

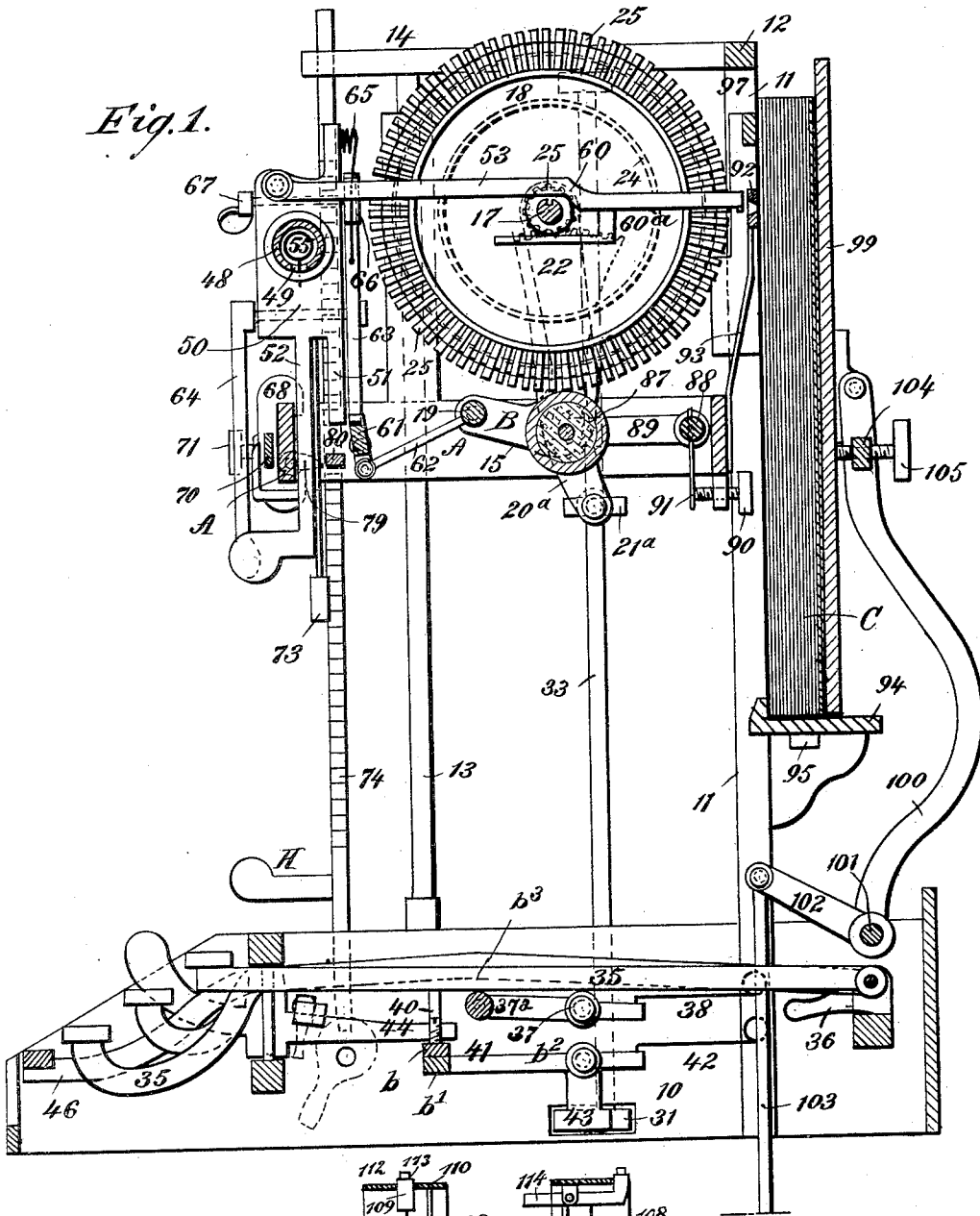
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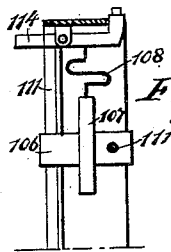
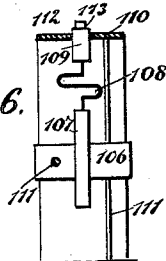
W. J. BORDEN & J. W. JOHNSON.
TYPE WRITING MACHINE.

No. 477,165.

Patented June 14, 1892.



