

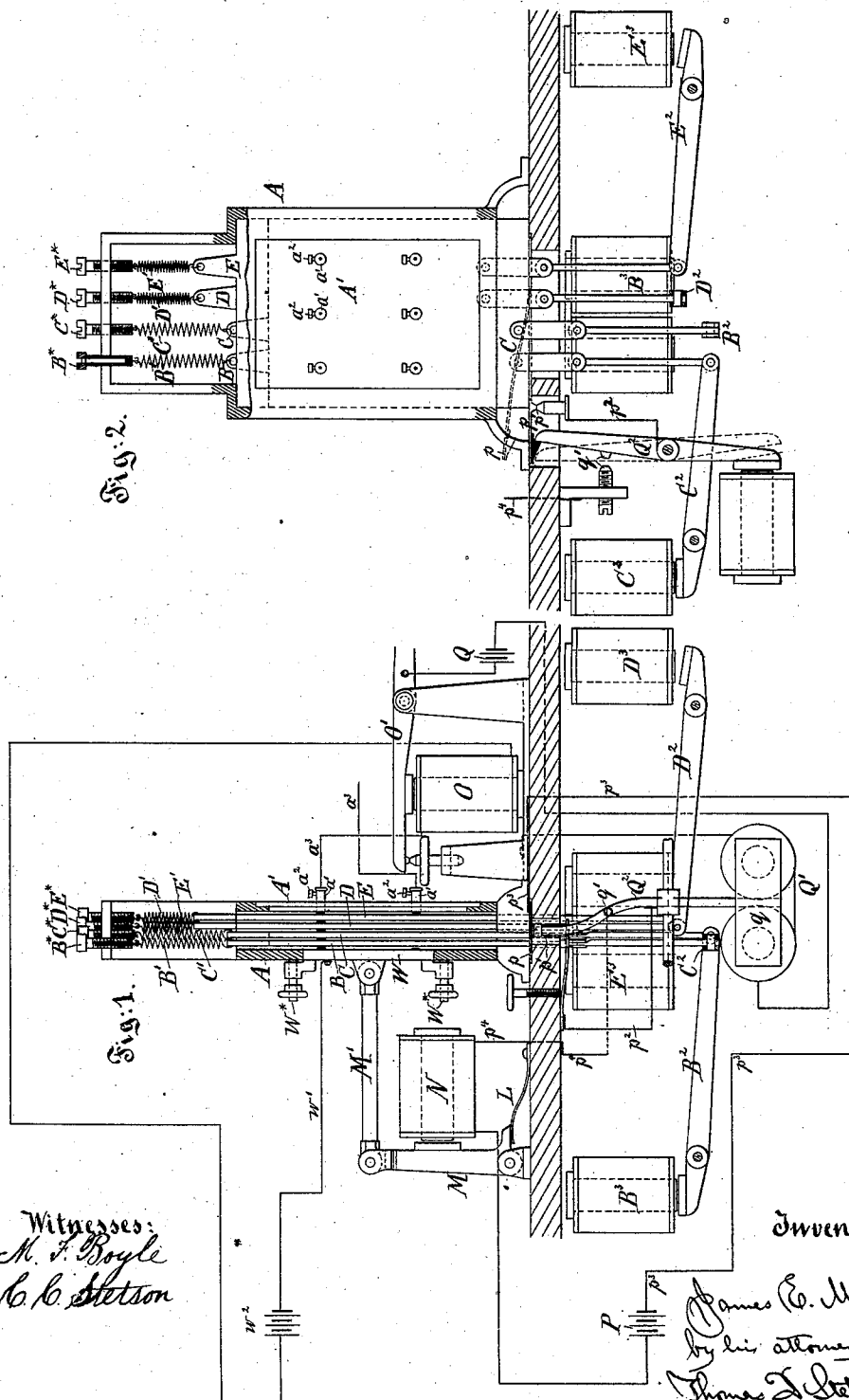
(No Model.)

