

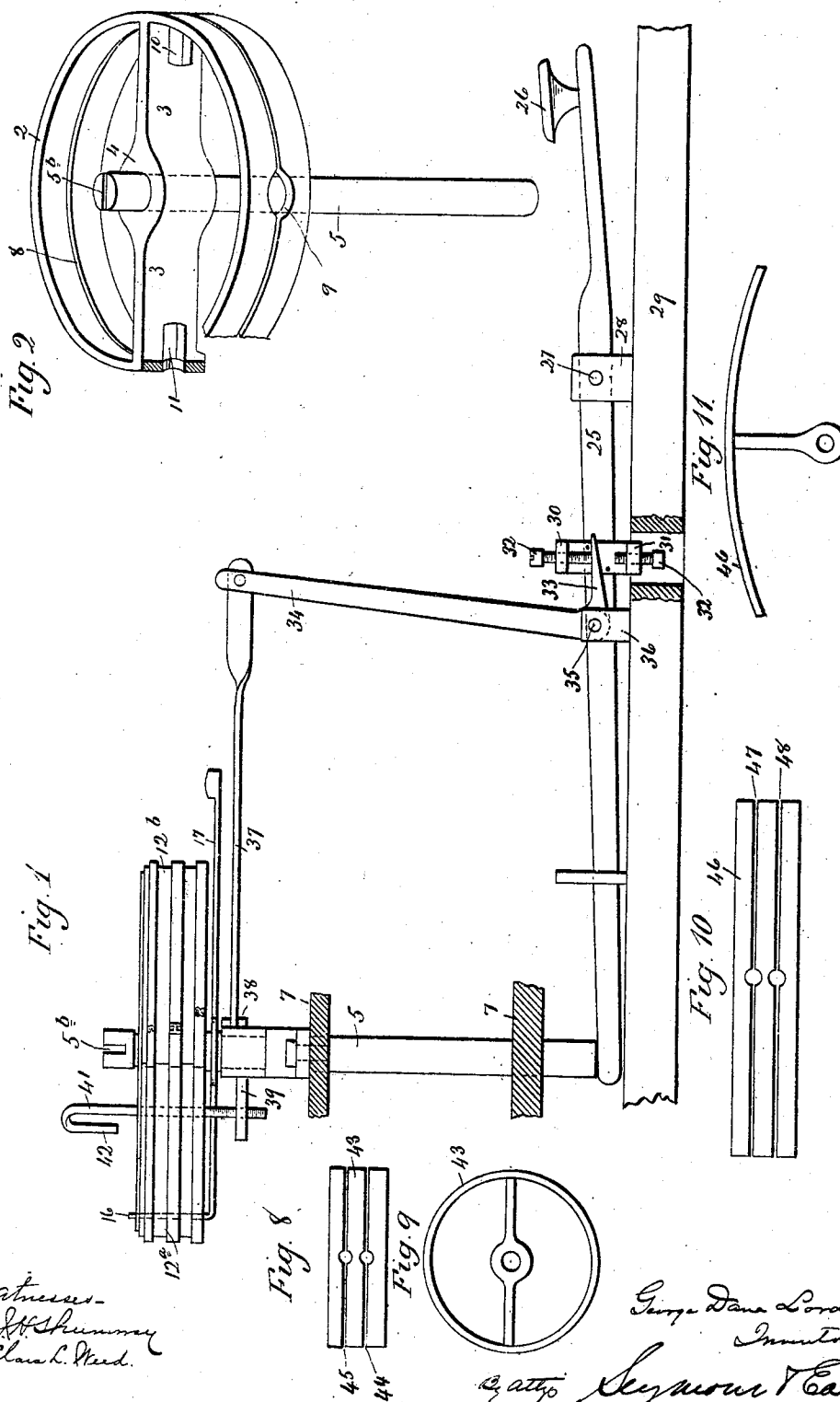
N.o. 860,876.

PATENTED JULY 23, 1907.

