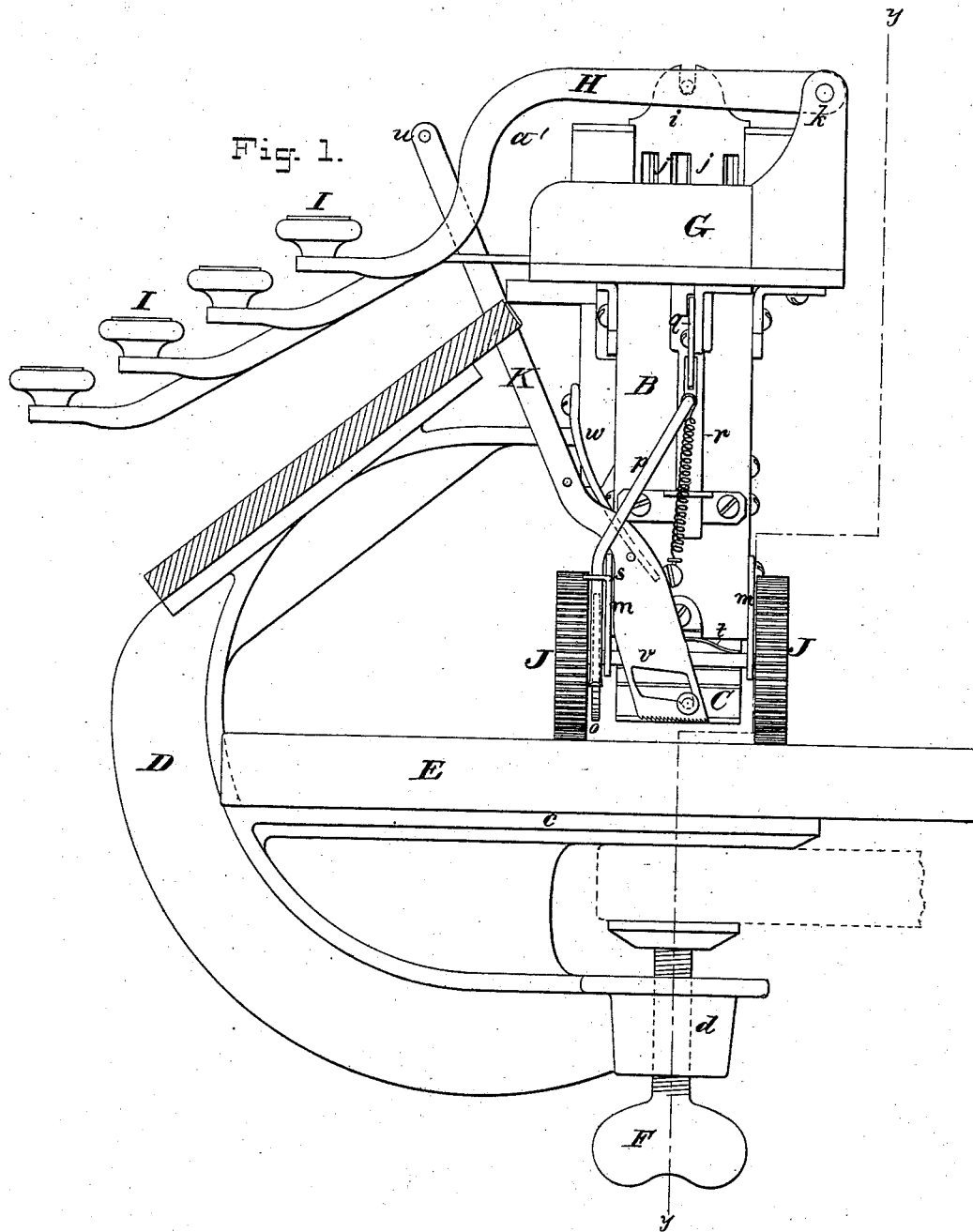


H. M. GRANT.
Type-Writing Machine.

No. 217,210.

