(No Model.) 2 Sheets—Sheet 1.

H. J. THOMAS.

TYPE WRITING MACHINE.

No. 346,000 Patented July 20, 1886.

Fig. 1.

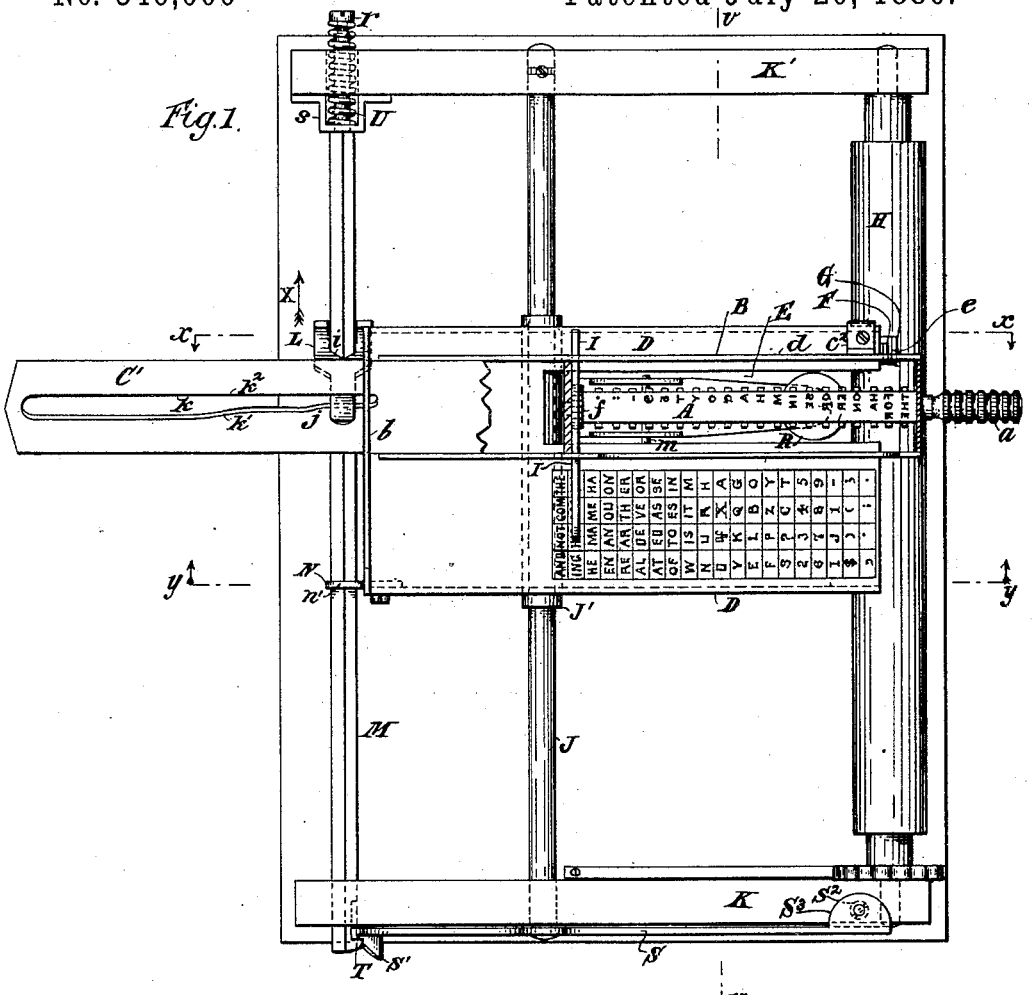
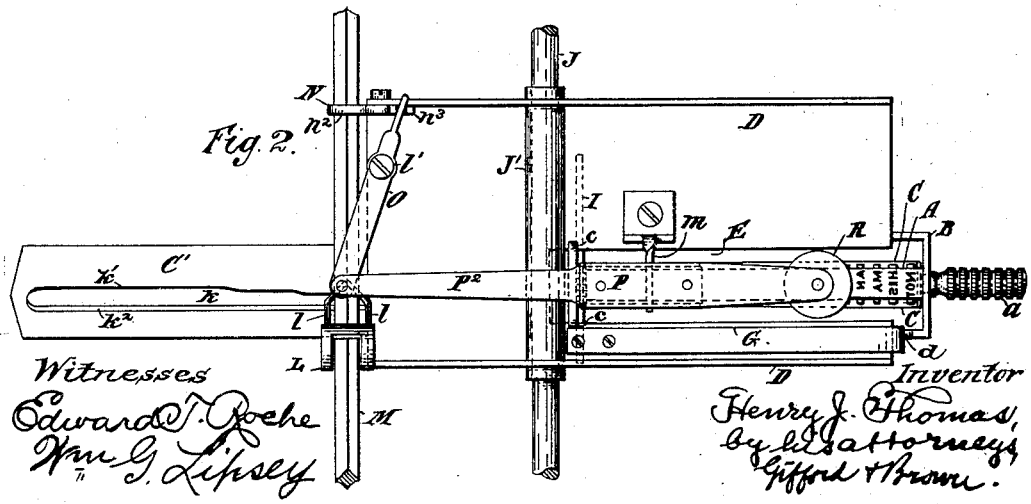