G. D. LORD.
TYPE WRITER.

APPLICATION FILED JAN. 30, 1905.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3-

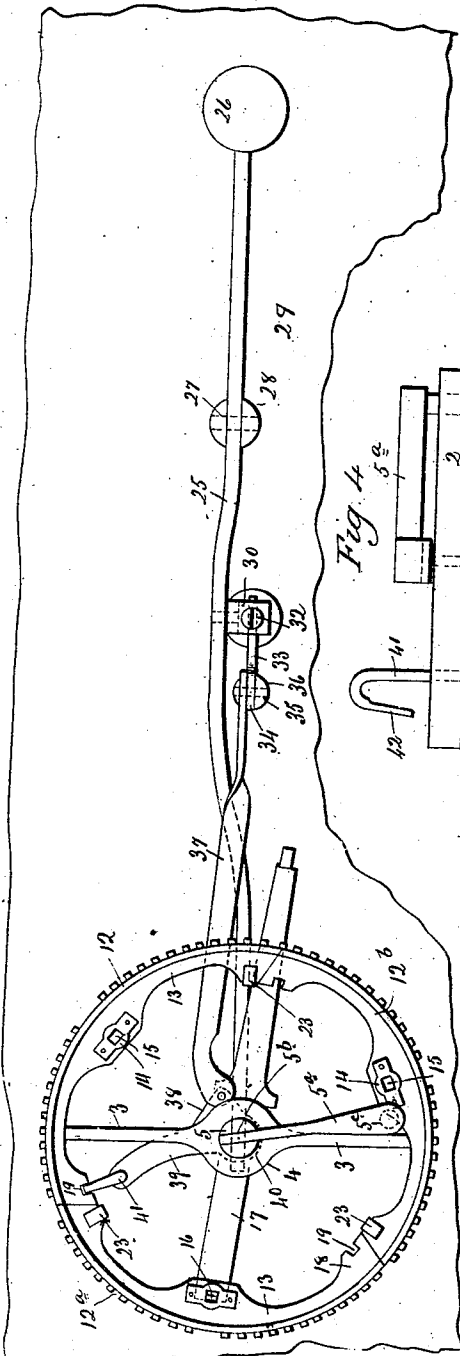


Fig. 4

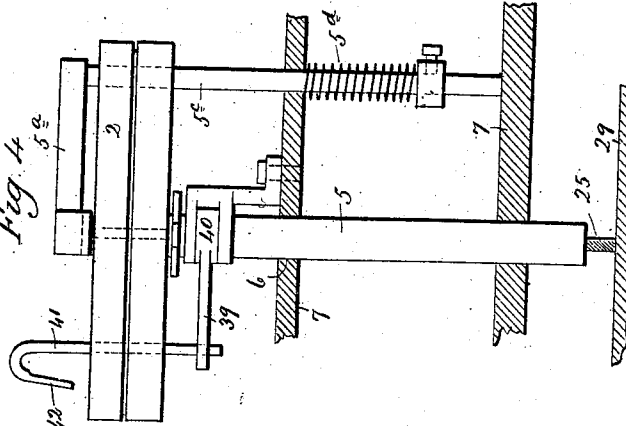


Fig. 7



Fig. 5

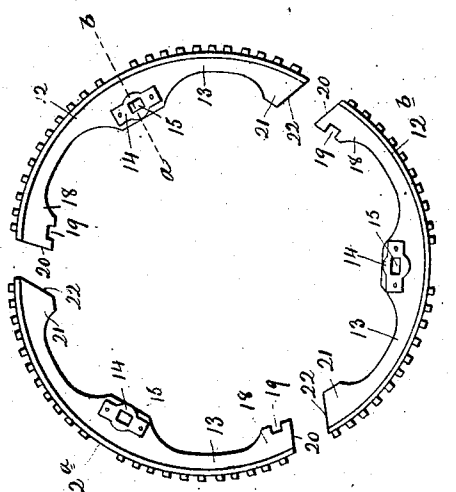
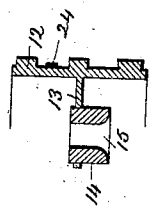


Fig. 6



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3 SHEETS—SHEET 3.