3 Sheets—Sheet 1.

J. E. MUNSON.  
SELECTING DEVICE.

No. 352,143.

Patented Nov. 9, 1886.



Witnesses:  
M. J. Boyle  
C. C. Stetson

Inventor:

James E. Munson  
by his attorney  
Thomas J. Stetson

(No Model.)

3 Sheets—Sheet 2.

J. E. MUNSON.  
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Fig. 3.

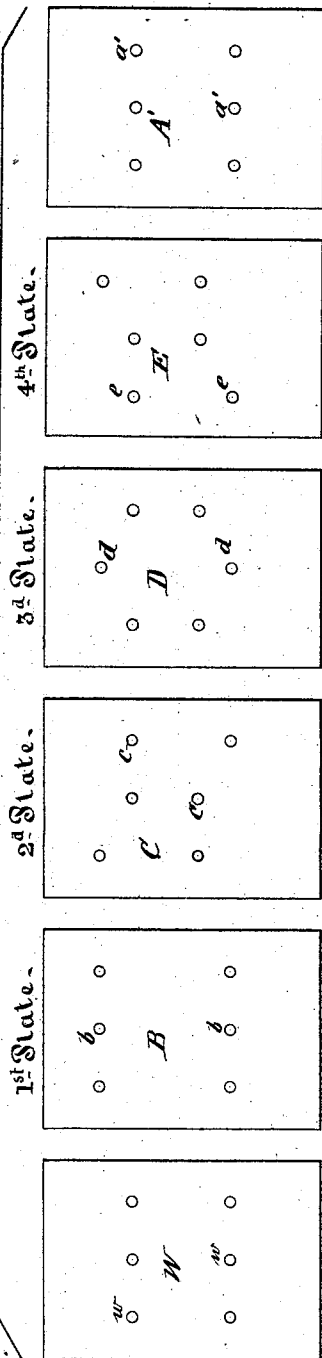
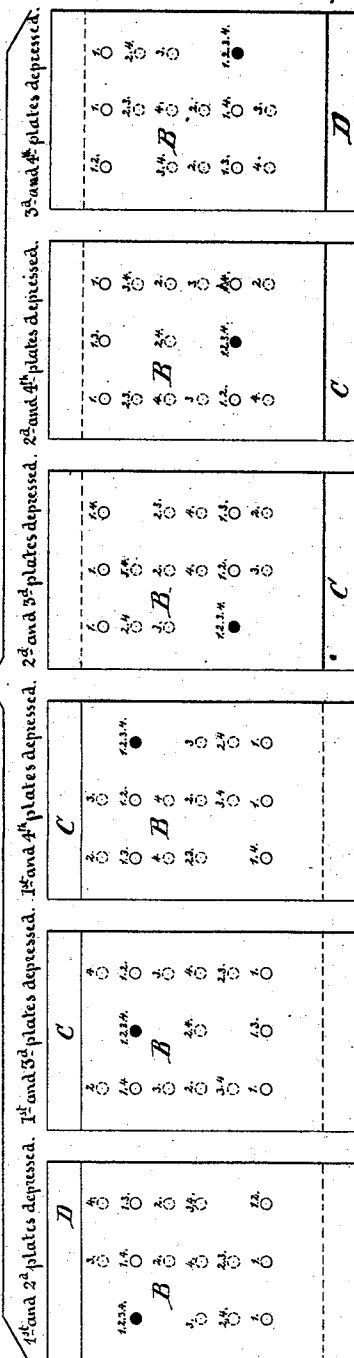


Fig. 4.



Witnesses:

*M. F. Boyle*  
*Charles C. Stetson*

Inventor.

*James E. Munson*  
*by his attorney*  
*J. L. Latham*

(No Model.)

3 Sheets—Sheet 3.

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Fig. 7.