Fig. 2.



Witnesses
Edward J. Roche
Wm. G. Lipsey

Inventor
Henry J. Thomas,
by his attorneys
Gifford & Brown.

(No Model.) 2 Sheets—Sheet 2.

H. J. THOMAS.

TYPE WRITING MACHINE.

No. 346,000. Patented July 20, 1886.

Fig. 3.

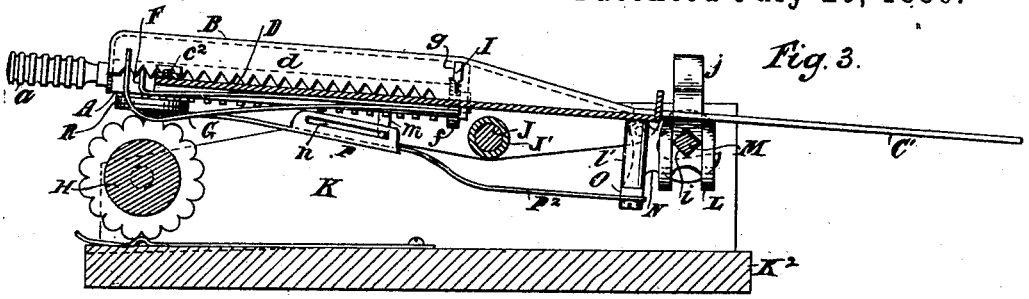


Fig. 4.

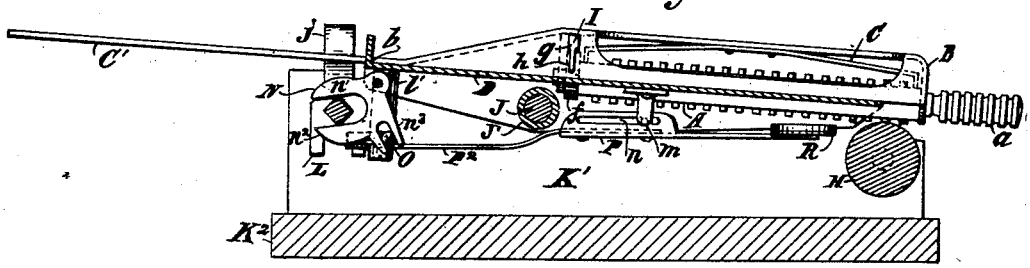


Fig. 5.

