3 Sheets--Sheet 1.

G. M. PHELPS.

Printing-Telegraph.

No. 168,919. Patented Oct. 19, 1875.

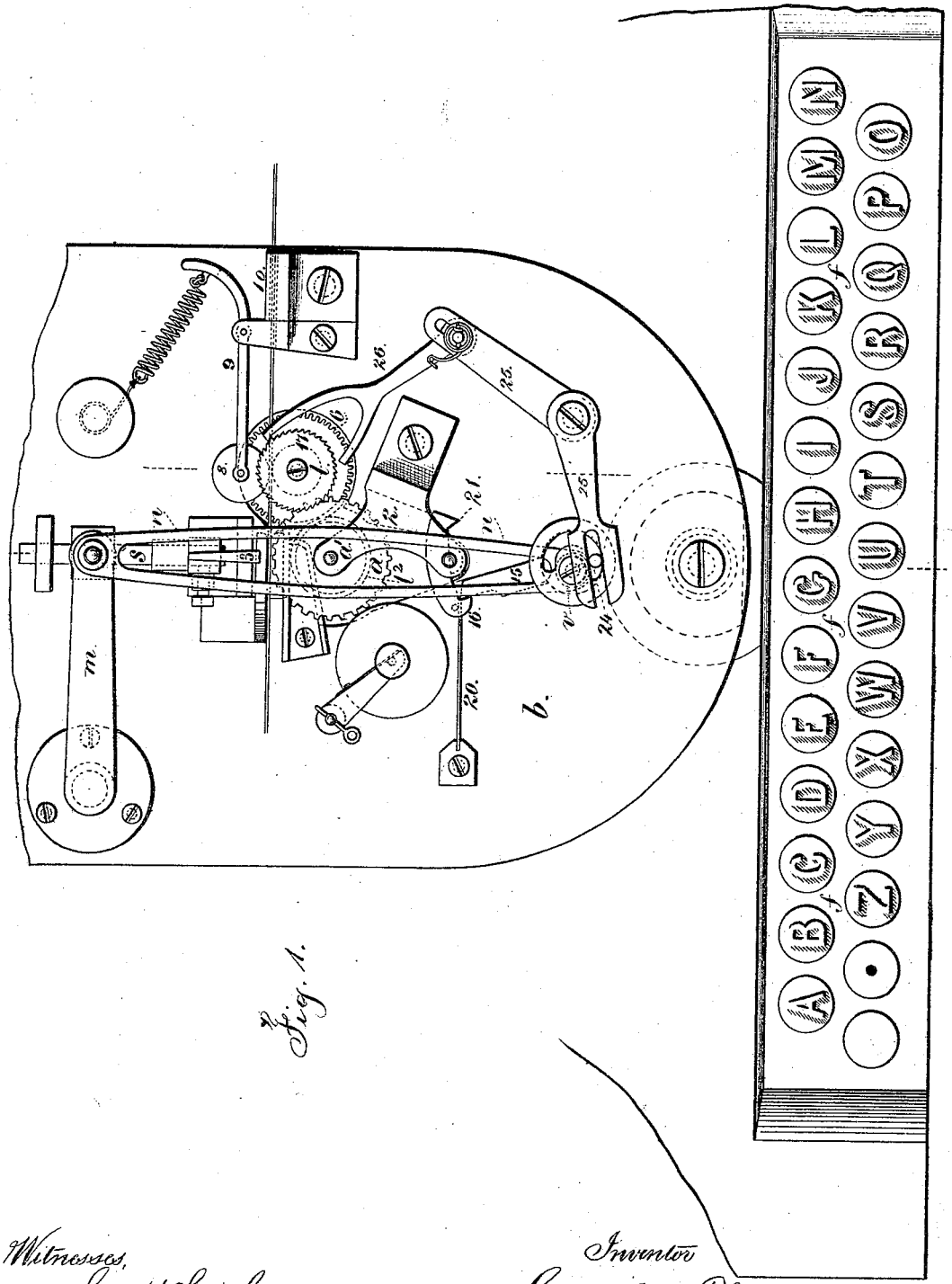

Fig. 1.

