No. 628,268. Patented July 4, 1899.

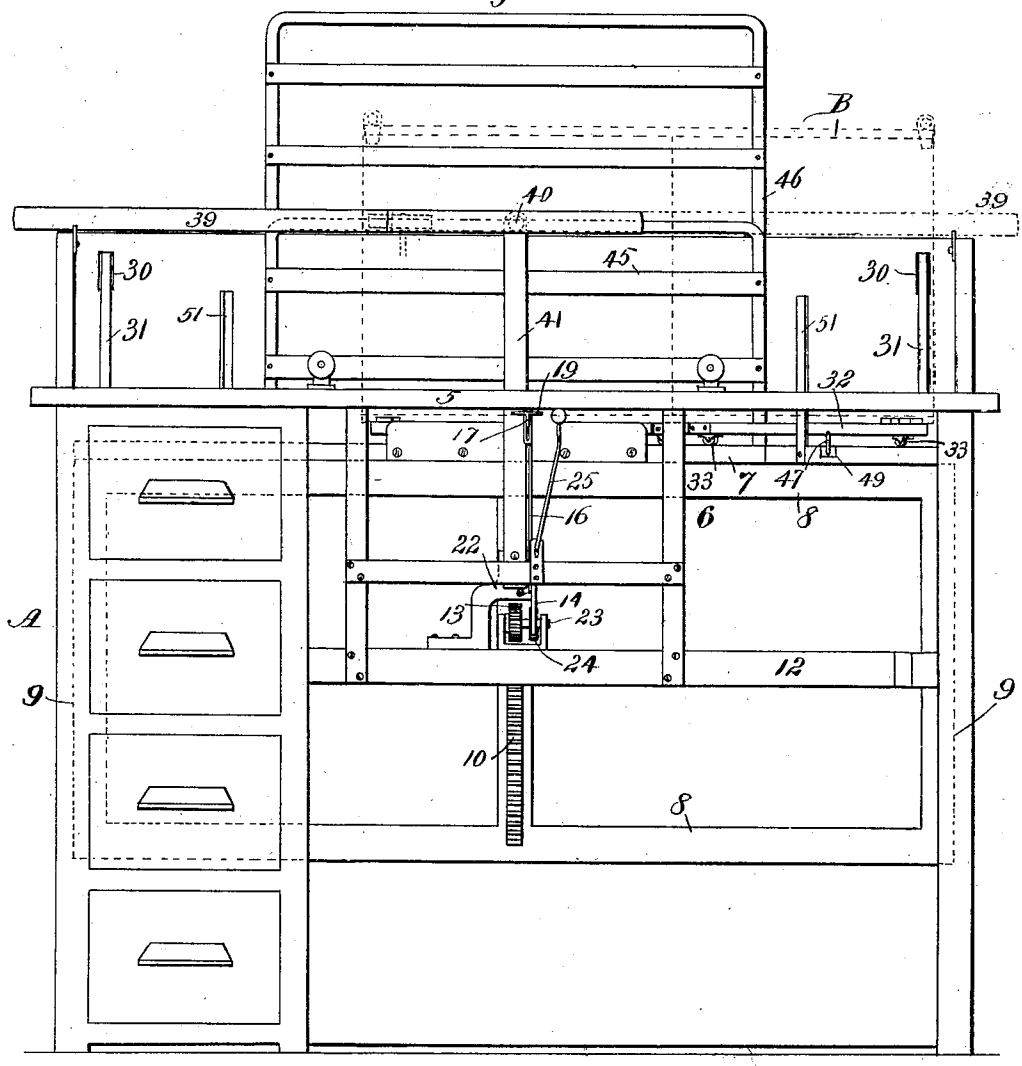
J. W. JOHNSON.

BOOK TYPE WRITER.

(Application filed Apr. 2, 1895.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

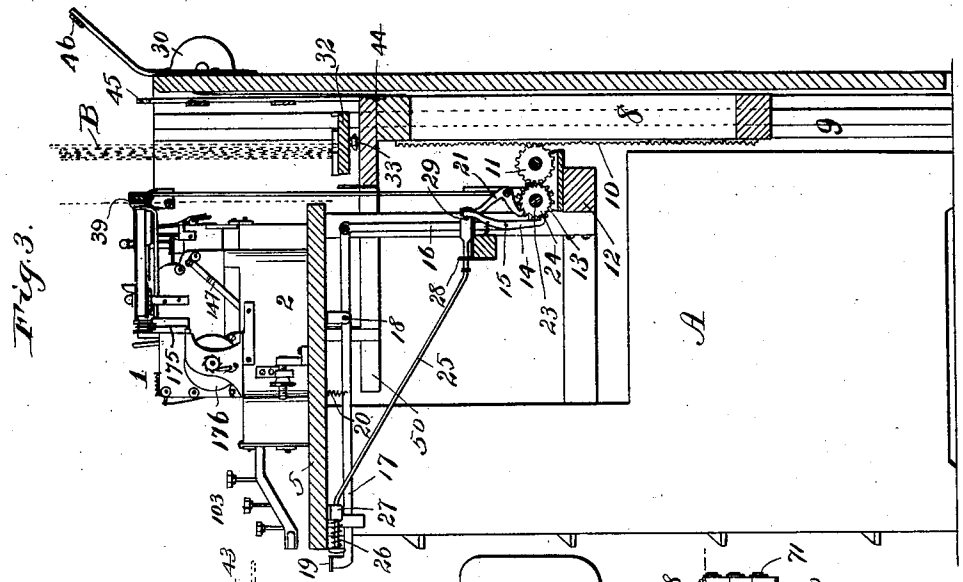


Fig. 3.

