

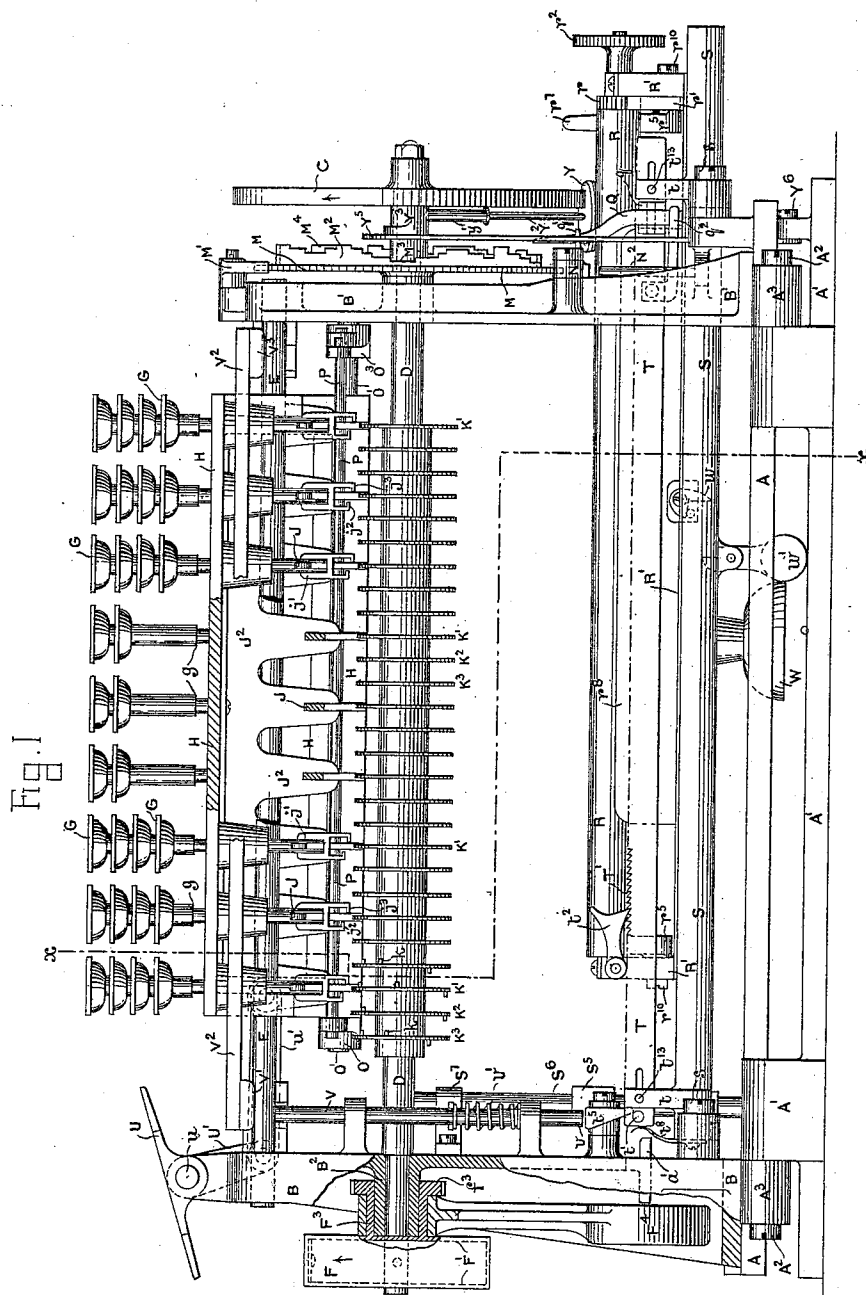
(No Model.)

5 Sheets—Sheet 1.

F. MYERS.
TYPE WRITING MACHINE.

No. 463,909.

Patented Nov. 24, 1891.



Witnesses

James F. Duhamel
Horace A. Dodge.

Inventor

Frederick Myers,
by Dodge & Sons,
Attys.

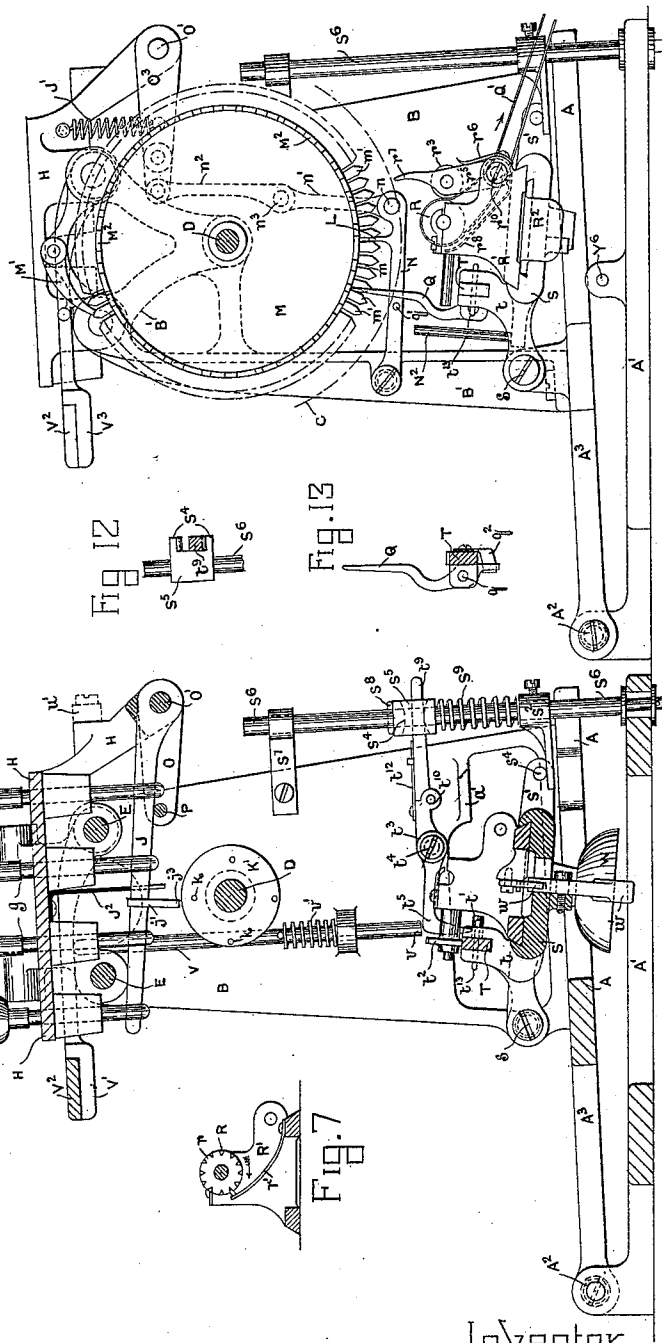
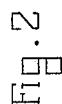
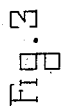
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5 Sheets—Sheet 2.

