(No Model.)

J. E. MUNSON.

SELECTING DEVICE.

No. 246,411. Patented Aug. 30, 1881.

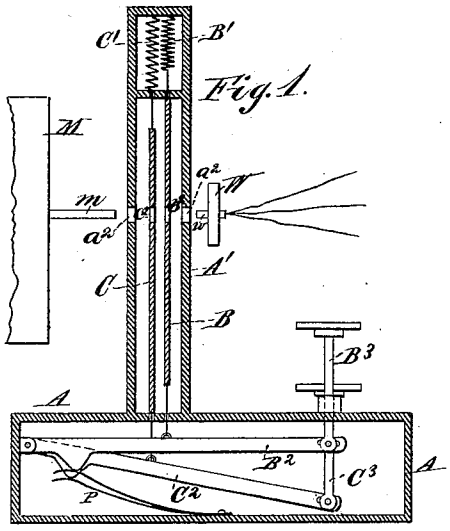


Fig. 1.

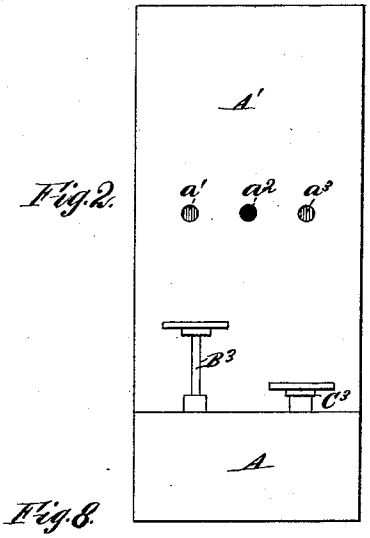


Fig. 2.

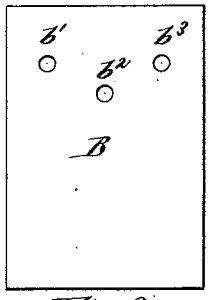


Fig. 3.

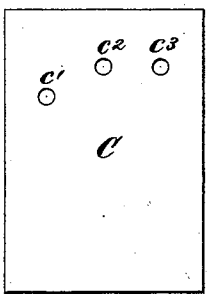


Fig. 4.

Fig. 8.

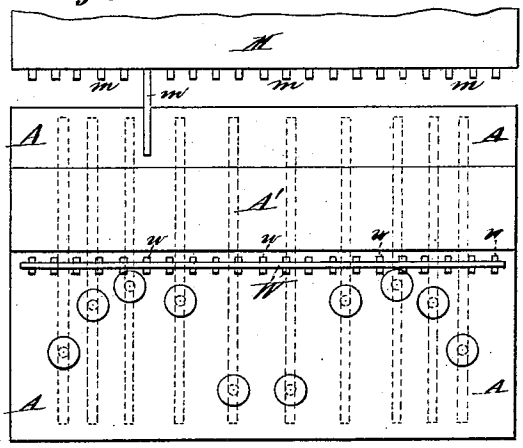


Fig. 6.

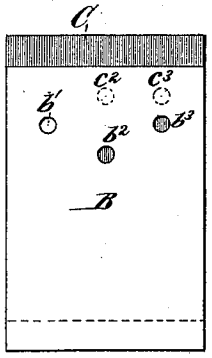
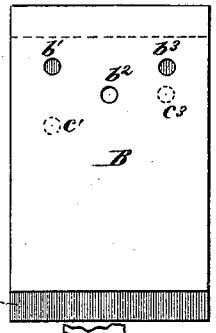


Fig. 5.



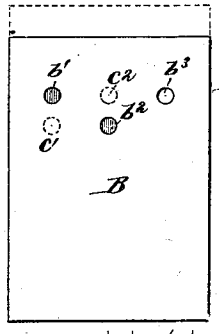


Fig. 7.

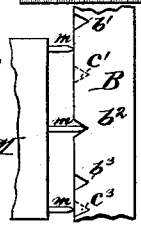


Fig. 9.

Witnesses
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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. 246,411, dated August 30, 1881.