Patented July 8, 1879.



ATTEST:

Arthur C. Fraser.

Walter W. Scott.

INVENTOR:

Henry M. Grant

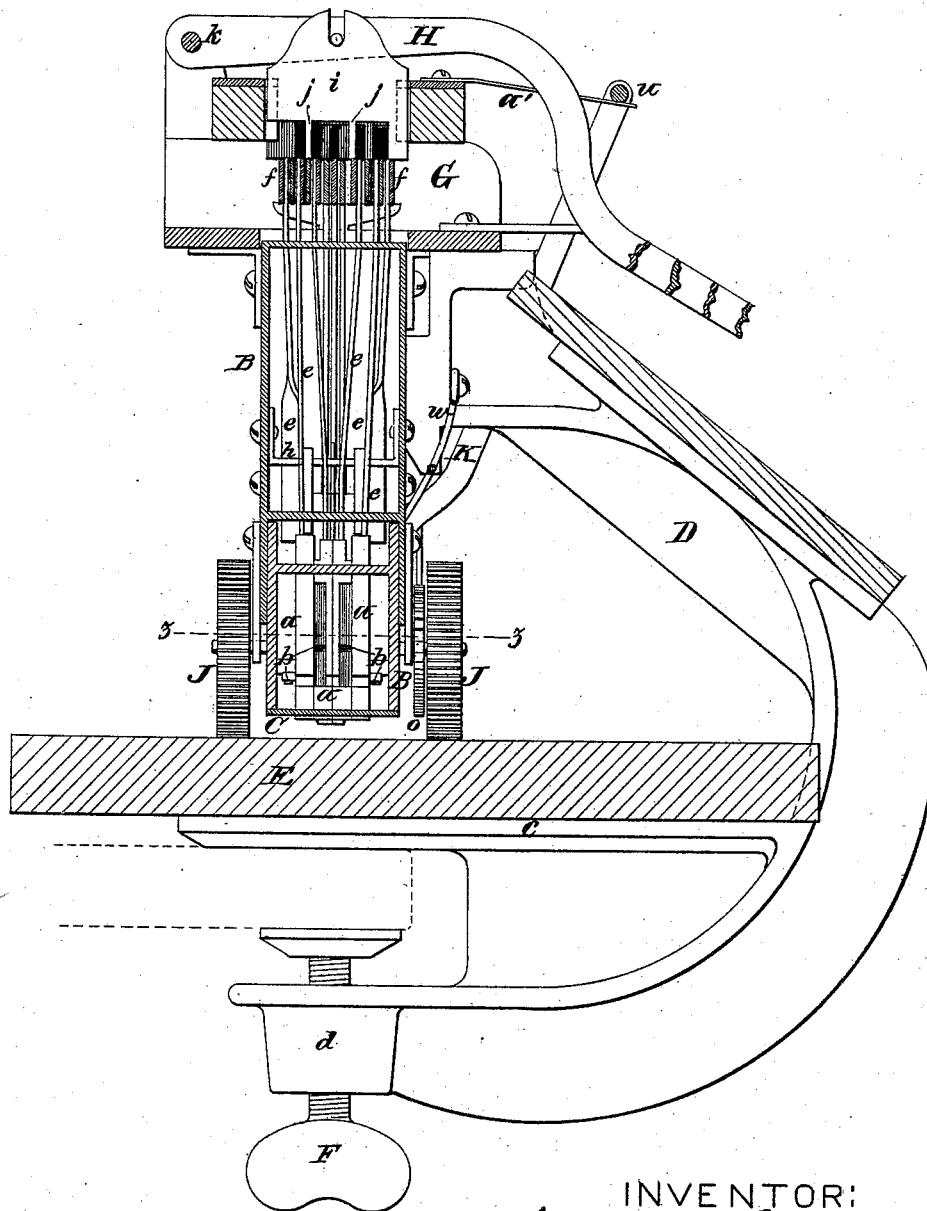
By Burke, Fraser & Connors
Attys

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Fig. 2.