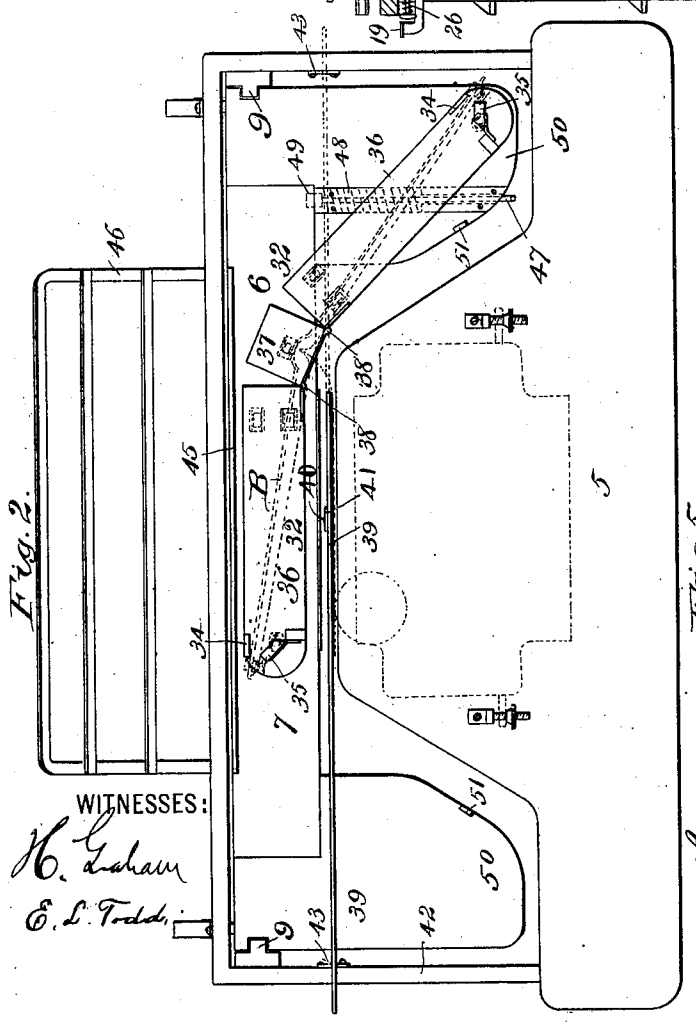


Fig. 2.

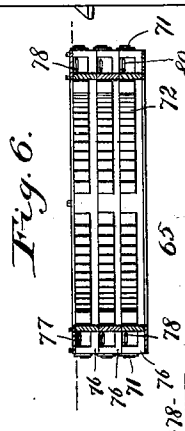


Fig. 6.

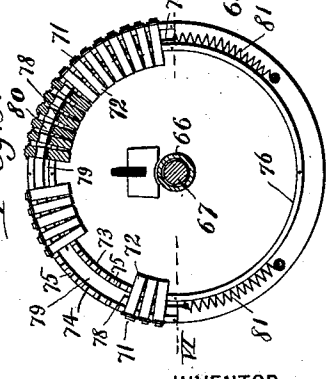


Fig. 5.

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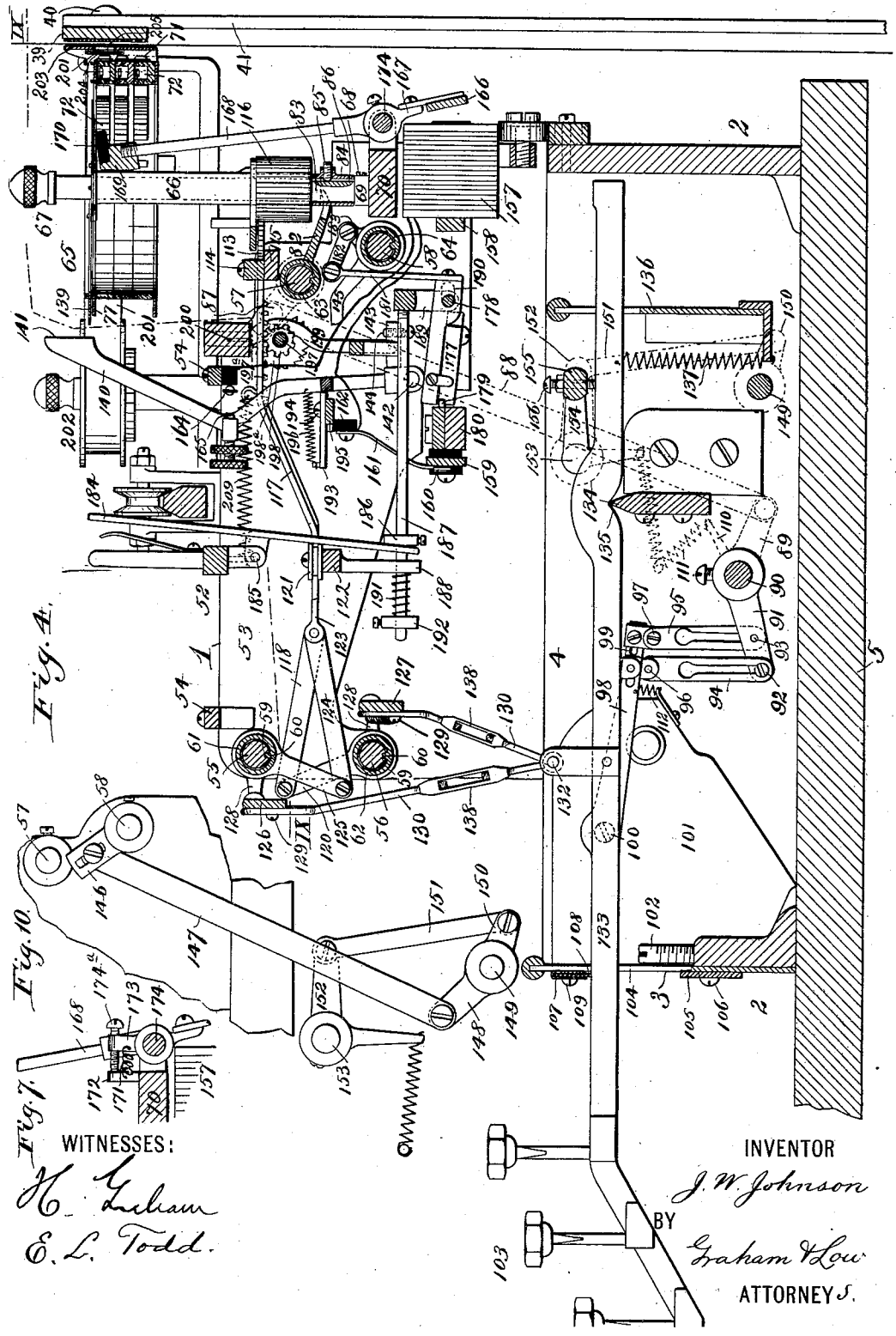