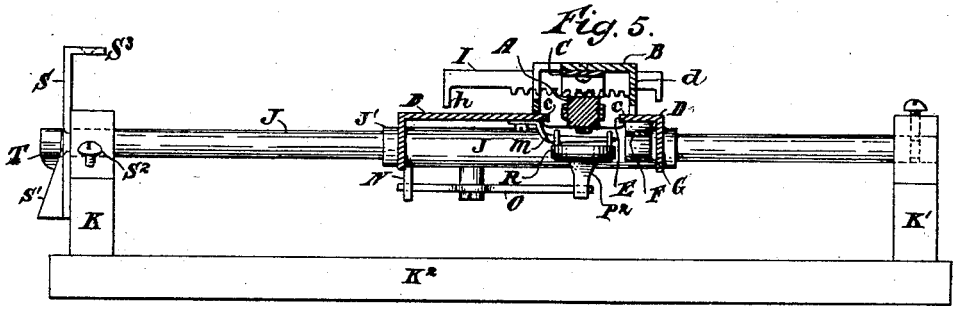
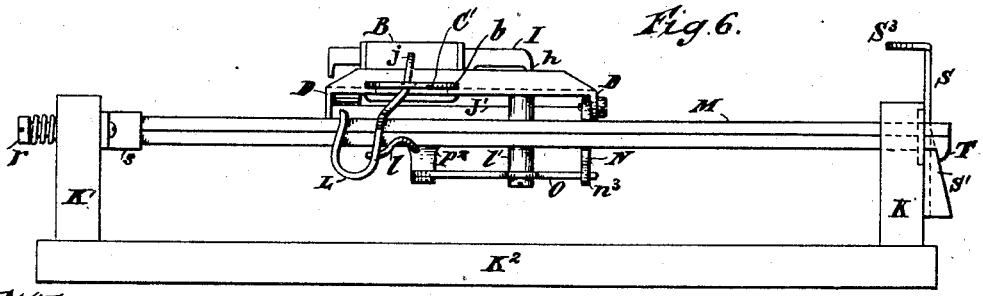


Fig. 6.



Witnesses
Edward F. Roche
William E. Libsey

Inventor
Henry J. Thomas
by his attorneys,
Gifford & Brown

UNITED STATES PATENT OFFICE.

HENRY J. THOMAS, OF NEW YORK, N. Y., ASSIGNOR OF FOUR-SIXTHS TO ABRAM E. PRATT, OF SAME PLACE, AND SIDNEY C. THOMPSON, OF BROOKLYN, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,000, dated July 20, 1886.

Application filed January 27, 1885. Serial No. 154,173. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. THOMAS, of New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Type-Writing Machines, of which the following is a specification.

I will describe a type-writing machine embodying my improvement, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a plan view of a type-writer embodying my improvement, a certain part being removed to render visible parts which otherwise would be concealed. Fig. 2 is a view from beneath the same, the base-piece of the machine being removed. Fig. 3 is a transverse section of the same, taken at the plane of the line *x x*, Fig. 1, and looking in the direction indicated by the arrows at the ends of said line. Fig. 4 is a transverse section thereof, taken at the plane of the dotted line *y y*, Fig. 1, and looking in the direction of the arrows at the ends of this line, the parts in this view being shown in a different position from that in which they are shown in Fig. 3. Fig. 5 is a section thereof taken at the plane of the line *v v*, Fig. 1, and Fig. 6 is a rear view thereof.

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

A designates a type-form, here shown as having a body which is rectangular in shape, and rows of types arranged longitudinally upon its sides. It may be cast of metal having the type raised thereon, or I may, if desired, apply thin sheets of metal, india-rubber, or other suitable material thereto, upon which types are raised. This type-form is journaled in bearings in a frame or holder, B. It extends longitudinally in the direction of the length of said frame, or at right angles to the length of the base-piece of the machine, and is adapted to be rotated, as here shown, by means of a hand-piece, *a*, upon the outwardly-extending end thereof.

C designates a spring for securing the type-form in different positions in the course of its rotation. I prefer to arrange said spring above the type-form and extend it in the direction of the length thereof. The spring C is secured about midway of its length to the upper portion of the frame B by rivets or otherwise. Each of the free portions of the spring converges downwardly toward the type-form B, and at the end is bent at approximate right angles to its length, and bears upon the type-form beyond the types. The type-form shown in this example of my improvement is adapted to receive three-quarters of a complete rotation in either direction, and the spring C tends to retain it at any desired one of the several quarter-rotations, in order to obviate rotary movement thereof while printing is being done. The frame B is mounted on a table, D, and adapted to be moved in a longitudinal direction, or toward the front or rear of the machine. In these movements the type-form of course moves with it. These movements may be imparted to the frame and type-form by grasping the hand-piece *a* and drawing it forward or pushing it backward. The frame B, in moving backward and forward upon the table D, travels above a longitudinal slot or opening, E, with which the table is provided. The frame works along guides, with which the table is provided. One of said guides consists of a slot, *b*, arranged in an upturned rearward portion of the table D, through which passes a flat strip or tail-piece, C', on the frame B. Another of said guides is formed by the longitudinal edges of the slot E in the table, the frame being provided with a downwardly-extending plate or portion, which has notches *c* fitting the longitudinal edges of the slot or opening E in the table D. Another guide, c^2, upon the upper surface of the table D tends to prevent lateral movement of the frame B in one direction independently of the table. The frame B is moved backward and forward for the purpose of bringing type arranged at different points in the length of the type-form A into position for printing upon paper or other material supported by a bed-roller, H. This bed-roller may be of any suitable construction, and is journaled in the side pieces, K K', of the base-piece K^2. It is intended to have a partial rotation after each line of printing has been done. I have