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per L. W. Serrell.
atty

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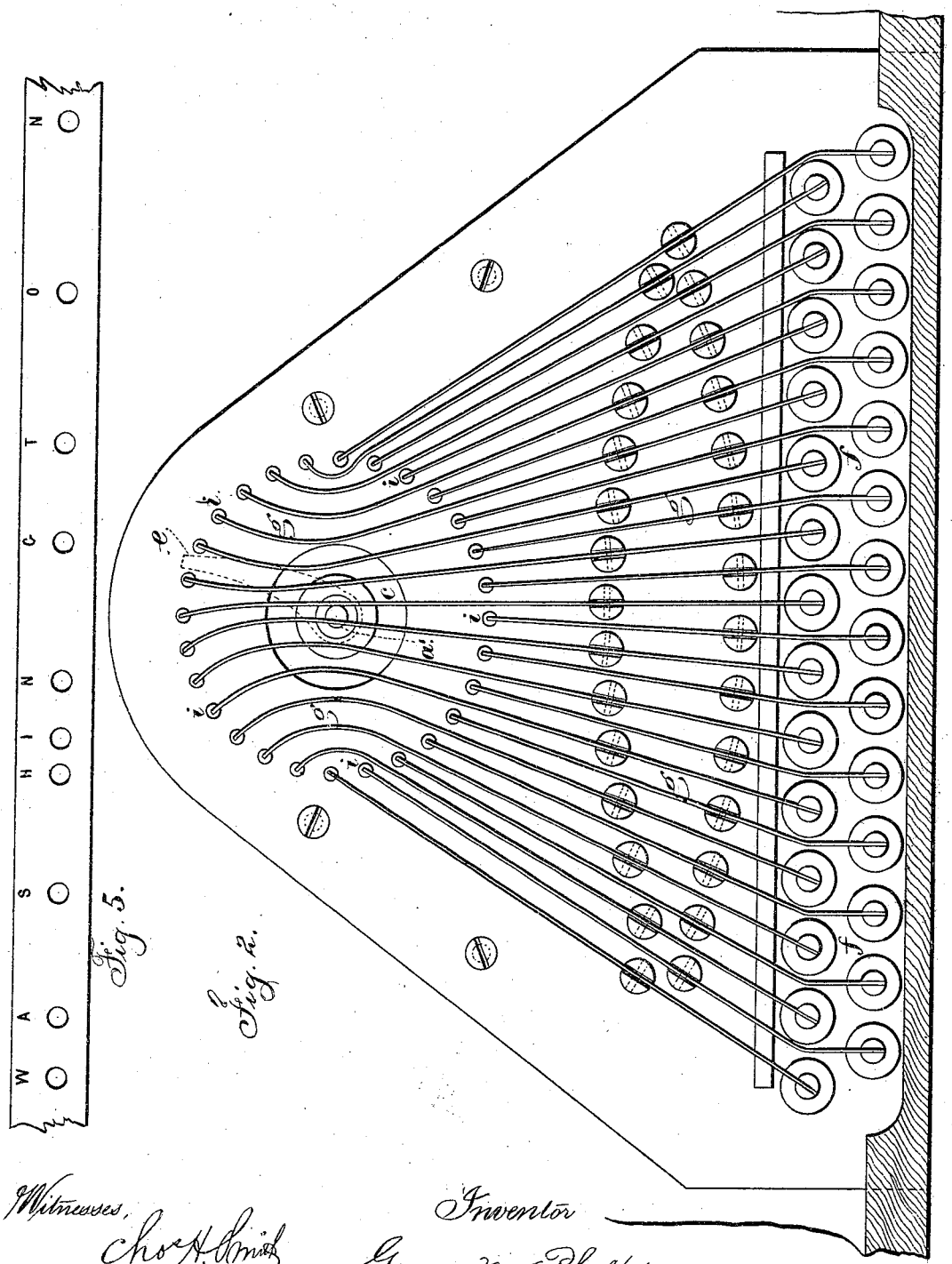

Fig. 5.

Fig. 2.

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Fig. 3.

