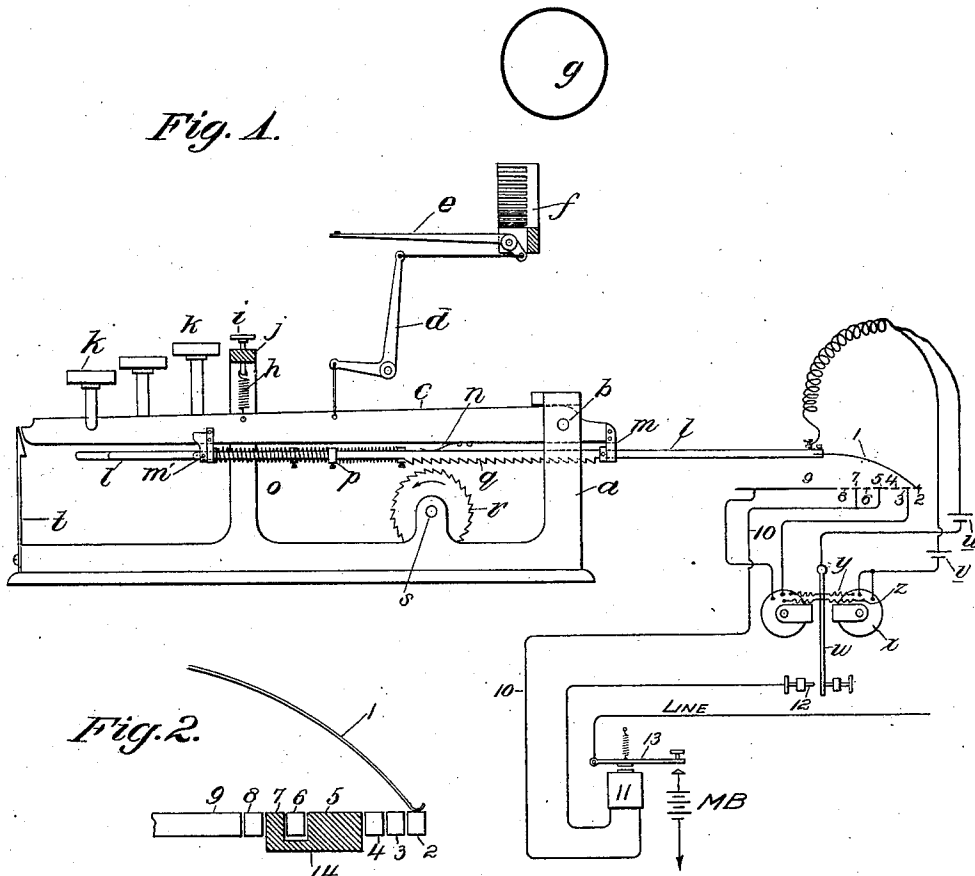


P. B. DELANY.
 KEYBOARD TRANSMITTER FOR MORSE AND OTHER TELEGRAPHIC CODES.
 APPLICATION FILED JULY 10, 1903.

918,291.

Patented Apr. 13, 1909.

