2 Sheets—Sheet 1.

J. B. FAIRBANK.

PRINTING MACHINE

No. 7,652. Patented Sept. 17, 1850

Fig. 1.

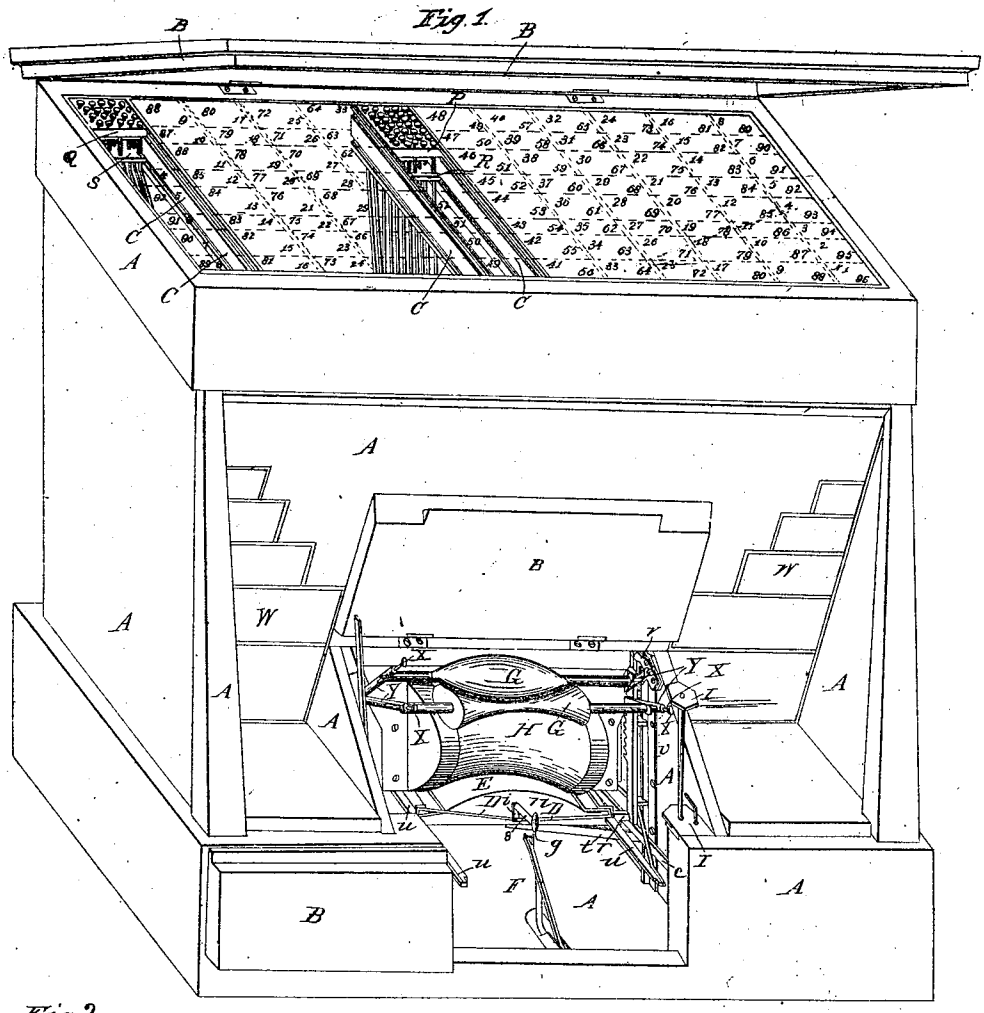


Fig. 2.

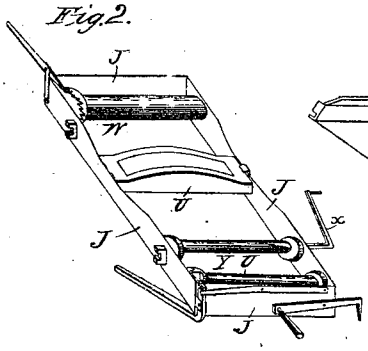


Fig. 3.