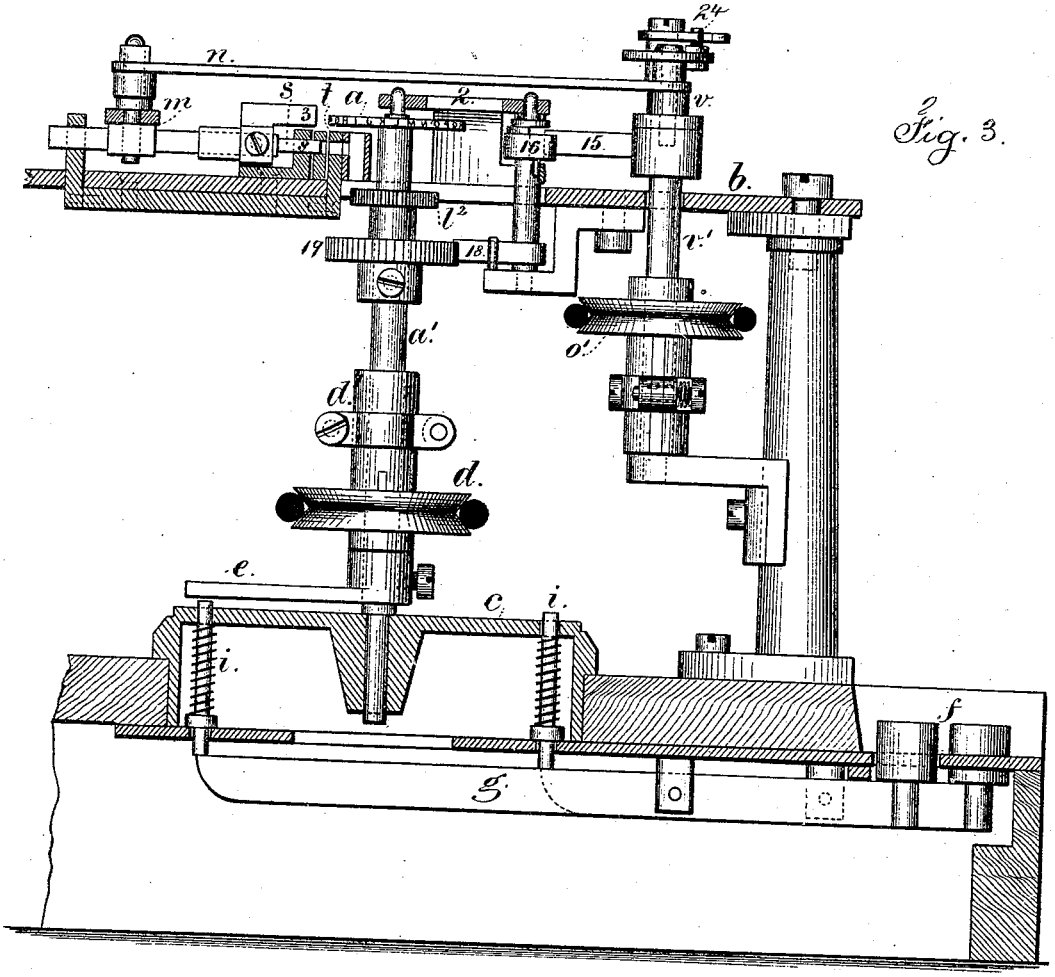
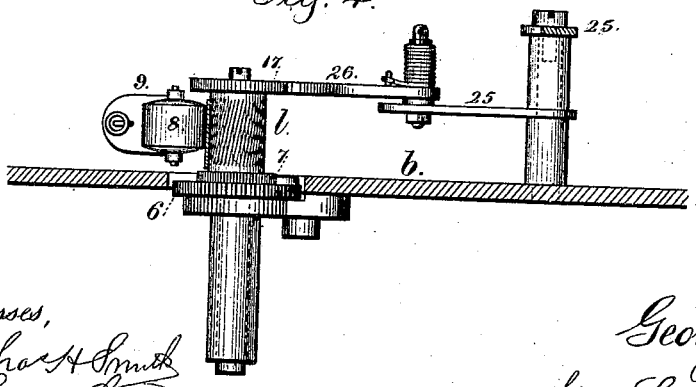


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PRINTING-TELEGRAPHS.

