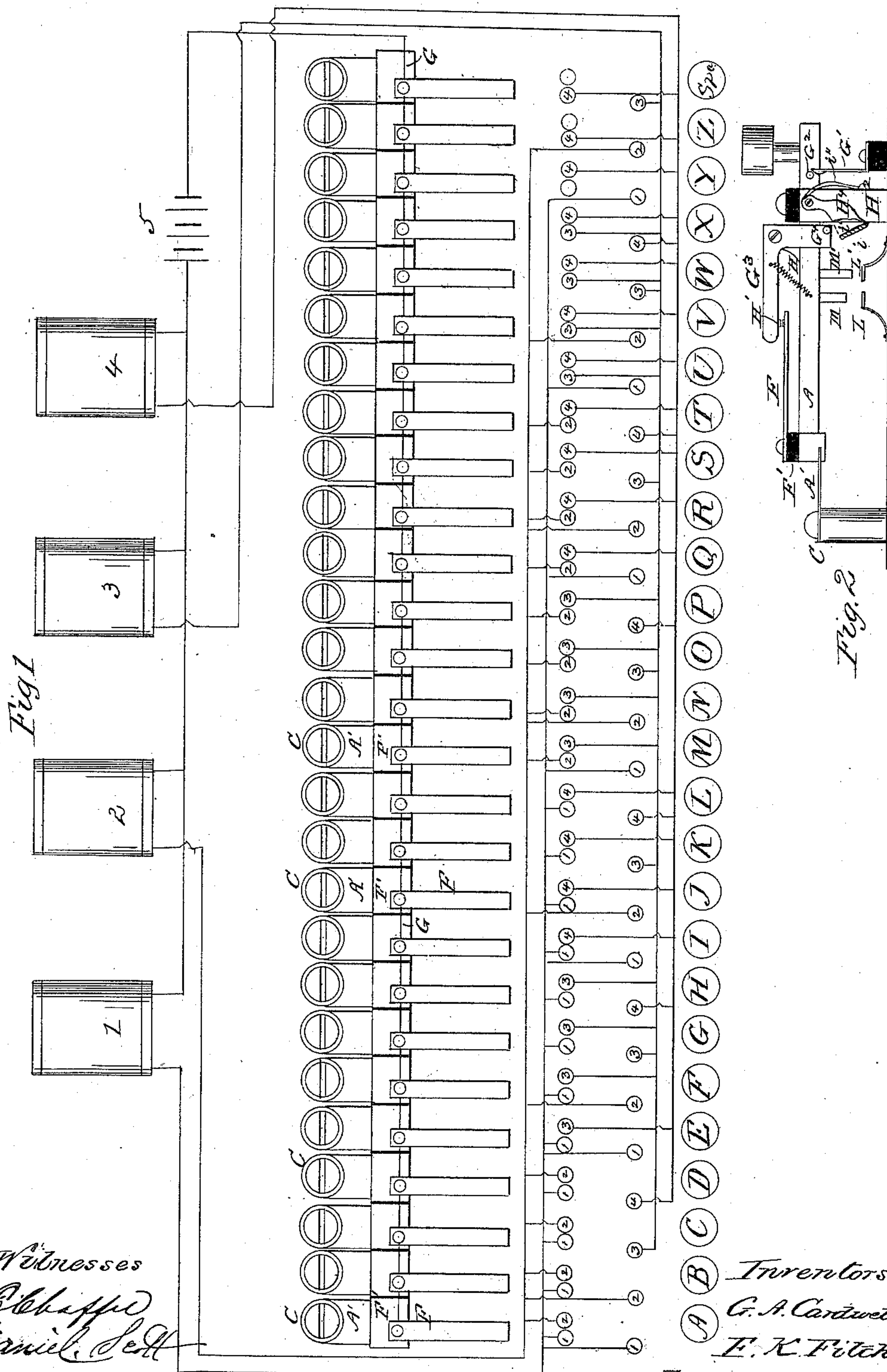
(No Model.)