2 SHEETS—SHEET 1.



Witnesses:
S. L. Fanning
M. L. Adams

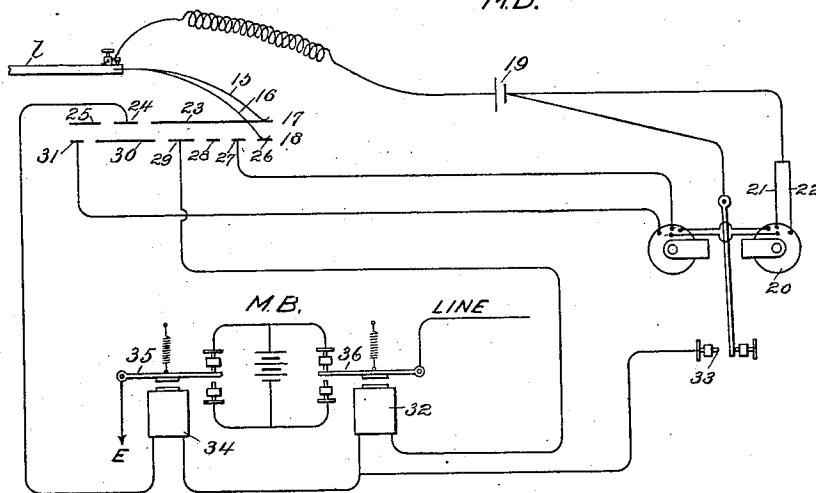
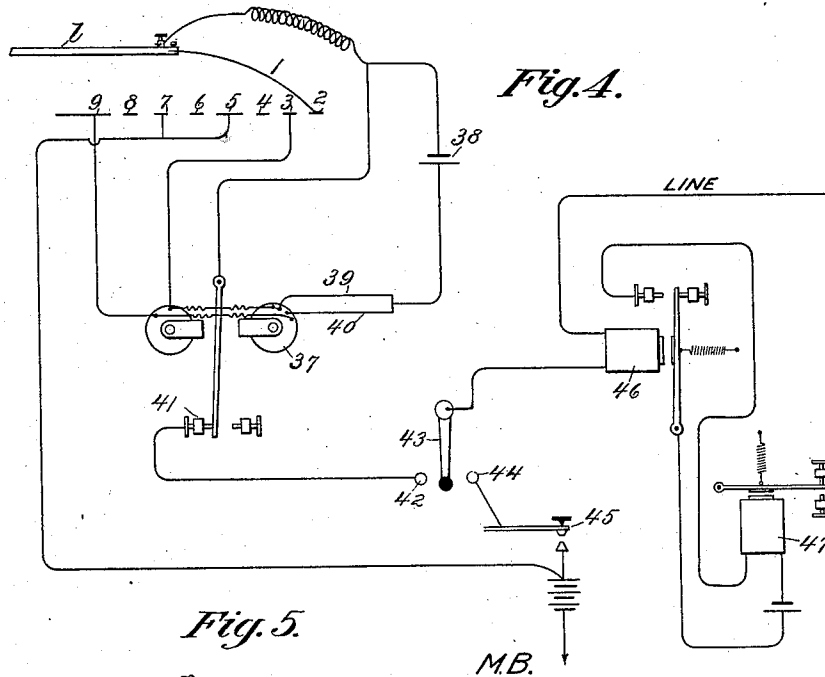
Inventor:
Patrick B. Delany
 by *Baldwin, Davidson, Wright*
 Attorneys

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UNITED STATES PATENT OFFICE.

PATRICK B. DELANY, OF SOUTH ORANGE, NEW JERSEY.

KEYBOARD-TRANSMITTER FOR MORSE AND OTHER TELEGRAPHIC CODES.

No. 918,291.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed July 10, 1903. Serial No. 164,999.

To all whom it may concern:

Be it known that I, PATRICK B. DELANY, a citizen of the United States, residing at South Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Keyboard - Transmitters for Morse and other Telegraphic Codes, of which the following is a specification.

This invention relates primarily to an organization, mechanical and electrical, whereby on manipulation of a key board, such as that of a printing telegraph or typewriting machine, the dot and dash characters of the Morse alphabet (or characters of other telegraphic codes) are transmitted into a main line or local circuit for record.

The leading feature of the invention consists in setting into operation by depression of a key, certain novel devices which automatically effect the transmission, locally or to the main line, of the electrical impulses representing dots and dashes or the characters of any telegraphic code. At the same time, it is proposed to make, in the ordinary alphabet, a record of matter so transmitted by means of type striking against a platen as in an ordinary typewriting machine. A system of this kind possesses the advantage that the characters are uniformly transmitted and idiosyncrasies of individual operators are eliminated.