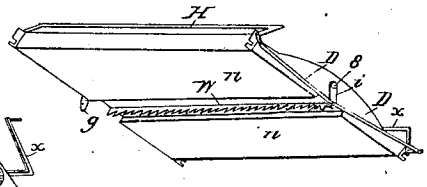
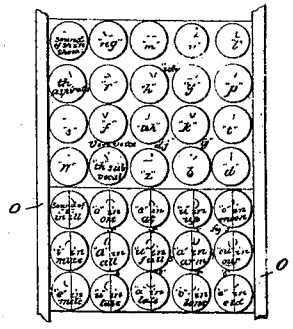


Fig. 4.



2 Sheets—Sheet 2.

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Fig. 5.

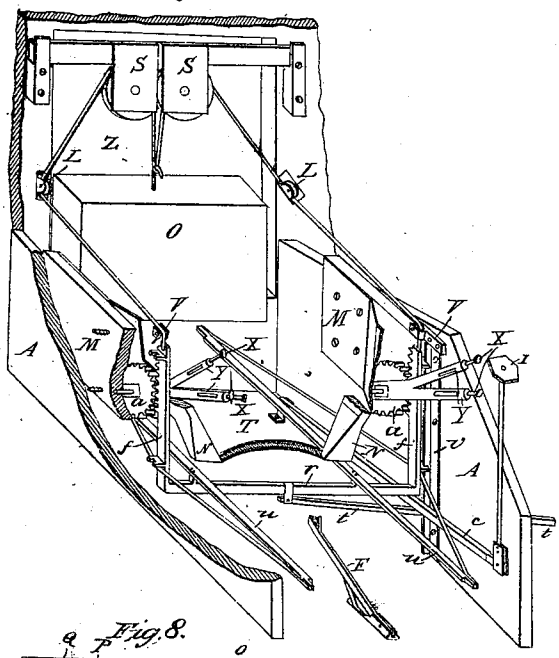

Fig. 6.

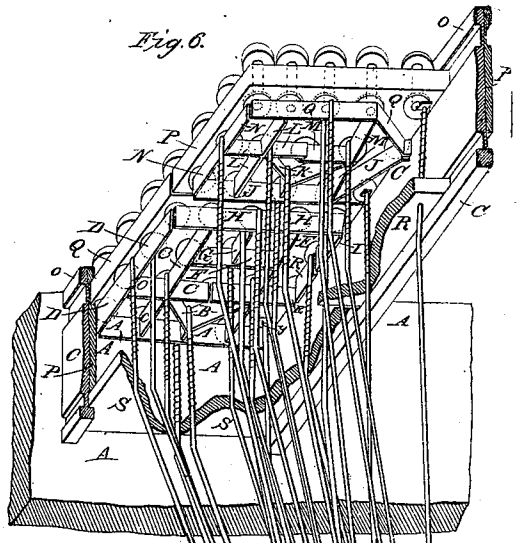

Fig. 8.

