FROMENT'S ALPHABETICAL AND WRITING TELEGRAPHS.

CHAPTER XXVIII.

Alphabetical Apparatus and Manipulation.—The Writing Apparatus.

THE ALPHABETICAL APPARATUS AND MANIPULATION.

THE alphabetical telegraph devised by M. Froment is distinguished for simplicity and peculiar construction of its transmitter or manipulating combination.

Fig. 1.

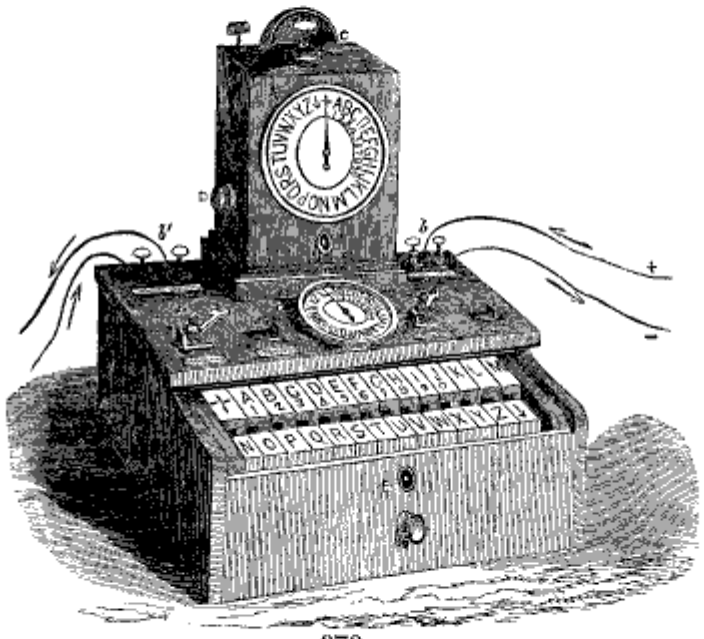


Figure 1 represents the instrument as seen in the station ready for telegraphing. It is an elegant piece of apparatus. In external form it resembles a small pianoforte without the black keys. There are twenty-eight keys: twenty-six of them representing letters, the twenty-seventh a cross, and the twenty-eighth an arrow; by pressing down any key its corresponding letter is shown on the dial, and at the same time on the dial of a similar apparatus at the distant station. Suppose, for example, the apparatus figured in the text to be at Paris, the current from the battery enters the apparatus at *b* and leaves it at *b'*; it proceeds thence to the distant station—say Rouen—where it traverses and works a precisely similar apparatus.

The mechanism of the internal part of the apparatus will be understood from a slight consideration of figs. 2 and 3.

Fig. 2.

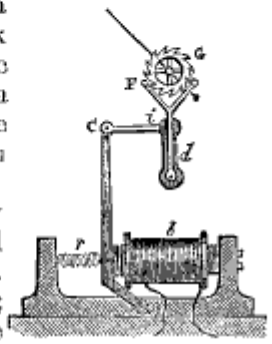
Fig. 3.

Fig. 2 is the *manipulator*, or the instrument for giving signals; fig. 3 is the *receiver*. The current from the battery enters through A, fig. 2, passes up the brass spring N, which is in contact with the wheel R, and from this through the second notched spring M, out by the wire B, and on along the line wire to the telegraph at the distant station. There the current traverses the coils of an electro-magnet, not seen in fig. 2, but exhibited separately in fig. 4. This electro-magnet is fixed horizontally at one extremity, the other being left free to operate on the soft iron armature *a*, which forms part of a bent lever, moveable round the pin *c*; the lever is restored to a vertical position when the electro-magnet is no longer active by the action of the spring *r*.

The moment the electric current traverses the coils of the electro-magnet, the lever at c is attracted, and the motion is

imparted to a second lever *d*, through the shank *i*. This second lever is fixed on a horizontal axis, and is united to the fork F. When the current is interrupted the spring pulls back the lever, and thus a step by step movement is given to the fork, which it transmits to the wheel G carrying the index.

Fig. 4.