G. A. CARDWELL & F. K. FITCH.

TRANSMITTER FOR HARMONIC PRINTING TELEGRAPHS.

No. 335,682.

Patented Feb. 9, 1886.



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UNITED STATES PATENT OFFICE.

GEORGE A. CARDWELL, OF BROOKLYN, AND FREDERICK K. FITCH, OF NEW YORK, N. Y., ASSIGNORS OF ONE-THIRD TO JOSEPH T. MURRAY, OF NEWARK, NEW JERSEY.

TRANSMITTER FOR HARMONIC PRINTING-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 335,682, dated February 9, 1886.

Application filed December 17, 1884. Serial No. 150,585. (No model.)

To all whom it may concern:

Be it known that we, GEORGE A. CARDWELL, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, and FREDERICK K. FITCH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Transmitters for Multiplex-Telegraph Systems; and we do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a diagram or plan view of the transmitter, the bodies of the keys being omitted to show contact-points. Fig. 2 is a side view of one of the keys.

In an application of even date herewith, filed in the name of George A. Cardwell, there is shown and described a system of transmitting and recording telegraphic signals involving the method of permutating "tone" or equivalent currents and causing the separate signals to be printed in response to the conjoint action of different currents.

In said application reference is made to a key-board or transmitter, wherein the keys, arranged in alphabetical order, are made to make and break several contacts of a local battery-circuit, so as to first prepare or adjust the "distributor" or receiving apparatus, and then cause the same to close currents of a local battery through printing-magnets. This key-board constitutes the subject of the present application; and the invention to which it relates consists in the novel construction and combination of parts, as hereinafter described and specifically claimed.

The distributor having been fully described in the concurrent application of George A. Cardwell, it will be unnecessary to repeat the description; hence we will confine ourselves to the special construction of key-board found most convenient and suitable for the purpose for which it is intended.

The "key-board," as the term suggests, consists of a bank of keys mounted in a suitable frame having suitable connections for the

attachment of circuit-wires and other appendages of an electro-magnetic instrument. These keys may be arranged conveniently side by side in alphabetical order, or they may be disposed in several banks. We have shown twenty-seven keys, the last being a spacing-key. The "button" on each key bears its appropriate character or letter. The keys A are supported by flat springs A', which are attached to a cleat or other support, C, allowing the keys to be depressed, and when released to assume their normal positions.

1 2 3 4 designate four electro-magnets in branch circuits with a local battery, 5. These magnets are adapted when energized to control each the transmission of a separate tone or equivalent current, which is "analyzed" by the receiving apparatus. The special construction of such magnets need not be detailed. The keys are intended to close and open certain circuits through these magnets in the order required for the operation of the distributor, and hence the battery 5 has branches leading to the contact-points of the keys by way of the magnets. One pole of the battery is in branch connection with the contact-points, while the other pole has a branch from its main conductor to each key. The outgoing line from each magnet is so branched as to provide common circuits for several keys.

When a key is depressed, it first closes a circuit through one magnet, and this being immediately broken the key closes circuit, with some exceptions to be hereinafter noted, through two magnets, so that a single tone impulse is first sent over the line to the distributor, causing an adjustment or preparation thereof, and then two tones are sent conjointly, so as to effect the printing of a character.

F designates a contact spring-plate attached to the key at its rear end and extending forward. These plates, which are insulated from the keys by rubber blocks F', are in common circuit, and are connected by a wire, G, with one of the poles of the battery 5.