In the accompanying drawings: Figure 1, is a somewhat diagrammatic view indicating a section of a keyboard and writing machine adapted to carry out the principles of this invention; Fig. 2, is a detail view showing one arrangement of the electrical contacts; Fig. 3, a detail plan view indicating the electrical arrangement of contacts for a period, the letter E and letter N. Fig. 4 is a diagrammatic view showing a modification in which transmission into the main line is made direct from the contacts traversed by the brush set into operation on the depression of a finger piece in the key board; and, Fig. 5, is a similar view showing an arrangement for transmitting signals according to the code used for cables.

Experience has shown that the organization illustrated is an efficient and practical way of carrying out the invention.

a is a frame of appropriate construction

in which are pivoted, on an axis *b*, the requisite number of horizontally disposed key levers *c*. Each such lever is connected by a link with a corresponding bell crank lever *d* connected with the heel of a type bar *e* pivoted in a slotted segment *f* and adapted to be thrown to the printing point on the platen *g* when a key lever is depressed.

The construction illustrated is well known and understood but any appropriate construction of typewriter may be employed. Each key, as shown, is maintained in normal position by a coiled spring *h* attached to an adjustable screw bolt *i* mounted in a bridge piece *j* extending transversely across the bank or gang of key levers, each of which is provided with a suitable finger piece *k*. Below, and carried and controlled by each key lever is a rod *l* movable endwise in guides *m*, *m'*, depending from the lower edge of the key lever, and normally pressed downwardly or away from the key lever by a spring *n*. These rods are normally urged rearwardly, or to the right as viewed in the drawings, by coiled springs *o* placed between the guide *m'* and an adjustable collar *p* on the rod; and, in rear of this collar, the lower edge of the rod is formed with rack teeth *q* adapted when the corresponding key lever is depressed, to engage the teeth of a wheel or cylinder *r* located beneath it, and continuously revolved by any appropriate motor mechanism, and preferably frictionally connected with its shaft or axis *s*. In front of the key levers is arranged a series of vertical spring latches *t*, one for each key lever, (although there may be one latch for the entire series of rods) the organization being such that when a key lever is depressed, it is engaged by its latch and held down until the rod *l*, the toothed part of which is engaged by the continuous toothed driver *r*, strikes it and forces it rearwardly, thus releasing the key lever and permitting it to move upwardly to its normal position, disengaging the rod from the continuous running driver. Whereupon, the coiled spring *o* returns the rod to its normal position. These rods are made of different lengths since the distance that they are required to travel varies with the letter or signal transmitted, as will be presently described; and they are respectively of such length that on completion of a transmitted

signal, the bar will engage its latch and release its key lever.

In the organization illustrated, the rear end of each endwise movable bar *l* is electrically connected with two batteries *u*, *v*, the battery *u* being connected with the armature lever *w* of a polarized relay *x*, while the battery *v* is connected with the reverse windings *y*, *z*, of the relay. On the end of each endwise movable rod *l* is a spring contact brush 1 which sweeps a series or table of contacts, there being a special series corresponding with each key lever,—that is to say, with each letter, character or signal to be transmitted. In Fig. 1 this series of contacts is for transmission of a dash and dot representing the letter N of the Morse code; and, in the particular arrangement shown, the separate contacts are marked 2, 3, 4, 5, 6, 7, 8, 9. Contact 2 is a dead or non-electrical one. Contact 3 is connected with the winding *y* of the polarized relay. Contact 4 is dead or non-electrical. Contact 5 is connected with wire 10 including the winding of an electro magnet 11 and connected with the contact stop 12 of the armature lever *w*. Contact 6 is dead; 7 is connected with wire 10; 8 is dead and 9 is connected through the winding *z* of the polarized relay. When the endwise movable rod *l* is in its retracted position, its contact brush 1 rests upon the dead contact 2. When its corresponding key lever is depressed and the rod becomes engaged with the toothed wheel or cylinder *r*, it commences to move to the left and passes to the contact 3 thereby completing the circuit *y* of the polarized relay and throwing the armature lever *w* to its live contact 12, where it remains, closing at that point the circuit of magnet 11. The continued movement of the rod carries the contact brush 1 to the dead contact 4 and thence to the elongated or dash contact 5, completing the local circuit of the magnet 11 which attracts its armature 13 thereby connecting the battery MB to the main line or circuit into which the dash impulse is to be transmitted. The contact brush 1, then passes to the dead contact 6, opening the circuit of magnet 11 and permitting its armature to be retracted against its back stop. Next, it passes to the dot contact 7, completing again the circuit of the magnet 11 and sending a dot impulse or signal from the main battery MB after which it passes to the dead contact 8 and, finally to 9, when the circuit of the winding *z* of the polarized relay is completed thereby throwing its armature lever *w* to its open or dead contact; and, when this has occurred, the end of the arm *l*, striking latch *t*, releases the key lever which, rising under the influence of its spring, carries the rod *l* out of engagement with the continuously rotating driver and permits its re-