Fig. 12.

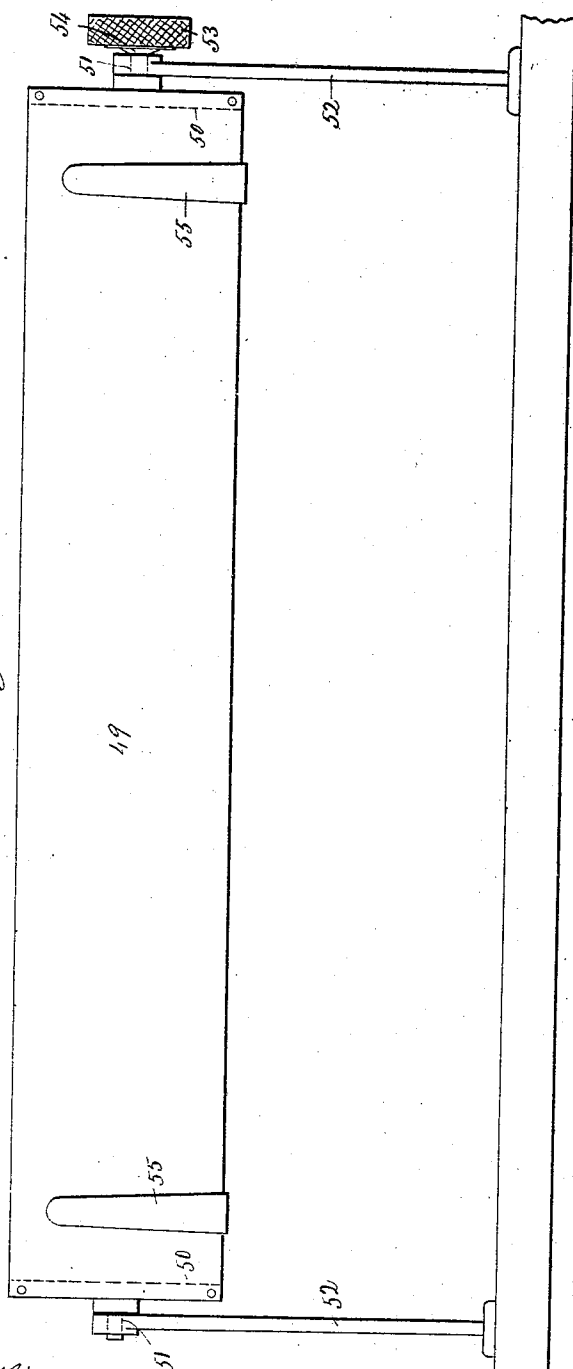
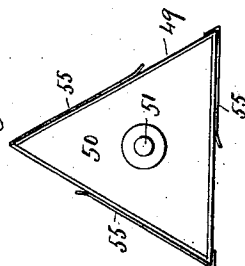


Fig. 13.



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UNITED STATES PATENT OFFICE.

GEORGE DANA LORD, OF HANOVER, NEW HAMPSHIRE.

TYPE-WRITER.

No. 860,876.

Specification of Letters Patent.

Patented July 23, 1907.

Application filed January 30, 1905. Serial No. 243,194.

To all whom it may concern:

Be it known that I, GEORGE DANA LORD, of Hanover, in the county of Grafton and State of New Hampshire, have invented a new and useful Improvement in Type-Writers; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a view in side elevation of an anvil constructed in accordance with my invention, together with means for putting the respective shuttles carried by it into and out of play. Fig. 2 a perspective view of the anvil with a portion of its rim or ring broken away. Fig. 3 a plan view of the anvil and the shuttle-selecting mechanism. Fig. 4 a view of the anvil in rear elevation showing a portion of the frame of the machine in section. Fig. 5 a plan view of three shuttles arranged as upon the anvil, but separated to better show the construction of their ends. Fig. 6 an enlarged sectional view of one of the shuttles on the line *a-b* of Fig. 5, showing the bushing-mounted in its fin. Fig. 7 a detached plan view of the oscillating shuttle driving arm. Fig. 8 a detached view in front elevation of a double-decked circular anvil having two anvil slots one above the other for the reception of two groups of shuttles. Fig. 9 a plan view thereof. Fig. 10 a detached view in front elevation of a double-decked segmental anvil. Fig. 11 a plan view thereof. Fig. 12 a view in elevation of a rotatable shuttle-index. Fig. 13 a detached end view thereof.