shown no mechanism for imparting motion to it, because I may use mechanism of ordinary construction for this purpose. For the same reason I have entirely omitted the mechanism for feeding the material to be printed upon.

It is desirable, when a type is brought into position for printing, that the frame should be there held and its reciprocal movement stopped while the type is being printed. To accomplish this I have serrated one of the edges *d* of the frame B, which rests upon the table D. A flat spring, F, acts in conjunction with said serrations. (Shown clearly in Fig. 3.) One end of said spring is secured, by rivets or otherwise, to the table D, upon the under side thereof, and the free end is curved upwardly, so that normally the upturned end rests within one of the serrations. The upturned end of the spring may, however, move in and out of the serrations as the frame-like device B is moved backward and forward. I have shown another flat spring, G, secured at one end in like manner to the table D, and adapted to bear near its free end upon the bed-roller H. By means of this spring the table is supported above the bed roller when the type is not engaged in printing. The spring G likewise has its free end turned upwardly, and is notched or set off to one side, as at *e*, to admit of the free downward movement of the frame B. The upturned ends of the springs F and G may advantageously be at such distance apart that when the frame B is pressed downwardly one of the teeth upon the serrated edge *d* will pass between the end of the spring F and the horizontal edge in the notch *e* of the spring G. The frame B is thereby locked and prevented from longitudinal movement when the type is down upon the paper. It is not, however, absolutely necessary to employ the spring G in conjunction with the spring F to lock the frame. Just forward of the point at which the type-form A is journaled at its inner or rear end to the frame B said type-form has secured to it a pinion, *f*. Said pinion acts in conjunction with a rack-bar, I, which latter is thereby moved backward and forward in a direction transversely to the length of the frame B through suitable slots, *g*, in said frame. The rack-bar I is supported in its movements upon a rib or shoulder extending throughout its length and resting upon shouldered edges of the slots *g*. One end of said rack-bar is curved downwardly to form a pointer, *h*, and the other end thereof has a downwardly-projecting lug, which limits the movement of the rack-bar in one direction. The pointer *h* extends over a series of letters, figures, and other characters arranged upon the table D. Said characters correspond in kind to the type upon the type-form A, and are arranged in four rows, corresponding to those upon the four sides of the type-form shown in this example of my improvement, except that whereas the types of greatest length are shown as farthest toward the rear upon the table D, and those of shortest length as farthest to the front thereof, those upon the type-form are arranged in exactly the reverse direction, or with the shortest types toward the rear and the longest toward the front of the machine. By rotating the type-form A, and by moving the frame B backward and forward, the pointer *h* may be brought above any character which it is desired to print. The corresponding type is then in a position to reproduce the same upon the paper being printed upon. The table D is supported upon a rod, J, in suitable bearings, here shown as a sleeve, J′, arranged about said rod. The rod J extends transversely to the length of the table D, and is secured at each end in the side frames, K K′, of the base-piece K². Said table may be swung up and down on said rod and be moved along on the same.