turn under the influence of its coiled spring *o* to normal retracted position. In such return, when the brush 1 reaches contact 3, the armature lever *w* is caused to pass to its live contact 12 where it remains. On the next actuation of the same or any other key lever, when brush 1 passes to contact 3, the position of the armature lever against its line contact 12 is emphasized or made more firm and the operation described is repeated. By proper adjustment of the respective springs *o* of the several rods *l*, the rate of return movement of the rods may be made substantially uniform with the result that the spaces between letters will be the same and owing to steady forward movement of cylinder, the characters or signals transmitted by the energization of magnet 11 will be uniform in character, producing a substantially perfect and entirely legible record where they are recorded, whether locally or at a distance, as well as certainty and uniformity where the transmitted signals are read by ear.

Different letters or signals require a different extent of movement of their rods or devices *l*. In the Morse code the period requires the longest movement and the letter E the shortest, as indicated in Fig. 3, where, for convenience of illustration, signal transmitting contacts, namely, the dot and dash transmitting contacts, are shown in solid black.

As indicated in Fig. 2, the signal or dot and dash contacts may be formed in one piece, the dot and dashes of the letter N being there represented by a metal block 14. The several contacts 9 may all form part of a single metal piece 15, as indicated in Fig. 3. The contacts 2, 3, 4 are, of course, properly insulated from each other and from contact 5; and the contacts 6, 8, 9, are properly insulated from each other; while 6 is, of course, insulated from both 5 and 7. Contacts 2, 4, 6 and 8 may all be part of one piece. The same general arrangement of insulation and contacts is, of course, employed with other series for automatic transmission of all the various letters of the Morse or other telegraphic code.

The special arrangement of contacts, as, for instance, 2 to 9 as explained for transmission of the letter N, is preferred; that is to say, the arrangement of dead contacts between the signal contacts and those which control the position of the polarized relay.

Of course, the details of an apparatus of this kind may be varied and the form in which it is mechanically and electrically embodied may be changed without departing from the principle of the invention or the general mode of operation described.

The invention is not in respect to some of the claims restricted to an endwise movable rod engaged, as described, by a continuously rotating toothed driver; nor in respect to

other claims to the special arrangement of electrical contacts and apparatus since the same results may be obtained in the same general way by other organizations which may be devised by those skilled in the art. This organization may be used in any circuit, local or main, where it is desired to produce Morse or other code characters, the impulses representing which are to operate sounders, recorders, tape embossers, tape perforators or other devices.

Fig. 4 shows a modified arrangement, the series of contacts for the letter N being shown. The contacts are marked 2, 3, 4, 5, 6, 7, 8, 9. The brush 1 is connected with the armature lever of a relay 37 and also through a local battery 38 with the reversely wound coils 39, 40 of the relay. The other terminal of winding 39 is connected with contact 3, and that of winding 40 with contact 9. The dash contact 5 and dot contact 7 are connected directly to the main battery MB; while the live contact stop 41 of relay 37 is connected to point 42 of the three point switch 43, the other point 44 of which is connected through a Morse key 45 with the main battery. The switch arm 43 is connected to line through a relay 46; and, in a local circuit controlled by the relay, is a local battery and sounder 47.