WITNESSES:
Donn Twitchell
L. Bedgwick

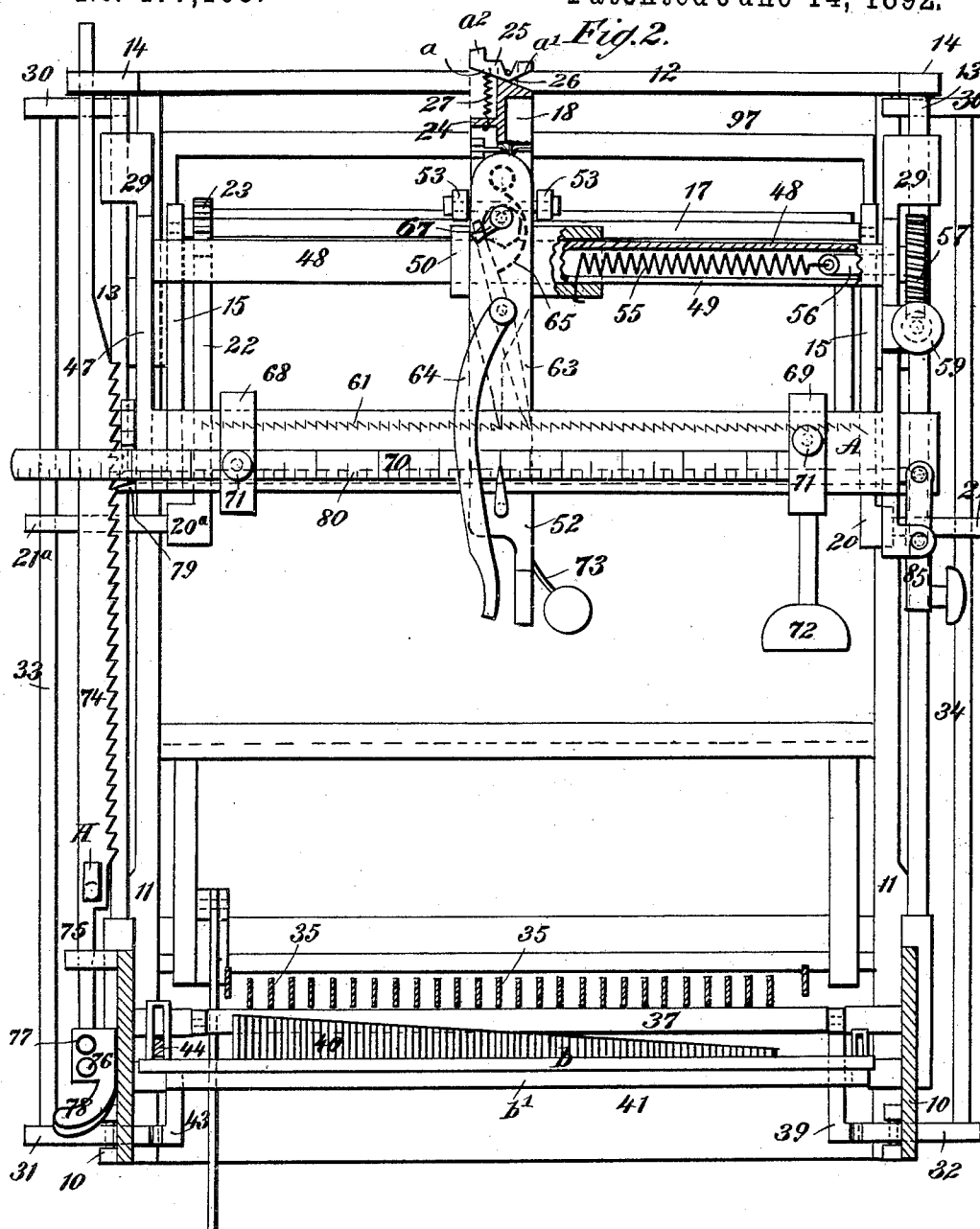


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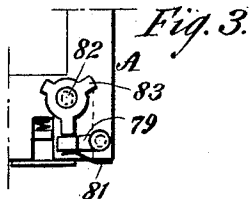
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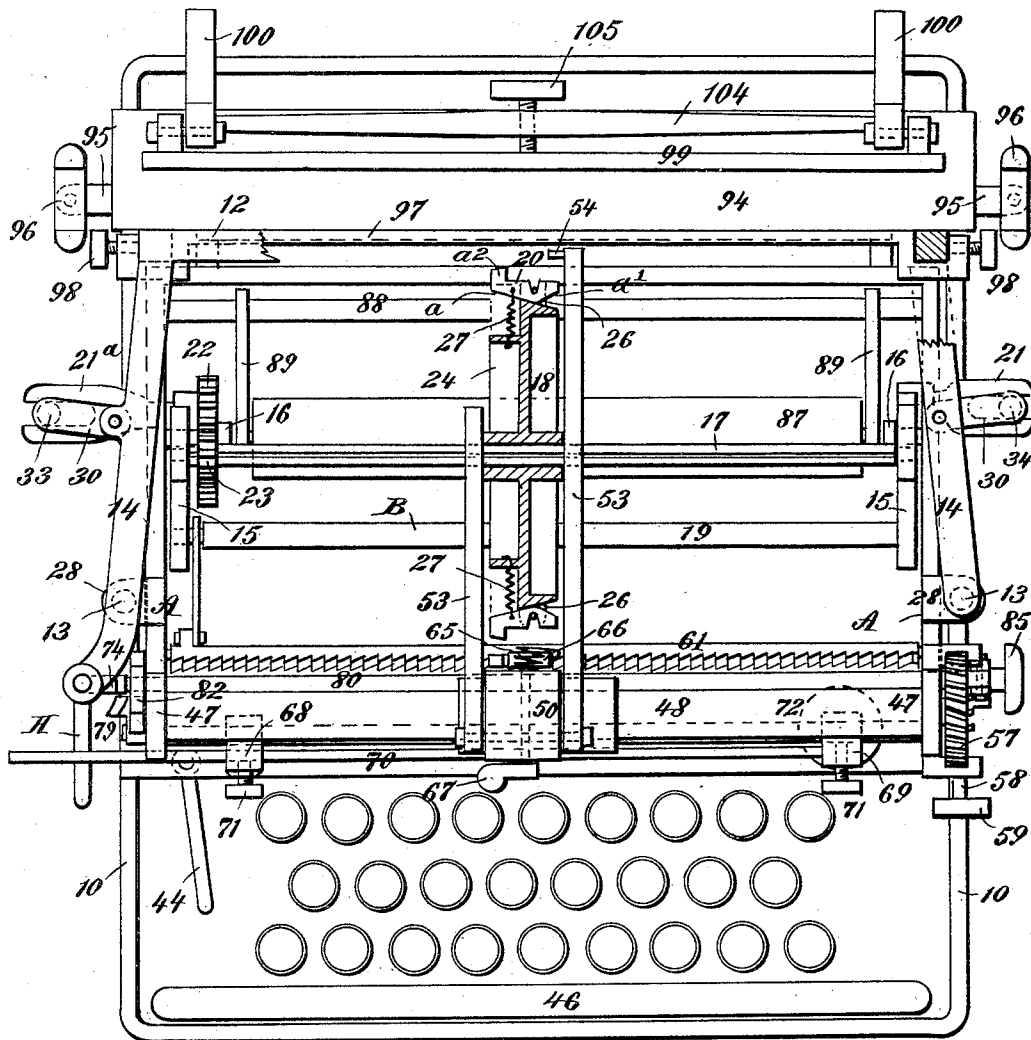
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Fig. 4.