Fig. 4.

Fig. 10.

Fig. 7.

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BOOK TYPE WRITER.

(Application filed Apr. 2, 1895.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 8

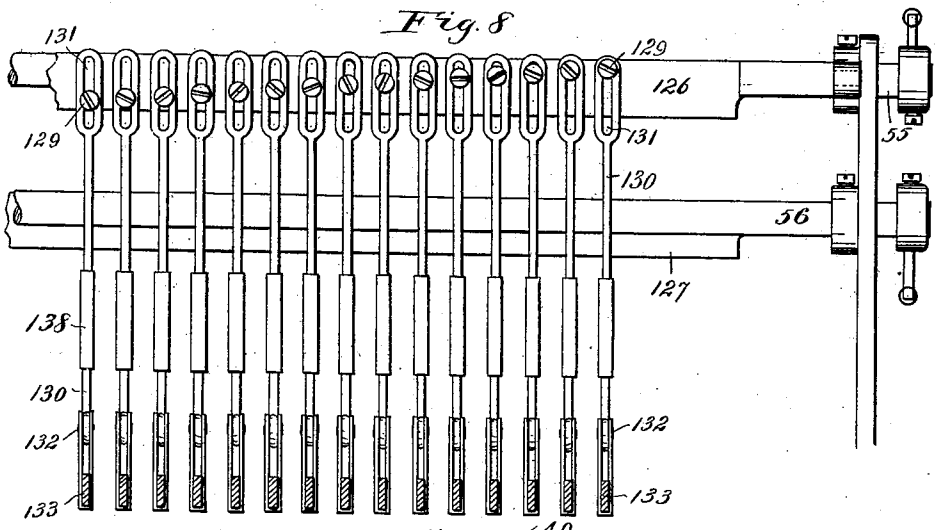


Fig. 9.

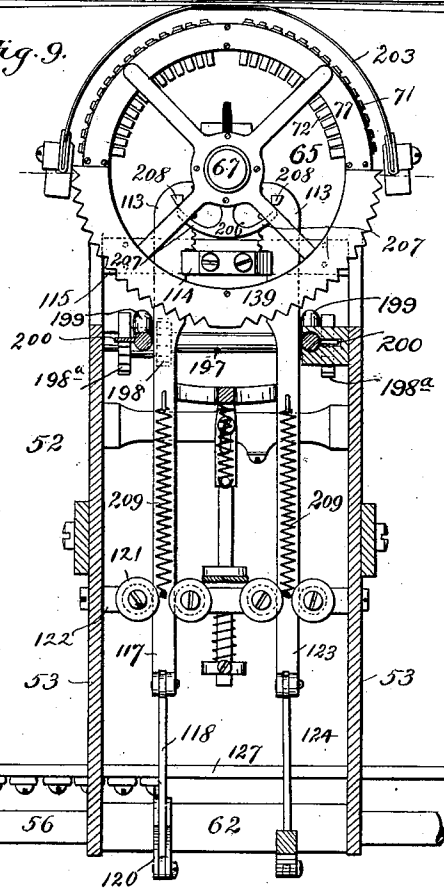


Fig. 11.

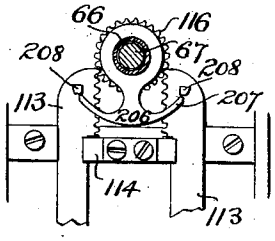
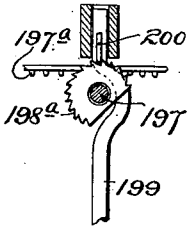


Fig. 12.



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UNITED STATES PATENT OFFICE.

JAHU W. JOHNSON, OF HOUSTON, TEXAS.

BOOK TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 628,268, dated July 4, 1899.

Application filed April 2, 1895. Serial No. 544,203. (No model.)

To all whom it may concern:

Be it known that I, JAHU W. JOHNSON, a citizen of the United States of America, residing at Houston, Harris county, State of Texas, have invented certain new and useful Improvements in Book Type-Writers, of which the following is a specification.

It is one of the principal objects of my invention to provide a type-writing machine by which such writing may be done in bound books or on leaves already united together.

To this end one feature of my improvements consists in any suitable type-writing mechanism combined with means for holding a book or collection of leaves with one of its pages or leaves in position to receive the impression and with feed devices by which a relative step-by-step or progressive movement is caused to take place between the type-carrier and the said holding means.