When the switch arm 43 is on the point 44, the Morse key may be used for sending signals to line. When the switch, however, is on point 42, the operation already described in connection with Fig. 1 occurs except that a main battery current passes through the signal contacts 5 and 7, brush 1 and armature lever of relay 37 direct to line.

Fig. 5 shows an arrangement for transmitting the ordinary cable code in which the dot and dash impulses are of equal duration but of opposite polarity. There are two electrically connected contact brushes 15, 16 which sweep parallel series 17 and 18 of contacts. One pole of the local battery 19 is connected with the two brushes and the other pole is connected to the armature lever of a relay 20; and also to the reverse windings 21, 22, of the relay. The two series 17, 18 of contacts are of equal length, the series 17 has a long dead contact 23, a signal contact 24 and a dead contact 25. The other series 18 has a dead contact 26, a relay contact 27, dead contact 28, signal contact 29, long dead contact 30 and a relay contact 31. The contacts 27 and 31 are respectively connected with the windings 21, 22 of the relay. The signal contact 29 is connected through the winding of a magnet 32 with the live contact 33 of the relay 20; and the signal contact 24 is connected through the windings of the magnet 34 with the relay stop 33. The armature levers 35, 36 are connected re-

spectively with earth and with line and vibrate between pole changing contacts of the main battery MB. The operation is obvious. When the brush 16 traverses contact 29, an impulse of one polarity is sent to line; and, when brush 15 traverses contact 24, an impulse of the same duration but opposite polarity is sent to line and between the impulses the line is grounded.

When brush 16 is on contact 27 the relay is energized and of such polarity that its armature lever is caused to pass to stop 33 where it remains as the brush passes to contact 29 when circuit of magnet 32 is closed and its armature lever passes to its bottom stop connecting one pole of battery MB to line. When brush 15 is on contact 24, in the other series, magnet 34 is energized and an impulse of opposite polarity from battery MB is sent to line; and contacts 29 and 24, being of equal length, the current impulses sent to line are of equal duration. When brush 16 is upon contact 31, the relay is reversed, its armature lever passing away from stop 33, and during the return traverse of brushes 15, 16, the circuit of magnets 34, 32, are open at the stop 33. The armature lever of the relay, however, is again moved to stop 33 when brush 16 comes upon contact 27 and remains there until on the next actuation of this bar 1, brush 16 reaches contact 31. It is to be assumed that Fig. 5 shows the apparatus before it has been used at all, or that the relay armature lever has been manually moved to its back or open stop.

In Fig. 4, the brush is supposed to have made an excursion and to have set the relay armature in working position when it returned over contact 3. In Fig. 1, the armature lever *w* is shown in the position it might occupy assuming that brush 1 had not made an excursion over the table of contacts.

I claim as my invention:

1. The combination of a key board comprising finger pieces corresponding with the alphabet; a series of contacts and a contact brush for each finger piece and means for reciprocating one relatively to the other on the depression of the corresponding finger piece to cause the passage of the brush in both directions over and against the contacts during the reciprocating movement, and local electro magnetic devices and circuit connections controlled at the contacts of the series and acting to automatically transmit the code impulses, corresponding with the letter of the depressed finger piece, during said movement in one direction only.

2. The combination of a series of depressible finger pieces corresponding with the alphabet, an endwise movable part for each finger piece whose position is controlled by its corresponding finger piece, a contact

brush carried by said part, a continuously moving driver engaging and moving said part endwise when its finger piece is depressed, means for holding the finger piece down while said part is being moved in one direction, means for returning it endwise to normal position when said movement is completed, a series of contacts over which the contact brush traverses, and circuit connections and electrical devices controlled at said contacts whereby telegraphic code impulses representing the letter of the depressed finger piece are automatically transmitted.