G' designates an insulated upright spring-plate having a beveled head or protection, g, against which impinges a pin, G², on the side of the key. A bell-crank lever, G³, is pivoted

to a standard, H, on the key, and carries on the under side of its horizontal limb, near the free end thereof, a platinum contact-stud, H', designed to maintain contact with the spring F when the key is depressed, while at the same time contact is made between the key by pin G² and the plate-spring G'. A standard, H², carries a pivoted S-shaped cam, H⁴, the lower portion of which is bent laterally, and so shaped as to provide an inclined lip at i, leaving a V-shaped cavity, i', between the inner surface of the lip and the opposing side of the standard H. A spring, i'', presses against the upper end of the device H⁴ and tends to maintain the lower edge of the lip i in contact with the standard H². The depending limb of the bell-crank G³ has a laterally-projecting finger, G⁴, which when the key is in its normal position lies directly above the cavity i'. Now, when the key is not in use, the contact between the spring F and the bell-crank G³ is complete. When the key is depressed, the finger G⁴ impinges against the inner surface of the lip i, and moves the latter outwardly while circuit is completed through the key and the spring G', thus sending at first a preparatory impulse to the distributor. As the key descends the finger G⁴ passes the lip i on its inner side and the contacts at G² are broken.

L L' designate contact-springs in circuit with transmitting-magnets of the series 1 2 3 4, and M M' are pins depending from the under side of the key, and so arranged that after the contact G² is made and broken circuits will be made through the springs L L' and the pins M M' from the battery V through two transmitting-magnets, which may include one of the magnets already energized.

In general the contacts L L' M M' are made simultaneously; but in some exceptional instances one impulse should anticipate the other, in order to avoid the establishment of a false or short circuit in the distributor. So, too, in some cases, instead of making two circuits through the contacts L L' M M', but one circuit is required, the distributor being so arranged that in these cases the printing-magnet responds to a single impulse, instead of to a permutation.

As the key rises it first breaks circuit at L L' M M', allowing the distributor to assume its normal condition; but in order to prevent the preparatory circuit from being re-established and the distributor disarranged, the renewal of the preparatory circuit is avoided by the finger G⁴ and lip i, the latter moving the bell-crank lever so that the contacts H' F are separated and held apart until the pin G² passes the spring G', when contact is immediately made at H' F, while the circuit is open at G' G².

We have especially described that form of key which we think best adapted for the use for which it is designed; but we do not wish to be confined to any special construction,

since the same object may be attained by various mechanical expedients.

Our invention lies, broadly, in the provision of a key which will first make and break a preparatory circuit, then make the printing-circuit, and finally resume its normal position without remaking the preparatory circuit.

In fact, our invention may be considered to embrace any transmitting-key which will make and break not only three, but any number of circuits, from two on, one circuit being a preparatory circuit and the others actual working-circuits.

We have referred to the key-board as an expedient to be employed in printing-telegraphy, but it is obvious that it may be used in switching operations in connection with a distributor, when, instead of relaying currents through printing-magnets, it will relay circuits to various lines diverging or radiating from the distributor, as from a "central office" or switching station. Thus a key may be depressed so as to effect a preparatory adjustment of the distributor, after which a succession of impulses through the contacts L L' M M', according to the "Morse" or other system, will affect a sounder or recorder on the line corresponding to that in which the printing-magnet is now situated, and this line may proceed to any distant point.

What we claim is—

1. In a telegraphic transmitting apparatus, the combination of a series of electro-magnets adapted to close circuits over a main or trunk line or lines, a local battery or generator in circuit with said magnets, and a series of keys in branch circuits of the battery, each of said electro-magnets having circuit-wires branched or subdivided and leading to different keys, and each of said keys being provided with contact-closing devices constructed and arranged substantially as described, whereby when a key is depressed it will close a circuit from said battery through two or more of said electro-magnets, as set forth.

2. A telegraphic key having two or more pairs of contact-points related to different circuit-lines, and means, substantially as described, for momentarily closing one circuit in advance of the other or others when the key is depressed, and for maintaining the break in the open circuit until the key assumes its normal position, as set forth.

3. The combination of the key A, stem A', spring-plate F, bell-crank lever G³, cam H⁴, and contact-springs L L' G', substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands this 9th day of December, 1884.

GEORGE A. CARDWELL.
FREDERICK K. FITCH.

Witnesses:

THOS. A. CONNOLLY,
GEORGE F. ESCHBACH.