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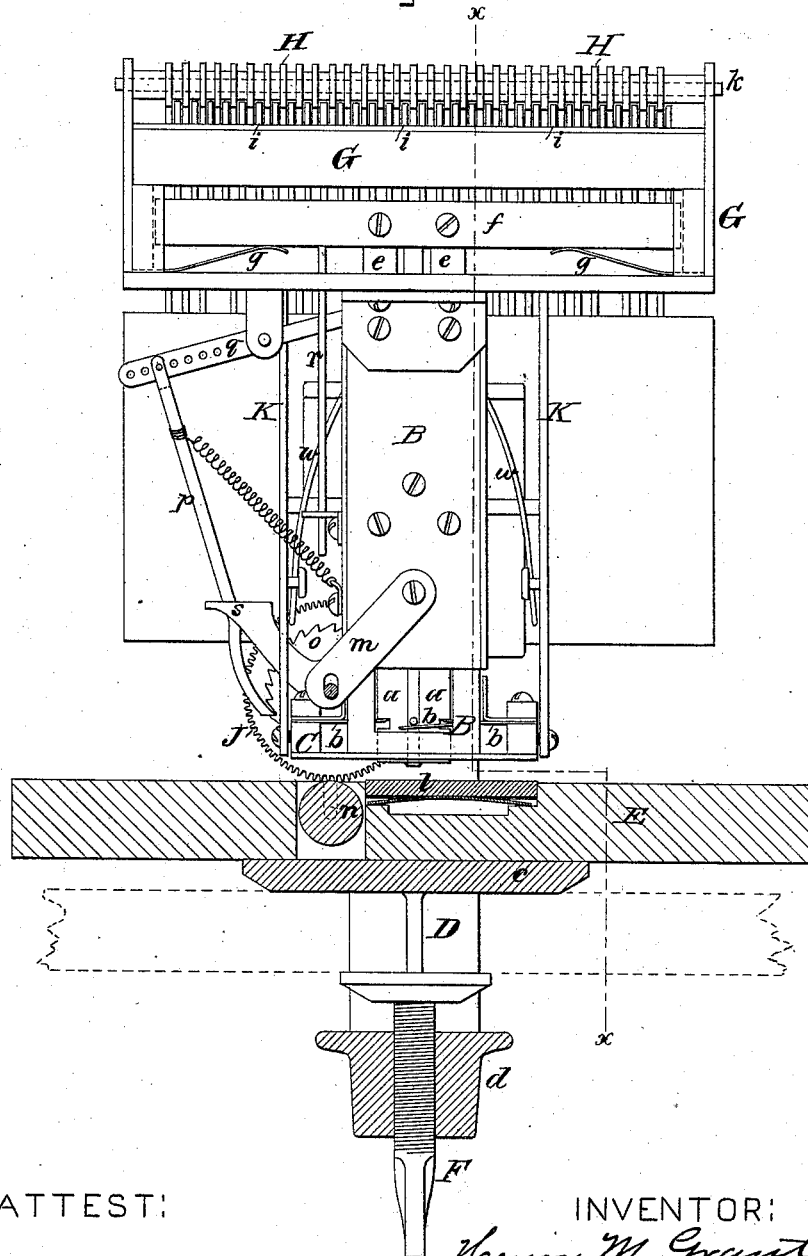
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Fig. 3.



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Fig. 4.

