

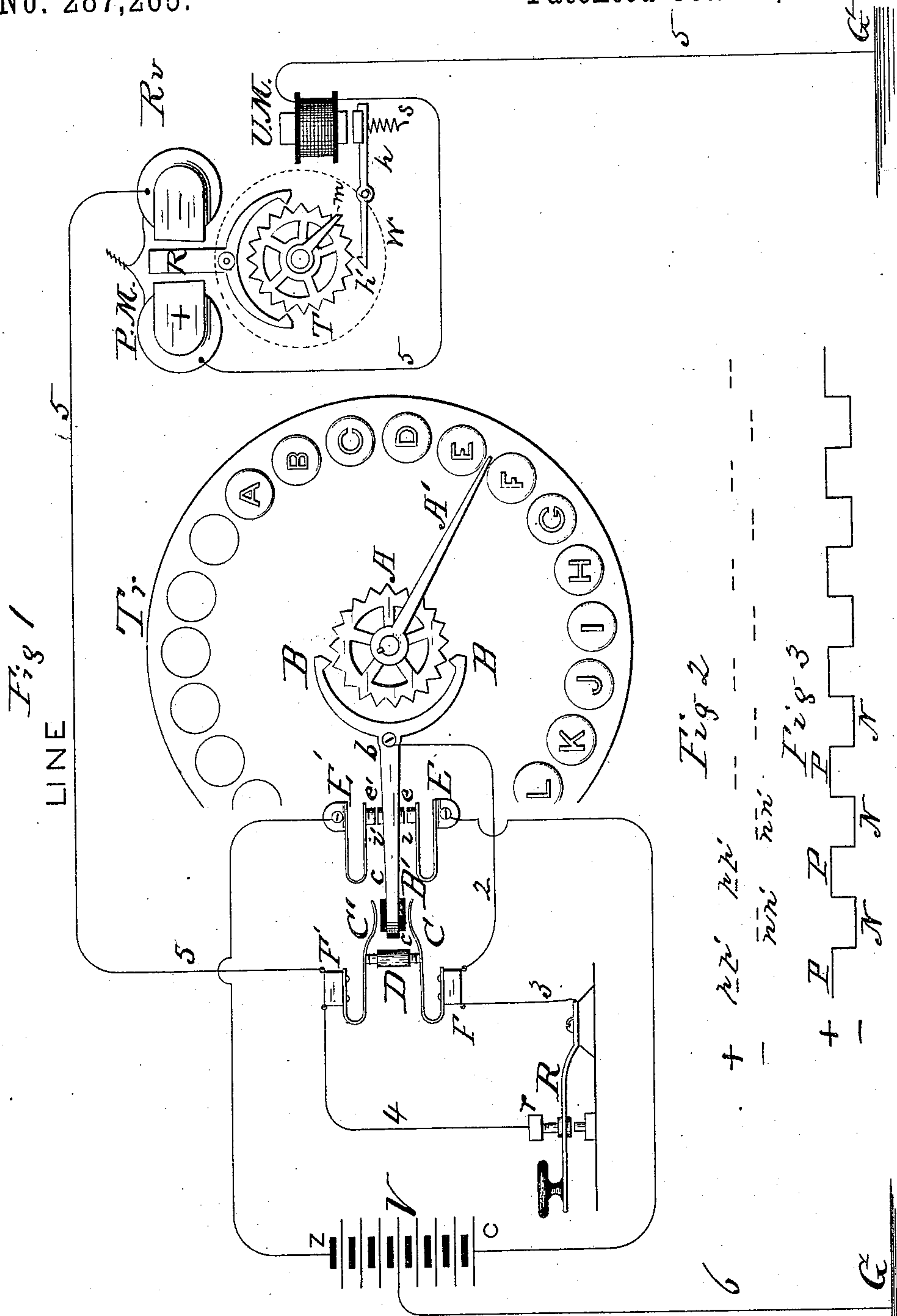
(No Model.)

S. D. FIELD.

PRINTING TELEGRAPH AND TRANSMITTER THEREFOR.

No. 287,265.

Patented Oct. 23, 1883.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

STEPHEN D. FIELD, OF NEW YORK, N. Y., ASSIGNOR TO THE COMMERCIAL TELEGRAM COMPANY, OF SAME PLACE.