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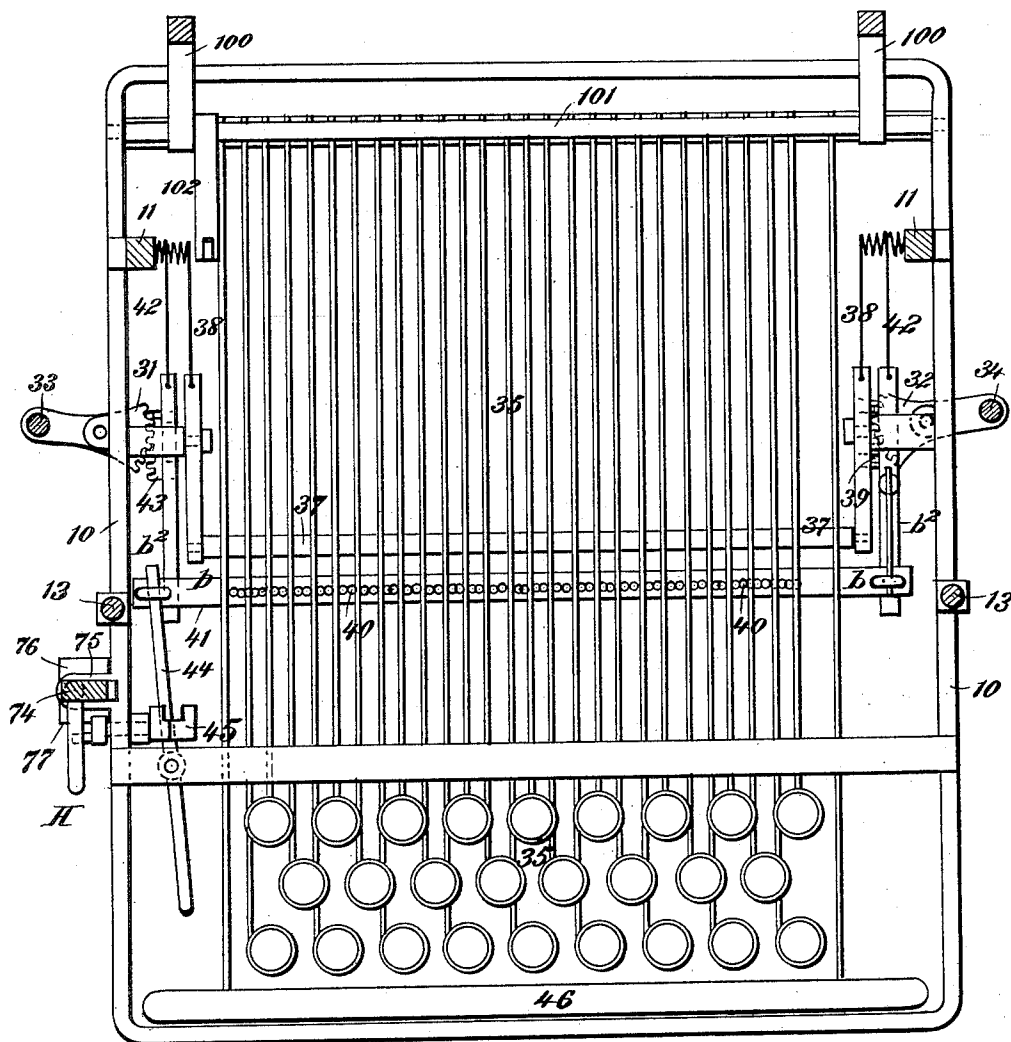
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Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM J. BORDEN, OF HICO, AND JAHU W. JOHNSON, OF HOUSTON, TEXAS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 477,165, dated June 14, 1892.

Application filed April 11, 1891. Serial No. 388,512. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM J. BORDEN, of Hico, in the county of Hamilton, and JAHU W. JOHNSON, of Houston, in the county of Harris, State of Texas, have invented a new and useful Improvement in Type-Writers, of which the following is a full, clear, and exact description.

Our invention relates to an improvement in type-writing machines, and has for its object to provide a machine of simple and durable construction, capable of use for the ordinary purposes to which type-writers are applied, but especially adapted and designed for type-writing upon blank books, thereby facilitating the making of official records and producing records that are more legible and compact than it is possible to obtain by handwriting.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is central vertical section through the machine. Fig. 2 is a front elevation of the machine, a portion of the keyboard and the upper portion of the machine, including the type-wheel, being in section. Fig. 3 is a detail view of the vertical adjusting mechanism of the carriage. Fig. 4 is a plan view of the machine, the type-wheel being in horizontal section and a portion of the main frame being broken away. Fig. 5 is a horizontal section through the machine, taken just above the keyboard; and Figs. 6 and 7 are views illustrating a construction of type-wheel differing from that shown in the other figures.

The base 10 is preferably made rectangular, its upper front surface being beveled downward, and a stationary frame is secured to the base, comprising two uprights 11, attached to the right and left sides of the base near the rear, the said uprights being preferably rectangular in cross-section and connected at their upper ends by a cross-bar 12. Two guide-standards 13 are secured to the

base in like manner to the uprights, but nearer the front. Above the base the standards are circular in cross-section, and their upper extremities are connected with the cross-bar 12 by side bars 14. Within the frame, secured to the base, a carriage A is capable of vertical movement, the said carriage being adapted to support the type-wheel and its appurtenances and also an oscillating frame B, in which the shaft of the type-wheel is mounted. The oscillating frame comprises two angle or elbow side sections 15, one being journaled in each side of the carriage near its rear upon stud-axes 16, extending horizontally inward from the side bars of the carriage. In bearings formed upon the vertical members of the side sections the extremities of the drive-shaft 17 or the type-wheel 18 are journaled, and the horizontal members of the sections are united by a rod or bar 19. The right-hand elbow-section has secured to its outer face an angle extension 20, the horizontal member whereof extends outward below the side of the carriage, and an arm 20^a of similar shape is loosely mounted upon the left-hand stud-axle, while in the extremities of the horizontal members of the extension and arm horizontal forks 21 and 21^a are swiveled.