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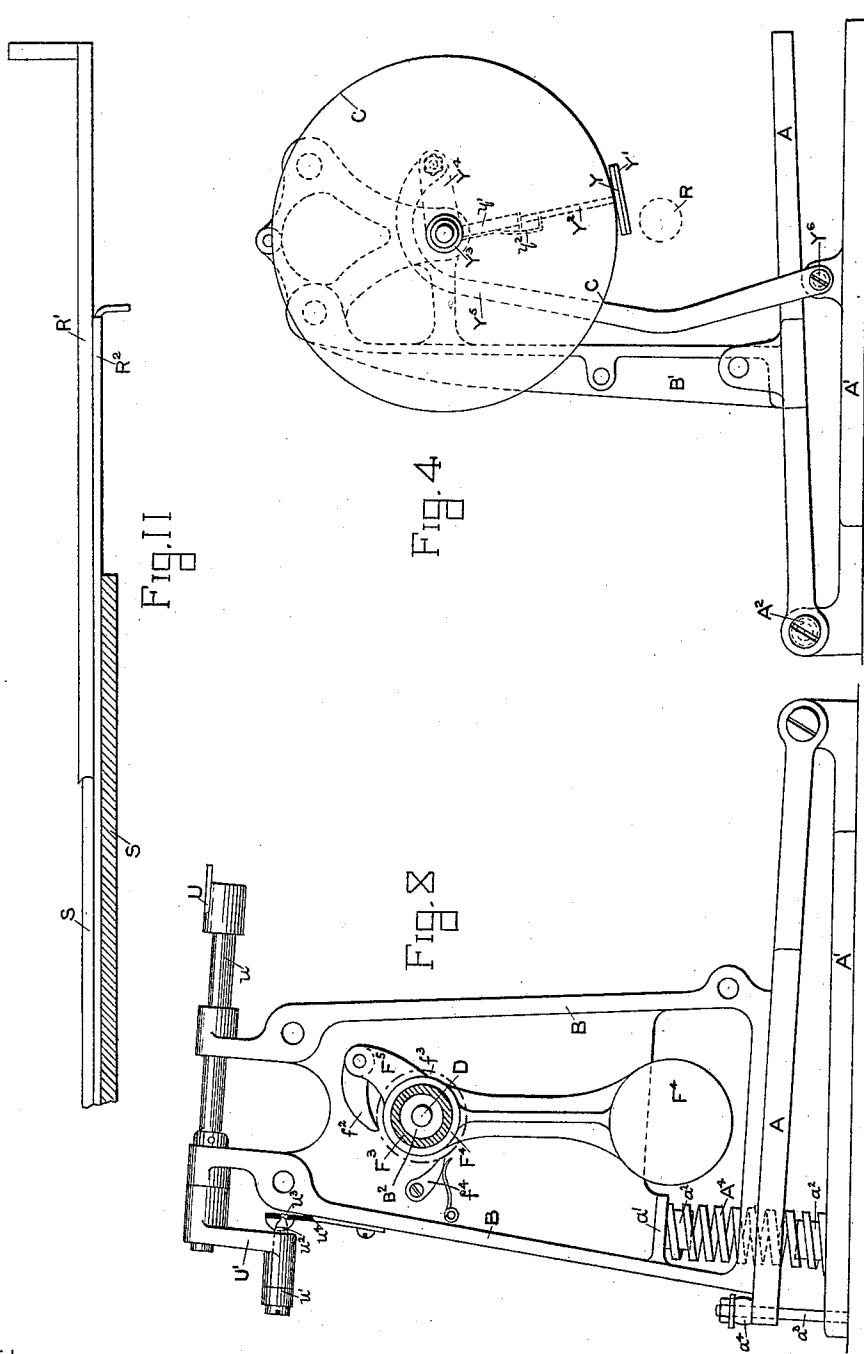
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Frederick Myers,
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5 Sheets—Sheet 3.

No. 463,909.

Patented Nov. 24, 1891.



Witnesses
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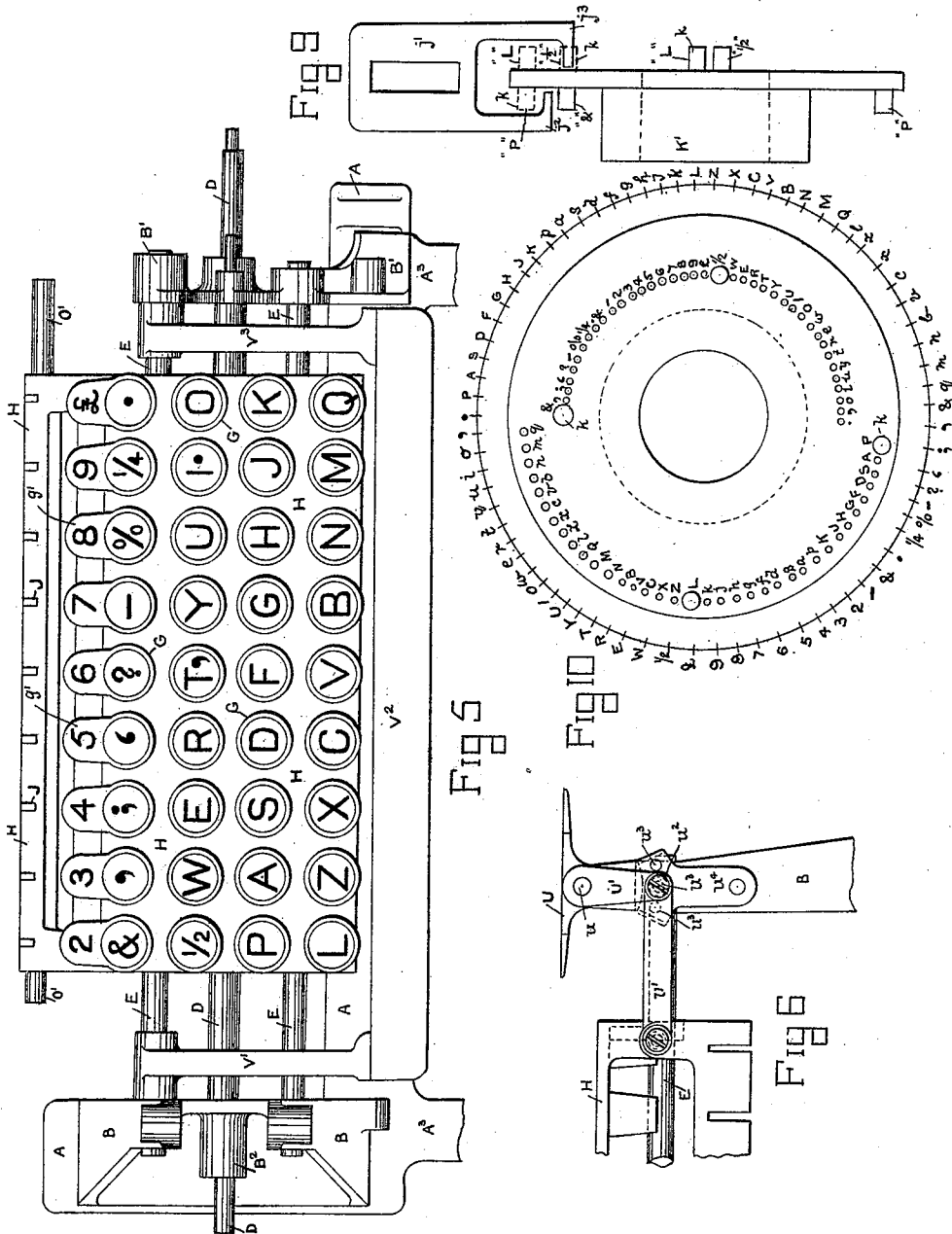
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5 Sheets—Sheet 4.