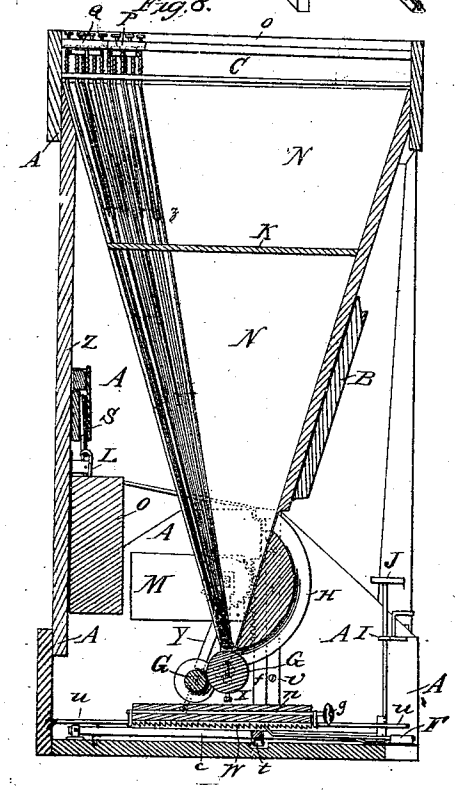

Fig. 7

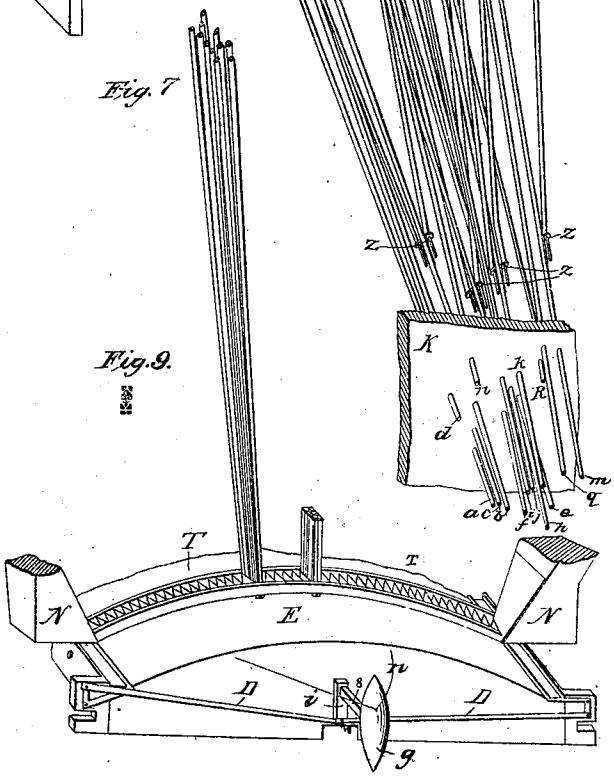

Fig. 9.

UNITED STATES PATENT OFFICE.

JOHN B. FAIRBANK, OF LEON, NEW YORK.

IMPROVEMENT IN PRINTING-MACHINES.

Specification forming part of Letters Patent No. 7,652, dated September 17, 1850.

To all whom it may concern:

Be it known that I, JOHN B. FAIRBANK, of Leon, in the county of Cattaraugus and State of New York, have invented a new and useful Improvement in the Mode of Representing Letters and the Sounds of Letters by Means of Characters. The mode of representing them is by changes wrought upon a less number of movable types than the number of letters or sounds of letters used or represented for phonographic or phonetic writing or printing, to be used for reporting the words of a speech delivered, or for transferring to paper any thoughts, words, or expressions (by attaching telegraphic wires or otherwise) with facility and correctness, intended, principally, for the phonetic system and for other purposes, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is a perspective view of the case for performing the object above stated, and also a part of the machinery for inking the type and conducting the paper-carriage in its proper place, together with a part of the wires, keys, &c., at the top of the machine, the lid of the case being elevated front to the right of the eye, scale three inches to the foot. Fig. 2 is the same view of a series of rollers to roll paper upon, together with the frame that supports them, &c., same scale. Fig. 3 is a perspective view of the back part of the paper-carriage with the front elevated and to the left of the eye. Fig. 4 is a top view of one set of consonant and one set of vowel keys, with the characters, letters, and sounds they represent made upon each key. Fig. 5 is a perspective view of parts of the machinery, which cannot be seen in Fig. 1; near the bottom of the case A, a part of the case also shown. Fig. 6 is a perspective view of the keys, wires, or rods and their attachments for one consonant and one vowel alphabet, making together one entire alphabet, front being elevated to the right of the eye on a full-sized scale. Fig. 7 is a perspective view of the lower portion of the long wires or rods represented in Fig. 6, together with a part of the paper-carriage and the type-guide T, showing the parts in their connection, same scale, front depressed to the right of the eye. Fig. 8 is a vertical transverse section of Fig. 1, made by a plane passing from front to back through the center, giving an end view of one-half of each ink-roller brought under the type-guide T, with the same view of one-half of the ink bed or vessel H, lid removed, scale three inches to the foot. Fig. 9 is an end view, looking up from the bottom, of one set of type, both vowel and consonant, (being separated a little from each other,) on a full-sized scale.

Similar letters in the several figures refer to corresponding parts.