The arm 20^a at the left of the oscillating frame has connected therewith an upwardly-extending segmental rack 22, engaging with a pinion 23, secured to the type-wheel shaft. The object of the oscillating frame is to carry the type-wheel to and from the surface to be printed upon. Instead of connecting the parts comprising the sides of the oscillating frame and mounting said sides to rock upon fixed stud-axes, the axes may be rigidly secured to the sides of the oscillating frame and mounted to turn in the carriage.

The type-wheel shaft is provided with a longitudinal groove and the hub of the type-wheel has a key to fit in the groove. The preferred construction of the type-wheel consists in forming the same with an annular flange 24 upon one side, as shown in Fig. 4, and short type-bars 25 are pivoted in a diametrical line upon the circumference of the wheel or at a right angle to it. The circum-

ferential face of the wheel is beveled and provided with lugs 26, pins or their equivalents constituting fulcrums for the type-bars. The type-bars extend horizontally over and beyond the flanged side of the wheel, and their under edges are provided with two beveled surfaces a and a' , extending upwardly and outwardly in opposite directions, the outer or upper edges of the bars at the ends projecting over the flange of the wheel being provided with offsets a^2 , upon which offsets the type is produced. Each type-bar is connected with the wheel-flange by a spring 27.

The carriage is guided in its vertical movement by affixing to its sides vertical plates 28, provided with sleeves 29, which slide upon the standards 13.

Each side bar 14 of the main frame has pivoted thereto between the standards and uprights 11 and 13 an outwardly-extending horizontal arm 30, the pivotal connection being effected between the inner ends of the arms and the upper or under faces of the side bars, and some distance below the arms segmental racks 31 and 32 are pivoted in the base, one at each side, the toothed surfaces of the racks being within the base. The outer ends of the racks 31 and 32 are connected by rods 33 and 34 with the pivoted arms 30, and the said rods pass between the swiveled forks 21 and 21^a of the oscillating frame B.

The key-levers 35 are fulcrumed at their rear ends in the base of the machine, and near their fulcrums rest upon springs 36 of any approved construction. The forward ends of the key-levers are bent downward and upward and are provided with the usual form of key. The key-levers rest normally upon a crank-shaft 37, journaled upon suitable bearings, preferably projecting from the inner side surfaces of the base, the central crank-arm 37^a of the shaft being normally held horizontal and essentially parallel with the front of the machine by springs 38, attached to the base and the shaft near its extremities.

The crank-shaft at the right-hand side of the central crank-arm is provided with a downwardly - extending section having a straight rack-surface 39, adapted to engage with the right-hand segmental rack 32. By this arrangement whenever a key-lever is pressed downward it engages with the central crank-arm of the crank-shaft and carries the shaft in the same direction, and the rocking movement of the shaft, through the medium of the racks 32 and 39 and their connections with the oscillating frame, causes the latter to rock rearward and carry the type-wheel in the direction of the page to be written upon, and the pinion 23 of the type-wheel shaft moving upon the segmental rack 22, mounted on the frame B, which is stationary at this moment, revolves the type-wheel sufficiently to present the proper type to the page. The rota-

tion of the type-wheel is stopped by causing the segmental rack of the oscillating frame B to move with the frame, and this is accomplished by the downward movement of the key-levers also, as said levers after engaging with the crank-shaft engage with pins 40, graduated in height and preferably attached to a pivoted crank-lever 41, located in advance of the crank-shaft and beneath the normal plane of the latter, as is best shown in Fig. 5.

The crank-lever consists of a body-section made in two sections b and b' , the upper section being adapted to slide upon the lower section. The graduated pins 40 are located upon the sliding section and the lower body-section has secured to each end a rearwardly-extending bar or plate b^2 , the said bars being pivoted to the side pieces of the base, preferably below the journals of the crank-shaft 37.

Each bar or plate b^2 is normally pressed by a spring 42, located near the springs bearing upon the crank-shaft, as is best shown in Fig. 5, and upon the left-hand bar or plate b^2 a downwardly-extending lug is formed having a straight rack-surface 43 engaging with the segmental rack 31. Instead of using the pins 40, screws may be employed—in fact are preferred, being more readily adjustable. The sliding section of the crank-lever, having the pins or screws attached, may be shifted to the right or to the left by means of a lever 44, which is illustrated in Fig. 5 as engaged by a keeper 45, which may be of any approved construction, and is adapted to lock the lever in a predetermined position. The keeper is represented as comprising a rod journaled in one side of the base, jaws carried by the rod, and a handle or button by means of which the rod is turned.

By shifting the lever 44 different sets of pins or screws are brought beneath the key-levers, enabling one key-lever to control, for instance, three styles of type, all the styles being arranged upon the type-wheel. The machine may be built either with or without shifts to suit purchasers.

The spacing-lever 46 does not when pressed impinge upon a screw or pin 40, but is adapted, primarily, for engagement with the crank-arm 37^a of the crank-shaft 38, whereby the frame B is moved in direction of the page to be printed, carrying with it the type-wheel, which wheel is revolved while being moved forward. As the frame-segment is stationary when the spacing-lever is pressed down to its full extent, the type-wheel will not have engaged with the page to be printed, since the spacing-lever does not move the crank-shaft as great a distance as the key-levers, the surface of the spacing-lever engaging with the crank-shaft being concaved, as shown at b^3 in Fig. 1.