F. MYERS.
TYPE WRITING MACHINE.

No. 463,909.

Patented Nov. 24, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK MYERS, OF LIVERPOOL, ASSIGNOR TO THE MERCURY TYPE WRITING MACHINE COMPANY, LIMITED, OF LONDON, ENGLAND.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,909, dated November 24, 1891.

Application filed January 18, 1889. Serial No. 296,720. (No model.) Patented in England March 2, 1888, No. 3,233; in France April 17, 1888, No. 190,032, and in Belgium May 1, 1888, No. 81,648.

To all whom it may concern:

Be it known that I, FREDERICK MYERS, a citizen of the United States of America, residing at Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Type-Writing Machines, (for which I have received Letters Patent in France, No. 190,032, dated April 17, 1888; in Belgium No. 81,648, dated May 1, 1888, and in England No. 3,233, dated March 2, 1888,) of which the following is a specification.

This invention relates to certain improvements in that class of type-writers in which the type are arranged on the periphery of a type-wheel having a tendency to revolve under the action of a constant source of power, but prevented from revolving by suitable mechanism, except when a type-key or its equivalent is depressed.

The objects of the improvement are to render such a machine more efficient and easier to work and to enable it to turn out neater and better work.

The manner in which the invention may be carried into effect may be understood by the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of my improved type-writing machine. Fig. 2 is a cross-section on line *xx*, Fig. 1, with the platen removed. Fig. 3 is an end elevation with keys, type-wheel, inking mechanism, &c., removed for the sake of clearness. Fig. 4 is a similar end elevation showing mechanism for inking the type on type-wheel. Fig. 5 is a plan of the upper portion of the machine. Fig. 6 is a back elevation of a small portion of the key-frame with its handle and connecting-rod for moving it longitudinally and a device for locking it in the required position. Fig. 7 is a device for spacing the lines. Fig. 8 is an end elevation looking the reverse way to Figs. 3 and 4, showing the self-winding mechanism, &c. Fig. 9 is a side elevation (enlarged) of disk with pins and stopping device for engaging the said pins or projections. Fig. 10 is an end elevation of Fig. 9, and is used also as a diagram to show the arrangement of pins in the whole series of disks and

the relative positions of the corresponding type on the type-wheel. Fig. 11 is a detail showing the mode of supporting the frame of the platen. Figs. 12 and 13 are other details hereinafter described. Fig. 14 is a view on a reduced scale illustrating the manner of operating a machine by means of a foot-treadle. Fig. 15 shows a modified arrangement for automatically rewinding the driving device of the type-wheel, and Fig. 16 a view of the type-wheel detached.

A is the main frame of the apparatus, on which are mounted the upright frame B and the standard B'.

A' is the fixed machine-bed.

The main frame A, carrying the frame B, standard B', and almost the whole of the mechanism, is pivoted to the fixed machine-bed A' at A², the pivots passing through the arms A³, extending from the lower front edge of the main frame.

C is a wheel or disk, on the periphery of which are arranged, as hereinafter described, the letters, numbers, stops, symbols, &c., which are required. This type-wheel C is mounted on a spindle or shaft D, which is journaled at one end to the standard B' and at the other to the frame B. The shaft D is preferably driven by a spring, though other sources of motive power may be employed, such as a small dynamo-machine, a descending weight, a traveling band, &c. By preference I use a coiled spring F' as a source of power. The shaft D and type-wheels are continually under the action of this spring, which is somewhat similar to those used for clocks, and is carried in the spring-barrel F on the end of the shaft D. It may be rewound from time to time (as soon as it has spent its force) by turning the barrel F by means of a suitable handle or projection thereon. Instead, however, of rewinding it (after it has run down) I prefer to keep it continually wound up by means of a self-winding arrangement hereinafter described.

The keys G are arranged in parallel rows in the key-frame H. The same keys which are used for printing the large characters may also be used for printing the small characters and the figures in the manner hereinafter de-

scribed. The key-frame H is mounted on guide-rods E so as to slide longitudinally, the said rods being secured to the frame B and standard B' or in other convenient manner. Below each transverse row of keys there is provided a key-lever or rod J, which is pivoted loosely upon the spindle O', carried by the sliding frame H, and upon which the keys G or their spindles rest. This key-lever can be depressed by any one of the keys G in the row which rest upon it.