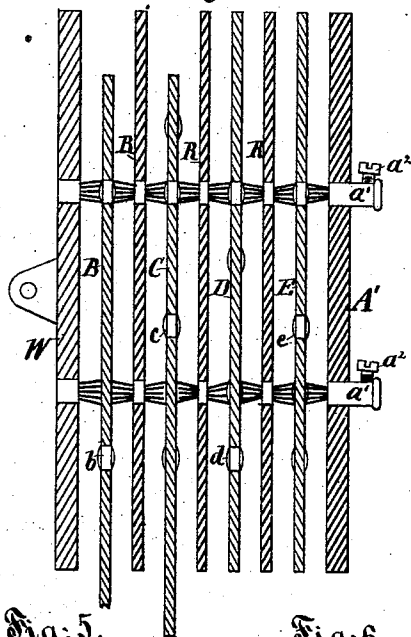


Fig. 5.

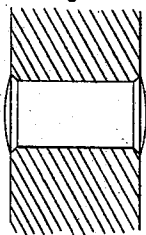


Fig. 6.

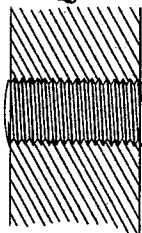
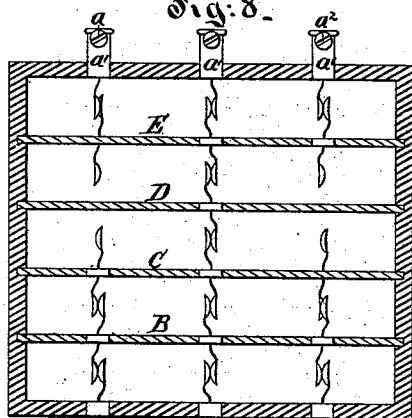


Fig. 8.



Witnesses:

*M. F. Boyle*  
*Charles C. Stetson*

Inventor:

*James E. Munson*  
*by his attorney*  
*Thomas D. Stetson*

# UNITED STATES PATENT OFFICE.

JAMES E. MUNSON, OF NEW YORK, N. Y.

## SELECTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 352,143, dated November 9, 1886.

Application filed March 6, 1882. Serial No. 54,421. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES E. MUNSON, a citizen of the United States, residing in New York city, in the county and State of New York, have invented certain new and useful Improvements Relating to Selecting Devices, of which the following is a specification.

The invention is applicable to type-writers, type-setting, and various other machines operated by keys in the vicinity of the instrument, as usual, but I esteem it more particularly important in its application to telegraphy, in combination with a type-writer or analogous instrument worked at a distant point, and will so describe it.

The invention is based on that set forth in the patent to me dated August 30, 1881, No. 246,411, and which I will, for brevity, refer to herein as the patent of 1881.

By the present invention the means set forth in 1881 are employed to greater advantage in communicating between distant points. I have successfully applied the key-board and transmitting apparatus, of the kind known in telegraphy as "harmonic," at one end of the line, and what are known as "harmonic receivers or analyzers," my selecting device of 1881, and a proper type-writing machine, at the other end. The effect is to communicate faster and more reliably and with simpler apparatus. I mount the plates at the receiving-station, and by operating at the other end of the line induce the proper movements of the plates to communicate all the letters, capitals, italics, figures, marks of various kinds, and word-signs, the whole range of signals which the plates are capable of producing, or such part thereof as may be required. I can effect this by using ten connecting-wires, one for each of ten plates. In practice, by aid of the harmonic system, or some of the analogous systems of telegraphy, I effect it by ten varieties of communication through a single wire, thus accomplishing by ten varieties what would without my invention require a greater number, and would, in general terms, be impracticable. I provide conducting pins, plugs, or spots in the plates, which serve, when the conductors thus formed are brought into line through the entire series of plates, to convey the electric current and produce the required

effect, without the necessity for the nest of pins, or for the mechanism for operating them, which are required in the patent of 1881. I provide mechanism by which the plates are compressed firmly together so soon as they are adjusted, and are allowed to separate slightly when they are to be moved, thus involving but little friction.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation, partly in section. Fig. 2 is a rear elevation, partly in section. Fig. 3 is a diagram showing four plates and the movable pressing-piece, as well as the opposite side of the fixed casing containing the plates. Fig. 4 is a diagram illustrating the different combinations which may be obtained by means of the plates shown in Fig. 3, when two plates are always depressed at a time. Figs. 5 and 6 show on a larger scale two different methods of setting the conducting-plugs in the plates. Figs. 7 and 8 show modified constructions and arrangements of the plates.