L designates a clutch arranged upon a rod, M, here shown as rectangular, extending between the side frames, K K′, to the rearward of the rod J. This clutch is preferably made of one piece of metal, and has in it a rectangular aperture, *i*, whereby it is fitted about the rod M, so that it cannot rotate upon the same. It is bifurcated below the aperture *i*, and the bifurcated ends thereof are turned upwardly, one upon each side of the rod M, and act as guides for the clutch in its movements backward and forward upon said rod. The clutch has a portion, *j*, extending upwardly above the rod M, which portion enters a slot, *k*, in the portion C′ of the frame B. The edges *k*′ *k*² of said slot are beveled in the same direction, or toward the body of the clutch, and the portion *j* of the clutch is bent in such manner as to present an inclined surface to the edges of the slot corresponding to the incline of the bevels. When the table D is rocked downwardly in front, it causes the beveled edge *k*′ of the slot *k* to travel along the under side of the bent portion *j* of the clutch L, by which means the clutch is moved along in the direction of the arrow X in Fig. 1. When, however, the table D is rocked upwardly in front, the beveled edge *k*² of the slot *k* is caused to travel along the upper side of the bent portion *j* of the clutch L. Said clutch is thereby canted toward the edge *k*′ of the slot *k* in such manner that it is firmly locked upon the rod M. The continued upward movement of the table D, and consequent downward movement of the portion C′, then causes the beveled edge *k*² of the slot *k* to slide along upon the inclined upper surface of the portion *j* of the clutch L, thereby imparting a forward movement to said table and its appurtenances in the direction of the arrow X, Fig. 1. I have shown a spring, *l*, arranged upon the clutch L beneath the rod M and upon the side of the clutch opposite to the bifurcated upturned ends thereof. This spring bears against the under side of the rod M, and tends to maintain the clutch in such a position that it will not bind when being moved to the right, or in the direction of the arrow X in Fig. 1, by force applied through the tail-piece C′. When it is desired to move the table

D and its appurtenances to the left, or in the opposite direction to the said arrow, the clutch may be grasped by hand below the rod M and canted upon said rod. The influence of the spring *l* is thereby overcome, and the clutch and table may then be moved back freely; or the tail-piece C′ may be rocked downward upon the upturned bifurcated end of the clutch L, as shown more clearly in Fig. 3. The hold of the clutch upon the rod M will thereby be relieved, and the table D and its appurtenances may be moved back freely in a direction opposite to the arrow X. It will be observed that the slot *k* varies in width, the variations being produced by the deviation from a straight line of the edge *k′* thereof, which is the edge by which the clutch is moved along on the bar M. This variation is for the purpose of increasing and decreasing the distance which the clutch and the table D, with its appurtenances, shall be moved in the direction of the arrow X. This is made necessary for the following reasons: By my type-writer I am enabled to produce a great number of characters and combinations of characters including many words of two and three letters. It is obvious that when a word is printed therewith having three letters the type-form must be moved along farther before another letter or word is printed than would be necessary if but a single letter were printed each time the type is brought into contact with the paper. I have shown the single letters and characters arranged upon the table D nearest the front end thereof, those of two letters or their equivalent in width next to the rearward of the single letters, and those of three letters behind those of two letters. It will be seen, therefore, that when single letters are being printed the pointer *h* is well to the front of the table D, and the portion C′ has been drawn forward proportionately. The edges of the slot *k* are then acting upon the clutch at the widest part of the slot, whereby only a short movement of the table D, and consequently of the type form, is effected in the direction of the arrow X; but when words of two or three letters are being printed the pointer *h*, and likewise the portion C′, has been moved backward, the edges of the slot are therefore acting upon the clutch at the narrower parts of the slot, and the distance which the type-form is moved is increased accordingly. By this means the variations necessary in spacing are effected automatically.

I will now describe the device for inking the type, of which N is a bell-crank lever fulcrumed to a downwardly-extending portion of the table D, near the rear end of the table. This lever has upon one of its arms jaws *n′* n^2. The jaw *n′* extends above the upper side of the rod M. The jaw n^2 extends beneath the lower side of said rod. The other end, n^3, of the lever is bifurcated and receives between its bifurcated ends one end of a lever, O, which lever is fulcrumed upon a post, *l′*, extending downwardly from the table D and rigidly affixed thereto. The other end of the lever O is pivotally connected to one end of a lever, P, made resilient or with a resilient portion, P^2. This lever P is fulcrumed upon a bracket, *m*, upon the under side of the table D, and extends in the direction of the length of the type-form A. An arm of the bracket extends through slots *n*, which, as here shown, are in upturned portions of the lever P. The said arm is notched to receive the edges surrounding one of said slots, whereby lateral movement of the lever is prevented.

