

(No Model.)

2 Sheets—Sheet 1.

C. G. BURKE.

AUTOMATIC PRINTING TELEGRAPH.

No. 360,995.

Patented Apr. 12, 1887.

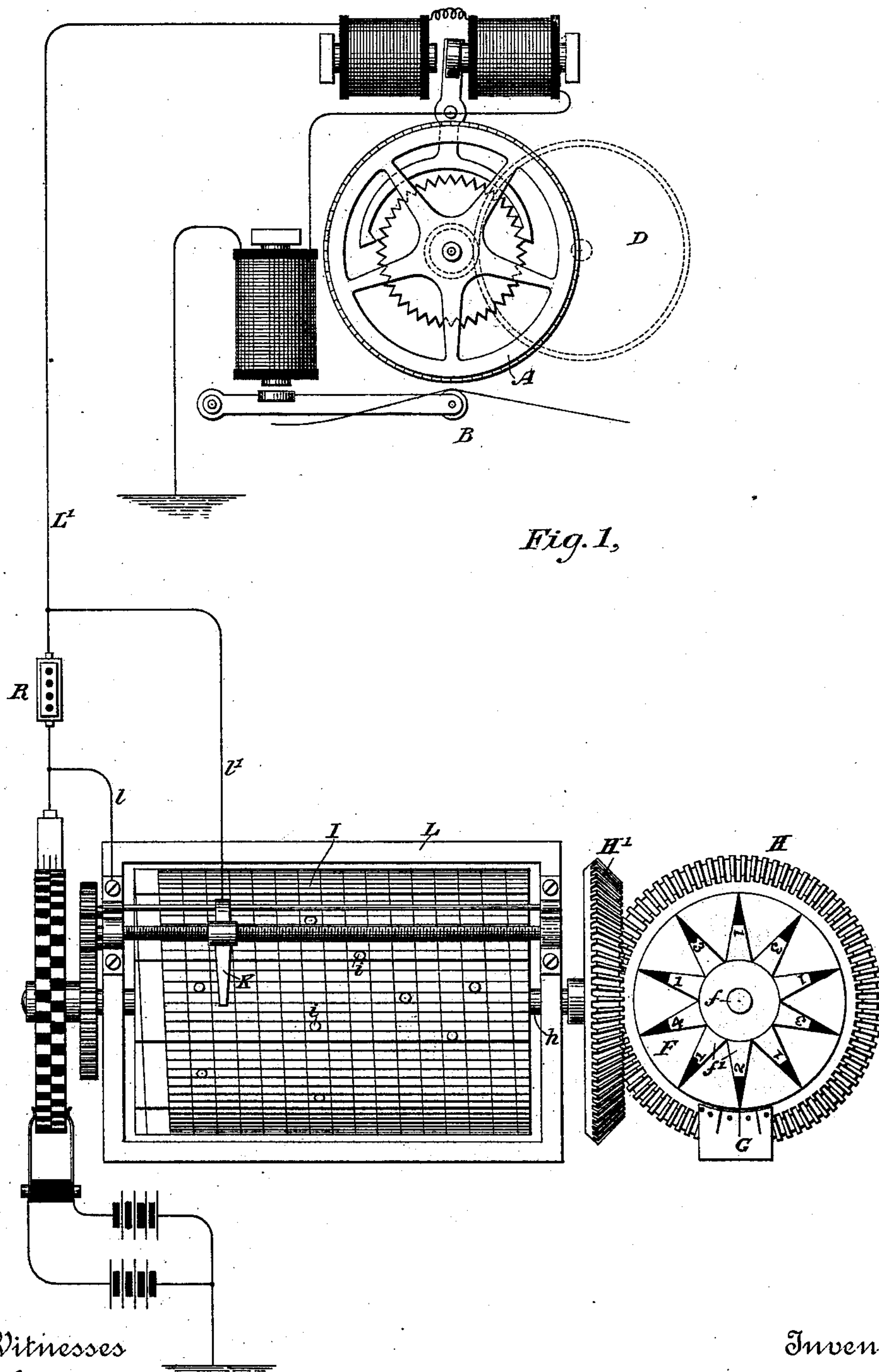


Fig. 1,

Witnesses

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Pope & Edwards

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

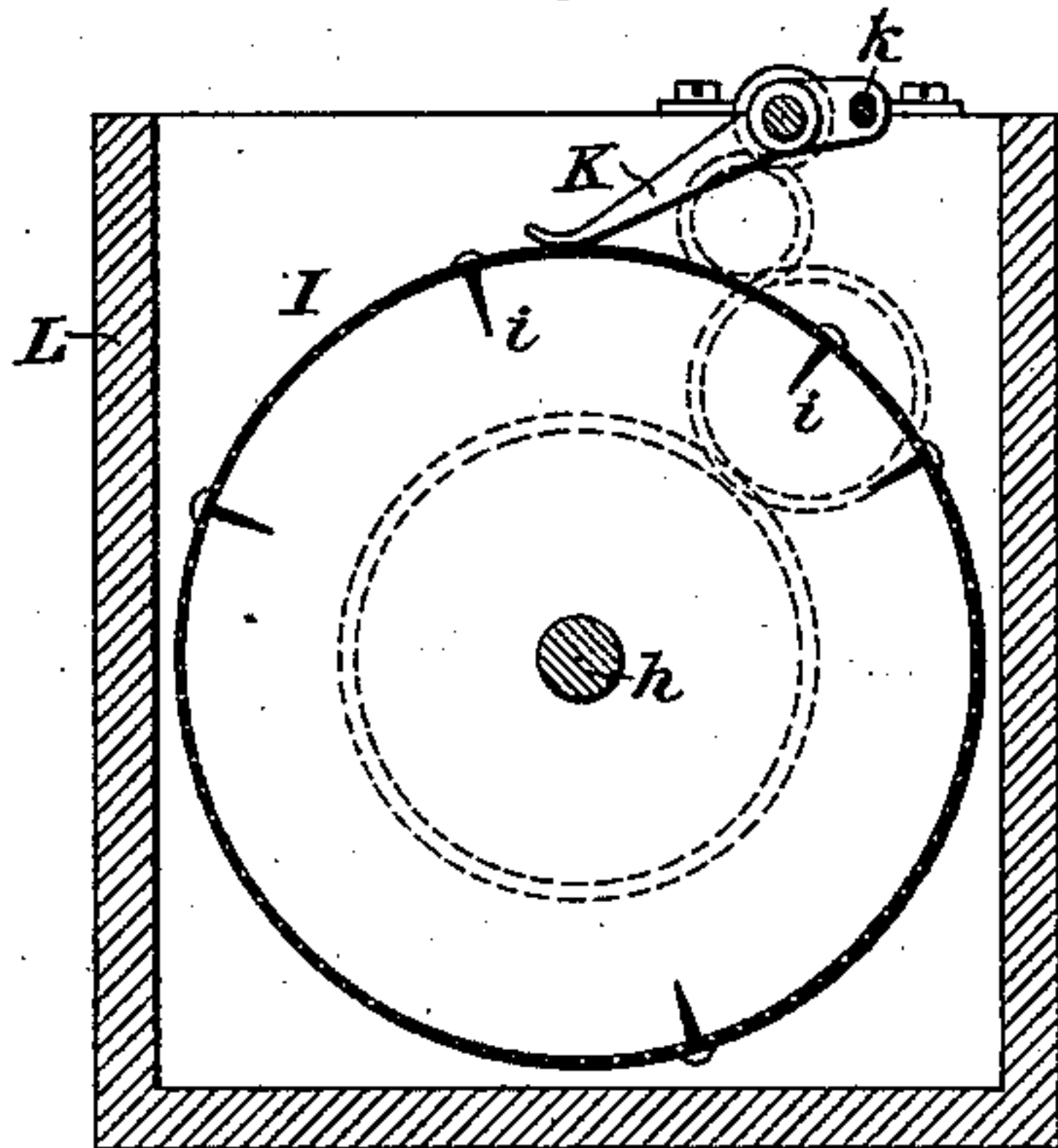


Fig. 3,

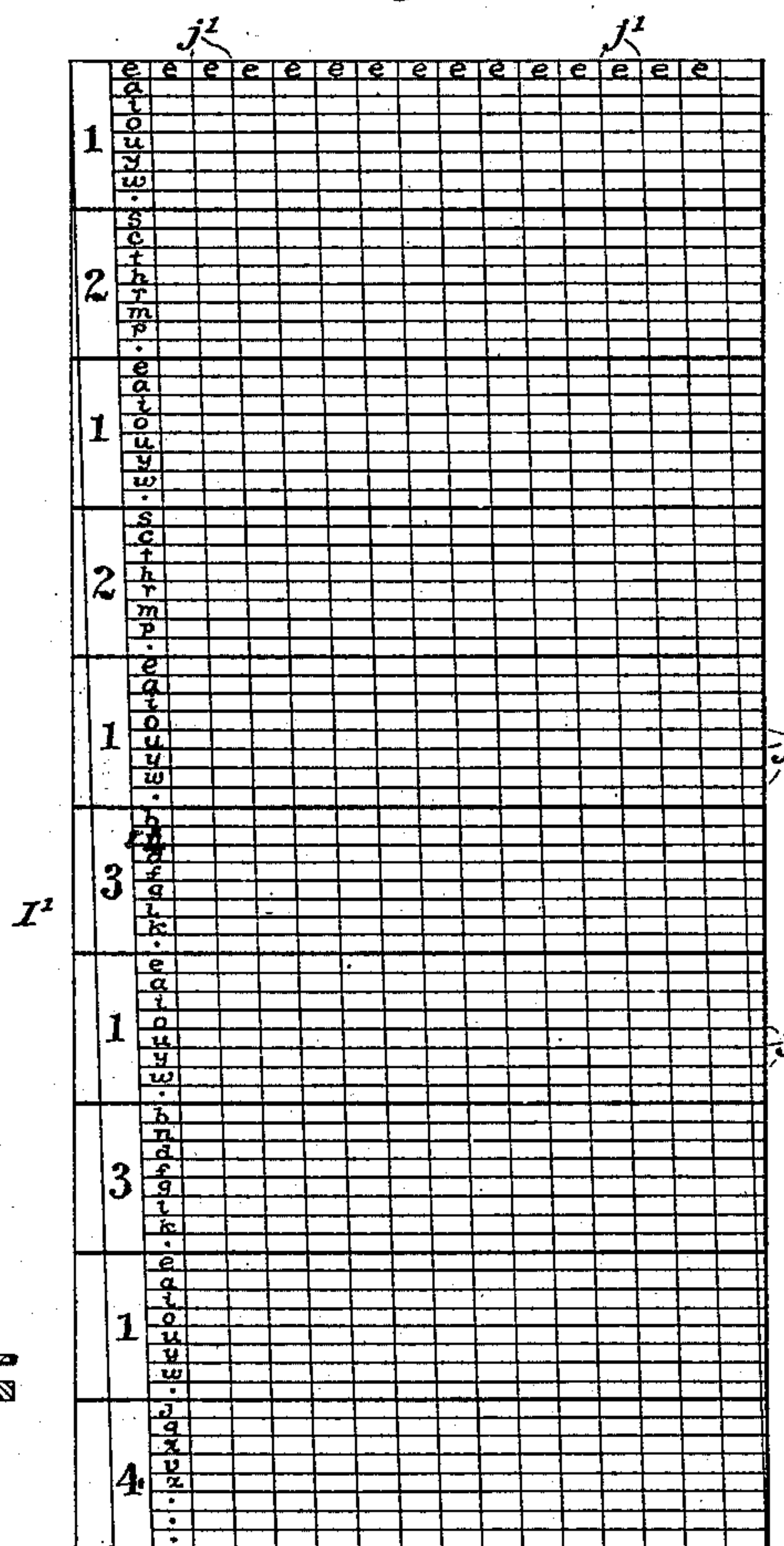


Fig. 4,

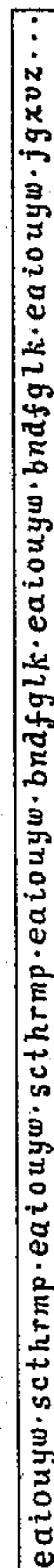
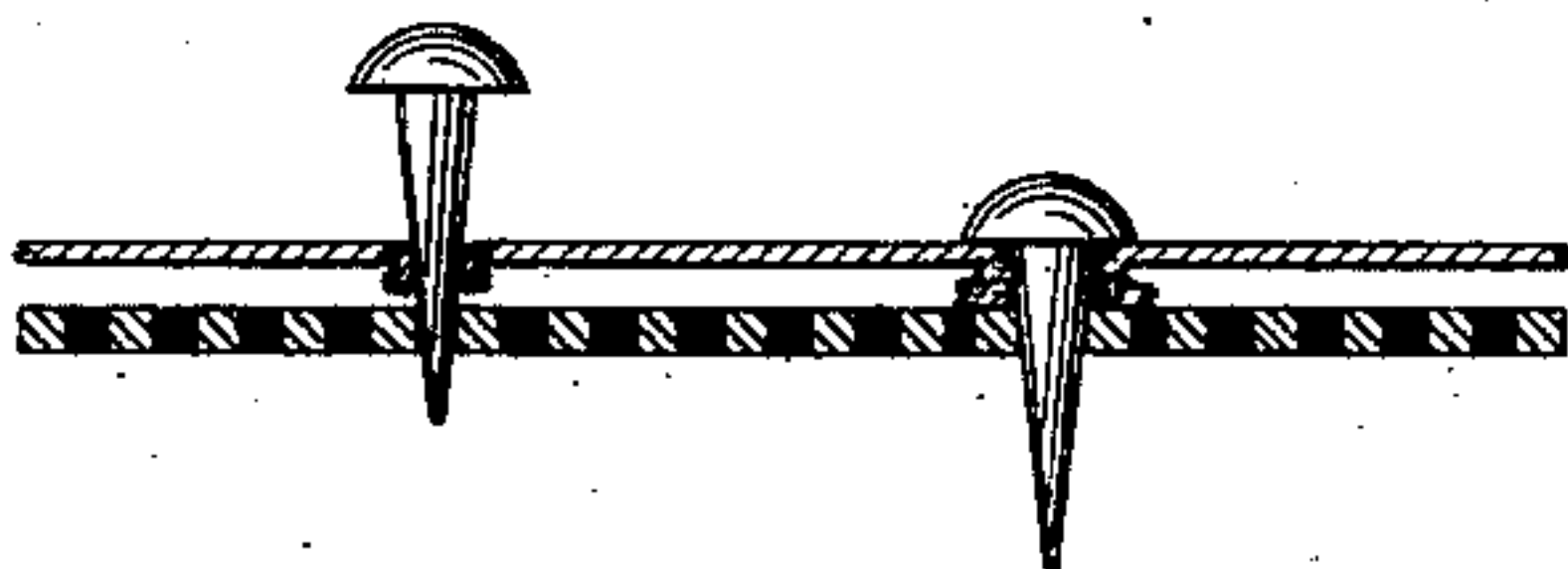


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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AUTOMATIC PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 360,995, dated April 12, 1887.