Application filed January 3, 1881. (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 in Selecting Devices Adapted for Operation by the Fingers, of which the following is a specification.

The invention is adapted for use with type-writing machinery or type-setting machinery. It may also be used with mechanism for sending messages by telegraph. I will describe it as applied to type-setting machinery.

I operate the device by depressing the fingers on suitable keys or devices, keeping each in a uniform position on a certain key or analogous device, not changing as in piano-playing. I can depress to uniform extent. There is no necessity for delicacy in that respect. The fingers and thumbs of the two hands, using each separately and only one at a time, are capable of producing only ten different signals. By depressing another finger with either of them the number may be nearly doubled. By depressing three, properly distributed, another addition is made to the changes, and so to the end, the last step being to depress all simultaneously. The total number of changes which may be thus produced with ten keys is one thousand and twenty-three. This is more than sufficient to indicate for a complete set of lower-case and capital letters of the common style, the same in italics, and, if required, in one or two different sizes of type, with all the figures, stops, and mathematical and other peculiar marks which may be required for all general purposes of communication.

What is known as the "jacquard" mechanism in looms contains a nest or series of movable thrust-pins arranged in regular lines distributed over a considerable area of rectangular form. These thrust-pins are held out with gentle force in the working of a jacquard. They are at every movement of the loom all thrust out, and, on being presented to a properly-punched card, a portion are forced back and another portion are allowed to stand forward by reason of their meeting perforations instead of the solid body of the card. Each pin, being connected to one or more of the yarns of the warp, controls that portion of the weaving. I use a similar bank of pins. Before each movement all are moved forward. Then, by the operation of the machine, the whole are brought up against a surface formed of a number of movable cards or plates peculiarly punched. Unlike the cards of a jacquard mechanism, my cards are superposed one upon the other, and are ten in number. A number of holes are perforated in each, and the holes are so distributed that, however the fingers are depressed, one perfect hole will be presented quite through the entire set of cards, and only one. No combination of depressions of the fingers can open more than one hole. No combination of complete and perfect depressions of the fingers can be made which will not open one hole. The hole thus opened is different for each combination. It follows that, the banks of pins being arranged to correspond to the holes in my cards, one pin will always be left forward after each operation, according as the fingers are depressed. By proper connections with the several pins each induces the proper working of the mechanism to set a certain type or to induce the corresponding action for other purposes.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention as applied for facility of illustration with the simplest possible combination—that is to say, only two keys and two separately-movable punched cards or plates.

Figure 1 is a side elevation, partly in section. Fig. 2 is a face view. Figs. 3 and 4 are the cards detached. Figs. 5, 6, and 7 represent the three positions of the cards which may be induced by the depression, first of one key, then of the other, and then of both. The above figures complete the description of the illustrative machine of two cards. The same construction may be applied for a greater number of keys and a correspondingly greater number of cards. Fig. 8 is a plan view of the machine adapted for operating by ten keys. Fig. 9 represents a modification in which recesses or notches produced in the edges of the several cards or plates serve in substantially the same manner relatively to pieces which match.

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

I have not deemed it necessary to represent the mechanisms which shall be controlled by the changes of positions of the pins. They may be greatly diversified. I propose particularly to work by magnetic connections, and will so describe it.

Referring to Figs. 1 to 7, inclusive, A is the main body of the fixed casing or box, and A′ is an upright portion thereof, which may be made of hard wood or other firm material, punched with as many holes *a* as there are pins in the moving bank of pins to be controlled.

B and C represent two movable cards. They are supported by yielding springs B′ C′, housed in a suitable space above. Their lower edges are connected one to each of the levers B^2 C^2, which are operated by push-pins B^3 C^3, playing through the top of the box A in convenient positions to be actuated by the fingers. Springs P are provided, which urge the levers B^2 C^2 and their connected push-pins up so soon as the pressure of the finger thereon is released. The arrangement of the holes in the front and back of the upright fixed casing A′ is indicated in Fig. 2. The arrangements of the holes in the cards B C are indicated separately in Figs. 3 and 4 and collectively in Figs. 5, 6, and 7.