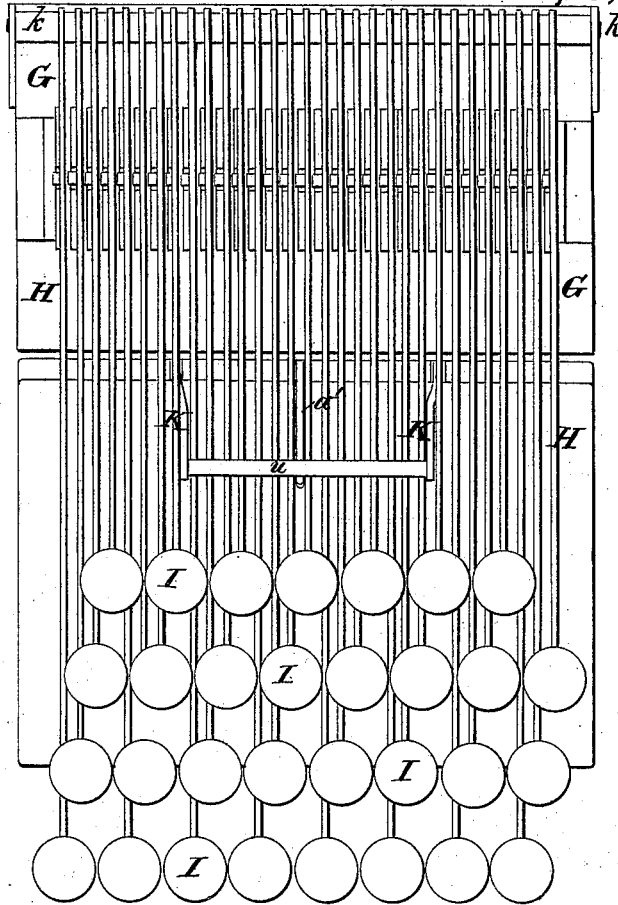
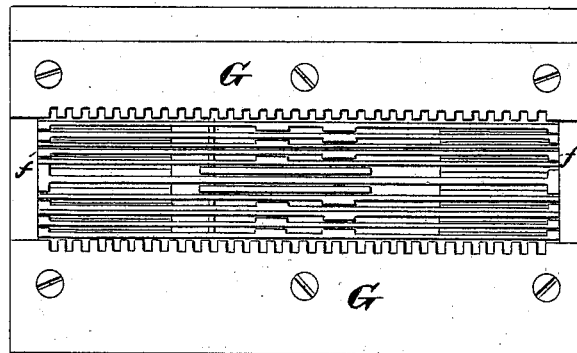


Fig. 5.



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Fig. 10.

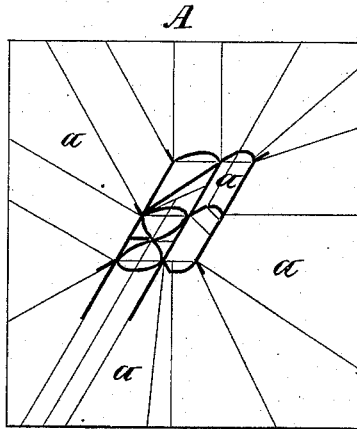


Fig. 11.

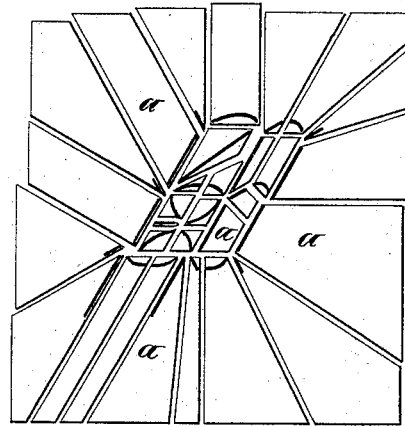


Fig. 12.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
STUVWXYZ abcdef
ghijklmnopqrst
vwxyz...

Fig. 13.

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UNITED STATES PATENT OFFICE.

HENRY M. GRANT, OF NEW PROVIDENCE, NEW JERSEY.

IMPROVEMENT IN TYPE-WRITING MACHINES.

Specification forming part of Letters Patent No. **217,210**, dated July 8, 1879; application filed July 25, 1878.

To all whom it may concern:

Be it known that I, HENRY M. GRANT, of New Providence, in the county of Union and State of New Jersey, have invented a Monogrammic Alphabet, and certain improvements in the method of and apparatus for mechanically writing or printing with the same, of which the following is a specification.