3. In an apparatus of the character described, a relay, a transmitter magnet, a series of contacts some of which are connected with the relay winding to thereby determine the position of its armature lever and some of which are dot and dash signal transmitting contacts and are connected with the transmitter magnet, a contact brush automatically operated to traverse such series of contacts, and a connection between such brush and the armature lever of the relay, for the purpose set forth.

4. The combination of a series of key levers having finger pieces corresponding with the alphabet, an endwise movable part carried by each finger piece, a contact brush carried by said part, a continuously rotating driver with which said part is engaged on the depression of a finger piece and thereby moved, a latch serving to hold down the finger piece and which is struck and disengaged by said part when it has been moved a predetermined distance by the driver, means for returning said part to normal position when its key lever is released, a series of contacts over which the brush passes, and circuit connections and electrical devices controlled by said contacts to transmit signal impulses representing the letter of the depressed finger piece.

5. In an apparatus of the character described, a contact brush, a series of contacts over which the brush passes some of which are signal transmitting contacts, a polarized relay, a contact at one side of the signal contact connected with the circuit of the polarized relay for moving its armature into signaling position and a contact at the other side of the signal contact also connected with the circuit of the polarized relay for returning its armature lever to normal position.

6. In an apparatus of the character described, the combination of the contact brush, a series of contacts, means for at will reciprocating the brush over said contacts from, and back to, normal position, an electro magnetic instrument, circuit connections between its winding and contacts in the series controlling the position of the armature lever of the said instrument, and signal con-

tacts between said controlling contacts, one controlling contact being located adjacent to the brush in its normal position and serving to effect movement of the armature lever of said instrument to signaling position and the other controlling contact being at the other side of signaling contacts and serving to effect movement of said armature lever to normal or non-signaling position.

7. In apparatus of the general character described, the combination of two members—a series of contacts and a contact maker—one movable relatively to the other so that during one direction of movement the contact maker successively makes contact with the contacts of the series to form a signal and in the other direction of movement again traverses them but in reverse order, an electric circuit completed through the contacts of the series and the contact maker during the signaling traverse of the latter and a local relay and its circuit connections acting to automatically open said circuit during reverse movement of the contact maker.

8. In apparatus of the general character described, the combination of a series of contacts, a contact maker movable in both directions over and in contact with the contacts of the series, a source of energy, and means for connecting the contacts of the series with such source when the contact maker traverses them in one direction and a local relay and its connections automatically acting to disconnect them from said source when it traverses them in the other direction.

9. In apparatus of the character described, a series of movable carriers of unequal length, contact fingers thereon, one for each letter, arranged in alinement when in normal position, a latch which determines the respective distance of travel of each such carrier and which is released when the carrier has traversed the required distance.

10. In apparatus of the character described, contact pieces or plates one insulated from the other, one plate having teeth corresponding to the letter to be transmitted and the other having teeth corresponding to the spaces between the characters composing the letter.

11. In apparatus of the character described, two toothed plates joined together and insulated from each other the projections of one representing the letter, and the projections of the other representing the spaces between the characters of the letter.

12. In apparatus of the character described, a contact maker, a series of contacts over which it passes, some of said contacts operating an electro-magnetic instrument for transmission of currents of one polarity into a main circuit and the other of said con-

tacts operating another electro-magnetic instrument for transmission of currents of opposite polarity into said main circuit.

13. In apparatus of the character described, an endwise movable contact maker, a fixed flat series of contacts over which it passes, an electro-magnetic instrument, its circuit locally controlled by said contact maker and said contacts, and a source of

electric energy from which signals are transmitted into a main line by said electro magnetic instrument. 10

In testimony whereof, I have hereunto subscribed my name.

PATRICK B. DELANY.

Witnesses:

WILLIAM A. STAHLIN,
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