From each forward end of the carriage A a vertical bracket 47 is projected, and in the

said brackets the ends of a tube 48 are secured, the said tube being provided in its under side with a longitudinal slot 49. Upon the carriage-tube 48 a sleeve 50 is held to slide, having a spur 51 projected downward from its inner face, and a finger 52, longer than the spur, projected from its outer face. The sleeve 50 controls the lateral movement of the type-wheel, being provided with two rearwardly-extending horizontal arms 53, one located at each side, which arms project over the type-wheel shaft in engagement with the hub of the wheel. One arm is shorter than the other, and the longer arm at its extremity has secured therein a pin 54, extending in direction of the periphery of the type-wheel, as shown in Fig. 4, being adapted for engagement with the pivoted type, and acts to force the type in engagement with the surface to be printed.

Within the tube 48 a spring 55 is concealed, the said spring being usually a coil or spiral one, as shown in Fig. 2. One end of the spring projects downward through the slot in the tube 48, and is secured to the sleeve 50, and the opposite end is attached to a stud 56, forming a portion of a worm-wheel 57, located at the right-hand end of the tube, and meshing with a short worm-shaft 58, manipulated through the medium of a disk or thumb-wheel 59 at the front of the carriage. The worm shaft and wheel are adapted to impart more or less tension to the spring 55. The type-wheel-actuating arms are not perfectly straight, but midway of their length are provided with downwardly and rearwardly beveled shoulders 60, as shown in Fig. 1, for a purpose set forth in the operation, and also with stirrups 60^a, extending below the hub of the wheel, as also shown in Fig. 1. The spring 55 causes the sleeve when not held in a fixed position to move from left to right, carrying the type-wheel in the same direction. The sleeve cannot move until after a letter has been printed or the space-key has been depressed, its movement being controlled by a spacing mechanism. This mechanism consists of a rack 61, journaled at its ends in the sides of the carriage and connected at one end with the oscillating frame B by a link 62, or its equivalent. The rack when rocked by the oscillating frame is adapted for engagement with the spur 51 of the sleeve and a spring-pressed tooth 63, pivoted upon the rear face of the spur 51. The tooth 63 is fast upon a spindle pivoted in and extending through the carriage sleeve, and upon the outer end of the spindle a lever 64 is secured. The tooth is pressed by a spring 65 above its fulcrum, as shown in Fig. 2, and the distance that the sleeve shall move when the rack is disengaged from the tooth is regulated by a cam-faced or eccentric button 66, which impinges upon the upper portion of the tooth and is manipulated through a spindle, to which the button is at-

tached, and a crank 67, or its equivalent, secured to the forward end of the spindle.

When the frame B oscillates, the rack is so rocked as to release the tooth 63 and again engage with it. As soon as the tooth is disengaged from the rack it is moved by its spring the distance of one or two teeth in the rack, according as it has been set to move by the cam-faced or eccentric button 66, as it is understood that the tooth will move different distances, according to the face of the eccentric with which it is brought in contact. By forcing the lever 64, connected with the tooth, to the right the tooth can be made to disengage from the rack at any time—as, for instance, when it is desirable to move the sleeve, and consequently the type-wheel, quickly from left to right. The sleeve can be moved from right to left by simply pressing the sleeve-finger 52 to the left, as the tooth will ride over the rack.

Upon the front of the carriage A two stop-slides 68 and 69 are located, adapted to check the movement of the sleeve at any desired point either to the right or to the left. A bar 70, upon which is marked the letter-scale, is loosely mounted in the slide 68 and is secured to the slide 69. The slide 68 can be moved on the bar 70 to space the width of the page to be operated upon and determine the length of the lines to be printed, whereupon this slide is secured to the bar 70 after adjustment by means of a set-screw 71, or its equivalent. The slide 69 is also provided with a corresponding fastening device, which maintains it at any desired point upon the face of the carriage. The set-screw of the slide 69 being released and that of the slide 68 set, both slides are free to move together.

The spacing mechanism heretofore described regulates the distance laterally between the letters and the words. Another mechanism is employed for spacing between the lines and for making insertions between the lines. This latter mechanism consists of a vertical rack-bar 74, located at the left side of the machine, the upper end whereof is journaled in the left top bar 14 of the main frame, the lower end being passed through a guide-collar 75, attached to the base and journaled in one of a series of apertures 76 of different depths, produced in the periphery of a disk 77, pivoted to the side of the base and having a handle 78 attached. The object of thus journaling the lower end of the vertical rack is to enable the operator by changing the socket of the rack to raise or lower the carriage A for the purpose of interlining above or below the line being printed, which is especially useful in making fractions or for inserting omitted words.

The vertical rack is engaged by two teeth 79 and 80. The tooth 79 is located at the left-hand side of the carriage at the front and is, essentially, L-shaped. The rack-engaging

member is preferably beveled rearward and extends horizontally at a right angle from the carriage, the shank member being pivoted to the carriage, and the tooth is normally supported in its normal position (shown in Fig. 3) by a spring 81. The rack-engaging member of the tooth 79 is depressed to permit the carriage to drop the distance of one or more teeth of the rack by a regulating-disk 82, pivoted to the carriage and provided with marginal or peripheral spurs 83 of different lengths, which spurs are brought in engagement, as required, with the rack-engaging member of the tooth, as illustrated in Fig. 3. The tooth 80 is located parallel with the inner front surface of the carriage and the extremities of the tooth project through openings in the sides of the carriage. The tooth at its left-hand extremity is free to be raised or lowered and engages with the rack, and at the right-hand extremity the tooth is pivoted to the upper end of a spring-pressed lever 85, fulcrumed at or near its center in any approved manner to the carriage. The rack near its lower end, within convenient reach of the operator, is provided with a horizontal handle H.

In operation when the handle H is moved to the left the tooth 80 is released and allowed to fall and the rack engages with the tooth 79, thus supporting the carriage; but upon returning the handle to the right the rack again engages with the tooth 80, the weight of the carriage causing it to descend the distance of one, two, or three teeth in the rack, according as has been predetermined by the regulating-disk 82. By means of the lever 85 the carriage can be released to be raised or lowered at will, as by pressing inward the lower end of the lever the tooth 80 is disengaged from the rack and the carriage is free to be moved up or down.