The levers J are held in position, as hereinafter described, by means of a spring J', Fig. 3, and, if desired, the keys themselves may be provided with springs. I prefer, however, to act upon the levers only with the spring or springs, so that all the keys in one row or the whole series of keys will descend when one key is depressed, and thus leave ample space for the hand or fingers of the operator. The key-levers are made of thin sheet metal, and are preferably guided in their downward course by guiding-fingers J², attached to the under side of the key-frame H.

All the keys are provided with shoulders or stops g so placed that no two keys in a row will depress their lever J to the same distance. For example, the first or back key may cause its lever to descend a little farther than the second, the second key a little farther than the third, and so on. Disks K are mounted in a rigid manner upon the spindle D, and between each of the said disks K', I mount two other similar disks K² K³, which are also secured in a rigid manner to the spindle.

The spindle D, with its type-wheel C, is prevented from revolving under the action of the spring in barrel F by means of a stop-wheel M. This wheel is fixed on the type-wheel spindle, and preferably between the type-wheel and the standard B' of the machine. It is of slightly smaller diameter than the type-wheel and has on its periphery a number of wide-mouthed nicks or holes m, formed by projections or pins m', or their equivalent, and corresponding in number and relative angular position to the type on the type-wheel. The stop-wheel, and therefore the shaft D, is held normally stationary by a movable catch or pawl L, which engages one of the nicks m on its lower edge. This catch is carried by an arm N, which is pivoted at one end to the standard B' of the machine, the other end n being connected by an upright pivoted link n' n² to the outer extremity of the arm O³, forming one end of a rocking frame hereinafter to be described. The aforesaid connecting-link n' n² is jointed at or about its center, as at n³, for reasons which will appear forthwith. The arms O O³, forming the ends of the rocking frame, are attached to the spindle O', which forms a pivot about the axis of which the frame may oscillate. The remaining side of the frame is formed by a horizontal bar P, fixed between the arms O and O³ and at or near their outer ends. The bar P lies imme-

diately below the key-levers, and the latter rest upon and are supported by it, the frame itself being supported by the spring or springs J' aforesaid, connected to one or both arms O O² and to the key-frame H. The frame O O' O³ P could, however, be pivoted at other points besides those indicated. Each time a key is depressed the key-lever J below it depresses the rocking frame by striking the bar P carried thereby. The frame in its turn depresses the link n' n² and catch-arm N, and releases the stop-wheel M. The type-wheel now revolves under the influence of the driving-power, being arrested, as hereinafter described, by a small pin k in one of the disks K', K², or K³ as soon as the property type is approximately in position for printing. The pawl M', pivoted to the standard B' above the stop-wheel, prevents any tendency of the latter to rebound when arrested, as hereinafter described. The wheel M having been released by the depression of a key, as aforesaid, any further movement of the latter is prevented by the shoulder g striking the frame H. On continuing the pressure the main frame A is caused to turn about its pivots A², carrying with it the type-wheel C and catch-arm N. The latter immediately strikes a pin N², fixed in the hinged bed S, hereinafter described. This causes the arm N to be raised and the catch L to be inserted into one of the wide-mouthed nicks m, so as to exactly adjust and lock the type-wheel. The aforesaid movement of the arm N is permitted by the jointed link n' n², which bends about its pivot n³, but assumes its straight position as soon as the key is released and the rocking frame O O' O³ P rises. The wheel M being locked, a further pressure on the type-key brings the type-wheel C into contact with the paper on the platen R, hereinafter described, the downward movement of the latter being slight in comparison with that of the wheel C. The pressure on the key being removed, the main frame and its mechanism rise by reason of the spring A⁴, Fig. 8, which is introduced between a flange a' on the frame B and the fixed bed A'. The spring is held in position by a core a² at each end thereof. The upward movement of the frame A is controlled by the adjustable stop a³, which is fitted with a buffer-block a⁴.

Instead of employing a direct pressure on the keys to depress the main frame in order to lock the type-wheel and to print, the following arrangement might be adopted: The entire machine might be mounted upon a table A⁵, similar to the table of a sewing-machine, and below the said table an ordinary foot-treadle a⁵ might be placed, to which an upright connecting-rod a⁶ should be pivoted. The upper end of this rod would be attached to the hinged main frame A aforesaid, preferably at or near its rear edge, as at a⁷, so that at each stroke of the treadle the main frame A would be depressed and the type-wheel C

brought into contact with the printing-platen R. On releasing the treadle the machine would be elevated as before by the spring A⁴.

R is the platen, supported in any convenient manner on the frame R', which slides in a hinged guide or bed S. The end of the platen R is provided with a wheel having a number of notches *r*, Fig. 7, into which a spring pin or pawl *r'* engages itself, holding the platen in any desired position. The distance between each of the notches *r* is equal to the distance required between the lines of writing or printing. On the completion of a line the hand-wheel or disk *r*², Fig. 1, is turned in the direction of the arrow, Fig. 7. The pawl *r'* is therefore depressed and the platen can be moved the required distance. One side of the bed S is hinged or pivoted at *s* to the main frame A of the machine and to the frame B or in other convenient manner. The other side is supported upon the arm S², which is preferably adjustable by means of the pin *s*⁴, carried by the tail S' of the hinged bed, or the whole of the hinged bed S may be rigidly or adjustably attached to the fixed bed A'.

Referring to Figs. 1 and 2, the depressing of the pivoted main frame A also causes the platen-frame R' to be moved longitudinally the necessary distance for spacing the letters. This may be effected as follows: A toothed rack T is supported in brackets *t*, attached to the hinged bed S, and has at its end a pin *t'*. The sliding frame R' has pivoted to it a pawl *t*², which engages the teeth of the toothed rack T in one direction only. As the frame A is depressed by the depression of a key, the rocking spacing-lever *t*³, pivoted at *t*⁴ to the frame B, is also depressed. The tail end *t*⁹ of the lever *t*³ passes through a fork S⁴, Figs. 2 and 12, or its equivalent, carried by a block S⁵, which slides upon an upright rod S⁶, loosely supported on the fixed bed A' of the machine and in the bracket S⁷ on the frame B. The said block is unable to move upward beyond a certain point by reason of the fixed pin S⁸, but is capable of a varying amount of downward movement, such movement being resisted to a certain extent by a spring S⁹, which tends to keep the block always in its elevated position, where it remains when the machine is at rest. On depressing the machine by means of a key G or the treadle aforesaid the tail *t*⁹ of the spacing-lever is held stationary by the lower branch of the fork of the block S⁵, thus causing the lever to turn on its pivot *t*⁴ and to force the inclined finger *t*⁵, Fig. 1, at its other end between the pin *t'* of the spacing-rack and the side of the bracket *t*. As soon as the rack has traveled the required distance it is arrested, as will be hereinafter explained, and any further downward movement of the pivot *t*⁴ causes the tail *t*⁹ of the spacing-lever to depress the forked block S⁵ in defiance of its spring S⁹. On the key or treadle being released after the letter is printed, the machine is elevated by the spring A⁴, the block S⁵ rises

to its upper position, and the tail *t*⁹ of the spacing-lever, catching the upper fork of the block, causes the inclined spacing-finger *t*⁵ to be withdrawn, and the rack T is returned to its original position by spring *t*⁸. The pins *t*¹³ serve to limit the backward movement of the rack.