## PRINTING-TELEGRAPH AND TRANSMITTER THEREFOR.

SPECIFICATION forming part of Letters Patent No. 287,265, dated October 23, 1883.

Application filed April 27, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN D. FIELD, of New York, in the county of New York and State of New York, have invented a new and  
5 useful Improvement in Printing-Telegraphs and Transmitter therefor; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the let-  
10 ters of reference marked thereon.

In some forms of telegraphy, more especially in what are known as "step-by-step" printers, it is desirable to perform two or more different operations over the same wire. This  
15 has been done by sending a comparatively weak current for one operation and a stronger current for another, or by sending currents of short duration for one and of longer duration for another operation, the magnets to be af-  
20 fected being properly adjusted for these variations. In my present invention, however, I use neither of these plans; but taking as a standard a current of any given length suffi-  
25 cient to operate the magnet in the circuit requiring the longest current to operate another magnet solely, I divide such current into im-  
pulses any one of which is sufficient to operate the last-mentioned magnet, but not the first one.

30 My invention therefore relates to a novel method of affecting two operations—one by what may be termed a "whole impulse," and the other by what may be termed "semi-im-  
35 pulses"—to means whereby at will either such whole impulses or semi-impulses may be transmitted over the line, and to an arrangement of magnets for utilizing such different charac-  
ters of impulses over one wire.

In carrying my invention into effect I use,  
40 primarily, any well-known form of reversing-key properly connected to a battery, and also to the line, through the devices hereinafter described. For use with printing-telegraphs, the type may be of the well-known reversing-  
45 key—that is, a key actuated by a motive power and escapement. Instead, however, of one pair of springs, as is usual, I use two. Of these, the first pair is connected one to either pole of a battery, whose center is connected  
50 to the ground, while the key itself is connected to the line, as hereinafter explained. The

second pair is arranged so that each contacts with a common anvil, forming electrical connection between them, and arranged so that one is lifted from such common anvil just af- 55  
ter the key has made contact with one of the springs referred to, and to return to such anvil just before the key and spring break contact. The key-lever, however, is connected, prima-  
60 rily, to the line through one of this second pair of springs, their common anvil, and the second spring of this pair. In such construction the key, when in operation, always lifts one of the second pair of springs from the com-  
65 mon anvil, breaking the electrical connection between them just after it has formed electrical connection from the battery to line through contacting with one of the first pair of springs. The result of this is that each impulse is cut  
70 in two—that is, immediately after contact is made between the key-lever and one of the first pair of springs, the circuit is broken at one of the second pair of springs, sending a short impulse, while, as the key returns, this break at the second pair is closed, and imme- 75  
diately thereafter the circuit is broken at the first pair, the currents sent being graphically represented by two dots (- -) instead of a (—) dash. The two springs of the second pair,  
80 however, are also electrically connected by a second circuit, which is a shunt to the circuit through their common anvil, this shunt-circuit containing a key, whose lever and back stop are normally in the circuit and maintain  
85 it closed. The result of this is that so long as the key is unused a circuit direct from the reversing-key to line is maintained without re-  
90 gard to the operation of the reversing-key lever upon the second pair of springs referred to, so that during such period currents of maximum length of duration are sent to line. If, however, this key be operated, this second  
95 or shunt circuit is broken, and the only path to line for each impulse is through the two pairs of springs, whereupon each impulse is broken, or, as it were, chopped in two. To  
100 utilize this principle in a receiving-instrument, I use a step-by-step printing-telegraph of one or more type-wheels, actuated by any suitable motor and controlled by an escape-  
ment and polarized magnet. In the same circuit is arranged the unison-magnet, the



strength of which and the resilience of whose armature-lever retractor are so adjusted relatively to each other that the total impulse is necessary to give the magnet the strength requisite to hold its armature and the unison out of action, while, when the semi-impulses are sent, the magnet cannot overcome the resilience of the spring and the unison mechanism is permitted to act. Of course these particular actions are only typical, as any other two actions may be accomplished over the same wire upon the same principle. These things are conventionally illustrated in the drawings, in which—

Figure 1 shows, mainly in diagram, a transmitter and a receiver embodying my invention, while Figs. 2 and 3 are graphic representations of the whole and the semi impulses sent by the transmitter.