M is a frame or carriage carrying the bank of yielding pins, which are thrust against the cards. The pins are indicated by *m*.

In Fig. 5 the plate or card B alone is down. This brings the hole b' in the card B in line with the hole c' in the card C. The other holes, b^2 c^2, are out of line, also the holes b^3 c^3. It follows that, when the bank of pins *m* is by the motion of their carriage M thrust against the back of the case A′, all the pins *m* enter the corresponding holes in the back of the case A′; but beyond that they will be differently acted on. One of the pins *m*—that which is presented to the hole a'—moves unobstructedly through the hole c' in the plate C, and also through the hole b' in the plate B, and thence out through the hole a' on the opposite side of the box; but the other pins *m*, which are presented to the holes a^2 and a^3, are arrested. The pin which strikes through a^2 is immediately arrested by striking a solid or unperforated part of the card C. The pin *m* which enters the hole a^3 similarly meets a solid part of the card C and is arrested. Now, if the muscles of the fingers are worked so as to depress the push-pin C^3, and consequently the card C, previously allowing the push-pin B^3, and consequently the card B, to rise, it will induce the condition shown in Fig. 6. Thus conditioned, the forward movement of the carriage M, and consequently the bank of pins *m*, will result in thrusting unobstructedly only the pin *m* which enters the hole a^2. That pin will find the holes a^2 and c^2 in line, and will move quite through the set of cards and out through the hole a^2 on the front side of the box; but the other pins will be arrested. The pin which enters the hole a' will be arrested by the first card, C. The pin which enters the hole a^3 will find the hole c^3 in line with it, and will consequently move unobstructedly through the first card, C, but will be arrested by the second card, B. Now, suppose both fingers depressed so as to depress both cards B and C, when the bank of pins *m* comes forward only that pin which enters the hole a^3 will move unobstructedly. The other two will be arrested, the first against the first card, C, and the second against the second card, B. This simple illustration with only two cards will explain the action as well as the more lengthy description which would be required to fully elaborate the action of ten.

The pins for a ten-keyed instrument capable of controlling one thousand and twenty-three of the pins *m* are preferably arranged in several tiers. The plan view in Fig. 8 shows only one tier. The other corresponding pins may be understood to be exactly in line below.

Full instructions for producing the required holes in ten or other large number of cards may be given as follows: Take a hard-wood back plate, *a*, for the box A′, properly bored, with all the holes in the exact positions for all the several pins *m;* lay it on a set of ten cards, firmly held superposed one upon the other, with their edges coinciding; fix a gage to determine exactly how far each shall be moved to make the fully-depressed position; depress the first card, leaving all the rest up, and drill a smooth hole of the size of the hole in the back plate right through all the ten cards; restore that card again to its place, depress the next, and drill in line with the next hole. So continue, depressing each card separately and drilling successively through the holes in the back plate, and then depress two together, then three together, and at last depress the whole entire series of ten cards to their extreme depressed condition, and drill one (the last) hole in the series. The cards will be found to be properly perforated for the required action, and you may proceed to make the attachments, by suitable small wires or otherwise, to the several keys, and proceed to operate.

When the devices are to be worked by electric connections I will provide a series of wires or other electrical conductors on the front of the machine, as indicated by *w*, supported on a fixed board, W, and having separate insulated connections to the several mechanisms. (Not represented.) The plan view only shows one tier of these conductors *w*. It will be understood that there are as many tiers of these conductors as there are of the pins *m*. In short, the pins *m* and the magnetic conductors *w* correspond exactly in number and position. A battery (not represented) is connected to the entire carriage M and bank of pins *m*. The body of the carriage M and all the pins carried therein may be iron or other good conductor; but the carriage is mounted on insulated bearings. A single flexible connection to the battery will suffice for the whole. The box A′ and the several cards B, C, &c., being dry paper or wood or hard rubber or other tolerable non-conductors, the successive con-

tacts therewith do not detract materially from the force of the current; but the single pin *m*, which moves unobstructedly through the hole presented, is thrust quite through the entire box A′ and touches the corresponding conductor *w*. This, by suitable mechanism, induces the required action of the type-setting device, or the proper key for the type-writer, or works the proper connections for telegraphing the required signals.