Similar letters of reference indicate corresponding parts in all the figures.

A is the main body of the box or case, and A' an upright portion thereof.

B, C, D, and E represent movable cards or extended pieces, of any required thickness, which I will term "plates," composed of cardboard, dry wood, ebonite, hard rubber, ivory, or other insulating material.

B' C' D' E' are yielding springs connected with the respective plates B C, &c. All these parts correspond to the parts similarly lettered in my patent of 1881, above referred to.

B\* C\* D\* E\* are screws for adjusting the tension of the springs.

B<sup>2</sup> C<sup>2</sup> D<sup>2</sup> E<sup>2</sup> are armature-levers, subject each to the influence of one of a series of electromagnets, B<sup>3</sup> C<sup>3</sup> D<sup>3</sup> E<sup>3</sup>, actuated by strong electric currents which are controlled through proper intermediate apparatus by weak currents received from a distant point. These levers B<sup>2</sup> C<sup>2</sup>, &c., are connected each to a plate, B C, &c., by means of a suitable link, as shown.

I do not deem it necessary to detail minutely

the apparatus which effects this important end—the engaging and disengaging the strong currents by the aid of weak currents. I can use any ordinary or suitable form of what is known as the “harmonic” system. A good example is described in the patents of Elisha Gray, dated July 20, 1876, No. 165,728, and December 18, 1877, No. 198,379. It is only essential that by means of one or more wires, preferably one wire, leading from a distant point—as another city—successively magnetizing the several electro-magnets  $B^3 C^3$ , &c., I may correspondingly move the plates  $B C D E$  at the will of the operator. The action may be aided by what are known as “relays,” set forth in the patent to Joseph H. Stombs, dated October 29, 1873, No. 144,157. By this means a series of weak currents received from a party at a distance, in proper variety, through a single wire, with variations in the character of the currents, or in their intensities, or in the order of succession, or rapidity of the pulsations, will result in applying strong currents from a local battery to energize the proper magnets  $B^3 C^3 D^3 E^3$ , and thus effect the required movements of the plates. I have shown and will describe what I consider the best means of attaining that end. This mode of working the levers  $B^2 C^2$ , &c., and their connections, may be used with the plates  $B C$ , &c., perforated with holes to properly allow the passage of the desired pin or feeler from a bank of such devices operated after the manner of what is known as the “Jacquard” mechanism, as described in my said patent of 1881. I will now describe what I esteem an important improvement over the said device of 1881, and which dispenses with the necessity for the said bank of movable pins, and facilitates rapid operation by saving much of the time necessarily occupied in the movement of said pins.

The plates  $B C$ , &c., in my previous patent were simply perforated with holes peculiarly arranged. In my present invention the parts  $B C$ , &c., are continuous plates, and the required effect is produced by making the main body of each plate of a non-conducting material, and providing at certain points small areas which are good conductors, and allow the electric current to flow freely through the plate from one side to the other. I propose, as a simple construction, to use hard rubber for the plates  $B C D E$ , and small metallic plugs fitted tightly in holes, with the ends or outer faces of each slightly swelled beyond the general surface of the plate. The plates being employed in sufficient numbers, and worked in their various combinations, as set forth in the patent of 1881, each different combination presents one, and only one, continuous line of these plugs or metallic connections through the plates from one face to the other, and consequently allows electricity to pass at that point, and at no others. One side,  $A'$ , of the box  $A$  is stationary, and is formed of non-conducting

material provided with conducting-plugs  $a'$ , to each of which is affixed by a binding-screw,  $a^2$ , a conducting-wire,  $a^3$ , which leads away to operate the corresponding type-hammer of a type-writing machine or other analogous apparatus. (Not represented.) There are as many wires  $a^3$  and as many conducting-plugs  $a'$  as there are type-hammers of the type-writing machine, or types, stops, spaces, &c., in the type-setting machine.