It is a further object of my invention to provide an improved means for carrying and operating the type and for producing the feed movement irrespective of whether or not the machine is adapted for book-writing, and this feature of my invention consists in a rotary and progressively movable type-carrier with means for communicating from a set of finger-keys the desired movement of the individual type and the feed of the type-carrier combined with any suitable book or paper holder.

My invention further consists in the parts and combinations thereof hereinafter set forth and claimed.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying it into practical effect without limiting my improvements in their useful applications to the particular construction which for the sake of illustration I have delineated.

In said drawings, Figure 1 is a front view of a book type-writer embodying a portion of my invention and comprising a table or desk adapted to its requirements, the writing mechanism being omitted. Fig. 2 is a plan view of the same. Fig. 3 is a vertical sectional view of the book-holder and desk, showing in end elevation the writing mechanism. Fig. 4 is a vertical sectional view of the writing mechanism and showing a portion of the book-holder. Fig. 5 is a plan view, partly in section, showing the type-wheel. Fig. 6 is a vertical sectional view of the same on line VI VI, Fig. 5. Fig. 7 is a detail elevation, partly in section, illustrating the means for actuating and controlling the armature-lever and hammer. Fig. 8 is a front elevation showing a portion of the type-wheel-actuating mechanism. Fig. 9 is a plan view, partly in section, on line IX IX, Fig. 4, illustrating the type-wheel and actuating mechanism. Fig. 10 is a detail view illustrating a portion of the mechanism for operating the space-keys, the type-wheel-centering device, and the electric contact for causing the movement of the type-hammer. Figs. 11 and 12 are details hereinafter described.

Referring to the drawings, 1 indicates a frame having its various parts properly constructed and disposed for the support and to permit the operation of the fixed and movable parts of the machine. In the particular construction about to be described the relative progression or feed which takes place between the book or paper holder and the type-carrier is produced by making the latter the movable part, while the said holder is stationary; but it will be understood that my invention is not to be confined in all of its features to this arrangement. The said frame comprises, preferably, a hollow base 2 open at the top and having a front plate 3 and end plates 4 and is adapted to rest on a bottom plate 5, which may be the top of a table or desk A. Upon this frame is carried the type-writing mechanism hereinafter described. The book or leaf holder adapted for coöperation with such mechanism is shown at 6. It consists of upwardly and laterally movable parts, the latter serving to give the letter and space feed along a line and the former to give a feed from line to line. The upwardly-movable part is shown at 7, by preference in the form of a platform fixed on a slide 8. The slide fits and may reciprocate on guides 9 and has a rack 10, engaged by a rotary gear-pinion 11. The latter is mounted on a part of the desk-frame or other fixed support, such as a bar 12, and is turned by suitable mechanism at the end of each line or when desired so as to elevate the book the proper distance to bring level with the type the part of the page

next to be written on. This mechanism comprises a second pinion 13, meshing with the pinion 11 and fixed on a shaft 23, a ratchet 24, also fixed on the shaft, a pawl 14, pivoted at 15 on a bar 16 and engaging the ratchet, and a lever 17, pivotally mounted at 18 on the desk. The front end 19 of this lever constitutes a line-space key and is within convenient reach of the operator, who by depressing it may cause the rack, platform 7, and book (shown at B) to be elevated one space, the lever and pawl being returned by a spring 20. The platform is retained in the position to which it is thus raised by a pawl 21, which is pivoted on a bracket 22, carried by the bar 12.

25 is a push-bar controlled by a spring 26, sliding in guides 27 28 and having a pin 29, by which the pawls 14 and 21 may be both thrown out of engagement with the ratchet 24, so as to permit the platform and book to descend and enable the upper end of the latter to be written on. The platform is thus lowered when a change in writing is to be made from the bottom of one page to the top of another. The weight of the book and holder may be wholly or partly counterbalanced, as by a spring 30, connected by a metal strap 31 with the holder. Two sets of such devices are preferably employed, one at each side of the desk.

The laterally-movable part of the book or leaf holder is indicated at 32, consisting of a carriage mounted so as to move freely from side to side upon the platform 7, as by rollers 33. This carriage is adapted for the support of a book in an upright position, and to this end may be furnished with standards 34, adapted to engage the back of the book, and with holdiing devices 35, adapted to press against its front. The natural position of an open book being with its two portions at a slight angle to each other, the carriage 32 is formed in two or more parts 36 and 37, hinged to each other at 38, so that while one part supports one half of the book opposite to the writing mechanism the other part of the carriage may take position at an angle to the first-mentioned part, so as to properly support the other half of the book, Fig. 2. When it is desired to change the place of writing from one leaf to another or from one side to the other of the same leaf, the carriage may be readily shifted laterally by hand. The subjacent leaves not ordinarily forming a proper backing to the leaf which is to be written upon, I provide a platen adapted to be adjusted beneath such leaf and situated at the level of the type, extending for the width of the page or the length of a line. Such platen is indicated at 39 and is pivotally mounted at 40 upon a standard 41, supported from the bar 12 or other fixed part. The platen is thus kept opposite the type and the book moves up relative to the platen when the platform 7 is actuated, as already described. The platen receives an additional support at its outer end upon one or the other of the edges 42 of the desk, where it may rest in a clip 43. When the carriage 32 is moved to the left-hand side of the desk, so that the right-hand pages of the book may be written upon, the platen 39 will be turned upon its pivot 40 so that its outer end will rest upon the right-hand edge of the desk or other equivalent support. It will then be in position to lie beneath the right-hand page of the book in a manner similar to that which is illustrated in connection with the left-hand page in Fig. 2. For convenience for changing the pages of the book while on the carriage the platform 7 is hinged at 44 to the slide 8, so that when said platform has reached its uppermost position at the top edge of the desk it may be tipped backward. In such position the back of the book will rest against a rack 45, fixed on the platform, and said rack will in turn be supported by a fixed rack 46 at the back of the desk. In order to hold the platform 7 in its normal position, I provide for it a catch or bolt 47, controlled by a spring 48 and adapted at its inner end to engage a recess 49 in the platform 7. The said catch is mounted in one of two tables or extensions 50, fixed on the slide 8 and level with the hinged platform 7. Said extension serves to support that part of the carriage 32 which for the time being is at one side of the desk.