Upon the end of the lever P nearer the front of the machine is arranged an inking-pad, R. Said pad is loosely pivoted at its center upon the lever P and may turn freely about said pivot. When the table is rocked upwardly, the jaw of the bell-crank lever N which extends above the rod M is caused by the said bar to be rocked upwardly The bifurcated end of the bell-crank lever is then rocked toward the rear of the machine, and operates to move the end of the lever O with which it is in contact along with it, and the other end of the lever O to be accordingly moved toward the front of the machine, carrying with it the lever P, which is moved along on the arm of the bracket *m*, upon which it is fulcrumed. It will be observed, also, that when the forward end of the table D is raised the rearward end is depressed and carries with it the post *l′*, upon which the lever O is fulcrumed, so that said lever is moved bodily downward and carries with it in its downward course the end of the lever P to which it is connected. By this means not only is the lever P moved forward toward the front of the machine, but its forward end is rocked upward toward the type upon the type-form A. When the lever P is moving forward, the rear end of the slots *n* is caused to abut against the bracket *m* before the rear end of the table D, and consequently the lever O, has reached its farthest downward movement. The further downward movement of the lever O therefore causes the lever P to turn as on a pivot upon the arm of the bracket *m*, and the pad R upon the lever P is moved forcibly upward against the type upon the type-form without any additional forward movement of the lever P. The pad R is so arranged that when it reaches the type it strikes it at a point off from the center of the pad, and when the pad is moving away from the type there may be a slight drag on the type, which serves to turn the pad a little, so as to bring fresh portions of the same successively into contact with the type. When the forward end of the table D is moved downwardly, in order to bring the type upon the type-form A into contact with the paper to be printed upon, the rear end of the table D is raised. The jaw of the bell-crank lever N which is beneath the rod O, being in contact with said rod, is held thereby, so as to prevent the lever from following the vertical course of the adjacent end of the table D, causing said lever to be rocked so as to shift the lever O and draw backwardly the lever P, so

that when the type reaches the paper the pad has moved backward and wholly out of the way of the type.

S designates a lever, which can be manipulated at the same time with the table D, to effect the spacing between words. It is, as shown, fulcrumed upon the side frame K, upon the outside thereof. Its rearwardly-extending end has upon it a wedge, S′, preferably made integral therewith. Said wedge is adapted to operate in conjunction with a corresponding inclined surface upon the inner side of a projection or lug, T, upon the outwardly-extending end of the rod M. When the wedge is moved upwardly, it operates to draw the said rod outwardly through the said frame K. When the force operating to move the wedge upwardly is removed, a coil-spring, U, arranged about the rod M at the portion thereof adjacent to the side frame K′, operates to draw the said rod back to its normal position. The inclined surface on the lug T will then force the wedge downwardly out of contact therewith. I have shown said spring as abutting at one end against the head of a screw, *r*, fitting in a screw-hole in the end of the rod M, and at the other against a bracket, *s*, secured to the inner side of the side frame K′ and about the rod M. By tightening or loosening the screw *r* the tension of the spring U may be increased or decreased, in order to regulate the action of the lever S. When the last type-character is reached in printing a word, the type-form A and the lever S are pressed downwardly in unison. The rod M is moved outwardly by the wedge S′, as previously described, without, however, imparting a retrograde movement to the clutch L or the table D. When, therefore, the table D and the lever S are moved upwardly in unison, the forward impetus given to the table D and its appurtenances is not only that which ordinarily results from the action of the clutch L, but has added thereto that occasioned by the returning movement of the rod M. By this means the spacing between words is effected. It will be seen, therefore, that the spacing between words may be effected simultaneously with the movement of the frame B which causes the spacing between letters, thus obviating two movements—one for spacing the letters and the other for spacing words. Much time in writing is thereby saved. I arrange a stop, S^2, here shown as a screw, upon the upper side of the side piece K, beneath an inwardly-projecting lip or lug, S^3, upon the lever S. When the front end of the lever S is moved downwardly, the lip S^3 comes in contact with the stop, and the action of the wedge S′ upon the bar M is thereby limited. By adjusting the stop, therefore, the length of movement of the bar M can be shortened or lengthened, and the length of the spaces between the words regulated as desired.