I make no claim to the apparatus by which strong currents of electricity from a local battery, to be presently described, operate through the several wires  $a^3$  to work the corresponding type-hammers of the type-writing machine. It is sufficient for the present purpose to say that through each wire  $a^3$ , when electric connection is made through the plugs  $a'$ , a strong current of electricity may act on the armature of a magnet connected with the type-writing machine that will cause the corresponding type-hammer to strike and print. For a type-writing machine I can employ a mechanism similar to that set forth in the patents of C. Latham Sholes, dated June 23, 1868, No. 79,265, July 14, 1868, No. 79,868, and August 29, 1871, No. 118,491.

The other side of the casing  $A'$  is peculiarly equipped. It is a movable piece of metal,  $W$ , having projections  $w$ , arranged to exactly correspond in number and position with the plugs  $a'$  in the fixed side described. This movable side  $W$  is connected by a wire,  $w'$ , with a local battery,  $w^2$ , care being taken to provide elasticity by coiling or otherwise arranging the wire so that the movable side  $W$  may be moved sufficiently without disturbing the connection. The weight of the movable side is supported by loosely-fitted horizontal guiding-pins  $W^*$ .

$M'$  is a mechanical connection, which is operated through a lever,  $M$ , by a separate magnet, or preferably a series of magnets,  $N$ , and spring  $L$ , so as to be moved toward and from the sliding plates  $B$ , &c., at each operation. The actuation of the magnets  $B^3 C^3 D^3 E^3$ , and the consequent elevation of their respective armatures, not only depresses the corresponding plate,  $B, C, D$ , or  $E$ , so as to cause the proper line of plugs  $b c d e$ , Fig. 3, to form a continuous conductor for the electric current, but also, through the magnet  $N$ , lever  $M$ , and connection  $M'$ , presses the movable side  $W$  toward the plates  $B C$ , &c., so as to urge them together, and thus insure perfect contacts through the several plugs. On the electric current ceasing to flow through the magnets  $B^3 C^3$ , &c., and the relaxing of the force on the armature-levers  $B^2 C^2$ , &c., so as to allow the springs  $B' C'$ , &c., to return the plates  $B C$ , &c., to their original positions, the return movement of the connection  $M'$  draws away the movable side  $W$  of the case and allows the plates  $B C$  to separate a little. This entire mechanism relieves the plates from friction against each other while in the act of be-

ing shifted in position, and yet insures a reliable contact when the plates are in position for the current to do its work.

I operate the magnet or magnets N, and consequently control the compressing-piece W, through the aid of a circuit, which has two separate places at which the connection is made and broken. I have combined means which make the action automatic and reliable.

Referring to Fig. 1, O is one of a series of electro-magnets corresponding in number to the number of signals which are to be made, or different marks to be printed by the typewriter. (Not represented.) These magnets operate each an armature, O', and each operation of this armature, in addition to giving the desired signal, performs another important function, as will presently appear. P is a local battery having a series of somewhat complex connections. The downward movement of any two of the plates B C, &c., acting on a spring, p, depresses the same, which by closing the circuit between the points p' energizes the magnet N, and induces the proper movement of the lever M and connection M' to force the piece W firmly against the series of plates B C, &c., clamping them together, so as to insure the contact of all the plugs which have been brought in line through all of the plates by the depression of the plates already mentioned. Q is another local battery, in the circuit of which is introduced an electro-magnet, Q', the armature q of which is attached to and operates a lever, Q<sup>2</sup>. In the circuit of this battery Q is connected the armature-lever O' of the electro-magnet O, said lever forming a circuit-breaker, as will be seen farther on. The spring p and the lever Q<sup>2</sup> also form each a circuit-breaker for the circuit of the local battery w<sup>2</sup>.