In Fig. 1, Tr is the transmitter. In it the arm A' is on a shaft driven by proper motive power, to which shaft is secured the escape-wheel A, actuating the anchor B, pivoted at b, and terminating in the key-lever B', which carries contacts i i, arranged to take on the contacts e e' of the first pair of springs, E E', and form therewith a reverser for the battery V, which is here shown as a divided battery, having a ground-connection, 6, from its center, while its C and Z ends are connected to E and E', respectively.

Upon the free or farther end of B' are arranged, one on each side, the insulating-pieces c c, arranged to take under the second pair of springs, C C', and lift one or the other thereof, according to the direction of movement of B' from the anvil D, common to and electrically connecting both of them.

From the lever B' an electrical connection is made to one of this second pair of springs—in this case C—while from it to the other spring—here C'—an electrical connection is formed through a key, R, and its back stop r. The lever B' and its contacts and the springs E E' C C' are so adjusted that B', immediately after contacting with E or E', shall lift the springs C or C', the one on the corresponding side from the anvil D, and thereby break the connection between them and between B' and the line through the anvil D. So long, however, as the key R is in the position shown there is a circuit around D, via 2 3 R 4, to line, so that the pulsation is of full length, or a whole impulse, which may be graphically illustrated as in Fig. 3, where P N represent these whole impulses. If, however, at any time the key R be depressed, breaking this shunt 3 R 4 around D, immediately after circuit be closed at e or e', it will be broken at D during the advance movement of B'. On the return movement of B' it will be made again at D, just before being broken at e or e', and P or N of Fig. 3 will be divided into semi-impulses, as p p' n n' in Fig. 2.

In the receiver R is illustrated a device for making use of these two characters of current,

an escapement and a unison device being chosen as types.

P M represent the polarized magnet actuating the armature and escapement R, controlling the escape-wheel T, upon a shaft upon which a type-wheel, W, (indicated in dotted lines,) is mounted.

Upon the type-wheel shaft is an arm, m, adapted to take into and catch upon a hook, h', at the free end of an armature-lever, h, when such lever is held by the resilience of the spring S against the action of the unison magnet U M in the escapement-circuit 5 5. The spring s and the magnetic strength of U M are so adjusted relatively to each other that it requires what has been called hereinbefore a "whole impulse" to charge U M sufficiently to attract h, and thereby keep the unison mechanism m h' out of operation. The result of this is that so long as the key R at the transmitting-station is not used whole impulses are sent and U M attracts h, keeping h' and m from acting upon each other. If, however, R be used, the shunt around D is broken and semi-impulses are sent—that is, each reversed current is in two impulses, the first of which affects R, the second simply holding R in the position given it by the first, and neither of which is sufficient to cause U M to hold h—whereupon the spring s places h in position to check the type-wheel train and type-wheel at the designated or unison point, from which it is released by simply allowing R to resume its normal position. By thus changing an impulse from its total character, or a whole impulse, to a series of semi or fractional impulses, in contradistinction to reversing a current, to augmenting it, or to polarizing it, I am able, without interference with or stoppage of the transmitter, to accomplish two independent operations over one line.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a transmitter, the combination of a pair of springs connected one to each end of a battery, a key-lever, a second pair of springs, and an anvil adapted to normally connect them and a shunt-circuit to the anvil controlled by a key, substantially as set forth.

2. The combination, with a current-reverser, of a second pair of springs normally electrically connected and adapted to be separated by the key-lever, and an independent electrical connection controllable at will to send two different characters of electrical impulses upon the line, substantially as set forth.

3. In a telegraph-transmitter, the combination of a current-reverser, a second pair of springs, one of which is connected to the key-lever of the transmitter and the other to the line, a common anvil normally electrically connecting them, and an independent controllable connection between them, substantially as set forth.

4. The combination, in one circuit, of a trans-



mitter provided with means for dividing at  
will its normal or full pulsations, as described,  
and a receiver having two magnets in such  
circuit, one adapted to operate with either the  
5 normal or the divided pulsations, and the other  
with normal or full pulsations only, substan-  
tially as set forth.

This specification signed and witnessed this  
3d day of April, 1883.

STEPHEN D. FIELD.

Witnesses:

GEO. W. CASPER,  
LUTHER E. SHINN.