The manner in which the battery current is interrupted and renewed will be understood by referring to fig 2. The wheel R carries twenty-six teeth; on turning it by the button P while the plate N is, from its curved form, in constant contact with the teeth, the plate M, being crooked, has its contacts broken and renewed every time it passes over a tooth and at the same time the battery current is thrown off and on. Suppose the pointer P is advanced four letters, then the current between N and M will be four times made and four times broken, and the armature of the electro-magnet at the distant station will be four times attracted and four times pulled back by its spring; but these four attractions will give four movements to the wheel G, and the pointer will pass over the same number of letters in the dial of fig. 3, the *receiver*, as in that of fig. 2, the manipulator. At the top of the case of the instrument is the alarum C, which is worked by a special electro-magnet. Referring now to fig 1, will be seen in front of the apparatus a series of twenty-eight ivory keys, the first marked with a cross, the last with an arrow; and the intermediate twenty-six with the letters of the alphabet, the first ten letters carrying also the ten numerals. Immediately in front of the keys, on a horizontal platform of mahogany, is the dial B and two small metal pieces, *m n*, which are moveable, and which by means of a handle may be brought into contact, *m* with *s* or *r*, and *n* with *q* or *p*. The dial B is the verifier; its index must always point to the same letter as that last signalled; if it does not, it shows that the apparatus is not in proper working order. When *m* is in contact with *s*, the apparatus is in a condition to send signals from Paris to Rouen. When in contact with *r*, it is in a condition to receive a signal from Rouen to Paris. In like manner when *n* is in contact with *q*, the alarum may be sounded at Rouen; when in contact with *p*, the machinery is in a state to receive a notice forwarded from Rouen.

As this apparatus is regarded of much importance, I will be more specific in its description than can be found elsewhere.

If the reader will carefully study the following descriptions and diagrams, he will not fail to comprehend the construction and manipulation of this beautiful system of telegraphing.

Fig. 5.

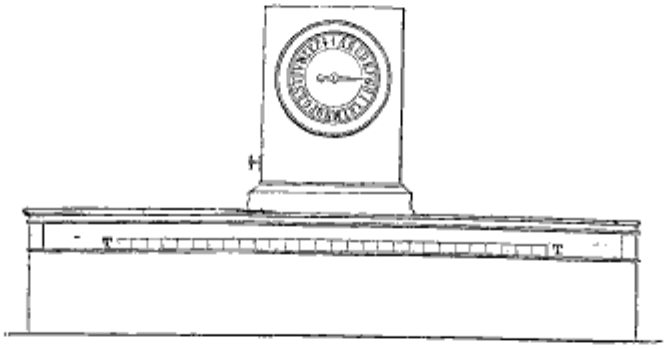


Fig. 5 represents an outline view of the front of the apparatus, as more fully shown by fig. 1. The key-board is indicated by T T.

Fig. 6.

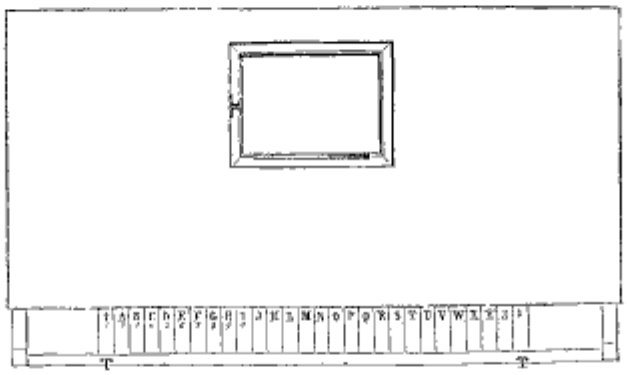


Fig. 6 shows a full view of the key-board T T, with the letters and numerals marked on the keys respectively. The key-boards, represented by figs. 5 and 6, are arranged different from the key-board of fig. 1. The two styles of instruments are used. Fig. 1 is more modern; but the arrangement shown in figs. 5 and 6 are also in operation. Operators exercise their own convenience in the use of the one or the other.

Fig. 7.

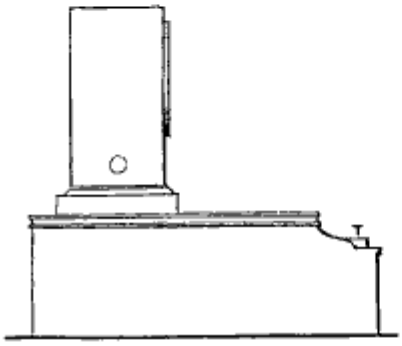


Fig. 8.

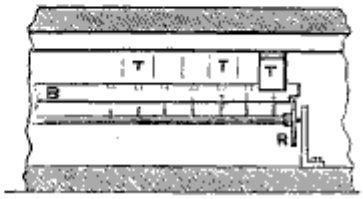


Fig. 7 represents an end view of fig. 1, and fig. 8 represents a section of the key-board T T, and the arrangement for the action of the keys. B is an elongated bar, and R is a wheel with a ratchet.

Fig. 9 represents a section of the key-board, as seen from above. T T are the keys; B a bar traversing beneath the keys, as seen by the dotted lines, disengages the ratchet from the wheel R, and the releasement permits the arbor A to turn, until the pin answering to the key pressed. Z Z Z are pins upon the arbor A, as seen in the figure. C C is a centre, around which moves the keys, which bear at their middle a stop pallet s, the use of which will be hereafter explained.