My invention relates to an improvement in that type or class of type-writers in which a shuttle carrying characters in type is mounted in a circular or segmental anvil and oscillated in front of an impression hammer fixed in location and released to press the paper and the inked ribbon against the types presented by the shuttle which, as well as the hammer, is brought into operation by keys, the object being to increase the facility and convenience of such a machine by having more than one shuttle available for use upon the anvil at a time, whereby the user of the machine can avail himself of any of the characters upon any of the shuttles without removing and replacing the shuttle according to the present practice.

With these ends in view, my invention consists in a type-writer having its anvil provided with a plurality of shuttles arranged in tandem and put into and out of play, as required, by shifting them in position upon the anvil.

My invention further consists in the combination with an anvil, of a plurality of shuttles mounted thereupon in tandem, and a shuttle-selecting mechanism for putting the shuttles into and out of play by shifting them in position upon the anvil.

My invention further consists in the combination with an anvil having a plurality of shuttles mounted upon it in tandem and put into and out of play by being shifted in position upon the anvil, of a shuttle-index provided with shuttle cards corresponding to the respective shuttles on the anvil and movable to expose the card corresponding to the shuttle in play upon the anvil at any given time.

My invention further consists in certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

Type-writers of the type specified are so well known in the art that I have considered it unnecessary to do more than to illustrate and describe those features of such a machine to which my invention directly relates, together with such parts as are closely associated with them.

In carrying out my invention as herein shown, I employ an anvil consisting of a vertically arranged rim or ring 2 and two radial arms 3 corresponding in width to the width of the ring and merging at their inner ends into an integral hub 4 receiving a vertically movable post 5 upon which the anvil is fixedly mounted and which has bearing in openings 6 formed in the machine-frame 7. The ring 2 of the anvil is bisected throughout its entire circumference by a horizontal shuttle-fin-receiving or anvil slot 8 which is interrupted by a shuttle-hole 9 centrally located in the front of the ring. The right hand anvil arm 3 is formed with a clearance opening 10 which registers with the anvil-slot 8. As thus far described, the anvil is of common and well known construction.

In carrying out my present invention, I form the outer end of the left hand anvil arm 3 with a clearance opening 11, which when taken in conjunction with the clearance opening 10, gives a free passageway around the entire anvil. Here I may state that prior to my invention the shuttles have never been free to make the entire circuit of the anvil, but have had to be removed in the reverse direction from that in which they have been entered into it.

As herein shown, I have provided such an anvil with three shuttles 12, 12^a and 12^b all corresponding to each other in general form and construction though of course not in type, and arranged end to end, or, as it may be said, in tandem. I may not employ more than two shuttles, or I may employ more than three, but preferably I shall employ three shuttles or as many as are required to completely encircle the anvil in which they are free to be moved as a group so as to bring any one of them into play according to the requirements of the user of the machine. These shuttles are of ordinary construction in their general form, and each is provided with a centrally arranged inwardly projecting driving fin 13 adapted to pass through the shuttle-opening 9 from which they are entered sidewise into the right or