This invention relates to a machine for mechanically writing, printing, embossing, stenciling, or otherwise marking upon a proper surface the letters, figures, punctuation-marks, or other characters which constitute written language, by means of marks in the nature of elementary lines, curves, and dots formed on the ends of types bundled or nested together in a prearranged manner, so that the said marks will bear certain relations to each other with respect to the position in the monogram formed by all of the marks as grouped together.

The invention consists partly in the nest of types or parts, having its individual pieces constructed and arranged with respect to each other in a particular manner, as will be set forth; also, in a nest of types bearing upon their faces elementary marks, and the said types arranged to be protruded in combination with suitable keys and mechanism whereby such and such only of the types in the nest may be protruded by one manipulation of a given key-lever as will print or produce the letter in character prearranged to be produced by that key.

It also consists in various combinations and arrangements of the elements of the machine, mechanism, or apparatus, all as will be hereinafter set forth.

Figure 1 is a side elevation of the machine. Fig. 2 is a vertical section taken in the plane of the line *xx* in Fig. 3. Fig. 3 is a front elevation, the table and lower part being in section, taken in the vertical plane of the line *yy* in Fig. 1. Fig. 4 is a plan, and Fig. 5 is the same with the keys and their levers removed. Fig. 6 is a horizontal transverse section of the barrel or stock of the machine enlarged to show the details. This section is taken in the plane of the line *zz* in Fig. 2. Figs. 7 and 8 are end or face views of the monogram-nest, the latter showing the element-pieces slightly sep-

arated. Fig. 9 shows the alphabet and digits that may be printed or produced by the thirteen elements of the monogram shown in Figs. 7 and 8. Figs. 10, 11, 12, and 13 are modified forms of Figs. 7, 8, and 9, and will be referred to farther on.

The machine or mechanism which I prefer to use for mechanical writing or printing is constructed substantially as follows: I construct a number of pieces or parts, *a a*, which I group together in such a manner as to form a nest, which I will designate generally by the letter *A*. These are arranged for convenience so as to form a rectangle (see Figs. 7 and 10) when viewed endwise. Each part is given such a horizontal sectional contour as may be best adapted to its position or for operating it, and each bears on its face the element which belongs to its position in the monogram. In the present instance the element is a printing-surface, raised above the general level of the end, precisely as in ordinary printing-type; but it may be sunken below the surface, or be brought to a fine line or edge, so as to form a stencil-cutter.

The nest above described may be inclosed within a band or collar to keep the parts together, but in which each has longitudinal play independently of the others. This enables the nest to be removed from the machine and replaced by another, if it is desired.

Each piece or part *a* is supported upon and upheld by its own independent spring *b*, so that when the piece is depressed in the manipulation of the keys it will lift or fly back of itself as soon as the pressure is removed. These springs are made, preferably, like the teeth of a comb, being all affixed to a solid back; but this is only a matter of convenience. Upon noting Figs. 8 and 11, it will be seen that some of the parts *a a* are entirely surrounded by the others. To reach these with the springs it will be necessary, or at least convenient, to mortise or gain the outer ones. The ends of the springs in most cases enter nicks in the sides of the pieces, as shown by the dotted lines in Fig. 6, and are arranged in planes at right angles longitudinally to that of the nest *A*. In lieu of springs weights might be used to retract the parts.

The nest *A* is inclosed within a frame, *B*, to

which is secured a bottom or bed piece, C, to which the springs are attached. The frame B is secured to a curved arm, D, and to this arm is secured a bracket, e, upon which rests the printing bed or table E. The lower end of the arm may be provided with a boss, d, and screw F, whereby the machine may be attached to the edge of a desk or table, as indicated in Figs. 1, 2, and 3.

Upon the upper ends of the parts *a a*, which may be of different lengths or of one length, as found most convenient, rest depressors *e e*, each part or pair being provided with a separate depressor. These depressors are rigidly secured at the top to cross guide-bars *f f*, arranged to play vertically in guide slots or grooves in the top frame, G. The depressors *e e* need not be attached to the parts *a a* of the nest, but may simply rest upon them, being guided in their vertical play by a perforated guide-plate, *h*, through which they pass. They are upheld by and supported upon springs *g g*, arranged under the ends of the guide-bars *f f*, substantially as indicated in Fig. 3.