Fig. 9.

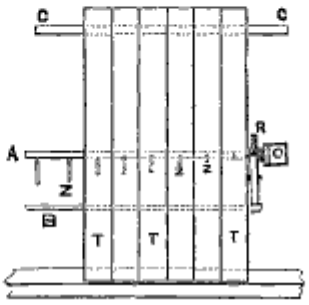
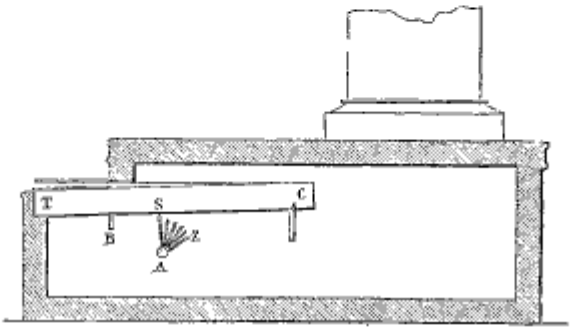


Fig. 10 is an end view of fig. 9, and shows the pallet s, the keys T T, the centre C, the pins Z Z, the bar B, and the arbor A.

Fig. 11 is another end view of fig. 9, having thereon the wheel R, and the ratchet attached to the arbor A. The arbor A, which is a horizontal bar, capable of being moved downward parallel to itself, is stopped in its movement by the ratchet, which engages in the wheel R. Whenever a key is touched, the bar A is lowered, and it rises when the finger is withdrawn. It is made to turn by means of a clock movement.

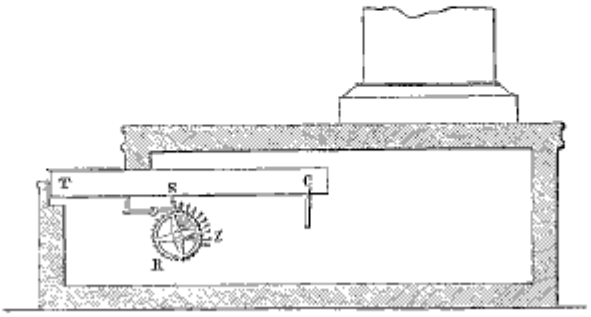
Another key may be pressed down, and there will be produced a similar effect, and the arbor A is permitted to turn

Fig. 10.



through an angle proportional to the length of the helix comprised between the two keys, which have successively stopped the movement.

Fig. 11.



In this way, if the arbor A bears an electric interrupter, or circuit-breaker, which opens and closes the circuit every time that a tooth of the ratchet-wheel passes, the effect produced by this mechanism upon an electrical current, will be identical to that produced by the rotation of a telegraphic dial, having as many signals as there are keys in this apparatus, but with very perceptible advantages.

The rotations of the arbor A being uniform, are regulated according to the greatest velocity that the receiving apparatus is capable of executing. When a uniformity is once established, between the transmitting and the receiving apparatus, it will continue indefinitely to exist, independent of any irregularity in touching the keys; provided, of course, that the needle is allowed time to pass over the divisions of the dial, and this time

is extremely short, as the uniformity of movement permits of regularity for the greatest mean velocity of the receiving apparatus.

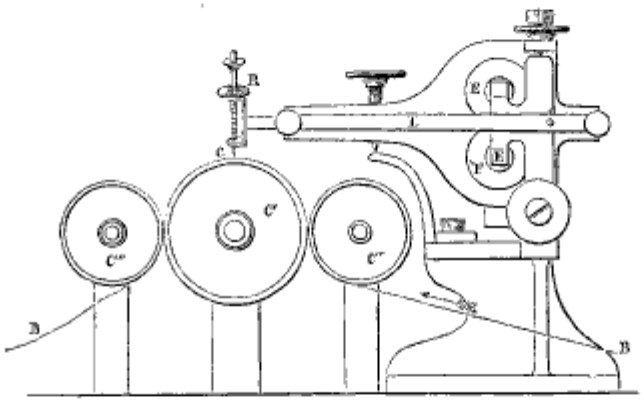
From these facts, it will be seen that any one knowing how to read, can transmit at first sight with this instrument a dispatch without an error resulting from the apparatus.

The clockwork of this instrument is wound up from time to time in the usual manner; but in addition to the care necessary to be observed in winding, the following mechanism has been attached. A fine-toothed ratchet wheel, fitted to the clock movement, and moved by a ratchet set in motion every time that the bar B is lowered, gradually winds up the spring of the clockwork, at a rate which has been found to be a little more rapid than the unwinding process of the clock movement. When the spring is wound up entirely, the ratchet ceases to act, because it is turned aside by a lever arranged for that purpose.

WRITING TELEGRAPH APPARATUS.