The nature of this invention and improvement consists in arranging within a suitable case a series of sets of inclined wires or rods attached to bent plates at their upper ends, upon which rest keys, the keys, plates, and wires being supported by coiled springs, each set of wires being brought within a small compass at the bottom and having type upon their lower ends marked with characters indicating letters and sounds of letters, and capable of being inked and pressed against a sheet of paper, either singly or in connection with others, by pressing on said keys, the keys working changes upon the type. I use in one machine forty-eight entire and separate alphabets, each of which comprises a vowel and a consonant alphabet, separate and distinct from each other. In writing I use a vowel-alphabet for every vowel-character printed in a line upon the paper, and a consonant-alphabet for every consonant-character in one line. Each vowel-alphabet has fifteen keys and their attachments, by which changes are wrought upon five wires and their attached types to make either of the fifteen vowel-characters, and each consonant-alphabet has twenty keys and their attachments, working changes upon six wires or type for making either of the consonant-characters used. In writing, letters (or sounds indicated by characters) are selected from the various alphabets, one letter from each, the characters upon the keys taken expressing the sounds of the words written, observing to select the alphabets in the order in which the sets of type (the five and six type forming one set) are arranged above the paper, one-eighth inch from it. At the end of every line written the ink-roller is forced under the type and the paper-carriage moved by the foot or hand.

To enable others skilled in the art to make and use my invention, I will proceed to describe it, as follows:

A is the case in which the several parts of the apparatus are arranged, made of a rectangular form and somewhat resembling in its outward appearance an upright-piano case.

B are lids for covering the top and machinery in front.

Z is a door in the back part of the case for the purpose of arranging the wires and machinery.

I will now proceed to describe one set or alphabet of consonant and one set or alphabet of vowel wires, keys, plates, &c., which will be a description of the other forty-seven sets of each, the forty-eight sets of consonant-wires and their attachments being in all respects similar one to the other, except that the wires of some of the sets are bent a little more than others immediately after passing through the spring-board S, and the forty-eight vowel sets are in the same manner similar.

Q, Fig. 6, is a consonant key-board, through which pass twenty keys working changes upon the six wires *a b c e f h*, forming one consonant set. To the top of the wire *a* is firmly soldered the metallic plate A, of a rectangular form, placed edgewise under and partially supporting five keys. To the top of the wire *b* is fastened the plate B, nearly in the shape of a triangle, with one side removed the ends extending from C to E, partially supporting three keys. C is fastened to *c*, and E (also placed edgewise under the keys, being in the shape of a cross similar to C) is fastened to wire *e*. *f* is fastened to F, a rectangular plate one-half the length of H. H is attached to wire *h*, and is similar to A. Plate D, fastened to wire *d*, serves only as a spring to support the keys above it, when the plates, that would otherwise support them, are taken down by other keys. R is used for the same purpose, and its attached wire (like *d*) extends only through the board K, which is a horizontal board placed within the case of the machine for the purpose of steadying the wires in their up-and-down motion, a part only being shown in Fig. 6. The wires attached to plates I and G extend down nearly to the guide-board K, and pass through small openings made in ears *z*, arising from the sides of the wires *f* and *b*, a shoulder being made upon the wire, which rests upon the upper side of the ear. Two other wires, without plates, *y*, extend the same distance and pass through other similar ears on the opposite sides of the same wires, *f* and *b*. These four wires and two plates last named only serve as aids in working changes upon the original wires *a b c e f h*. The plates fastened to these original wires are disconnected one from the other, and pass in their several directions, in order to extend under the eight keys for working the changes. Each of the wires described passes easily through the spring-board S, which is similar to Q, but not as thick, a part only being represented. Upon each of the original wires and the two key-supporters *D d* R is a spiral spring resting upon the board S. These springs keep the several plates up flush with the key-board, when they are not pressed down by the performer.

P, Fig. 6, is the key-board, through which pass fifteen keys, working changes upon the wires *j k l m q* for a vowel-alphabet to accompany the consonant alphabet already described. Plates J K L M Q are soldered to wires *j k l m q*. N *n* is similar to D *d*, and used for the same purpose. The three other wires in the vowel set pass through openings in ears upon the wires *m* and *k* in the manner above specified, and are used as aids in working changes upon the original vowel-wires.