Specification forming part of Letters Patent No. **168,919**, dated October 19, 1875; application filed March 25, 1875.

To all whom it may concern:

Be it known that I, GEORGE M. PHELPS, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Printing-Telegraphs, of which the following is a specification:

In Letters Patent No. 89,887, granted to me, a printing-telegraph instrument is represented, in which the type-wheel is revolved in unison with the transmitting portion of the instrument at the other end of the line, and the printing is effected during a pause that is equal to one quarter-revolution of the type-wheel.

The speed of transmission by this instrument is limited by the skill of the operator in fingering the keys, its actual capacity being far greater than the most expert operator.

The object of my present invention is to provide an automatic mode of transmission, whereby a speed may be attained limited only by the capacity of the instrument receiving the message.

My present invention consists of a machine for punching holes in a strip of paper at the intervals required for producing electrical pulsations corresponding to those that would occur if sent by the finger-key transmitting-instrument, so that the proper letters of the revolving type-wheel at the receiving-station will be printed, the strip of paper being run by the transmitter synchronously with the receiving-instrument.

I have invented a machine that perforates correctly the strip of paper, and at the same time prints upon the strip the letter or sign corresponding with the perforation. By this improvement the operator learns that the message is correctly composed, and a record is kept of the message, and the sending-operator has only to run the perforated strip through a machine similar to that used in an automatic chemical telegraph, but revolving synchronously with the type-wheel at the receiving-station, so that the message is transmitted by pulsations through the perforated paper, which pulsations control the detent and printing mechanism at the receiving-station.

In the drawing, Figure 1 is a plan of the machine. Fig. 2 is an inverted plan of the finger-board and connecting-levers to the stops. Fig. 3 is a sectional elevation, and Fig. 4 is an elevation of a portion of the paper-feed; and Fig. 5 represents the strip of paper with a portion of a composed message.

The type-wheel *a* is upon a vertical shaft, *a'*, sustained at the upper end by the bracket 2 upon the plate *b*, and at the lower end by the base-plate *c*, and this shaft is provided with a pulley, *d*, to which a continuous revolving motion is applied from competent power; and *d'* is a friction, that allows the pulley to continue to revolve when the shaft is stopped. Upon this shaft *a'* is an arm, *e*, permanently attached, and around the base-plate *c* there is a circular range of vertical pins, *i*, corresponding in number to the keys *f* of the key-board, and to the divisions of the type-wheel; and these keys are connected to the respective pins by the system of converging levers *g*, (seen in the inverted plan, Fig. 2,) and the letters upon the keys and their respective pins are so arranged that when a key is depressed and its corresponding pin *i* raised, the shaft *a'* will be stopped by the arm *e* coming in contact with said pin, and the letter of the type-wheel corresponding to the letter of the key will be opposite the impression-pad 3, so that the pad may be brought up and impress the letter at the same time that the paper is perforated, as hereafter described.

It is to be understood that the operator depresses one key before he releases the next, so that the type-wheel only turns from letter to letter, as they are required by the operator in transferring the message to the strip of paper perforating a hole to represent a letter, and also printing the letter opposite the perforation, the object being to space the distances of the perforations, to give the same proportional intervals of time as would occur if the message were sent by the existing finger-transmitter.

This object is effected in my present composing-machine by a feeding-roller, *l*, that is driven by the shaft *a'* through a gear-wheel, l^2, on said shaft, meshing with the wheel 6 of the roller *l*, and this wheel 6 and roller *l* are connected by a ratchet and pawl, 17, so that the roller *l* will be moved forward by the wheel 6; but the pawl 17 will allow of an additional forward movement being given to the roller *l*, for a purpose hereafter named.

The contact-roller 8 is upon a lever, 9, with

a spring, so that it presses the paper firmly to the paper-feed roller, to feed the paper along reliably, and said paper is led through the guide 10, and in the slot between the punch *s* and die *t*, (shown sectionally in Fig. 3,) and this punch is brought up and perforates the paper when the type-wheel is stopped, and simultaneously with an impression taken from the type upon the paper.