51 indicates standards or guards fixed on the extensions 50 and adapted to keep the parts of the carriage 32 from getting too far from their proper positions.

Referring now to the writing mechanism, which I have adapted for coöperation with the book or leaf holder above described, 52 is a laterally-movable carriage constituting the main portion of the type-carrier. It comprises, preferably, side plates 53, which are connected together by cross-pieces 54, which are suitably perforated and which are mounted upon, by means of said perforations or bearings, a suitable number of transverse rock-shafts carried in bearings in the end plates 4 of the frame 1. In the construction illustrated these shafts are four in number and are indicated at 55, 56, 57, and 58. Each shaft is formed with a groove 59, with which engages a corresponding tongue or projection 60, the latter being formed with or carried by sleeves 61, 62, 63, and 64, Fig. 4. These sleeves are confined between the plates 53 of the carrier, and as the latter is moved from side to side of the machine in carrying the type step by step along the line or in returning to the left to begin a new line the sleeves move with the carrier, so as to be always kept in proper relation to the writing mechanism, which is also supported by the carrier. It will therefore be seen that whatever be the position of the carrier 52 if one of the said rock-shafts be oscillated its corresponding sleeve within the carrier will be turned and the mechanism connected with said sleeve correspondingly operated. By these means the desired set of

type (where two or more sets or stories of type are employed) may be brought to the level of the line to be written, the type-carrier may be further turned or moved to bring the particular type desired to be struck into a position perpendicular to the page or leaf, and the said type may be moved toward the page to produce the impression, and, finally, the type-carrier as a whole may be moved for a space along the line to be written.

Referring now particularly to that portion of the carrier in which the type are immediately supported, 65 is an oscillatory wheel or casing mounted upon a vertical sleeve 66, which forms a bearing for the movements of the wheel, to this end being fitted upon a fixed post or journal 67, so that it may both turn and move vertically upon the journal. The latter is fixed by a set-screw 68 in a socket 69, formed in a cross piece or plate 70 of the carriage 52.

The individual type are indicated at 71, having faces formed with the usual or any desired characters and having shanks or stems 72 fitting in radial bearings in the wheel 65 in such manner that they move inward and outward relative to the wheel for the production of their impressions upon the book or paper. For the sake of lightness I prefer to form the radial bearings for the type-stems in one or more rings of hard rubber or vulcanized fiber. Such a ring is indicated at 76 in Fig. 5 and is provided with inner and outer vertical flanges 73 74, in which are formed recesses 75 of a height and width equal to the dimensions of the type-stems. By the use of these rings 76 the type-wheel may be readily built up to carry as many banks or stories of type as may be desired—for instance, one of such banks carrying the lower-case letters, another the upper-case letters, and a third carrying numbers, punctuation-marks, and other characters. In the construction illustrated three of such rings are employed; but it will be understood that their number and the arrangement of type therein will depend upon the desired capacity of the machine and the uses for which it is intended. For convenience in use and in order that it may not be necessary to turn the type-wheel for more than about a quarter of a revolution I have formed the recesses 75 in only a half-circumference of the rings 76. In combining several of these rings with the rest of the type-wheel the bottoms of the upper rings will rest upon the type below and confine them in their recesses, while the upper set of type will be held in place by the top plate 77 of the wheel. For retracting each type after it has made its impression I provide each set of them with a wire 78, arranged in the annular space 79 of the type-ring and situated in slots or recesses 80, formed in or through the type-stems 72. Interposed in or connected with each retracting-wire 78 is a spring or springs 81, which will be extended by the outward movement of the type and whose tension upon the wire 78 will serve to retract the type.

Each slot 80 extends outward for a distance substantially equal to the outward movement of a type in making its impression, so that a single type and its retracting wire or device 78 may move outward without similarly moving any other type. Thus although several or many type have a common retracting device in making an impression no more power is required than is sufficient to actuate a single type.

The arrangement of the type will ordinarily be such that the lower-case letters and characters most commonly used will be in that set or bank—say the top set—which is normally on a level with the inking device and the line to be written, and when it is desired to bring another set of type into operative position the type-wheel is moved vertically for a distance equal to the space between that set of type already in use and the other set which it is desired to employ. This movement is effected by an arm 82, fixed on the sleeve 63 and engaging by its end beneath a shoulder on the sleeve 66 or some part connected therewith. Said shoulder need not, however, be rigid with the sleeve 66, and I have illustrated it at 83 as formed upon a sleeve 84. The latter is beneath and supports the lower end of the sleeve 66 and is provided with a screw 85, which enters a vertical groove 86 in the post 67 and guides the sleeve 84 in its vertical movement. The shoulder 83 preferably consists of two projections, one at each side of the post and engaged by the forked end of the arm 82. The rock-shaft 57, carrying the sleeve 63, is operated by an arm 87, fixed on its end and connected by a link 88 with an arm 89 on a rock-shaft 90. The latter is mounted in bearings in the base of the frame 1 and has fixed upon it an arm 91, carrying pins or projections 92 93. These pins are engaged by slotted or perforated links 94 95, connected at their upper ends by pivots 96 97 with the inner ends of key-levers 98 99. Said levers are fulcrumed at 100 in the base of the machine upon a bracket 101 and at their outer ends are provided with suitable keys having the words "Caps.," "Figs.," or other suitable designation of that bank of type which each key is adapted by its depression to bring into operative position. The key-levers 98 and 99 are caused to have different throws, so that they will raise the type-wheel different distances by means of one or more stop-screws 102, fixed in the frame beneath their outer arms. The keys above referred to form a part of the keyboard 103, and the levers already described and the other levers from the keys of said board pass through and are guided by slots 104 in the front plate 3 of the frame 1.