When arranged in place in their respective grooves the guide-bars present the appearance indicated in Fig. 5. Arranged transversely over the bars *f f*, and at right angles thereto, are upper depressors, *i i*, one for each letter, number, or other character capable of being formed by the monogram. These are also arranged to play vertically in guiding-grooves in some part of the top frame, G, and each is connected in a suitable manner with its respective key-lever H, through which the manipulation of the depressors is effected.

Each of the depressors *i* is provided on its lower edge with one or more points or projections, *j j*, arranged directly over and to rest upon such of the guide-bars *f f*, and such only, as will, when the depressor *i* is pressed down, actuate the elements in the nest A that will form the letter or character prearranged to be produced by the key and depressor manipulated.

It must be understood that each of the depressors *i* will be differently constructed with respect to the number and arrangement of the points or projections *j*, as each depressor is prearranged to produce or develop a different character from the monogram.

The key-levers H H may be provided with fulcrum-pivots at *k* by being arranged upon a rod secured to the frame G, or they may be arranged in any other good and convenient way.

For convenience of manipulation I prefer to arrange them in banks, with buttons I I to receive the pressure of the fingers, and these may be marked legibly with the letters or characters they are prearranged to produce on the surface to be printed, embossed, or stenciled.

To form an elastic bed to receive the impression, I prefer to arrange in a recess in the table E, immediately below the nest A, a block, *l*, of rubber or equivalent yielding material, which may also rest upon a spring to give it

additional elasticity. This block is adapted mainly to receive the impression in writing or printing with colors or pigments on a printing-surface.

In cutting a stencil a harder surface or bed may probably be employed to advantage, or a hard plate with the monogram cut or recessed in it to correspond with the cutting-faces of the elements may be used.

The operation of printing is substantially as follows: Carbonized paper, a ribbon, or some other suitable inking device or mechanism being provided, as in hand-stamps, the paper or other printing-surface is placed upon the elastic bed *l*, and one of the buttons I smartly depressed. This depresses a depressor, *i*, and it, acting upon certain guide-bars *f*, causes the said bars to actuate certain of the parts *a* in the nest A through the lower depressors, *e*.

When the parts *a* are actuated, they protrude below and impinge upon the printing-surface, leaving the impression of the letter or character belonging to the key struck. As soon as the finger is removed from the key-button, the springs *b g* return the parts *a* and the depressors *e* to their respective places.

To feed the paper or printing-surface along so as to make room for the next letter or character, I employ, preferably, the following-described mechanism:

J J are feed-wheels (preferably two) fixed on a shaft which has elongated bearings in brackets *m m* on the frame B. These wheels rest upon a roller, *n*, which has bearings in a slot in the table E, and which is flush with the upper surface of the same, or nearly so. On the inner face of one of the wheels J is fixed a ratchet-wheel, *o*, and with this engages a spring-pawl, *p*, adjustably jointed or pivoted to a lever, *q*, at its upper end, substantially as represented in Fig. 3. The lever *q* is fulcrumed in a bracket on the top frame or some other fixed part, and its other end engages a slot or mortise in a T-headed rod, *r*, arranged to play in guides on some fixed part of the machine. The horizontal head of this rod is arranged transversely underneath all of the bars *f*; so that whichever key may be depressed the feed will be actuated.

The operation is as follows: Whenever a key is depressed the bar or bars *f* actuated by the same will depress the rod *r*, and through it the inner end of the lever *q*, the outer end of which rises. This lifts the pawl *p* (which plays in a guide-bracket, *s*) from the notch of the ratchet in which it last rested to the one above, or it may pass over several ratchet-teeth. When the finger is removed from the key-button the spring on the pawl is permitted to draw the latter down, and to rotate the feed-wheels through the medium of the attached ratchet *o*, thus feeding the paper along a sufficient distance to receive the next impression.