An inking-roller 87 is located immediately below the type-wheel, which may consist of cork or other substance covered by an inking-pad, as shown in Fig. 1. The axes of this roller are in horizontal alignment with those of the oscillating frame B. This arrangement is made in order that all of the type may be brought in contact with the inking-roller at each revolution of the type-wheel. All of the type are inked every time the space-key is depressed and all will be frequently brought in contact with the ink-roller in the course of printing words.

The inking-roller is supported in the following manner: A rock-shaft 88 is journaled in the carriage at the back, from which arms 89 are forwardly projected, and in the forward extremities of the arms the axis of the roller is journaled. The roller is constantly made to bear to a greater or less degree against the type of the type-wheel by manipulating a set-screw 90, located in the lower edge of the carriage at the back to bear more or less against a spring 91, projected vertically down-

ward from the rock-shaft, as shown in Fig. 1. In order that the surface to be printed upon shall be perfectly smooth and to preserve perfect alignment a thin bar 92 is made to engage with the page, as shown in Fig. 1, longitudinally slotted to permit the passage of the type, the said alignment-bar being rigidly secured to the back of the casing by uprights 93, or their equivalents. Brackets are secured to the rear of the frame-uprights 11, upon which brackets a table 94 is firmly fastened, adapted to support the book C to be type-written. Beneath the table at each end a bar 95 is held to slide, and each bar has pivoted upon its outer end a cleat 96, the said cleats being adapted to support that portion of the book not being operated upon.

When the book is placed in an upright position upon the table, the upper portion of the leaf presented to be operated upon is engaged by a binding or smoothing bar 97, provided with sleeves adapted to slide upon the uprights 11, said sleeves having each a set or binding screw 98, as shown in Fig. 4. The bar is made vertically adjustable to clamp large or small books. The book is held firmly to place against the clamping-bar 97 and the uprights 11 by a platen 99, engaging with its back. This platen is pivoted between two arms 100, curved upward from a shaft 101, journaled in the back of the base of the machine, as shown in Fig. 1, which shaft is provided with an arm 102, connected by a pitman 103 with a treadle or its equivalent, whereby the platen may be pressed with considerable force against the book. In connection with the treadle any approved form of locking device may be employed.

When small books are to be type-written, it is necessary that more force than is obtainable through the treadle should be applied to the platen. Therefore a bar 104 is located between the arms 100 of the book-holder below the fulcrum of the platen, and a set-screw 105 is passed through the bar to an engagement with the platen, as is best shown in Fig. 1.

The machine must be of sufficient strength to accommodate the largest size of books, and while designed especially for books it can be put to all the uses of type-writers in general. The position of the book when held by the platen against the frame is such that it will at all times afford the operator a plain view of the work, since the printing mechanism will not obscure that portion of the page which has been printed.

In turning leaves the operator has only to release the platen, when it will fall back and constitute an inclined rest for the book, which will afford ample room for turning the leaves. It will not be necessary at any time to remove a book to inspect its contents.

The machine will fulfill all the requirements of type-writers in general and more

than any other can accomplish, in that it will enable an operator to type-write upon blank books of any size or description with a facility equal to that obtained by any type-writer operating on single sheets. Various styles of type can be employed, it being only necessary to remove one type-wheel and substitute another. Cone-bearings will be employed throughout in the construction of the machine wherever practicable, and metal only will preferably compose its parts.

The type-wheel shown in Fig. 6, and which in many cases is preferred, consists of a slide-like hub 106, adapted to slide upon a grooved shaft, which hub is provided at or near its central portion with a perpendicular flange 107, and around the circumference of the flange a series of delicate springs 108 is fastened, the number of springs being equal to the number of types to be employed, each type being provided with a spring. These springs stand at right angles to the flange projecting on both sides.

The springs and the inner ends of the type-bars 109, which rest upon and are attached to the springs, occupy the circular space between the flange and the circumferential face 110 of the wheel. The face of the wheel is supported by spokes 111, connecting with the hub at both sides of the flange, which spokes have sufficient tenuity to allow them to pass between the springs. The type-bars are straight and stand radially, extending outward through slots 112 in the face of the wheel.

The outer ends of the type-bars are provided with types set therein and secured thereto in any suitable or approved manner, and the type-bars are somewhat wider than the types, thus forming on both sides of them shoulders or lugs 113, which are designed to have contact with pins set in the ends of the guide-arms 53, and when this form of wheel is employed the guide-arms are of equal length, or practically so. The pins are arranged upon the guide-arms so as to point inward, facing each other, and stand at a right angle to the arms. The contact of the pins with the shoulders or type-bars takes place when the wheels are brought in close proximity to the page of the book. The type-bars being free to move in the slots of the wheel, the contact of said bars with the pins upon the guide-arms causes the said bars to recede, compressing their attached springs, and the bars, on being released from engagement with the pins, are by the reaction of the springs projected outwardly, carrying the types beyond the circumferential line in which they stand when at rest. The chief object of this peculiar construction is to prevent the possibility of more than one type at a time coming in contact with the page, for the curvature of the wheel, whose diameter could accommodate in a single line seventy-eight or more types, would be so

slight as to make it probable that more than one type would impinge upon the page of the book, its surface being a plane.

The type-bars are released in the following manner: The under side of the guide-arm 53 is arch-shaped where the wheel-shaft plays in its oscillation, producing thereby lug-like projections extending downward and with which the shaft comes in contact, thus raising the guide-arm slightly and releasing the types from engagement with the pins on said guide-arms. The stirrups on the under sides of the guide-arms serve the dual purpose of preventing the pins rising beyond a predetermined distance and of stopping the type-wheel in its forward motion at the desired point.