Application filed February 9, 1883. Renewed July 27, 1886. Serial No. 209,255. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. BURKE, of Richmond Hill, in the county of Queens and State of New York, have made a new and useful Improvement in Automatic Electro-Printers, of which the following is a specification.

The invention relates to the class of electric telegraphy, in which the telegraphic messages and dispatches are recorded by impressions taken from a revolving type-wheel.

The object of the invention is to provide convenient means for automatically transmitting the necessary electric currents and impulses for revolving the type-wheel and effecting the required impressions therefrom, and to so construct the type-wheel that a greater number of words may be printed therefrom during the passage of a given number of type above the printing-platen than can be printed from the usual forms of type-wheel.

The invention consists, generally, in employing substantially the following organization of apparatus: A prepared transmitting-sheet is placed upon a cylinder adapted to be automatically revolved, and when so revolved to actuate a suitable pole-changing device, whereby alternate positive and negative impulses are sent to line. This cylinder is constructed of wire-gauze or other similar material, into which suitable metallic pins may be inserted. A transmitting-stylus is provided for making electrical connection with these metallic pins when the cylinder is revolved. For this purpose the stylus is constructed to be moved over the surface of the paper, describing a spiral line throughout its length. The alternating impulses are designed to actuate the type-wheel of the receiving-instrument in the usual manner, and the stylus, by contact with the pins, serves to send currents adapted to actuate the press-magnet in any convenient manner.

