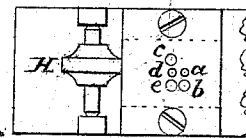
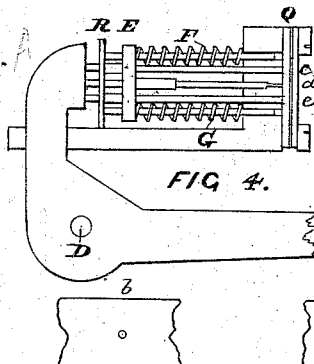
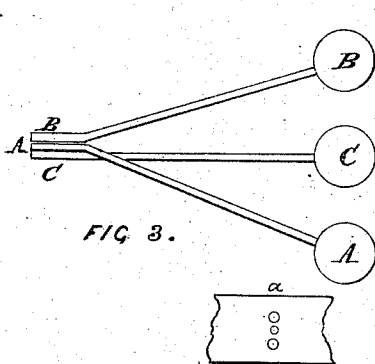
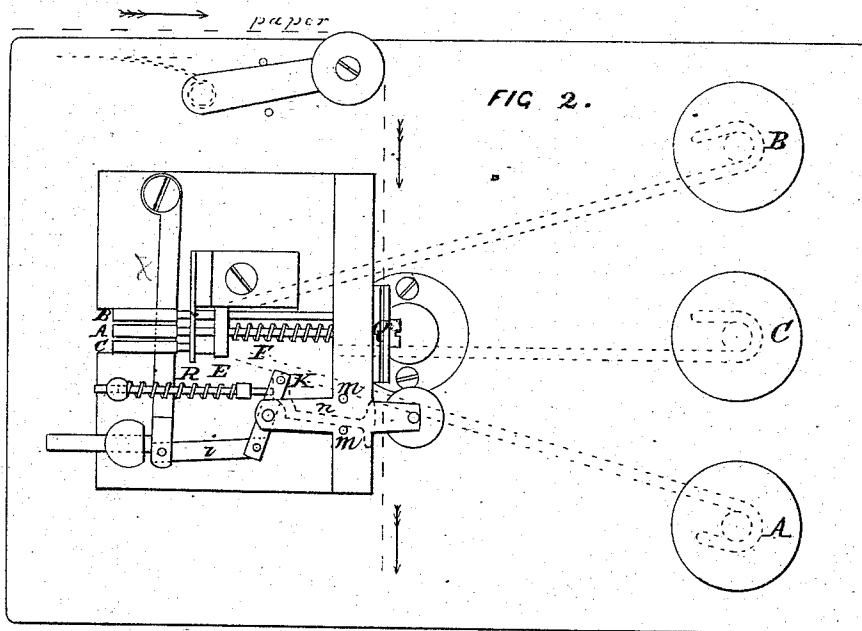
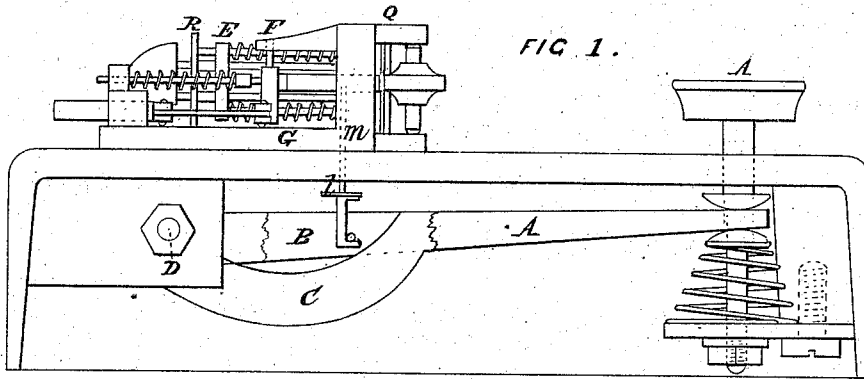


C. WHEATSTONE.
Perforators for Telegraph-Paper.

No.158,158.

Patented Dec. 22, 1874.



WITNESSES

Walter Allen
 Henry Tanner.

FIG. 6.

INVENTOR.

Charles Wheatstone
 By *Knight & Co.* Attys

UNITED STATES PATENT OFFICE.

CHARLES WHEATSTONE, OF LONDON, ENGLAND.

IMPROVEMENT IN PERFORATORS FOR TELEGRAPH-PAPER.

Specification forming part of Letters Patent No. **158,158**, dated December 22, 1874; application filed March 7, 1873.

To all whom it may concern:

Be it known that I, Sir CHARLES WHEATSTONE, Knight, of 19 Park Crescent, Portland Place, London, England, have invented certain Improvements in the Perforator of Automatic or Fast-Speed Electric Telegraphs, of which the following is a specification:

The automatic or fast-speed electric telegraph formerly invented by me comprises three distinct apparatuses indispensable to each other: first, a perforating-machine, for preparing the messages to be sent on strips of paper or other suitable material; second, a transmitter, or apparatus for receiving the strips of paper so prepared, and for transmitting the currents produced by a voltaic battery, magneto-electric machine, or other rheomotor, in the order corresponding to the holes perforated in the strip, the direction and sequence of these currents being governed by pins disposed so as to enter the perforations, and operating in manner analogous to that in the mechanism of a jacquard-loom, and the strip being advanced intermittingly by the action of the pins; and, third, of a recording or printing apparatus, adapted to print or impress marks on a strip of paper, such marks corresponding in their arrangement with the currents transmitted to the telegraphic line, and with the apertures in the perforated paper.