It may possibly appear that if the type-wheel is mounted in the frame B and swings with said frame its pinion would not move properly over the rack 22. Such is not the case, however, as the rack 22 is held stationary by reason of its connection with the crank-shaft carrying the graduated pins or screws until caused to move by a depressed key-lever coming in contact with its corresponding pin on the crank-shaft, and the rack 22 being thus held stationary the forward movement of the frame B will cause the pinion to move over the rack rotating the type-wheel shaft, and consequently the type-wheel.

In Fig. 7 we have illustrated a slight modification in the construction of the type-wheel, in which the type-bars 114 are essentially angular or L-shaped in general contour, and the bars are fulcrumed upon the inner face of the periphery of the wheel in such manner that the extremity of the horizontal member will extend a slight distance beyond one side face of the wheel, and the vertical member of each type-bar is adapted to extend outward through openings in the circumferential face of the wheel, and the said members of the bars have the types attached thereto. Each type-bar is connected with a spring secured to the flange of the wheel-hub in any suitable or approved manner. In the operation of this form of the wheel the outer ends of the type-bars will come in contact with a pin on the right-hand guide-arm and, thus being forced inward, will cause the vertical members to be thrown outward, and the printing of a page can in this way be effected. It may be mentioned that the guide-arms can be made to serve as indicators to facilitate placing the type-wheel in position wherever desired.

Owing to the manner in which the line-spacing and the letter-spacing is accomplished we are enabled to employ type of different sizes.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a type-writer, a type-wheel, spring-pressed type carried by the wheel, an oscillating frame supporting the wheel, an actuating

mechanism connected with the frame, a shifting and a driving mechanism connected with the wheel, and a trip mechanism in the path of the rotation of the wheel acting success-
 5 ively upon the type carried by the wheel, as and for the purpose specified.

2. In a type-writer of the character described, the combination, with a laterally-movable type-wheel, of a sleeve, a tension device connected with the sleeve, and arms pro-
 10 jected from the sleeve and engaging with the wheel, as and for the purpose specified.

3. In a type-writer of the character described, the combination, with a laterally-movable wheel and spring-pressed type lo-
 15 cated upon the wheel, of a sleeve, a tension device connected with the sleeve, arms projected from the sleeve and engaging with the wheel, and pins carried by the arms, adapted
 20 for engagement with the type, substantially as specified.

4. In a type-writer of the character described, the combination, with a rocking frame and a type-wheel laterally movable in
 25 said frame, of a sliding sleeve, a tension device connected with the sleeve, arms projected from the sleeve and engaging with the wheel, and pins carried by the arms, adapted to en-
 30 gage with the type of the wheel, substantially as described.

5. In a type-writer of the character described, the combination, with a vertically-movable carriage, a sleeve held to slide later-
 35 ally upon the carriage, and a tension device connected with the sleeve, of a rocking frame journaled in the carriage, a type-wheel having lateral movement in the frame, and arms pro-
 40 jected from the sleeve and engaging the wheel at opposite sides thereof, substantially as described.

6. In a type-writer of the character described, the combination, with a vertically-movable carriage, a sleeve held to slide later-
 45 ally upon the carriage, and a tension device connected with the sleeve, of a rocking frame journaled in the carriage, a feed mechanism connected with the sleeve and the frame, a
 50 type-wheel laterally movable in the frame, and guide-arms projected from the sleeve and engaging with opposite sides of the type-wheel, substantially as described.

7. In a type-writer of the character described, the combination, with a vertically-movable carriage, a sleeve held to slide later-
 55 ally upon the carriage, and a tension device connected with the sleeve, of a rocking frame journaled in the carriage, a feed mechanism operated from the frame and operating upon
 60 the sleeve, a type-wheel having lateral movement in the frame, guide-arms attached to the sleeve and engaging with the type-wheel, and an ink-roller connected with the carriage, the
 65 axes whereof are in alignment with the axes of the rocking frame, substantially as described.

8. In a type-writer of the character described, the combination, with a vertically-movable carriage, a sleeve held to slide later-
 70 ally upon the carriage, and a tension device connected with the sleeve, of a rocking frame journaled in the carriage and carrying a shaft, a wheel having lateral movement upon the
 75 said shaft and provided with spring-pressed type, a feed mechanism operated by the frame and operating upon the sleeve, guides attached to the sleeve and engaging with the
 80 wheel, an ink-roller journaled within the carriage and engaging with the type, and a tension device connected with the roller, as and for the purpose specified.

9. In a type-writer of the character described, the combination, with a carriage, a rocking frame journaled in the carriage, a
 85 type-wheel capable of lateral movement in the frame, a crank-shaft journaled below the carriage, and keys engaging with said shaft, of a sleeve mounted to slide laterally on the
 90 carriage, a tension device connected with the sleeve, a fork swiveled to one side of the rocking frame, a vertical rock-shaft engaging with the fork, a connection between the crank-
 95 shaft and the rock-shaft, and a feed mechanism operated by the rocking frame and operating on the sleeve, substantially as shown and described.

10. In a type-writer of the character described, the combination, with a carriage, a rocking frame journaled in the carriage, a
 100 type-wheel capable of lateral movement in the frame, a crank-shaft journaled below the carriage, and keys adapted to bear upon the crank-shaft, of a sleeve held to slide upon the
 105 carriage, a tension device connected with the sleeve, guide-arms projected from the sleeve and engaging the type-wheel, a fork having a swivel connection with one side of the rock-
 110 ing frame, a vertical rock-shaft passing through the fork, a gear connection between the lower end of the fork and the crank-shaft, a feed operated from the rocking frame and
 115 operating upon the sleeve, and a cam journaled in the sleeve and connected with the feed, regulating the throw of the same, substantially as and for the purpose specified.