The type being of different widths, it becomes necessary when a neat and uniform spacing of the printed matter is a desideratum, to provide means whereby the printing-platen may be moved along through varying distances, according to the width of the character to be printed. If "W," for instance, required the roller to be moved a distance equivalent to five teeth of the spacing-rack, "I" might only require it to be moved the distance of one or two teeth. The varying spacing is accomplished as follows: The teeth T' of the spacing-rack are of such pitch that the space required for each different width of letter corresponds approximately to an integral number of teeth in the rack. Upon the rack is mounted a stop-arm or finger Q, Figs. 1, 3, and 13, which projects upward between the type-wheel C and the stop-wheel M and at a short distance from the face of the latter. On the said face, and preferably near the periphery thereof, is a narrow raised annulus M², the various points in which are raised more or less from the face of the wheel, as shown in Fig. 1, according to the width of the characters on the type-wheel, and have the same relative angular position as the said characters. For instance, the projection of that portion, such as M³, of the annulus which would correspond to "W" (the widest character) on the type-wheel would be comparatively little, while the projection of the portion, such as M⁴, corresponding to "I" (the narrowest character) would be comparatively great. The actual difference between these projections (supposing "W" to equal five teeth on the rack and "I" to equal one tooth) would be a distance equal to four teeth, and the aforesaid stop-arm would stand normally, as in Fig. 1, at a distance of one tooth from that part of the annulus having the greatest projection beyond the wheel-face. In printing from left to right with this spacing device the characters on the type-wheel are so arranged that all their right-hand edges lie in a plane parallel to the face of the type-wheel. If a letter (say "W") is to be printed, the type-wheel being placed in position by depressing the key corresponding to that letter, and the machine being then depressed, the inclined spacing-finger *t*⁵ draws the rack along as aforesaid until (after traveling a distance of, say, five teeth) it is arrested by the stop-arm coming in contact with that portion of the said annulus, such as M³, which corresponds to the character in question. Any further movement of the spacing-lever is compensated, as hereinbefore explained, by the spring S⁹. Similarly the rack would be drawn along a greater or less distance, according to the par-

ticular part of the annulus against which the stop-arm would strike. The stop-arm is preferably spring-pivoted to the rack at q , so that it can move in a direction transversely thereto.

(See Figs. 1 and 13.) Each time the machine is depressed the stop-arm Q comes in contact with the stop q' on the catch-arm N or with some other abutment and turns slightly upon its pivot, so that its upper extremity always moves approximately in the same vertical plane. q^2 is the spring by which the stop-arm is returned to its normal position. When the sliding frame R' is to be withdrawn, the pawl t^2 may be thrown out of gear. If desired, the pawls t^2 may engage the rack in a reverse direction, and the action of the sloping finger t^2 and of the spring t^2 may also be reversed, so as to actuate the frame R' in the reverse direction.

For the purpose of spacing the words I provide an additional key V , having a foot v , which when the key is depressed causes the sloping finger t^2 to engage the pin t' on the end of the toothed rack T , and this moves the printing-platen forward the necessary distance. This movement of the finger t^2 is permitted by the tail t^3 of the spacing-lever by forming the latter with a spring toggle-joint $t^{10} t^{12}$. When the pressure is removed from the key V , it flies up under the action of spring v' , and the finger t^2 is withdrawn by the straightening of the tail under the action of the spring t^{12} of the toggle-joint. The rack T being thus released, it moves back, as before, under the action of the spring t^2 , the pawl t^2 riding over the teeth of the rack. The spacing-key V is depressed by the pivoted lever V' , having a pedal or finger-bar V^2 , which is supported at its other end on a similar pivoted lever V^3 . By means of the finger-bar V^2 the spacing-key V may be worked conveniently by either hand. The spacing-rack T can be drawn along to any suitable distance by depressing the word-spacing lever, as the stop-arm Q is of such a length that it will not come in contact with the annulus M^2 on the stop-wheel except when the said wheel is depressed by depressing the main frame A . The amount of travel of the rack when spacing a word is constant—say about equal to five rack-teeth or the space required for a "W."

Any suitable stop may be provided for arresting the movement of the rack after it has traveled the required distance for spacing a word. The pins t^{13} may for this purpose be made to engage the right-hand ends of the slots in the rack through which they pass; or the amount of projection of the annulus M^2 and the distance of the stop-arm Q from the face of the wheel M may be such that the said face itself serves as a stop to limit the movement of the rack.

The sheet of paper Q' is held in position on the platen R by means of a roller r^3 , Figs. 1 and 3, which lies against the platen R . The roller r^3 is mounted between two arms r^5 ,

which are pivoted at r^{10} to the sliding frame R' . The roller r^3 is held in contact with the platen by a spring r^6 , which presses against the arm r^5 . This arm has an extension r^7 , by means of which the roller r^3 may be drawn away from the platen R when the paper Q' is to be inserted or adjusted.

To fix a sheet of paper in the machine, the edge of the sheet is first slipped under the platen R , being guided by the guide r^8 . The roller r^3 is then thrown back, and the edge of the paper turned over the platen and held in position thereon by releasing the roller r^3 .

Each key-lever J is provided with a stopping device or plate j' , secured thereto, having projections $j^2 j^3$, Fig. 9, at its end for engaging pins or projections k on the disks K' K^2 K^3 , attached to spindle D ; or the disks K' K^2 K^3 may be simple bosses provided with one or more arms having each a stop-pin k .