105 is a stop-plate arranged across the slots 104 and beneath the key-levers. This stop is vertically adjustable by means of screws 106, which pass through slots in it, so that the

downward movement of the key-levers may be properly limited.

107 is a doubled or grooved plate arranged across the front of the machine above the key-levers and adapted to hold a strip of rubber 108 or equivalent cushioning material, against which the key-levers may strike without noise as they return to position. This cushion-holder may also be adjustable by means of screws 109 passing through slots therein. I prefer to return the rock-shafts 57 and 90 irrespective of the gravitating effect of the type-wheel and provide the shaft 90 with an arm 110, between which and some fixed part of the machine is arranged a spring 111. The key-levers 98 and 99 are also independently returned to position by springs 112. The type-wheel being at the desired level or having been raised to such level by the mechanism already described, it is upon each key-stroke turned sufficiently to bring opposite to the place of impression the type desired to be impressed. This turning of the type-wheel is effected by a rack or racks 113 sliding in guides 114 upon a bar 115, fixed in the carrier 52. Said rack engages a pinion 116, fixed on the sleeve 66 and made of sufficient length that the vertical movement of the type-wheel will not carry the pinion out of engagement with the rack. The said rack is connected by a bar 117 and link 118 with an arm 120, fixed on the sleeve 62, said bar 117 being preferably guided in its reciprocation by a grooved roller or rollers 121, fixed on a part 122 of the carrier 52. In order to minimize the angle through which the type-wheel must be turned and correspondingly the power required to operate the machine, I provide for turning said wheel in either direction, and consequently combine with the pinion 116 two of the racks 113. The second of said racks is connected by a bar 123 and link 124 with an arm 125, fixed on the sleeve 61. The turning of the rock-shaft 55 will consequently bring one half of the type-wheel into operation—say the right-hand half—while the turning of the rock-shaft 56 will bring the type on the other half of the wheel into use. Said rock-shafts are actuated for this purpose by bars 126 and 127, fixed upon the said shaft, as by arms 128, each of which bars is provided with a series of projections or screws 129. Said projections are engaged by links 130, formed with a slot 131 for the purpose, while the lower ends of said links are pivotally connected at 132 each with a key-lever 133. The latter are preferably fulcrumed upon a knife-edge 134, engaging a recess 135 in the lower edge of the levers and are guided at their front ends in the plate 3. The rear ends of the key-levers are similarly guided in a slotted frame-plate 136 and are held downward and returned to place after each key-stroke by springs 137. In order that each key may turn the type-wheel through the angle required to bring into position the type desired to be impressed, it will be understood that various means may be employed. I prefer to make the strokes of the key-levers uniform in length and by differently arranging the projections 129 and slots 131 relative to each other. Thus where the slots are of uniform length, as in the construction illustrated, I arrange the projections 129 at different heights upon the bars 126 and 127, Fig. 8, so that one of the links 130 will have more lost motion than another and will consequently turn the type-wheel through a less angle. In order to provide for accurate adjustment, I interpose in each of said links a turnbuckle or equivalent take-up 138. I do not, however, depend upon this last means of adjustment for bringing the various type into accurate position, but prefer to center each type just at or before the moment of impression. I accomplish this by forming in or attaching to the rim of the type-wheel a notched rack 139, the notches of which are formed with inclined sides, with the apex of the notches so arranged relative to the type that when one of the notches is brought into a predetermined position its corresponding type will be accurately centered opposite the point where the impression is to be made upon the book or paper. I provide for thus centering the notches by a lever 140, having a knife-edge 141 and pivotally mounted at 142 in the carrier 52. The lever 140 has a pawl or projection or arm 143, with which, or with an adjusting-screw 144 in which, is adapted to engage an arm 145, fixed on the sleeve 64. The rock-shaft 58, which actuates said sleeve, is in turn operated by an arm 146, Fig. 10, fixed upon it, a link 147, connecting said arm with another crank-arm 148, a rock-shaft 149, journaled in the base of the frame 1, arms 150 on the latter shaft, links 151, connecting the arms 150 with arms 152 on journals 153, arms 154, also fixed on said journals, which latter are mounted in the frame 1, and a bar 155, carried by the arms 154 and arranged transversely of the machine just above the inner arms of the key-levers, so that the depression of the outer end of any one of said key-levers will cause the bar 155 to be raised. This movement, through the train of mechanism just described, will turn the shaft 58, depress the arm 145, and move forward into engagement with the rack 139 the centering-lever 140. For purposes of individual adjustment I prefer that the engagement between the key-levers and the bar 155 may take place through the medium of adjusting-screws 156, Fig. 4.

The particular type desired having been brought into position, I prefer to move it against the book or paper by a motor to a certain extent independent of the key-lever, but adapted to be brought into operation by the movement of the latter, thus relieving the fingers of the operator from this additional amount of work. In the construction illustrated said motor is electrical, in the form of a magnet 157, fixed upon a cross-bar 158 in

the carrier 52. A battery or other suitable generator is connected with the circuit of the magnet 157, and said circuit is connected at one end with an insulated bar 159, fixed in the frame 1, and at the other end with the main frame of the machine.