The punch and pressure-pad are connected and move together. The perforated and printed strips are shown in Fig. 5. The means employed for moving the punch and pressure-pad are as follows: The lever-arm *m* is connected with the punch, and also with one end of the link *n* to the crank *v* upon the vertical shaft v^1, to which a friction-pulley, *o'*, is applied, and a belt from suitable power tends to rotate this shaft *v'*, and gives a partial revolution whenever the arm 15 is liberated from the anchor-escapement 16, and in that revolution the crank *v* moves the punch and gives the impression. The escapement is upon a vertical shaft with an arm, 18, the end of which is pressed toward the ratchet-wheel 19 by a spring, 20, and when the type-wheel is revolving the arm 18 cannot fall into the ratchet-teeth far enough for the arm 15 to be liberated from 16; but when the type-wheel is stopped the arm 15 is freed, and the shaft *v'* is instantly revolved until the end of the arm 15 strikes against the end 21 of the escapement, and as the type-wheel starts again this arm passes from 21 to 16, and is held as before. In the revolution of the crank-pin *v* the punch and impression-pad are first brought up, and then carried back out of the way. During the first part of this movement the pin 24 and lever 25 have drawn back the spring-pawl 26 upon the ratchet-teeth 17 around the head of the feed-roller *l*, and after the punch is clear of the paper the pin 24, by its further movement, gives to the roller *l* about a quarter-revolution, while the type-wheel is still stationary, the object of this being to space the distances between the perforations, so that, while the said strip of paper is being drawn along through the transmitting-machine at a uniform continuous rate, corresponding with the revolutions of the type-wheel at the receiving-station, this increased length of paper between each perforation will allow of the paper continuing to move while the type-wheel pauses to perform the printing, which pause takes place while the paper is moving through the transmitting-instrument, so that the type-wheel in the printing-telegraph will be in unison with the paper strip at the sending-station, and the letters will be printed in succession in the order in which the keys have been depressed in this present instrument, and the paper strip, when used for transmitting, produces the same intervals between the electrical pulsations as would occur if the message were sent by the known finger-key transmitter.

The paper moving with the rotation of the type-wheel gives the relative distances of the letters on the type-wheel selected for transmission.

The additional length of paper that is supplied by the movement of the ratchet and pawl represents the time of the detention of the receiving type-wheel.

If desired, the paper might be perforated at distances apart corresponding to the distances apart of the successive letters upon the type-wheel, in which case the transmitting-roller might be provided with an apparatus similar to that shown in aforesaid Letters Patent, to produce a pause of a quarter-revolution of the transmitting-roller every time a perforation passes and the electric circuit is closed. In this case the transmitting-roller and perforated strip of paper would, by a mechanical device, be detained in its revolution a given length of time for each letter, the same as the type-wheel in the receiving-instrument is detained while printing.

I claim as my invention—

1. The combination of a paper-feeding mechanism, punching mechanism, and mechanism for stopping the movement of the feed at distances proportionate to the relative distances between the successive types to be printed, so as to compose in a strip of paper a message that can be used in transmitting for a printing-telegraph.

2. The combination of a type-wheel and punch in a telegraphic composing-instrument, so that the letter represented by the perforation is printed simultaneously with the perforations, as set forth.

3. The range of pins *i*, operated by keys, the revolving type-wheel *a*, shaft *a'*, and arm *e*, in combination with the paper-feeding mechanism, punch, and punch-actuating devices, brought into operation when the type-wheel is stopped, substantially as set forth.

4. The combination, with a type-wheel and punching, feeding, and stopping mechanism, of an additional paper-feed, actuated independently of the motion of the type-wheel, substantially as and for the purposes set forth.

5. A telegraphic transmitting-strip of paper, perforated with holes at distances apart proportionate to the relative distances of the characters required on a type-wheel, and with additional length between the perforations, to allow for the time during which the type-wheel is detained in printing, substantially as set forth.

Signed by me this 22d day of March, A. D. 1875.

GEO. M. PHELPS.

Witnesses:

GEO. T. PINCKNEY,

CHAS. H. SMITH.