Mr. Froment also devised a printing telegraph, not employing the ordinary Roman letter, but signal letters. These letters were made by means of a pencil adjusted in mechanism, so that

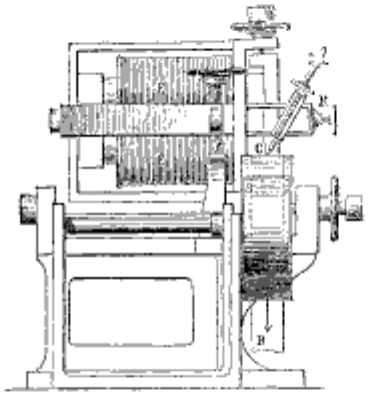
Fig. 12.



as the apparatus was put in motion by a clockwork, the pencil was sharpened and pressed upon the paper band, so as to make a clear and distinct mark. It was arranged at the end of the rod, fastened to the armature, as seen in figs. 12 and 13. In the three figures, 12, 13, and 14, the same letters indicate the same parts of the apparatus, and the reader may refer to each and to all for an understanding of the description herein given.

E E is an electro-magnet, and L is a rod attached to the armature, elongated to sustain the pencil C. F is the armature of soft iron. Immediately under the extremities of the armature F are the cores or the electro-magnets surrounded by the coils E E. C is the pencil writing on the ribbon paper B; R is a ratchet-wheel, which turns the pencil on its axis; c' is the cylinder upon which the ribbon paper B is rolled, and c'' c''' are cylinders regulating the movement of the ribbon paper B.

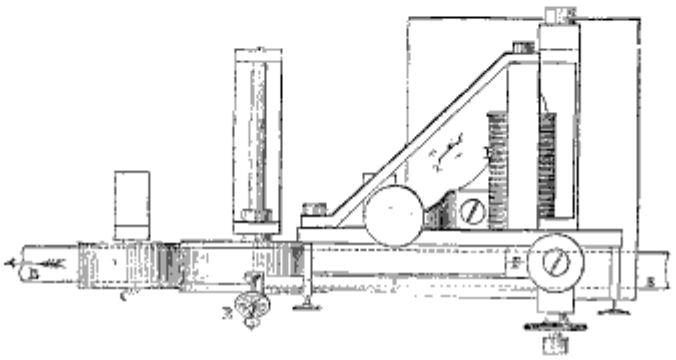
Fig. 13.



The apparatus is made to move by clockwork.

The practical operation of this apparatus is as follows: When the current is on the line, the electro-magnet attracts the armature, which causes the pencil to make a mark across the ribbon paper B; and as the paper

Fig. 14.



is in motion, the mark will be made at an angle in proportion to the speed of the paper passing over the cylinder c'. When the circuit is broken, the pencil will make a mark back to its normal position, regulated by a spring. A movement forward and another backward will make the letter V. If the manipulation is continued, by opening and closing the electric circuit, or by transmission or non-transmission of the voltaic current, the writing executed by the pencil will be as follows, viz.:

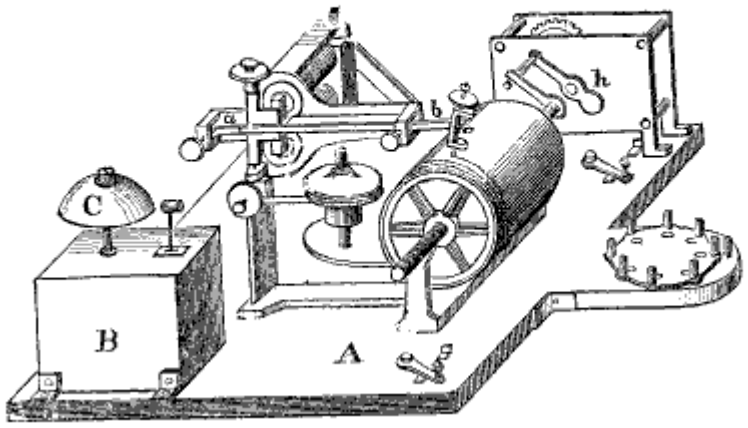
2 1 5 3 6 2 5 8

These points may indicate letters or numerals to be compounded and explained by a vocabulary. Thus, 215—36—2—58, may mean,

215	36	2	58.
Froment's	Practical	Printing	Telegraph.

The writing thus produced is clear, and easily to be read. The apparatus is simple, and not liable to get out of order. Fig. 15 gives a perspective view of the same. A is the frame upon which the parts are fastened; B is the bell apparatus and

Fig. 15.



c is the bell; *h* is the clockwork, *a b* is the armature and pen lever, and *c* is the roller, upon which is fixed the paper. The current passes through the electro-magnet, attracts the armature, and thus motion is given to the pen point, which, being on the paper, the marks are produced.