For the purpose of determining the proper points for inserting the pins to actuate the press-magnet at the proper moments for effecting the required impressions, the paper which is placed upon the cylinder has characters printed upon it, which, when placed upon the cylinder, correspond in arrangement to the characters upon the periphery of the type-wheel. For each revolution of the cylinder, or for each passage of the entire series of char-

acters by the stylus, the type-wheel will complete one revolution. If, therefore, the cylinder and the type-wheel be started in such position that the stylus and the printing-platen are opposite corresponding characters and the two be revolved in unison, so that for each character passed by the stylus a corresponding character will pass the printing-platen, then by the insertion of a pin opposite any required character upon the transmitting-paper a printing impulse will be sent at the proper moment for causing an impression to be taken of the corresponding character from the type-wheel.

The transmitting-sheet is provided with transverse lines, and the characters are printed in the respective lines.

The characters which are employed in printing are preferably divided into groups, preferably four in number, and in each group the characters are arranged in a sequence dependent upon the sequence with which they more frequently occur in ordinary composition. The groups themselves are repeated with reference to each other with a frequency proportionate to the frequency with which the characters contained therein are usually employed. In practice the first group may with advantage consist, essentially, of vowels, the second of the consonants most frequently employed, the third of the consonants somewhat less frequently employed, and the fourth of the characters least frequently used in ordinary composition. The following arrangement has been found to serve the advantages well:

Group 1: a e i o u y w .

Group 2: s c t h r m p .

Group 3: b n d f g l k .

Group 4: j q x v z . . .

The first group is preferably repeated five times for each time the fourth group is employed, while the second group, and also the third group, are employed twice for each time the fourth group is repeated.

The transmitting-paper is preferably of such dimensions that it will contain ten groups, and these are preferably arranged in the following order: 1, 2, 1, 2, 1, 3, 1, 3, 1, 4.

The type-wheel is of such dimensions that the entire number of characters may be placed upon its periphery, and this number, it will be observed, is in this instance eighty, there

being a mark of punctuation at the end of each of the first three groups, and three such marks at the end of the fourth group.

For the purpose of readily determining the position of the transmitting-paper with reference to the stylus, an indicating device is attached to the transmitting-cylinder. This device consists of ten indexes, which are caused in succession to pass a suitable scale, and the scale is constructed with eight divisions corresponding to the letters or characters in the several groups. The indexes are themselves numbered to correspond to the groups, and when a particular index comes upon the scale it serves to indicate, first, the group which is passing the transmitting-stylus, and, secondly, the particular letter in that group which is opposite the stylus.

It has been proposed to employ for telegraphic transmission strips having perforations designed to transmit electric impulses at various intervals, and to print opposite these characters which indicate the letters which they are designed to cause to be printed. These characters are not, however, printed continuously throughout the length of the strip, but only opposite the perforations made, a suitable machine being employed for printing the characters as the perforations are made. In the accompanying drawings, Figure 1 is a front elevation of such portions of the transmitting and receiving instruments as are necessary to illustrate the invention, showing the circuit-connections in diagram. Fig. 2 is an end view of the transmitting-cylinder. Fig. 3 is a plan view of the transmitting-sheet. Fig. 4 illustrates the arrangement of characters upon the type-wheel; and Fig. 5 is an enlarged detail of a portion of the surface of the cylinder, showing one of the pins in position and a second one partially inserted.

Referring to the drawings, I represents the transmitting-cylinder, which is carried in a suitable frame, L. This cylinder is designed to be revolved in any convenient manner by means of power, which may be applied through a wheel, H', attached to the shaft *h* of the cylinder. The wheel H' is geared with the wheel H, which carries an indicating device, F, and the two wheels are preferably beveled gear-wheels, so that the shaft *f* of the wheel H is at right angles to the shaft *h* of the cylinder. The index F is constructed with a series of radial pointers, *f'*. These pointers bear numerals 1, 2, 1, 2, 1, 3, 1, 3, 1, 4, and they are designed to be carried past a suitable scale, G, by the revolution of the wheel H. In this manner they serve to indicate the position of the cylinder I, and, as will hereinafter appear, the position of the transmitting-paper with reference to the transmitting-stylus K.