The operation of these parts is as follows: When any two of the plates B C, &c., are depressed, they act on the spring p, force the contact-point thereof into contact with the adjustable point p', mounted on a spring, which is connected to wire p<sup>2</sup>, as shown, the latter being connected to the lever Q<sup>2</sup>. At this point of time the electro-magnet Q' is not energized. The lever Q<sup>2</sup> is therefore in position to maintain contact with the point q', and consequently a current passes, as follows: from battery P through the wire p<sup>2</sup>, spring p, contact-point p', wire p<sup>2</sup>, lever Q<sup>2</sup>, contact-point q', and wire p<sup>2</sup> to the electro-magnets N, and thence back to the battery P. The electro-magnets N being energized, attract their armatures and operate the lever M and rod M' to force the movable piece W against the plates B C, &c., thereby closing the circuit through the line of plugs of said plates, they having been so brought into line by the previously-mentioned depression of two of the plates B C, &c. From this line of plugs the current from battery w<sup>2</sup> passes through one of the wires a<sup>2</sup> to its connected electro-magnet O, energizing the latter and producing a signal, as will be understood; but the operation of the armature and lever at the extreme end

of its way, and consequently after it has done its work, closes also the circuit of the local battery Q, and causes a current to pass through electro-magnet Q', which, being energized, attracts its armature q, and thus breaks the circuit of the local battery P at the point q', thus releasing the movable piece W, and consequently breaking also the circuit through the line of plugs in the plates B C, &c.

When one of the armatures O' becomes liberated from its electro-magnet, by the fact of the breaking of its circuit, it breaks also the circuit of the local battery Q, whereby the armature of the electro-magnet Q' becomes also released. It will now be seen that if any two of the plates B C, &c., were kept depressed for a short period after the desired action of one of the electro-magnets O the releasing of the armature of said electro-magnet would again break the circuit of the local battery Q, thus demagnetizing magnet Q' and releasing its armature q, and establishing again contact at the point q', and thus again closing the circuit of the local battery P, thereby causing the magnets N to act again upon the movable piece W, again causing the circuit from the local battery w<sup>2</sup> to be established through the same line of plugs, causing the magnet O to repeat its signal. This repetition of the same signal would go on indefinitely until the depressed plates were released. In order to avoid this I prolong the lever Q<sup>2</sup> and arrange a hook on the outer end of the spring p, so that when this spring is depressed, and the armature q of the lever Q<sup>2</sup> is attracted by its electro-magnet, the end of the said lever engages under the hook of the spring p, and the connection between the wires p<sup>2</sup> and p<sup>2</sup> is consequently held open as long as the spring p remains in its depressed position—that is to say, until the depressed plates are liberated and have begun to rise. It will now be noticed that the arrangement of all these parts is such that none of the actions described can take place until at the proper moment, and that such action will then occur instantly and will itself cause the succeeding action.

Although I have only shown four of my plates (respectively marked B, C, D, and E) I can use a greater or less number. I propose in ordinary practice to use ten plates, each with properly arranged conducting-plugs, and each arranged to be independently moved by its respective magnet and connections. I can with ten plates produce one thousand and twenty-three separate signals, if I use all of the combinations of which ten are capable; but it is in practice preferable to work a uniform number of plates in each combination, and thus require a uniform strength of current from the local battery, and to therewith secure a uniform speed of working the plates.

I can, in a selecting device using ten plates, by employing always three keys and depressing always three plates at a time, make one hundred and twenty different signals. I can,

by using always two plates, make forty-five different signals. This latter number is enough for ordinary practice. It will give the several letters of the alphabet, with the figures and punctuation-marks.

The preparation of the plates B C, &c., to receive the plugs *b c* may be conducted in the same manner as is described for preparing the holes in the plates in my patent of 1881, except that instead of depressing sometimes one and sometimes nine of the plates, two, and two only, are depressed at each operation.