On the 28th of January, 1867, a patent for Great Britain and Ireland was granted to me for various improvements in the constituent parts of this system; the object of which was to effect the printing of the dot-and-dash alphabet by means of positive and negative currents, which are transmitted alternately in opposite directions, the arrangement being such that the current, whether positive or negative, produces a mark, of which the length varies according to the time that elapses before the current is reversed, such reversal producing an interval or blank space, the length of which continues to increase until the current in the first direction is renewed. In this system no reacting springs, and consequently no adjustments, are required in the printing apparatus, as the alternate opposite currents produce the to-and-fro motions of the marker, and lines of various lengths may be printed, even when instantaneous currents are employed.

The invention to which I confine my present claim is the perforator or punching apparatus suitable for this system. It has three keys, each of which acts simultaneously on a series of punches, so that one key makes the perforations corresponding to a dot, another those corresponding to a dash, and a third those requisite merely to advance the paper.

Figure 1 represents a vertical section of the instrument; Fig. 2, a horizontal section, showing the positions of the three keys; and Figs. 3, 4, and 5, details of its construction.

The same lettering refers to all these figures.

The punches are five in number, and are arranged in two lines, three punches being in one transverse line, and two punches in the other transverse line. The plan of the punching-plate of the instrument is represented in Fig. 5, the exterior and larger apertures being intended to receive the pins of the transmitter, which determine the transmission of positive and negative currents, and the middle and smaller apertures for the continuous and regular movement of the paper. The strip of paper thus prepared with suitable perforations, on being passed through the transmitter described in a separate application for Letters Patent, will effect, at the receiving-instrument, the printing of the dots and dashes of the Morse alphabet.

A B C, Figs. 2 or 3, are three finger-keys, the key C being employed to effect the center perforations, and for this purpose the lever on which the key rests is bent so as to pass under lever A. These three lever-keys are each free to move about the axis D. (See Figs. 1 and 4.) The punches *a b c d e*, Fig. 5, are five in number, arranged horizontally in two parallel vertical planes, the one containing three punches, *c d e*, the other two punches, *a b*. The punches are supported by the guiding-pieces Q R. The whole of the punches pass through the collar-piece E, to which the central punch *d* is attached. This collar-piece E slides on two horizontal bars or guide-rods, F G, around which are wound helical springs tending to maintain the collar in its normal position. The ends of the punches at the back of the collar E are enlarged, so that they cannot pass through the apertures in the collar, and hence, if any one or more of the punches *a b c d e* are

pressed forward by the action of the lever-keys A C B, the collar E will advance, carrying with it the center punch *d*, and on the release of the finger-key the helical springs will force the collar back to its normal position, and with it any of the punches which may have been pressed forward. The ends of the punches *c d e* rest against the end of the lever-key A, which, owing to the bending outward of the said lever-key, is placed in the center. Vertical pressure on the key A will, therefore, cause the punches *c d e* to advance and perforate the paper passing through the groove Q, with three holes in the same transverse line. To the collar E is attached a short rod, resting against the end of lever-key C, so that, this lever-key being depressed, the collar will be forced forward, carrying with it the punch *d*, and so effect the perforation of the center hole only in the paper. Lastly, a short rod attached to the punch *c*, which, with the ends of the punches *a b*, rests against the end of the lever-key B, causes, upon the depression of the key B, the simultaneous advance of the four punches *a b c d*, (the collar E carrying *d* with it,) and hence the perforation of the paper with two center and two outer holes. Thus the left-hand key A effects the perforations shown at *a* in Fig. 6, the center key C those at *b*, and the right-hand key B those at *c*. The perforation of the left-hand key A occasions dots to be printed at the receiver, those of the center key C spaces, and those of the right-hand key B dashes. A portion of the tail of each finger-key acts upon a lever whenever a key is depressed. The motion of the said lever is conveyed to the paper-propeller *n* by means of

a connecting-rod, *i*, and oscillating piece K. By this means, during the release of a key, the paper is advanced the requisite distance, the advance of the paper during the release of the right-hand key B being double that which is accomplished by the release of either of the other keys, A C. This double advance at one step is accomplished by allowing the right-hand key-lever to have a greater extent of motion, and therefore a greater extent of reaction, than either of the other keys, and by drawing back the blade-spring *l*, on which one of the stops *m* of the paper-propeller *n* is mounted. On the release of the right-hand key the paper-propeller *n*, therefore, has double the throw to that afforded by the release of either of the other keys.

Having now described the nature of my said invention, and the mode in which I carry the same into effect, I would have it understood that what I claim as constituting the peculiar character of the present invention is—

1. The combination, in a perforator, of the three keys A B C, the series of punches and connecting devices, substantially as herein shown, each key controlling a combination of punches differing from that controlled by either of the others.

2. The combination, with the keys and punches, of the paper-feed and connecting devices, each key controlling the feed to advance the paper a space corresponding to the perforations controlled thereby.

C. WHEATSTONE.

Witnesses:

FREDK. HARRIS,
B. J. B. MILLS.