160 is a brush carried by a conducting-spring 161 and adapted to bear upon the bar 159 as the carrier 52 moves transversely in the main frame. The spring 161 is mounted upon a fixed insulating-block 162 in the carrier 52 and is electrically connected by a conductor 163 with a contact-spring 164, also mounted in the carrier 52.

165 is an adjustable contact-screw mounted on the centering-arm 140 and adapted to form an electric contact with the spring 164 whenever said arm moves forward. Said contact is arranged to take place just as or after the type is centered and energize the magnet 157. 166 is the armature of said magnet, carried by the lower arm 167 of a lever 168, and the upper end of the lever is furnished with a hammer-head 169, situated within the type-wheel and adapted when moved forward to strike the rear end of that type which has been brought into place, overcome the tension of the spring or springs 81, and cause the type to make its impression.

To guard against battering the type and give a certain elasticity to the blow of the hammer, I prefer to form the striking portion 170 of the same of ebonite or equivalent material. The forward or striking movement of the hammer is caused by the attraction of the energized magnet upon the armature 166, and after the finger-key has been released and the contact between the parts 164 165 consequently broken the hammer and armature are returned to their normal position (shown in Fig. 4) by a retracting-spring 171, Fig. 7, which connects a post 172 on the bar 70 with an arm 173 on the axis 174 of the hammer. Such backward movement is limited and the armature kept within proper distance of the magnet-poles by means of an adjustable stop-screw 174^a, mounted in the arm 173 and adapted to engage the post 172.

At the end of each key-stroke the carrier 52 is automatically advanced one space transversely of the machine. This movement is given by a cord 175, Fig. 3, connected with the carrier 52 and with a drum 176, fixed on the main frame 1 and operated by an internal spring in a well-known manner, so as to cause the carrier 52 to be constantly drawn from the left toward the right of the machine. This movement is made intermittent by spacing-dogs 177 of any suitable character pivotally mounted at 178 in the carrier and engaging a fixed rack 179 on the bar 180 of the main frame. Said spacer is operated by an arm 181, connecting its rear end, Fig. 4, with a link 182, the other end of said link being pivoted to an arm 183 on the sleeve 64. The latter is operated at each key-stroke by the mechanism already described, and the spacer is consequently at each of such strokes caused to release the carrier 52 from one tooth of the rack 179, and a movement of the carrier to the next tooth is immediately caused by the tension-cord 175. It is frequently desirable to disengage the type-carrier from the feed-rack, and I accomplish this by a finger-lever 184, pivoted at 185 in the carrier and having its lower end engaged with a collar 186 on a sliding rod 187. The latter slides in a bearing in an arm 188, fixed on the cross-bar 132, and is connected with or carries a downwardly-extending arm 189, which is preferably bifurcated and engages the axis 178 of the spacer at each side of the latter. The ends of said axis are mounted in slots 190, formed in the side plates of the carrier, so that the inward movement of the rod 187 is enabled to move the said axis and the spacer away from the rack, thus entirely releasing the type-carrier. The parts are kept in their normal position, Fig. 4, by means of a spring 191 on the rod 187 and interposed between a collar 192 thereon and the arm 188.

193 is a slotted adjustable stop secured by a screw 194 to a cross-bar 195 within the carrier. Said stop is situated so as to limit the backward movement of the arm 140, which latter movement is effected by a spring 196, connecting the arm with the stop. In order to lessen or prevent vibration of the type-wheel, I provide a stop for its turning movement.

197 is a shaft mounted in the carrier 52 and provided with a pinion 198, loose thereon and engaging a rack 197^a, formed on the rack-bar 113, and 198^a is a ratchet or ratchet-segment connected and turning with the pinion.

199 is an arm connected with the arm 143 and carrying a knife-edge or stop 200, adapted to engage said ratchet. (See detail Fig. 12.) The said parts are so adjusted that at or about the time when the lever 140 engages the type-wheel the stop 200 will be brought into engagement with the ratchet and prevent the type-wheel from turning farther in the direction in which the last key impulse has thrown it.

With the writing mechanism thus organized various inking means may be employed. I prefer an inked ribbon 201, mounted upon spools 202 and directed by suitable guides between the type-wheel and the platen 39, Fig. 4. The said spools may be turned by hand to feed the ribbon or in any other known manner. Just at the point where the type engages the ribbon the latter is held in place by a guide 203, having perforations or slits 204 for the ribbon and formed with an aperture 205, through which the type may force the ribbon to make its impression upon the book. This guide also performs the function of holding the ribbon from contact with the book, excepting when it is impressed upon it, as aforesaid.

In order to maintain the engagement of the racks 113 with the pinion 116, I fix upon the sleeve 66 a plate 206, provided with curved

arms 207, which are adapted to encircle pins 208 as the pinion oscillates. These pins are fixed in the racks 113, and the latter are thus held to the pinion and the return of the type-wheel to normal position insured, the racks being retracted for this purpose by springs 209. In the normal position of the parts the pins 208 lie immediately in front of the ends of the arms 207 (see Fig. 11) and prevent any movement of the type-wheel except when a key is moved, thereby moving one or the other of the pins from stopping position.

What is claimed is—

1. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support, a book-carrier movable horizontally on said support, and a stationary platen for the leaf independent of the holder and carrier, as set forth.

2. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a jointed book-carrier free to accommodate itself to the natural bend of the book when open and movable horizontally on said support, as set forth.

3. The combination with a type-writing mechanism, of a book-holder therefor adapted to support the book vertically with respect to said mechanism, mounted for free horizontal movement with respect to the type-writing mechanism, and jointed to accommodate itself to the natural bend of the book when open, as set forth.

4. The combination with a type-writing mechanism, of a book-holder therefor adapted to support the book vertically with respect to said mechanism, mounted for free horizontal movement with respect to the type-writing mechanism and jointed to accommodate itself to the natural bend of the book when open, and a platen for one of the leaves of the book fixed with respect to the movements of the book-holder, as set forth.

5. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a book-carrier movable horizontally on said support, and jointed to accommodate itself to the natural bend of the book when open, and a platen for a book-leaf fixedly supported with respect to the vertical movements of the book-holder, as set forth.

6. The combination with a type-writing mechanism, of a book-carrier adapted to support the book vertically with respect to said mechanism and jointed to accommodate itself to the natural bend of the book when open, as set forth.

7. The combination with a type-writing mechanism, of a book-carrier adapted to support the book vertically with respect to said mechanism and jointed to accommodate itself to the natural bend of the book when open, and a platen for a leaf common to the right and left hand pages of the book, as set forth.

8. The combination with a type-writing mechanism, of a book-carrier adapted to support the book vertically with respect to said mechanism and consisting of a plurality of pieces jointed together, and a support and coacting clamp for the outer edges of the book, as set forth.

9. The combination with a type-writing mechanism, of a book-carrier adapted to support the book vertically with respect to said mechanism, and consisting of a plurality of pieces jointed together, a support and coacting clamp for the outer edges of the book, and a platen for an unclamped book-leaf, as set forth.

10. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support hinged at its rear edge for backward tilting, and a book-carrier movable horizontally on said support, as set forth.

11. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support hinged at its rear edge for backward tilting, a rear rest or rack for the book, a book-carrier movable horizontally on said support, and a fixed inclined rest or rack for limiting the backward tilting of the book-holder, as set forth.

12. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a book-carrier horizontally movable on said support, a counterbalance for the support, a pawl-and-ratchet mechanism for elevating progressively the support and carrier, and a stationary platen for the leaf mounted independent of the holder and carrier, as set forth.

13. The combination with a type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a book-carrier horizontally movable on said support, a counterbalance for the support, means for progressively elevating the book-holder, means for disconnecting said elevating means to permit the free-hand movement of the book-holder, and a stationary platen for the leaf mounted independent of the holder and carrier, as set forth.

14. The combination with a laterally-movable type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a book-carrier horizontally movable on the support, and a stationary platen for the leaf supported independent of said holder and carrier, as set forth.

15. The combination with a laterally-movable type-writing mechanism, of a book-holder therefor comprising a vertically-movable support and a book-carrier horizontally movable on the support, and a platen for the book-leaf mounted independent of and fixed with respect to the vertical movements of the support, as set forth.

16. The combination of a type-wheel formed with radial recesses, individual horizontally

and independently movable types mounted therein, a retracting device extending around and connected at one point to said wheel and engaging the several types, and means for projecting a type radially outward through its recess, as set forth.

17. The combination of a type-ring formed with radial recesses and with a groove extending around the ring, individual horizontally and independently movable types mounted in said recesses and formed with slots or recesses, a retracting device situated in the groove of the ring connected at one point to the ring and engaging the slots or recesses of the types, and means for projecting a type radially outward through its recess, as set forth.

18. The combination of a type-wheel and means for actuating the same on a fixed journal, of a centering device comprising a notched plate carried by the type-wheel, a movable arm for engaging the same, mechanism for preliminarily actuating said arm, and means for thereafter actuating an individual type, as set forth.

19. The combination of a relatively-fixed type-wheel, individually-movable type carried by said wheel, a pinion connected with said wheel, racks for independently engaging the opposite sides of said pinion, means for independently moving either of said racks for predetermined distances, and means for actuating individual type, as set forth.

20. The combination of a type-wheel, a pinion connected therewith, racks for independently engaging the opposite sides of said pinion and carrying projections, arms connected with the type-wheel having concentric surfaces adapted to engage said projections, and means for reciprocating the racks, as set forth.

21. The combination with means for holding the surface to be printed upon, of a horizontally-rotary type-wheel, a laterally-movable carrier therefor, a rack for rotating said wheel, means for moving individual type in said wheel, and means carried by the type-wheel for temporarily holding the rack in its moved position, as set forth.

22. The combination with means for holding the surface to be printed upon, and means for progressively moving said holding means vertically, of a horizontal type-wheel, a laterally-movable carrier therefor, a transverse rock-shaft parallel with the movement of the carrier, and mechanism connecting said shaft with the wheel for turning the latter.

23. The combination with a horizontally-rotary and bodily-movable type-wheel and a vertical axis therefor, of a laterally-movable carrier therefor, a transverse rock-shaft, mechanism connecting the latter with said carrier for moving the latter and wheel bodily, and means for turning the wheel.

24. A type-wheel for type-writers consisting of a plurality of annularly grooved or recessed rings mounted one upon the other and having radial horizontal recesses adapted to receive the individual and independently-movable type between the rings, as set forth.

25. The combination of a type-wheel, racks for oscillating the same, pinions engaging said racks, ratchets connected with the pinions, and positively-mounted detents for engaging said ratchets to arrest the type-wheel, as set forth.

26. The combination with a type-writing mechanism of a transverse rock-shaft, a bar carried thereby, a series of differentially-arranged projections on said bar, a series of slotted links engaging said projections, and keys connected with said links, as set forth.

27. The combination with a relatively-fixed type-wheel, having independently-movable type and means for moving the type in the wheel, of means for oscillating the same, an arm movable with the type-wheel and a stop engaging said arm and movable with said means for releasing the type-wheel, as set forth.

28. The combination with the relatively-fixed type-wheel, having independently-movable type and means for moving the type in the wheel, of means for oscillating the same, a ratchet movable with the type-wheel and a knife-edge or stop engaging said ratchet, as set forth.

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

JAHU W. JOHNSON.

Witnesses:
GEO. H. GRAHAM,
E. L. TODD.