It will be seen that the plugs *b c d e* in the selecting-plates are arranged differently from the holes in the plates of my machine of 1881, inasmuch as the plates B C D E, with their plugs *b c d e*, allow only of combinations in which two keys are operated, and consequently two of the selecting-plates depressed at once. Instead of two, three or any other desired number may be used; but whatever the number determined on, the same number must be depressed at each operation. The depression of any greater or less number will produce no effect, because no continuous connection through the plate will be produced.

Modifications may be made in many of the details without departing from the principles or sacrificing the advantages of the invention.

Parts of the invention may be used without the whole.

The holes or plugs need not be round. They may be elliptical or rectangular; preferably always with the greatest diameter horizontally, because such will give the requisite surface for good connections, while it reduces the extent of the necessary vertical movements of the plates. The holes or plugs should be so far apart that those in one line shall never interfere with those in another line.

I can use any number of plates B C, &c., correspondingly increasing the number of magnets B<sup>3</sup> C<sup>3</sup>, &c., and levers B<sup>2</sup> C<sup>2</sup>, and their accompanying parts. I can use a greater or less number of plugs *b c d e*. I can provide other means for working the plates B C.

Instead of working the levers B<sup>2</sup> C<sup>2</sup> by the magnets B<sup>3</sup> C<sup>3</sup> from a distant point, or from a point near by, I can work them by push-pins or other forms of keys worked by the fingers of the operator, who shall set by the machine, as set forth in my patent of 1881. Instead of continuous plates B C, I can use open frames of suitable material analogous to net-work. It is only important that what I have termed "plates" shall carry the plugs properly arranged, and that the circuit shall be complete when the required plugs are in line, and that the current shall be effectually interrupted when the plugs are out of line.

What I have termed "plugs" may be rivets, eyelets, or various other forms of metallic or other suitable conductors. They may be locked in supporting-plates B C by the enlarge-

ment of each end, analogous to rivets, as shown in Fig. 5, or by screw-threads, as shown in Fig. 6, or by any suitable cement. I believe it practicable to work successfully with metallic or analogous conductors fitted in hard rubber, card-board, or other analogous non-conducting plates confined merely by friction without any special fastening.

I can work successfully without any appreciable swelling of the ends of the conductors *b c d e*; or, on the other hand, I can greatly extend the ends of the plugs, forming each with a thin and elastic end, either straight or curved, so as to constitute springs, which springs will yield and pass by each other with but slight friction or other resistance. Such a modification is shown in Fig. 8.

I can make the conducting portions corresponding to the plugs *b c d e* by simply saturating those portions of the plates B C with a material which will give the required conductivity.

Fig. 7 shows a plan in which R are stationary plates mounted between the movable plates B C, &c. These stationary plates are equipped with metallic conductors corresponding in position to the plugs in the front and back plates. These conductors are best each made of several wires with their ends rounded and slightly projecting, so as to be elastic and to insure electrical contact by brushing against the plugs in the movable plates.

It is important that there be a sufficiently sharp distinction in the conductive power of the different portions of the plates, and that the parts be properly distributed to produce the required making and breaking of the different series of electrical connections by the successive shiftings of the positions of the plates.

I believe it practicable to operate with a uniform gentle pressure, urging the several plates B C, &c., together, thus dispensing with the provisions L M M' N for inducing the pressure when the plates are in position, and relaxing it while they are being moved; but I esteem the intermittent pressure important, by reason of its reduction of the friction of working, while insuring a proper contact when the plates are adjusted.

Instead of using keys which would be depressed by the operator with his fingers, I can operate the invention by what is known in telegraphy as the "automatic system." This is set forth in a book by George B. Prescott, published by D. Appleton & Co., New York, entitled "Electricity and the Electric Telegraph," fourth edition, 1881, chapter XXVI. Care should be taken not to move the perforated strip of paper and induce the changes of condition of the line-wire faster than the plates B C, &c., can be moved and the type-hammers of the type-writer successively operated. The plates may be made light and worked very rapidly. I propose to make

such mode of working in connection with my present invention the subject of a separate application for patent.