The lever *q* is provided with a number of coupling-holes, whereby the pawl is attached, and by connecting the latter at different

points the amount of feed may be regulated. Other methods of adjustment may be used, however, if preferred.

For spacing between words a guide-bar, *f*, unprovided with a depressor, *e*, but properly provided with a spacing-key, may be used. By manipulating such key the paper is fed along, but no impression is received from the nest *A*. After a line has been completed on the paper the latter is drawn back to the starting-point, the feed-wheels rotating freely backward to allow the paper to pass. They are provided with roughened surfaces and held down elastically against the roller *n* or the interposed printing-surface by a spring, *t*, which presses on their shaft; or, in lieu of a spring, the weight of the parts may serve to keep them down.

Before proceeding to print another line below that just completed it is necessary to employ what I call a "line-spacer," which may be constructed and arranged as follows: *K K* are two bars, tied together by two tie-rods, the upper one, *u*, above the key-levers, being used to manipulate the device. The lower ends of the bars are slotted at *v v*, and engage slot-pins in the frame, and their under faces or ends are toothed or serrated. The slots are somewhat cam-shaped, and are so arranged that when the rod *u* is depressed the serrated feet of the bars are first pressed obliquely upon the printing-surface, and then pushed horizontally over the table, carrying the paper with them. The bars are retracted by means of springs *w w*, which engage pins in them, and are lifted and sustained by means of a spring, *a'*, or its equivalent, substantially as shown.

The nest of elementary parts shown in Figs. 7 and 8 consists of thirteen pieces, which bear on their ends as many elements, arranged in the form of a monogram, as shown. Of these thirteen elements there are really but four kinds, there being more than one of a kind. These will produce the letters, figures, and other characters shown in Fig. 9 without changing or in any way altering the relative positions of the parts or elements, the only requisite being that such parts as are not needed shall be removed or obliterated or not used. These thirteen pieces are arranged with respect to each other as follows: four corner-pieces bearing angular marks, four side pieces bearing vertical marks, two end pieces bearing curved horizontal marks, two inclosed pieces bearing centrally-arranged vertical marks, and one central piece bearing a horizontal mark.

In Figs. 10 and 11 is shown a nest of a more complex kind, which is capable of producing all the letters and characters shown in Fig. 12 and the figures or digits in addition thereto. This nest consists of thirty pieces, and produces the small as well as the capital letters.

In Fig. 13 is shown a monogram adapted to produce no capital letters, but only those known as "lower-case" or small letters. This

may be used by itself or be provided with a mark to indicate capitals.

Nests containing the same number of pieces may be interchanged in the machine without difficulty, so as to produce a large or small letter, as desired.

I contemplate cutting a stencil in paper, or its equivalent, by means of my machine, whereby a number of copies may be taken from one writing or printing. This may be done by bringing the relief-faces of the elements to a fine or sharp edge, and cutting away a little of each at the points where the lines join, so as to leave ties to prevent the interior parts of such letters as have interior parts from falling out of the stencil after it is cut. The operation of cutting the stencil is the same as that of writing or printing, in substance, except that the ink is omitted. After being cut the stencil may be used in the ordinary way.

In ordinary mechanical writers using the entire set of completed characters in the form of types arranged upon the ends of levers and adapted to strike in the same place, it is found impossible to manipulate the keys with great rapidity, as one type must be allowed time to fall out of the way before the next key is struck. In using my nest of parts, each, any, or all may be struck simultaneously, or in infinitely quick succession, if desired, the speed of manipulation being limited only by the dexterity of the operator and the retractive efficiency of the springs. The speed of manipulation is also facilitated by the very short distance traveled over by the pieces before coming in contact with the paper. I wish it understood, however, that as no two of the elements of my monogram are ever in the same place, or ever impinge at the same point upon the bed of the machine, the parts *a a* may be attached to levers and be operated as complete type, except that several may be required to be used at once to form the character or letter.