left hand portion of the anvil slot 8. Each fin 13 has mounted in it a bushing 14 the lower end of the opening 15 of which is made flaring to adapt it to the more readily receive the upwardly extending driving finger 16 of the oscillating driving arm 17 through which the anvil post 5 passes and which swings thereupon as upon a center, this arm being swung to the right and to the left by driving instrumentalities under the control of the keys of the machine. As this arm and the mode of operating it are well known, I consider it unnecessary to enter into any detailed description of its construction or operation. By making the lower end of the opening 15 of the bushing 14 flaring, it is not necessary to so exactly register the said opening with the said finger 16 preparatory to coupling a shuttle with the arm 17 for putting the shuttle in play. The shuttle-hole 9 permits the bushings of the shuttles to be entered into the space inside of the ring, the anvil-slot itself being too narrow to permit the bushings to pass through it. Each shuttle is formed at one end with an inwardly projecting selecting-fin 18 having a coupling notch 19 and a retreating beveled edge 20, and at its opposite end with an inwardly projecting retaining-fin 21 having an overhanging beveled edge 22, these fins 18 and 21 being also adapted to pass through the anvil slot 8. When the three shuttles are in place upon the anvil the beveled edges of their end fins abut against each other and form, as it were, a circular group of shuttles which moves as one shuttle as will more fully appear later on. To overcome the outward thrust of the shuttles due to the action of centrifugal force, the retaining-fin 21 of each shuttle is provided with a U-shaped retaining clip 23 the ends of which engage with the inner face of the anvil ring 2 at points just above and below the anvil slot 8. This prevents the end of the shuttle carrying the retaining-clip 23 from outward movement under outward thrust, while the overhanging beveled edge 22 of the same fin 21 overhangs the retreating beveled edge 20 of the flange 18 of the adjacent shuttle to the rear so as to prevent the adjacent end of the same from outward movement under outward thrust and so on, one end of each shuttle being held by its retaining clip and one end by the adjacent end of the next shuttle to it. Under this construction it will be sufficient to employ one retaining-clip at one end of each shuttle, the shuttles being further bound together or interlocked by the beveling of their end flanges as described. Of course, some other method may be adopted for overcoming the outward thrust of the shuttles. I may, for instance, bind the three shuttles together by an external metal band or fillet 24 (see Fig. 6) having its ends fastened together in any approved manner.

The three shuttles constructed as described and arranged in tandem on the anvil practically operate as one circular shuttle in so far as the movement of the shuttle coupled at any time with the driving arm 17 and therefore in play, operates the other two shuttles at the same speed and to the same extent as it is oscillated back and forth to a greater or less extent in front of the impression hammer of the machine. This hammer is well known as to its construction and operation and needs neither illustration nor description.

The respective shuttles may be selected and put into and out of play manually or means may be provided for doing this automatically. If it is desired to select

the shuttles manually, the anvil is unlocked in the usual well known manner by lifting the locking arm 5^a out of the slot 5^b in the upper end of the anvil post 5, the said arm 5^a being fixed to the upper end of a vertically movable rod 5^c mounted in the machine frame 7 and encircled by a spring 5^d which tends to pull it downward. The arm 5^a having been lifted out of the slot 5^b, the arm 5^a is swung clear of the anvil which is then manually grasped and lifted until the bushing in the fin of the shuttle then in play is lifted high enough to clear the upper end of the upwardly projecting finger 16 of the driving arm 17. The three shuttles are then turned as one shuttle in the anvil slot by the user who employs his fingers for the purpose, until the bushing of one of the other two shuttles is brought into registration with the said finger after which the anvil is allowed to settle back into its operating position, during which the shuttle just brought into position will be coupled with the said finger. In this way one shuttle may be exchanged for either of the other two by simply lifting the anvil so as to uncouple the shuttle in play, then manually shifting the shuttles in the anvil (by rotating them clockwise or counter-clockwise) to bring another into registration with the finger of the driving arm and then allowing the anvil to settle back into place.