I do not make any claim for the several separate mechanisms, in themselves considered, which are to be set in motion by the several signals communicated through my device. I do not esteem it therefore necessary to describe them. It may be sufficient to say that for a type-setting machine I can employ a mechanism similar to that set forth in the patent to Adam Millar, dated September 21, 1875, No. 168,044, having the keys of that machine each operated by a proper train of connections from a single one of my pins *m* or an electrical device operated through the instrumentality thereof.

Many modifications may be made in the details of my machinery. I can make the springs B′ C′ in the form of long bent springs instead of coils, or the springs P, which return the several levers B^2 C^2, in the form of coils. The fingers may apply directly to the levers B^2 C^2, instead of through the medium of push-pins. The positions of the parts may be changed within wide limits. I can add two more cards to be worked by the feet, and others to be worked by a side movement of the knees, thus greatly increasing the possible range of the number of different signals; but I do not esteem such generally necessary. I can substitute for plates long slides, and for holes grooves or indentations in the edges of the slides, with a series of knife-edges instead of pins thrust edgewise against the notched edges of the slides, so contrived that when any one slide or any combination of slides is moved, as aforesaid, the grooves in all of the slides, at some one point and at no other, will come in range and form a continuous groove across the edges of all the slides.

It will be seen that by the use in this manner of two or more perforated movable plates placed parallel, in which holes are so arranged that, by moving edgewise in a given direction one plate or any combination of the plates a certain fixed distance greater than the breadth of the holes in the direction of the movement, the holes in all of the plates, at some one point and at no other, will come in line and form a clear opening through all of the plates.

As regards the number of different indications possible, I may observe that with two plates three such may be obtained; with three plates, seven; with four plates, fifteen, and so on, each additional plate doubling and adding one to the number of possible combinations and results, so that with ten plates worked by the hands and two worked by the feet the number of such distinct and separate results is four thousand and ninety-five, which is more than enough for all purposes required in general practice.

The wires *w* may be made to serve by a mechanical action rather than electrical. For this purpose it is sufficient to connect each to a sufficiently-delicate mechanism, so that a gentle thrust or other movement received from the pins *m* may, by mechanically moving the devices *w*, initiate the required action of the several mechanisms.

It may be proper to designate the pins *m* by the term "yielding pins" or "yielding feelers," and the wires or other devices *w* as "sensitive devices." Both may be varied in mechanical construction.

The arrangement of the push-pins B^3 C^3, &c., shown in Fig. 8 is important in allowing the fingers and thumbs of both hands to work in easy positions.

My experiments indicate that under all conditions the number of holes in each card or plate B C of the entire series will be alike.

I do not limit this invention to use with type-writing machinery, type-setting machinery, and telegraphy. I esteem it capable of use in any situation where it is important to conveniently and rapidly select a great number of different articles or devices in succession. My invention enables me to accomplish by a few keys and a very compact apparatus what would otherwise require a great number of keys or analogous parts.

I claim as my invention—

1. In combination, the movable plates B C, having perforations, arranged, as shown, so that each change of position shall present a different opening through or across the entire series of plates, as herein specified.

2. The movable plates B C, having perforations, arranged as shown, in combination with each other and with means, B′ C′, for returning each to a uniform position when released, as herein specified.

3. The movable plates B C, having perforations, arranged as shown, in combination with each other, and with means, B′ C′, for returning them to a uniform position when released, and with means, B^2 C^2, for conveniently actuating them, as herein specified.

4. The casing A A′, movable cards or plates B C, springs B′ C′, levers B^2 C^2, keys B^3 C^3, and springs P, in combination with each other and with the carriage M, having a set of yielding pins or feelers, *m*, and with a series of sensitive devices, *w*, all arranged for joint operation as herein specified.

In testimony whereof I have hereunto set my hand at New York city, this 31st day of December, 1880, in the presence of two subscribing witnesses.

JAMES E. MUNSON.

Witnesses:

H. A. JOHNSTONE,

CHARLES R. SEARLE.