The springs, plates, wires, keys, spring-board, and key-board of the vowel set or alphabet will be mostly understood by the description already given of the consonant set. The spring-boards and key-boards (ninety-six of each) are all kept in their proper places by means of grooves formed in eleven slides, G, (and two half slides placed in the end of the case A,) set edgewise and passing from back to front within and attached to the case of the machine, a part of two slides C being represented in Fig. 6. Other slides, P, ninety-six in number, having a length of the width of and a groove for the key-board, are pressed down by the side of the slides first named and screwed to them at the upper edge and resting on the spring-board, so as to permit one alphabet of wires to be removed from the case without disturbing the others adjoining it. *o* is a cap, eleven in number, to cover the top of the slides.

The keys represented in Figs. 6 and 4 may be of any suitable material and of any required shape. About two feet of straight wire is unrepresented between the lower parts of *a b c f i j h e q m k*, Fig. 6, and the upper parts of the same wires in Fig. 7, but shown on a reduced scale in Fig. 8.

T, Fig. 7, are rectangular openings, forty-eight in number, one-eighth inch in width by about five-sixteenths of an inch in length, through which the forty-eight entire and distinct alphabets of type formed upon the lower end of the wires pass. A consonant and vowel alphabet, comprising eleven type, pass easily through each opening, and are made to fit it very nicely. One side of said type-guide is movable, to permit of adjusting the type without raising the key-boards. Other changes (characters) than those made by the keys singly may be made by taking two or more keys in the same alphabet to designate combinations of letters and sounds and to represent the figures. Any combination that will take down all the type in an alphabet may be used for erasing what has been written through mistake. The vowels written upon the paper will always be situated above or below their corresponding consonants, the sets being thus situated in the rectangular openings T, and they must be read accordingly.

In Fig. 4 the keys singly indicate the characters and sounds they represent made by

each type singly or by a combination of type, not being more than two type in one combination. The combinations of keys depress three or more type.

The machinery for inking the type and moving the paper-carriage in its proper place is represented in Figs. 1, 5, and 8.

G are ink-rollers for the purpose of inking the type, one made convex on its periphery from end to end and fitting a concave surface, H, over which it rolls and which forms an ink-bed, the other concave on its periphery from end to end and moving by the friction of the first, for the purpose of spreading the ink on the same. H is the segment of a circle, the bottom of the type-guide T forming a continuation, making nearly a semicircle, and having a lip upon each end near the center, by which it is screwed to N, Figs. 7 and 8. The rollers have each a continued axis or shaft with journals upon both ends passing through rectangular openings in arms or cranks *y* arising from the shafts of the wheels *a*, which are two cogged wheels with shafts turning in boxes formed in M, a part of which is removed in Fig. 5, the center of which shaft corresponds with the center of the semicircular ink-bed H in such a manner as to allow of the arms *y* (two of which are attached to each shaft) being turned around so as to bring the ink-roller under the type. Each of the four arms or cranks *y* are provided with a thumb-screw, *x*, for the purpose of pressing the rollers and ink-bed more closely together. Two of said arms on the same shaft have also springs, through which the journals pass, and on being bent permit the rollers to be removed from the machine. Ink is conveyed to the rollers by the ink-bed H. The two cogged wheels above named mesh in gear with cogs formed on the edges of two vertical bars, *f*, passing up on the outside of *y*, both of which bars are connected together at the bottom by means of a cross-horizontal bar, *r*. These bars *f* are directed in their up-and-down motions by tongues *v*, projecting from the case A and sliding through guides formed on the outer side of said bars. To the top of each bar is tied a cord, which passes over the pulleys *v* L S, and by which the weight O is suspended.

u are two parallel bars passing from back to front of the case A, with their outer edges resting upon and affixed to shoulders arising from the bar *r*, and with tongues formed on their edges next each other to fit grooves or guides formed on the outside of the paper-carriage for the purpose of guiding it in its motions back and forward.

t is a lever with one end passing to the right, Fig. 5, and resting on the bottom of the case A, and the other end terminating in a joint formed by ears projecting from the center and lower side of *r*. Crossing the lever *t*, on its upper side and at right angles to it, is the lever *c*, connected at one end to the bottom of A, and forming a hinge at the other end with the vertical rod I, which passes up through a slide lock or catch to the pad I, for the foot of the performer to rest upon when pressing down said rod.