On the top of the frame B is a horizontal spindle u , Figs. 1, 6, and 8, provided at the front end with a handle U , the other end being fitted with a crank U' . This crank is connected with the key-frame H by means of a connecting-rod u' . The key-frame can be moved longitudinally on the guide-rods E by means of the handle U , so that the projections $j^2 j^3$ on the stop-plate j' will engage the pins k on the disks K^2 when the crank U' is in the position shown in Fig. 6. When it is moved toward the left or right, the stop-plate j' will engage, respectively, the disks K' K^3 . The frame is locked in the desired position by means of the pin u^2 , which engages depressions or holes u^3 in the spring-plate u^4 .

The keys bearing their respective letters, figures, symbols, &c., may be arranged as shown on Fig. 5; but of course many other arrangements may be adopted. To print large characters, &c., the key-frame H is moved longitudinally, so that all the stop-plates j' will engage the disks whose projections k correspond with the large characters on the type-wheel. Disks K' may be conveniently used for the large characters. The first key in the front row is, for example, depressed, which on Fig. 5 is marked with the letter "L" until its shoulder g rests on the frame H . Its movement depresses the key-lever J and the rocking frame O O' O^3 P by means of the bar P thereof. The arm O^3 of the said frame depresses the catch-arm N and releases the stop-wheel M , so that the stop-wheel will rotate under the action of the spring in barrel F . One of the projections j^2 or j^3 of the stop-plate j' will, however, engage a pin (marked L , Figs. 9 and 10) on the disk K corresponding to letter "L" on the type-wheel, and will therefore instantly stop the motion of the type-wheel C , the letter "L" on the said wheel being then approximately in a position ready for making an impression on the surface of the paper on the platen R . By a further pressure on the key the wheel M is exactly adjusted and locked in position, as before described. If the second key in the same

row is depressed, which in the drawings is marked P, the stop-wheel is released as before; but the stop-plate j' descends a greater distance than the first key, and therefore does not engage pin L, Figs. 9 and 10, on the disk K', but a pin P, Figs. 9 and 10, corresponding to large "P" on the type-wheel. The remaining keys in the row stop the type-wheel in an exactly similar manner. As each key descends a greater or less distance the stop-plate j' can engage only one pin on the disk, and it is evident that the remaining pins cannot be engaged by it, because the projection j^2 or j^3 on its end is not of sufficient width to engage more than one pin at a time. The remaining rows of keys are arranged in a similar way; but it will be evident that the pins on one disk K' are not placed in the same angular position relatively to those on the other disks, but either lead or follow the pins thereon. If there are, for example, as shown in the drawings, seventy-five characters on the type-wheel, and all the said characters are the same pitch or distance apart, then the pins on each of the disks K' K² K³ will lead or follow the pins on one of the other disks (preferably the one nearest to it) by an angle subtended by one seventy-fifth part of its circumference. (See Figs. 9 and 10.)

L P $\frac{1}{2}$ &, Figs. 9 and 10, represent, for example, the pins on the first disk K'. Z A W ? represent the pins on the second disk K'; X S E ;, the pins on the third disk K', and so on. I prefer to place the pins on each side of the disks and on the lines of two circles of different radii, Figs. 9 and 10; but, if desired, the pins may be provided on one side only, or they may be arranged on the lines of more than two circles. When the pins k are arranged only on one side of the disk, one projection j^2 or j^3 only is required.

To print figures, the frame H is shifted on its guide-rods, so that the stop-plates j' will engage the disks whose pins correspond with the figures on the type-wheel, preferably the disks K². There are generally only a limited number of symbols and figures required for general use, and therefore a limited number of pins will be required on these disks. The third and fourth keys in the first row are marked, for example, with $\frac{1}{2}$ and 2, and therefore its disk will be provided with two pins corresponding with the fraction " $\frac{1}{2}$ " and the number "2" on the type-wheel. These pins are represented on Fig. 10 by $\frac{1}{2}$ and 2. The second disk in accordance with the arrangement of keys illustrated on Fig. 5, will be provided with one pin, represented by 3 on Fig. 10, the fifth disk with two pins represented on Fig. 10 by ? 6, and so on. The first two keys in the first row, P and L, and the first three keys in the second row, W A Z, will not engage any projection on disks K² if they are depressed. The small plates g' on the rear key of each row are only provided for convenience, as there is generally not sufficient space for the representation of more than one character on a key.

To print small characters, the frame H may be shifted so that the stop-plates j' engage the disks having pins in the same relative position as the small characters on the type-wheel, preferably the disks K³. The first disk K³ will therefore have pins represented on Fig. 10 by 1, p , $\frac{1}{2}$, and &.

W is a warning-bell, preferably attached to the hinged bed S. The pivoted projecting pin or snug w actuates the hammer w' each time the frame approaches the end of its travel, and thus indicates when the end of a line is nearly reached. The pawl t^2 can then be raised and the paper-roller drawn back to commence a fresh line of printing. The snug w , being pivoted so as to turn in one direction only, actuates the hammer in the opposite direction. If it is desired to repeat the impression of a character, the corresponding key may be again depressed, or the character may be repeated without the depression of the key and consequent rotation of the type-wheel by simply pressing upon the frame H or on some portion of the pivoted frame A.

I ink the type previous to each impression as follows: The ink is placed upon an absorptive pad Y, Fig. 4, attached to a disk or plate Y', having a stem Y². The stem Y² is carried by a socket y' , forming the depending arm of a bell-crank lever Y³, which is mounted loosely on the type-wheel spindle, preferably between the type-wheel and stop-wheel. The other arm Y⁴ of the bell-crank is pivoted to the upper end of an oscillating link Y⁵, whose lower end is pivoted at Y⁶ to the fixed machine-bed A' or other fixed point. Each time the machine is depressed the pad Y is drawn along the type which is about to print and swung out of the way of the paper-roller R. The stem Y² is held in its socket by the spring device y^2 , so that the pad Y just touches the type on wheel C.

When a spring is used for driving the type-wheel, it may be automatically rewound, as follows, (reference being had to Figs. 1, 8, and 15:) One end of the spring F' is attached to the spindle D. The other end is fixed to the spring-barrel F. To take the weight of the spring-winding mechanism off the shaft D, the barrel F is provided at one end with a long journal or bearing-collar F³, which fits over a stationary boss B² on the side of the frame B. On the end of this collar F³ is a ratchet-wheel f^3 . The outer surface of the collar F³, between the barrel F and ratchet f^3 , forms a bearing for the suspension-eye of the heavy pendulum F⁴. This eye carries an arm F⁵, bearing a ratchet-pawl f^2 , which engages the ratchet f^3 . A check-pawl f^4 is also provided, which prevents the return movement of the ratchet and barrel. As the machine is oscillated about its pivots A², the pendulum swings to and fro, imparting a similar movement to the pawl f^2 . The latter intermittently rotates the ratchet-wheel f^3 , which, being in rigid connection with barrel F, winds up the spring F' in the said barrel. I may

also, if desirable, apply an adjustable brake to the type-wheel spindle to reduce the speed of the latter, and so to lessen the concussion between the disk-pins k and the stop plates or fingers $j^2 j^3$, carried by the type-key levers J; or instead of the pendulum arrangement for rewinding the spring the latter may be automatically rewound, as follows: either by the direct pressure on the keys G or by means of the treadle, as aforesaid.