If preferred, I may provide means for selecting the shuttles automatically so as to bring any one of them into play by the use of a specially designed key of the key-board. Various devices may be employed for this purpose. As shown, I employ a lever 25 which, for the purpose of distinguishing it from similar levers in every type-writer, I shall call a shuttle-selecting lever. This is furnished at its outer end with an ordinary key 26, and hung upon a pivot 27 in a post 28 in the base 29 of the machine. Forward of its pivot 27 the said lever is provided with an upper lug 30 and a lower lug 31, each carrying an adjusting screw 32 the inner ends of which co-act with the upper and lower faces of the short arm 33 of a lever 34 turning upon a pivot 35 mounted in a post 36 in the base 29 of the machine. The upper end of the lever 34 is pivotally connected with the forward end of a link 37 the inner or rear end of which is pivotally connected with the flange 38 of an oscillating selecting-arm or plate 39 having a sleeve 40 through which the anvil post 5 passes so that the arm or plate swings upon the said post as upon a center. The outer end of this arm carries a vertically arranged selecting hook 41 the free end or beak 42 of which is adapted to enter the coupling notch 19 of the fin 18 of any one of the shuttles. At its inner end the lever 25 extends, as shown, under the anvil post 5 for lifting the anvil sufficiently to strip the bushing mounted in the fin of the shuttle in play from the upper end of the driving-finger of the driving arm, whereby the said shuttle is uncoupled therefrom and whereby also the other two shuttles are freed as well as the shuttle in play. The depression of the lever by its key is continued with the effect of lifting the anvil enough more to cause the beak 42 of the selecting hook 41 to enter the notch 19 in the fin 18 of the shuttle 12 which is the shuttle next on the right to the shuttle 12^a which is in play, whereby the selecting-hook is coupled with the shuttle 12 and through the same with the shuttles 12^a and 12^b. Just as soon as this last result has been secured the lower screw 32 carried by the lever 25 is engaged with the

lower face of the short arm 33 of the lever 34, and the same tilted rearward, whereby the oscillating selecting arm or plate 39 is swung from right to left and the three shuttles move through an arc of just 120 degrees which is sufficient to bring the hole in the bushing of the shuttle 12 into registration with the driving-finger of the oscillating driving-arm 39. Pressure upon the key 26 is now relieved, allowing the anvil to settle back sufficiently to clear the beak 42 of the selecting hook 41 from the coupling notch 19 in the shuttle 12. Just as soon as this has taken place, the upper adjusting screw 32 engages with the upper face of the arm 33 so as to operate the lever 34, the link 37 and the arm 39 in restoring the selecting hook to its normal position in which its beak stands registered with the coupling notch in the shuttle 12". During the descent of the anvil it will be understood of course, that the shuttle 12 now moved into play has been coupled with the driving finger of the driving arm, the said driving finger rising through the hole in the bushing in the fin of the shuttle as the anvil descends. If it is desired to bring the next shuttle but one, which is the shuttle 12", into play, the key-lever is operated twice, each operation of the key lever moving the three shuttles through an arc of 120 degrees, and always in the same direction.

I have described the movement of the shuttles from right to left, but of course, the mechanism may be arranged with equal facility to move them from left to right, and always in the same direction. Of course when the shuttles are operated manually, they may be pushed around from right to left, or left to right, as found most convenient and expeditious.

If it is desired to increase the range of the machine as to characters, as for instance, to adapt it to write a language commonly employing a great number of characters, I may provide the machine with a double decked anvil 43 such as shown in Figs. 8 and 9. I call this anvil a "double decked" anvil because it is provided with two slots 44 and 45 located one above the other whereby it is adapted to receive two separate groups of shuttles in tandem. These shuttles will be put into and out of play either manually or mechanically in the manner already shown and described, and the anvil itself will be raised and lowered as required to bring one group or the other into position to co-act with the hammer of the machine. In Figs. 10 and 11 I have shown a double-decked segmental anvil 46 having grooves 47 and 48 adapted to receive groups of shuttles arranged in tandem. This anvil will be one and one half times the length of the group of shuttles so as to provide for supporting them at the extreme limits of their oscillation in either direction. These shuttles will be operated in the manner described herein, but the anvil must be raised and lowered to a greater extent so as to operate in two positions—in one position for the lower group, and one position for the upper group of shuttles.

In order to guide the user of the machine in his use of more than one shuttle at a time upon the anvil, I may employ a shuttle index, though this is not necessary. As shown, this consists of a body 49 in the form of a triangular prism furnished at its ends with triangular heads 50 having trunnions 51 mounted in the upper ends of bracket arms 52 secured to the base 27 of the machine, one of the trunnions being ex-

tended to receive a knurled operating button 53, and a cup-like friction spring 54 for holding the device in any one of its three positions. Each of the flat faces of the body is provided with a pair of long card-holding fingers 55 under which long cards are slipped. In case three shuttles are employed at one time upon the anvil, each face of the index will be furnished with a card and the respective cards will contain an extension of the characters upon the respective shuttles so that by turning the index to correspond to the shifting of the shuttles a card representing the shuttle in play will be before the operator. This index may assume a variety of forms.