n, Figs. 1, 3, 7, 8, is the carriage for holding the paper, convex on its upper surface, (on which the paper rests,) to correspond with the concavity of the ink-bed and type-guide T, made of sufficient size to admit a sheet of paper.

w are triangular notches made in a strip of metal attached to the under side of *n* for removing said carriage the distance between lines on the paper by means of the spring-bar or fall F. A rod, *s*, passes through the center of *n*, terminating in a crank at each end which projects downward. The front end of said rod is also provided with a knob, *g*, for turning said rod and cranks H and rods which rest upon the edges of the paper and fasten it, having elbows upon each end and smaller cranks upon each elbow for the purpose of elevating and depressing said rods upon the paper by means of the cranks *i* and the connecting rods D. One of said smaller cranks (four in all) projects upward and the other downward (on the same end of the carriage) from the point on which they turn. Those on the same side of the carriage pass in the same direction.

Fig. 2 represents a series of rollers to roll paper upon to avoid the necessity of exchanging one sheet of paper for another in the carriage already described. Its location in the machine is the same as *n*, but is fixed by a pin to one of the bars *u*.

T is the frame. The paper is first wound upon Y by the crank X, thence passes over U, on which the printing is performed through the rectangular opening in the lid of U, thence over the roller W, which moves the paper the distance between lines by means of a ratchet-wheel and lever, when the frame T rises and falls. It is then wound upon roller & by another ratchet and a spring-lever, the levers being worked by the up-and-down motion of the frame T and its attachments.

The different consonant and vowel alphabets may be arranged in any convenient order in the case A, observing the same order in arranging the type in the type-guide T. Two of these orders are shown in Fig. 1, being the order in which the dotted rectangles are numbered, one commencing at the left and the other at the right hand of the machine. If the sets commence at the right, the paper-carriage should be thrown forward instead of backward in the machine by the notches *w* and the spring-bar or fall F. One vowel and one consonant set should be omitted between words in writing. If two consonants come together, in writing, a vowel set must be skipped and the same vice versa. Pauses may be represented by omitting two or more of each.

Two persons may write upon the same machine at the same time by having the consonant-alphabets placed in the back part of the case and the vowels in front, one operating the vowel and the other the consonant keys

A spring shoulder on the end of the screws *x* may be made to provide for any inequalities in the surface of the ink-bed and ink-rollers.

The mode of operating is as follows: The type for one line across the paper are first inked by pressing upon the pad I, (the paper having been previously bent over the surface E and fastened to the carriage *n* by the turning of the rod *s*, and the rods H by the knob *g*.) I being connected to levers *c* and *t*, the cross-bar *r* and the vertical bars *f* bring the ink-rollers under the type by turning the wheels *a* and the arms *y*. Removing the foot leaves the weight O to bring the rollers back to their original place by means of the cord and pulleys *v*, L, and S. The performer then depresses those keys, as above described, (in the order in which the different alphabets are arranged in the case or the type on the paper,) which designate the sounds in the words he wishes to write, being the words of a speech reported or any other words or thoughts, taking one letter from each alphabet (with the exceptions above) until all the sets of alphabets have been passed over, then again inking the machine, and so continuing, the paper being thrown along far enough for another line by the spring-bar F, or moved on rollers by the levers. Drawers may be made, as shown at *w*. A slight impression may be given with the type by indentation, or through paper saturated with a mixture of lamp-black and olive oil, or other similar mixture, in which case all the machinery for inking the type may be dispensed with.

The letters of the English alphabet may be used and several letters taken from each alphabet, if selected in any uniform order, one after the other. The number of type will, however, necessarily be so great as to cause the letters to be very much scattered on the paper, the number of type being nearly as many as the number of keys or letters in each alphabet.

What I claim as my invention, and desire to secure by Letters Patent, is—

The mode of representing letters and the sounds of letters by means of characters made by changes wrought upon a less number of movable type than the number of letters or sounds of letters represented, the type being made upon or attached to the bottom of wires or rods which are worked by keys at or near the top, substantially as herein set forth.

JOHN B. FAIRBANK.

Witnesses:

LEONARD CLARK,

IRA R. JONES.