The ratchet-pawl f^2 , instead of being mounted upon the end of the pendulum, is mounted upon an approximately horizontal arm F^6 , Fig. 15, the eye of which works freely on the collar F^3 or other suitable pivot on or near the axis of said collar. The outer end of the arm F^6 rests upon the upper end of a stiff spring F^7 , attached, as at f^5 , to the bed or table A' of the machine. As the machine is depressed the pawl-arm F^6 , resting on the spring-finger, rotates slightly on the collar F^3 , and thereby causes the ratchet to be rotated in such a manner as to wind up the spring F^7 . Should the spring be fully wound up, any subsequent depression of the machine causes the spring-finger F^7 to bend or slip along the under side of the pawl-arm.

The bottom of the hinged bed carrying the platen-frame is preferably made telescopic, as shown at R^2 , Figs. 3 and 11, so that it may be drawn out and form an additional support to the overhanging frame R' .

The details of the machine herein described may be modified to a certain extent without departing from the scope of the invention.

I do not herein claim, broadly, a device such as the following: the combination, with a type-wheel and a stop-wheel having both a constant tendency to revolve synchronously, of a catch device adapted to prevent the said wheels from revolving, a rocking frame connected with said catch device, and a series of type-keys, each adapted to depress the said frame and disconnect the catch device and its wheel, as a substantially similar device is fully described and claimed in my pending application, Serial No. 263,189; nor do I lay any broad claim in the present application to the following constructions, as such constructions are fully described and claimed in my aforesaid pending application, Serial No. 263,189: the combination, with the sliding platen-frame, the reciprocatory feed-rack connected therewith, and the spacing-lever having an inclined finger adapted to engage the side of a pin on said rack, of the spacing-key adapted to depress the said finger and the lever for operating said key; the combination of the power-driven type-wheel, the disks on the type-wheel shaft, the stop-pins on said disks, the key-levers, and the stop-plates thereon; the combination of the triple series of stop-disks, the sliding key-frame with its keys, levers, and stop-plates, and the means for adjusting and holding the frame in any of its three positions; neither do I make any broad claim for the following devices, as substantially similar de-

vices were described in my pending application, Serial No. 263,189, and are old and well-known constructions; the combination of the platen, sliding platen-frame and hinged bed carrying the same, and the line-spacing mechanism, nor the combination of the sliding platen, the warning-bell, and the striking mechanism therefor.

I claim as my invention—

1. In a type-writer, the combination, with a type-wheel C, means for revolving the same, and a notched stop-wheel M, movable synchronously with the type-wheel, of a key-frame H, a frame O O' O³ P, capable of oscillating about its side O' upon said frame H, a series of parallel key-levers J, pivoted upon the side O' of said oscillating frame and having their under sides in contact with its opposite side P, a series of reciprocating keys G, carried by the frame H and arranged in parallel rows above and resting upon the said levers, a frame-elevating spring or springs J', a movable catch L, adapted to normally engage said stop-wheel, and a device connecting said catch and oscillating frame, whereby the latter may be depressed and the type-wheel released by the depression of any individual key in the series, substantially as described.

2. In a type-writer, the combination, with a normally-elevated main frame A, pivoted at or near one side upon a fixed bed A', of standards B B', secured upon each end of said frame, a key-frame H, supported between the same and provided with a series of keys each adapted to engage its upper side, a shaft D, also supported between said standards and having a vertical type-wheel C with peripheral type, and a platen R, located below said wheel and approximately parallel to the axis thereof, whereby the type-wheel may be depressed to print by the continued pressure upon any key in said series, substantially as described.

3. In a type-writer, the combination, with a pivoted main frame A and with a sliding platen-frame R', carrying a platen R, of a platen-frame bed S, hinged at one side to said frame and supported at its opposite side upon a stationary abutment, substantially as described and shown.

4. In a type-writer, the combination, with a pivoted main frame A and with a type-wheel C and stop-wheel M, mounted thereon, of a movable catch-arm N, supported upon the said frame, a catch L on the upper side of said arm adapted to engage said stop-wheel, and a relatively-stationary abutment N², located below and in proximity to said arm, whereby the said catch is forced into engagement with the stop-wheel on the depression of the main frame and locks the type-wheel prior to the operation of printing, substantially as set forth.

5. In a type-writer, the combination, with a stop-wheel M, catch L, catch-arm N, and devices for raising the same, of a jointed link $n' n^2 n^3$, connected at its lower end with the

outer end of the said catch-arm and capable of bending under a slight compressive strain, a rocking frame O O' O³ P, capable of being depressed by a type-key and connected at or near its outer edge with the upper end of said link, and a spring J', adapted to return said frame to its elevated position and to straighten said link, whereby the catch may be raised into engagement with the stop-wheel while the said frame is in its depressed position and may be retained in engagement therewith on the return of the frame to its elevated position, substantially as set forth.

6. In a type-writer, the combination, with an oscillating main frame A, a rotary type-wheel C thereon, and a driving-spring for said wheel, of a ratchet-wheel f^3 , connected with said spring, a check-pawl f^4 , adapted to prevent said ratchet-wheel from rotating under the spring-tension in one direction, a movable pawl f^2 , adapted to engage said ratchet-wheel and rotate the same in the opposite direction, and means for vibrating said pawl f^2 at each oscillation of the main frame, whereby the driving-spring may be automatically rewound during the operation of the machine, substantially as described.

7. In a type-writer having a spring-driven type-wheel mounted upon an oscillatory main frame, the combination, with the driving-spring therefor and the spring-box inclosing the same, of an arm F⁶, pivoted at or near the axis of said box and adapted to vibrate with the oscillation of the said frame, a pawl f^2 , suitably mounted on said arm, a ratchet-wheel f^3 , attached to said spring-box and engaged by said pawl in one direction, and a check-pawl f^4 , adapted to engage said ratchet-wheel in the opposite direction, whereby the driving-spring may be automatically rewound by the oscillation of the main frame during the operation of the machine, substantially as described.