I do not wish to be understood as limiting myself to the use of a type-form having four sides only, as I may use a type-form having any desired number of sides.

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

1. In a type-writing machine, the combination of a bed-roller, a type-form arranged in a direction at right angles thereto, a hand-piece for rotating the same, arranged in front of the machine, a rocking table, a frame supporting said type-form, mounted upon said table and capable of being slid thereon in a direction transversely to the length of the bed-roller, letters or characters arranged upon said table in columns extending transversely to the length of the bed-roller, and a pointer, independent of the means for rotating the type-form mounted in said frame, extending over said letters or characters, sliding with said frame, and reciprocated by the type-form when the latter is rotated, substantially as specified.

2. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a table upon which said frame slides, a tail-piece on said frame provided with a tapering slot, a rod upon which said table may slide, and a clutch operating in conjunction with the frame for moving the table and its appurtenances along for varying distances automatically, substantially as specified.

3. In a type-writing machine, the combination of the type-form A, the sliding frame B, the table D, the portion C′ of the frame B, provided with the slot *k*, of varying width, the clutch L, having the portion *j* entering said slot, and the rod M, substantially as specified.

4. In a type-writing machine, the combination of the type-form A, the sliding frame B, the table D, the rod J, upon which said table is supported, the portion C′ of the frame B, provided with the slot *k*, having the beveled edges *k′ k²*, the clutch L, having the bent portion *j*, and the rod M, substantially as described, whereby when the forward end of the table D is rocked downwardly it will operate to move the clutch along in one direction upon the rod M, and when the same is rocked upwardly it will operate to lock the clutch upon the rod M and move the table and its appurtenances along upon the rod J.

5. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, provided with a slot of varying width, a table upon which said frame slides, words, syllables, and single letters or characters arranged in graduated rows upon said type-form, similar words, syllables, and single letters or characters arranged upon the table in correspondingly-graduated rows, a pointer extending over the same and supported in the sliding frame, and a clutch operating in conjunction with said slot, substantially as described, whereby when the pointer has been moved into a position over a word, syllable, letter, or character which it is desired to print the corresponding word, syllable, letter, or character upon the type-form will be in position for printing, and

when the same has been printed the clutch will operate automatically to move the table and its appurtenances along a distance equal to the length of said word, syllable, letter, or character.

6. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a table upon which said frame slides, a clutch for moving said table and its appurtenances along in one direction, a longitudinally-movable rod upon which said clutch is mounted, a lever for moving said rod, but not the clutch, in one direction, and a spring for moving the rod and the clutch in the opposite direction, substantially as specified.

7. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a table upon which said frame slides, a clutch for moving said table along in one direction, the rod M, upon which said clutch is mounted, the lever S, having the wedge S′, the projection or lug T on the rod M, and the spring U, substantially as specified.

8. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a rocking table upon which said frame slides, levers arranged beneath said rocking table and supported thereby, an inking-pad on one of said levers, and the rod M, substantially as described, whereby when the forward end of the table is rocked upwardly the pad will be moved forward and upward against the type to be printed, and when the same is rocked downwardly the pad will be moved downward and backward from said type.

9. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a table upon which said frame slides, a clutch for moving said table along, a rod upon which said clutch slides, a lever for imparting horizontal movement to said rod, and an adjustable stop for limiting the movement which the lever will impart to the rod, substantially as specified.

10. In a type-writing machine, the combination of the table D, the frame B, the rod M, the clutch L, the lever S, having the wedge S′, the lip or lug S^3 on said lever, the stop S^2, and the spring U, substantially as specified.

11. In a type-writing machine, the combination of a rotary type-form, a sliding frame in which said type-form is mounted, a table upon which said frame slides, the bell-crank lever N, fulcrumed on said table, and having the jaws n' n^2 and the bifurcated end n^3, the rod M, the lever O, fulcrumed from the post l', the resilient lever P, having the slots n and fulcrumed upon the bracket m, and the pad R, substantially as specified.

HENRY J. THOMAS.

Witnesses:
T. J. KEANE,
WM. G. LIPSEY.