The cylinder I is preferably constructed of fine wire-gauze, which is in electrical connection with the shaft *h*, and thus with the frame L. Upon this cylinder it is designed that a prepared sheet of paper (such as is indicated at I' in Fig. 3) shall be placed. This paper is pro-

vided with a series of transverse lines, *j*, and each of these lines is indicated by a character placed near the margin, as indicated in Fig. 3. The paper is also divided by lines *j'*, extending from the top to the bottom. The lines *j'* serve to divide the paper into one continuous spiral belt or band extending throughout its entire surface when the paper is placed upon the cylinder, the lower end of one line division being joined to the upper end of the succeeding line. The transmitting-stylus K is designed to follow the spiral band or division of the paper when the cylinder is revolved. This stylus may be constructed to follow the line in any suitable well-known manner, it being supported upon the rod or shaft *k*, along which it is movable, the rod *k* being supported in the frame L, but insulated therefrom.

Attached to the shaft or the cylinder is any suitable form of automatic pole-changing device adapted to transmit alternating pulsations to the main line L'. These pulsations may be caused to traverse an artificial resistance, R, while the stylus K may serve to short-circuit the resistance when it is desired to effect an impression. For this purpose a conductor, *l*, may lead from one side of the resistance to the frame L, and a similar conductor, *l'*, may lead from the transmitting-stylus K to the other side of the resistance. It is necessary, therefore, for the purpose of transmitting a printing-current, to complete a circuit-connection between the frame L, and thus the cylinder I and the stylus K. For this purpose the pins *i* are employed. These pins are designed to be pushed through a paper at the proper points, and by coming into metallic contact with the gauze of the cylinder to constitute parts of an electric circuit. When by the revolution of the cylinder the pins are brought beneath the stylus, the proper printing-current will be transmitted.

The mesh of the gauze is so fine that the pin will be brought into contact with its wires when it is first pushed through the paper and before the puncture in the paper has caused the latter to break or tear. There will thus be no opportunity for the broken edges of the paper, which the larger portion of the shank of the pin may occasion to come in between the pin and the wire of the mesh, and a metallic contact will thus be insured. The torn edges of the paper will gather between the head of the pin and the surface of the cylinder.

The characters printed in longitudinal lines across the paper are designed to indicate the characters which will be printed when a pin is inserted in any given space. Thus if a pin be inserted in the first line shown in Fig. 3, the letter "e" will be printed when the stylus has reached that particular pin, and it will be, moreover, observed that during the revolution of the cylinder the stylus will cross this particular line fifteen times, so that the character "e" may be printed from that line as many times. The particular group, however, con-

taining the letter "e" is repeated upon the sheet five times, so that the letter "E" may be printed seventy-five times from a single transmitting-sheet. Likewise the remaining characters "a," "i," "o," "u," "y," and "w" in the first group may be printed seventy-five times. The characters in the second and the third group may be each printed thirty times, and the characters in the fourth group fifteen times.

After the stylus has traversed the sheet the pins may be removed and inserted in other places, and the stylus caused to again traverse the surface from the starting-point.

Referring now to the indicating device F, the indexes are numbered to represent the groups 1, 2, 3, and 4 as they occur upon the transmitting-paper when it is placed upon the cylinder, and the position of each index-arm with reference to the scale G serves to show the position of the characters in the groups with reference to the transmitting-stylus K. Thus, when the index No. 1, which appears at the lower portion of the scale in the drawings, is opposite the central indicating-mark, it serves to show that the group No. 1 is opposite the stylus K, and that the line of the fourth character—namely "o"—is in the line of the transmitting-stylus. As the index-point No. 1 passes the succeeding divisions of the scale it shows successively that the lines of the characters "u," "y," "w," and "." pass the stylus. After group 1 has passed the stylus group No. 2 follows, and the index No. 2 enters upon the scale G.

The alternating impulses serve to cause the type-wheel A of the receiving-instrument to revolve in any suitable manner. This type-wheel is driven by a train of gear, as indicated at D, in any convenient manner. The printing-platen B is designed to be impelled toward the type-wheel under the influence of currents transmitted by the action of the stylus K when in contact with a pin, i, and to effect an impression from the type-wheel of the character which confronts the platen at that moment. It is understood, moreover, that the characters upon the type-wheel are arranged in the sequence, as indicated in Fig. 4, corresponding to the sequence adopted in preparing the transmitting-paper, and these characters are caused to pass above the printing-platen in unison with the passage of the lines corresponding thereto beneath the transmitting-stylus K.