8. In a type-writer, the combination, with an oscillatory frame A and a type-wheel-driving shaft D, mounted thereon, of a spring-box F, mounted concentrically with said shaft, a coiled spring F', inclosed in said box and having its opposite ends attached to the box and shaft, respectively, a concentric bearing-collar F³ upon said box, an arm F⁶, having its eye mounted upon said collar, a pawl f^2 , suitably mounted upon said eye, a ratchet-wheel f^3 , attached to said collar and engaged by said pawl in one direction, a check-pawl f^4 , adapted to engage said ratchet-wheel in the opposite direction, and a flexible device connecting said arm with a stationary part of the machine, whereby the spring F' may be automatically rewound during the operation of the machine, substantially as set forth.

9. In a type-writer, the combination of the fixed bed A', the oscillatory frame A thereon, the frame-elevating spring A⁴, the frame-stop α^4 , the type-wheel shaft D, the wheel-driving spring F', the spring-box F therefor, the ratchet-wheel f^3 on said box, the ratchet

check-pawl f^4 , the approximately-horizontal arm F⁶, pivoted on the axis of shaft D, the vertical spring-finger F⁷, mounted on the fixed bed A' and bearing normally against the under side of said arm F⁶, and the pawl f^2 , pivotally mounted on said arm and adapted to engage said ratchet in a direction opposite to the engagement of the pawl f^4 , substantially as and for the purpose described.

10. In combination with the type-wheel shaft D, spring-box F, bearing collar F³, and pawl-arm F⁶, the elongated boss B², attached to the frame B of the machine and serving as a bearing for said collar, whereby the weight of the spring-box and its connections is taken off the type-wheel shaft, substantially as set forth.

11. In a type-writer, the combination, with a sliding spacing-rack T and with a projecting pin t' thereon, of a pivoted main frame A, a rocking spacing-lever t^3 , mounted thereon, an abutment S⁴, bearing against the under side of the tail end of said lever, and an inclined spacing-finger t^5 on the opposite end of said lever above said pin t' and adapted to engage one side of the same, whereby the spacing-rack is drawn along for a certain distance in one direction at each depression of the main frame, substantially as set forth.

12. The combination, with the sliding spacing-rack T, the pivoted main frame A, and the rocking spacing-lever t^3 , mounted on said frame and adapted to operate said rack in one direction on the depression of the frame, of a rack-returning spring t^8 , a frame-elevating spring A⁴, and an abutment S⁴, adapted to engage the upper side of the tail end of said lever, whereby the said rack, frame, and spacing-lever are all returned to their normal positions after each depression of the frame, substantially as set forth.

13. In a type-writer, the combination, with a pivoted main frame A, a rocking spacing-lever t^3 , carried thereby and having an inclined spacing-finger at one end, and a reciprocatory spacing-rack adapted to be operated in one direction by said finger on the depression of said frame, of a movable abutment S⁴, bearing against the under side of the tail end of said lever, a stop S⁸, adapted to limit the upward movement of said abutment, and a spring S⁹, adapted to press against the under side of said abutment, whereby the said main frame may be depressed to perform the printing operation after the completion of the spacing operation, substantially as described.

14. In a type-writer, the combination, with the depressible main frame A, the rocking spacing-lever t^3 thereon, and the platen-carrying bed S, hinged at one side to the main frame, of the sliding forked block S⁵ S⁴, adapted to engage the tail end of said lever in either direction, the stop S⁸, resting normally against the upper side of said block, the spring S⁹, bearing against the under side of the same,

the fixed abutment S^2 , supporting the lower end of the spring and the free edge of the bed S , and the upright rod S^6 , serving as a support for the said block, stop, spring, and abutment.

15. In a type-writer, the combination, with a pivoted main frame A and a rocking spacing-lever t^3 thereon, having its inclined head t^5 adapted, when depressed, to operate a reciprocatory spacing-rack T in one direction and having its tail t^9 engaged on its upper side by an abutment S^4 , of a spring-retained spacing-key V , adapted to depress the said inclined head t^5 with its foot v , and a spring toggle-joint $t^{10} t^{12}$ on said spacing-lever, whereby the inclined head of the latter may be depressed to space a word in defiance of the said abutment S^4 and independently of the movement of the said main frame, substantially as described.

16. In a type-writer, the combination of a type-wheel C , having its peripheral type arranged with their corresponding edges in a plane at right angles to the wheel-axis, of a platen R , lying approximately parallel to the said axis and adapted to have its successive printing-points moved intermittently toward said plane, a sliding platen-frame R' , carrying said platen and provided with a pawl t^2 , a reciprocatory spacing-rack T , having a series of teeth T' , which are adapted to engage the said pawl in the direction above set forth and are so pitched that one or more of them corresponds approximately to the width of any given type on the type-wheel, letter-spacing mechanism for operating the rack T in the said direction, and means for arresting the movement of the said rack at different points, according to the width of the type with which it is desired to print, where-

by a uniform spacing of the printed characters is effected, substantially as described.

17. In a type-writer, the combination, with a revoluble shaft D and a concentric type-wheel C and a ring of projections $M^2 M^3 M^4$, 45 carried by said shaft, of a platen R , lying approximately parallel to the shaft D and adapted to be moved forward intermittently, as described, a sliding platen-frame R' , carrying said platen and provided with a pawl t^2 , a reciprocatory spacing-rack T , having a series of teeth T' , adapted to engage said pawl in one direction, as described, letter-spacing mechanism for operating the rack T in the said direction, and a stop-arm Q , projecting from said rack into proximity with the said projections $M^3 M^4$ and adapted to engage one of the latter each time it is drawn along by the said letter-spacing mechanism, whereby the successive movements of the platen are arrested at such points as will produce a uniform spacing of the printed characters, substantially as set forth.

18. In a type-writer, the combination of an oscillatory main frame A , a spacing-rack T , 65 an upright stop-arm Q , spring-pivoted on said rack, and a stop-pin q' , adapted to engage said regulator, whereby the upper end of the stop-arm is maintained approximately in the same vertical plane in spite of the movements of the main frame, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

F. MYERS.

Witnesses:

GEO. C. DYMOND,
HARRY P. SHOEBRIDGE.