In addition to its adaptation for mechanical writing, or to embossing or cutting stencils, my monogrammatic alphabet is adapted to teaching or for amusement. This end may be attained by sinking or recessing the monogram in a block and supplying the elements to fit into the same. Thus the learner may slip into the recesses only such as are necessary to form a given letter, and an accurate knowledge of the elemental parts of the letters and figures be attained.

I have shown the mechanism constructed and arranged so as to be operated by keys to be manipulated by the fingers; but I may operate the mechanism by means of any force—by machinery, electricity, or any other motive power. It is a part of my plan to employ this mechanism and my invention in telegraphy. In this way, by a proper arrangement in the usual methods of telegraphy, an operator may stand in one city and operate my machine in another city without the intervention of any human force.

It will be seen that in my machine, or in the precise form of the same illustrated in the drawings, the paper or other material to be written or printed upon lies flat upon a table, face up, as in ordinary writing with a pen. The advantage of this arrangement is obvious, as it enables the operator to observe the progress of the writing, and to manipulate the paper to better advantage and with less loss of time than when in an inaccessible position, or turned face downward. If preferred, the paper may be clamped or fastened to a moving table and this fed along by the operation of a suitable feed mechanism.

It is unnecessary to state every adaptation of the invention; but the above are perhaps the most important; nor need the precise construction shown be followed in all cases.

I claim as my invention—

1. The nest A, composed of the parts *a a*, thirteen in number, bearing upon their ends the marks shown in Figs. 7 and 8, and arranged with respect to each other substantially as therein shown—that is to say, four corner-pieces bearing angular marks, four side pieces bearing vertical marks, two end pieces bearing curved horizontal marks, two inclosed pieces bearing central vertical marks, and one central piece bearing a horizontal mark, the whole being capable of producing the letters shown in Fig. 9 without transposition of parts, substantially as set forth.

2. The nest A, arranged within a suitable frame, in combination with key-levers and depressors arranged to act upon the pieces of the nest in the manner described, so that each key-lever, when struck, will depress simultaneously all of the elements or pieces necessary to form or print the letter or character prearranged to be produced by said key-lever, substantially as set forth.

3. A nest of pieces having certain elementary marks, in the nature of straight lines, curves, and dots, formed upon their ends, the said pieces being symmetrically bundled together in a prearranged manner, so as to produce a monogram from which the letters, num-

bers, and other characters which make up the constituents of written language may be printed, embossed, or stenciled, in combination with the mechanism whereby the manipulation of a single key-lever will depress or protrude simultaneously such and such only of the pieces in the nest as are necessary to form the letter or character appertaining to that key, substantially as set forth.

4. The nest A, arranged within a guiding-frame, in combination with the vertical depressors and guide-bars *e f* and the upper depressors, *i i*, provided with projections *j j*, all arranged to operate substantially as set forth.

5. The nest A, composed of the pieces *a a*, arranged and provided with elastic supports, substantially as set forth, in combination with the vertical depressors *e e*, provided with guide-bars *f f*, the upper depressors, *i i*, provided with points or projections *j j*, to impinge upon the bars *f f*, and suitable keys or key-levers *H H* to actuate the depressors, substantially as set forth.

6. The combination of the key-levers *H H*, guide-bars *f f*, depressors *e e*, T-headed rod *r*, arranged beneath all of the guide-bars, and upper depressors, *i i*, arranged between the key-levers and the guide-bars, substantially as set forth.

7. The combination of the feed-wheels *J J*, arranged to be held down to the printing-surface by elastic pressure, the ratchet *o*, pawl *p*, lever *q*, rod *r*, guide-bars *f f*, depressors *i i*, and key-levers *H H*, all arranged to operate substantially as specified.

8. The line-spacer consisting of the bars *K K*, tied together, substantially as shown, and provided with roughened ends, slots *v v*, and springs *a'* and *w w*, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY M. GRANT.

Witnesses:

HENRY CONNETT,
ARTHUR C. FRASER.