11. In a type-writer of the character described, the combination, with a carriage, a
 120 rocking frame mounted in the carriage and carrying a horizontal shaft, and a type-wheel held to slide upon the shaft, of a sleeve loosely mounted upon the carriage, a tension device
 125 connected with the sleeve, guide-arms extending from the carriage and engaging with the wheel and provided with pins adapted to engage with the type, a rack pivoted in
 130 the carriage and connected with the rocking frame, a spring-pressed tooth pivoted upon the sleeve and engaging with the rack, a cam engaging with the tooth, and a lever connected
 135 with the cam, substantially as shown and described.

12. In a type-writer of the character described, the combination, with a carriage, a rocking frame mounted in the carriage and carrying a horizontal shaft, and a type-wheel held to slide upon the shaft, of a sleeve loosely mounted upon the carriage, provided with a downwardly-extending spur and a finger-bar, a tension device connected with the sleeve, guide-arms extending from the sleeve and engaging with the type-wheel and its type, a rack pivoted in the carriage and connected with the rocking frame, a spring-pressed tooth fulcrumed upon the inner side of the carriage and engaging with the rack, the pivot of which is provided with an attached lever, a cam engaging with the upper portion of the tooth, and a lever connected with said cam, substantially as described, and for the purpose specified.

13. In a type-writer of the character described, the combination, with a vertically-adjustable carriage, a rocking frame journaled in the carriage, a type-wheel having lateral movement in the frame, and brackets adjustable upon the front of the carriage and carrying a letter-scale, of a sleeve loosely mounted upon the carriage, provided with a downwardly-extending finger-bar and a spur, the said sleeve being adapted to slide between the brackets, a tension device connected with the sleeve, guide-arms projected from the sleeve and engaging with the type-wheel, a rack journaled in the carriage and connected with the rocking frame, a spring-pressed tooth pivoted upon the sleeve and engaging with the rack, and a regulating-cam engaging with the tooth, substantially as shown and described.

14. In a type-writer of the character described, the combination, with a carriage and a rocking frame journaled in the same, consisting, essentially, of two upright arms, each having an independent pivot and a shaft journaled in the top thereof, a type-wheel held to slide upon the shaft, and a pinion secured to the shaft, of an upwardly-extending rack journaled at one side of the frame and engaging with the pinion, a fork connected with the rack and a similar fork connected with the opposite side of the frame, vertical rock-shafts passing through the forks, a crank-shaft connected with one rock-shaft, a second and lower crank-shaft connected with the other rock-shaft, and key-levers adapted to press the said crank-shafts downward, as and for the purpose specified.

15. In a type-writer of the character described, the combination, with a rotary shaft and a type-wheel held to revolve with the shaft, of a crank-shaft connected with the wheel-shaft, the crank-arm whereof is constructed in two sections, one of which is movable, graduated pins located in the movable section of the crank-arm, and key-levers adapted to bear against said pins, substantially as described.

16. In a type-writer of the character described, the combination, with a rotary shaft and a type-wheel held to turn therewith, of a crank-shaft having a rack connection with the wheel-shaft, the crank-arm of which is made in two sections, one movable upon the other, detachable and graduated pins located upon the movable section of the crank-arm, key-levers adapted for engagement with the pins, and a shifting-lever connected with the movable section of the crank-shaft arm, substantially as described.

17. In a type-writer of the character described, the combination, with a carriage and a rocking frame journaled in the same, consisting, essentially, of two upright arms, each having an independent pivot and a shaft journaled in the upper end thereof, a type-wheel held to slide upon the shaft, and a pinion secured to the shaft, of an upwardly-extending rack journaled at one side of the rocking frame and engaging with the pinion, a fork connected with the rack and another fork with the frame opposite the rack, vertical rock-shafts passed through the forks, a crank-shaft below the carriage and connected with the rock-shaft of the frame, a second and lower crank-shaft connected with the rock-shaft of the rack, the arm of the latter crank-shaft being made in two sections, one of which is movable and provided with graduated pins, and key-levers adapted to engage first with the upper crank-shaft and then with the pins of the lower crank-shaft, substantially as specified.

18. In a type-writer of the character described, the combination, with the frame, a carriage located in the frame, and a rocking vertical rack at one side of the frame, of a tooth held to slide longitudinally in the carriage and adapted for engagement with the rack, a lever fulcrumed upon the carriage and connected with the tooth, a spring-pressed angular tooth pivoted at one side of the carriage, also adapted to engage with the rack, and a regulating-disk provided with graduated spurs adapted as a stop or check for the longitudinal tooth when the carriage is dropped downward, substantially as specified.

19. In a type-writer of the character described, the combination, with a frame, a carriage located in the frame, and a rack located at one side of the frame and having its upper end journaled in the frame and its lower end in an apertured disk pivoted to the frame, the said rack being provided with an attached handle, of a tooth held to slide longitudinally in the carriage and adapted for engagement with the rack, a lever fulcrumed upon the carriage and connected with the tooth, a spring-pressed angular tooth pivoted at one side of the carriage and also adapted to engage with the rack, and a regulating-disk provided with graduated spurs engaging with the angular tooth, substantially as shown and specified.

20. In a type-writer of the character described, the combination, with a frame, of a table located at the back of the frame and adapted to receive a book, arms pivoted at their lower ends in the frame, and a platen pivoted to the arms and adapted to engage with the back of the book, the said platen being located above the table, as and for the purpose specified.

21. In a type-writer of the character described, the combination, with the frame thereof, of a table located at the back of the frame and having end extensions, arms pivoted at their lower ends in the frame, mechanism, substantially as described, for manipulating said arms, a platen pivoted to the upper ends of

the arms, located above the table and adapted to engage with the back of a book, a bar connecting the arms beneath the fulcrum of the platen, and a set-screw carried by the said bar and adapted for engagement with the platen, as and for the purpose specified.

WILLIAM J. BORDEN.

JAHU W. JOHNSON.

Witnesses to the signature of William J. Borden:

L. E. HICKMAN,

F. H. SNIDER.

Witnesses to the signature of Jahu W. Johnson:

A. T. PATRICK,

ANNIE S. CONWAY.