It has been found advantageous, for the purpose of printing as many characters as possible from a single revolution of the type-wheel, to arrange the characters in four groups. The first of these groups comprises the vowels, the second the most frequent consonants, the third the less common consonants, and the fourth the remaining characters. A mark of punctuation may with advantage be placed at the end of each group. The characters contained in each group are placed in a sequence depending upon the sequence with which they are found to be most frequently employed in

ordinary composition. The arrangement of characters in groups and sequence is shown in Fig. 4, which represents the characters as printed by a single revolution of the type-wheel. By referring to this figure it will be seen that the character "N" precedes the characters "D" and "G," the vowel "E" precedes the vowel "A," the letter "T" precedes the letters "H" and "R," and the letter "S" precedes the letters "C," "H," and "L." In each instance the order of succession is different from that usually employed upon type-wheels.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with the type-wheel and printing-platen of a telegraph receiving-instrument, of means for transmitting currents for actuating the type-wheel, a transmitting-stylus for causing said printing-platen to be actuated, a transmitting-surface having a continuous line of characters printed or stamped thereon and corresponding in succession to the characters upon the type-wheel, and means, substantially such as described, for automatically transmitting an impulse by the action of said stylus corresponding to any or all of said characters.

2. The combination, substantially as hereinbefore set forth, with the type-wheel and printing-platen of a receiving-instrument, of a transmitting-stylus for actuating said platen, a prepared transmitting-sheet having characters printed or stamped thereupon corresponding in arrangement and order of succession to the characters of the type-wheel, means, substantially such as described, for causing the points indicated by said characters to pass said transmitting-stylus, and means for completing an electric circuit through said stylus when any of said characters pass the same.

3. The combination, substantially as hereinbefore set forth, with a conducting-cylinder, and a stylus beneath which said cylinder is designed to revolve, of a non-conducting material applied to said cylinder and having characters printed upon its surface, which characters are arranged in regularly-repeated series, and metallic pins inserted through said surface and placed in metallic contact with said cylinder.

4. The combination, substantially as hereinbefore set forth, with a type-wheel having characters arranged thereon in alternate groups of vowels and consonants, of a transmitting-cylinder, and a transmitting-sheet having characters repeated thereon in a sequence corresponding to the characters upon the type-wheel.

5. The combination, substantially as hereinbefore set forth, with a printing-platen and a type-wheel having characters arranged in groups of alternate consonants and vowels, of an automatic transmitting-surface having a continuous line of characters represented thereon corresponding in arrangement and succession to those upon the type-wheel, and

means, substantially such as described, for transmitting a printing-current corresponding to any one of said characters at the moment the corresponding character of the type-wheel is opposite said printing-platen of the receiving-instrument.

6. A type-wheel for printing-telegraph instruments, having characters arranged upon its periphery in alternate groups of consonants and vowels.

7. A type-wheel for printing-telegraph instruments, having its characters arranged in groups, certain of which groups are repeated with greater frequency than the others.

8. The combination, substantially as hereinafore set forth, with a transmitting-cylinder, and a transmitting-sheet having characters represented thereon in groups, of an indicating device having indicating-points corresponding to the groups, respectively, and a scale corresponding to the character-divisions of the groups.

9. A transmitting-sheet for telegraphy, consisting of a sheet of non-conducting material

having its entire surface covered with transverse lines of characters, the characters in each line being the same, but different from the adjacent lines.

10. A transmitting-sheet for telegraphy, having characters represented thereon in transverse lines, said characters consisting of vertically-alternating groups of consonants and vowels.

11. A transmitting-sheet for telegraphy, having lines of the same characters represented, said characters being arranged in groups of vowels and groups of consonants, the vowel and consonant groups alternating with each other.

12. A transmitting-sheet for printing-telegraphs, having characters arranged thereon in groups, certain of which groups are repeated with greater frequency than others.

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Witnesses:

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