I can dispense with the springs  $B' C'$ , and provide other means of returning the plates to their places after each movement. One modification, to which I attach much importance, would be to reverse the position of the operating means relatively to the plates and lift the plates, instead of depressing them, for the successive operations, allowing gravity alone, or gravity and a very gentle spring, to return each to its place.

I can hold the plates up by means of magnets connected in constantly-closed local circuits, and cause their downward movement in the required combinations by means of gravity or springs, or both, when the respective local circuits are broken by the action of the analyzers. Such arrangement renders the use of relays between the analyzers and the magnets  $B^3 C^3$ , &c., unnecessary. For such purpose a good battery to employ is the Bunsen.

I can dispense with the means  $B^* C^*$  for adjusting the tension of the springs  $B' C'$ ; but I prefer to use the whole substantially as here shown, employing as a preferable number for general purposes ten of the plates  $B C$  and their several connections.

I claim as my invention—

1. In a selecting device, the movable parts  $B C$ , having certain portions conducting and other portions non-conducting, in combination with suitable means, substantially as set forth, for shifting their positions, and with electrical conductors  $a^3$ , arranged to receive the currents conducted through the several portions, substantially as and for the purposes herein specified.

2. In a selecting device having plates  $B C$  and suitable actuating means, substantially as set forth, for operating each independently, the springs  $B' C'$  and adjusting means  $B^* C^*$ , combined and adapted to serve as herein specified.

3. The series of separately-movable plates  $B C$ , in combination with a like number of electro-magnets  $B^3 C^3$ , and with a single conducting-wire,  $w'$ , arranged to serve as herein specified.

4. The series of separately-movable plates  $B C$ , with their operating means  $B' C' B^2 C^2$ , in combination with each other, and with means  $M M'$ , for compressing the plates together at intervals, as herein specified.

5. The circuit-breaking device  $p$ , capable of being actuated by any one or more of the plates  $B C$  on their descent, and controlling the local battery-circuit, in which are included the magnets  $N$ , actuating the movable pressing-piece  $W$ , in combination with said plates  $B C$ , piece  $W$ , magnets  $N$ , and suitable connections, substantially as set forth, between the armature of said magnets and said piece  $W$ , substantially as herein set forth.

6. The circuit-breaking device  $p$  in the circuit of the electro-magnets  $N$ , actuated by the plates  $B C$ , in combination with the circuit-breaking device  $Q^2$  in the same circuit, and with the electro-magnet  $Q'$ , controlling the latter, and with the circuit-breaker  $O'$  in the circuit of said magnet  $Q'$ , operated by the signal-giving mechanism, all combined and arranged to release the pressure on the plates  $B C$  before they commence to move upward after every depression, substantially as herein specified.

7. The two circuit-breaking devices  $p Q^2$ , capable of engaging with each other when one is acted upon by the plates  $B C$ , while the other is attracted by the magnet  $Q'$ , and of being held so engaged until the plates  $B C$  have begun to rise, in combination with said plates, means for depressing and elevating the same, electrically-controlled means for laterally compressing the same, magnet  $Q'$ , and means for engaging the same controlled by the signal-giving mechanism, all substantially as and for the purposes herein specified.

8. In a selecting device operating through a series of plates and inducing the required selections by changing the combinations of the movements, the several selecting-plates  $B C D E$ , having the plugs  $b c d e$ , arranged as shown, so that a uniform number of the selecting-plates  $B C D E$  must be depressed in order to effect the operation at each movement, whereby uniform resistance to the battery at each movement is insured, as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 3d day of March, 1882, in the presence of two subscribing witnesses.

JAMES E. MUNSON.

Witnesses:

J. LIVINGSTON SEYMOUR,  
CHARLES C. STETSON.