In view of the modifications suggested and of others which may obviously be made, I would have it understood that I do not limit myself to the construction herein shown and described but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a type-writer, the combination with a one-piece anvil having a free passage-way entirely around it; of a plurality of shuttles arranged in tandem in the said passage-way, oscillating together and respectively put into and out of play, as required, by shifting them in position upon the anvil; and automatic means for driving the said shuttles.

2. In a type-writer, the combination with a one-piece anvil having a free passage-way entirely around it; of a plurality of shuttles arranged in tandem in the said passage-way and oscillating together, an automatic shuttle-selecting mechanism for putting the respective shuttles into and out of play by shifting them in position upon the anvil during the practical operation of the device in printing, and automatic means for driving the shuttles in printing.

3. In a type-writer, the combination with a one-piece anvil having a free passage-way entirely around it, of a plurality of shuttles each having a fin passing inwardly through the said passage-way, means for holding the shuttles against the outward thrust due to centrifugal force, and automatic devices for driving the shuttles together in printing.

4. In a type-writer, the combination with a one-piece anvil having a passage-way entirely around it, of a plurality of shuttles combined at the ends so as to oscillate together in the said passage-way, an automatic shuttle-selecting mechanism to shift the shuttles on the anvil during the practical operation of the device in printing for putting the respective shuttles into and out of play or selecting the shuttle to be used in printing while the others, though oscillated with it, do not print; and automatic means for oscillating the shuttles together in printing.

5. In a type-writer, the combination with a one-piece anvil having a passage-way extending entirely around it, of a plurality of shuttles each having an inwardly projecting centrally arranged fin and each having at one end a retaining fin, a driving-arm having a driving-finger passing through the centrally arranged fin of one of the said shuttles, a retaining device applied to the end fin of each shuttle for retaining it in place against the outward thrust of centrifugal force, means for automatically selecting the shuttle to be used in printing, during the practical operation of the device in printing, and separate means for automatically oscillating the shuttles together in printing.

6. In a type-writer, the combination with a slotted anvil, of a plurality of shuttles mounted therein so as to oscillate together while one of them is being used in printing, and each shuttle being provided with a coupling fin, an automatic shuttle-selecting mechanism co-acting with the coupling fin of each shuttle for selecting the shuttle to be used in printing, and means for automatically oscillating the shuttles together in printing.

7. In a type-writer, the combination with an anvil, of a plurality of shuttles mounted therein and combined so as

to oscillate together while one of them is being used in printing, means for driving the shuttles in printing, and a shuttle-selecting mechanism for selecting the shuttle to be used at any one time in printing, the said selecting mechanism comprising a lever arranged to lift the anvil, an oscillating selecting plate for shifting the group of shuttles in position upon the anvil while the said group is temporarily disconnected from the means employed for oscillating the group in printing, and connection between the said lever and plate.

8. In a type-writer, the combination with an anvil, of a plurality of shuttles mounted therein and combined so as to oscillate together while one of them is used in printing, means for driving the shuttles in printing, and a shuttle-selecting mechanism for selecting the shuttle to be used at any one time in printing and comprising means for lifting the anvil and uncoupling the shuttles from the driving means, shifting the shuttles as a group to bring one of them into printing position, and recoupling them with the driving means.

9. In a type-writer, the combination with an anvil, of a plurality of shuttles mounted therein, means for oscillating the shuttles together while one of them is used in printing, and a shuttle-selecting mechanism comprising a key-lever connected with the anvil for lifting the same, an oscillating selecting plate, a selecting-hook carried by the said plate and temporarily connected with and disconnected from one of the shuttles of the group for shifting the entire group to bring any one of them into position for printing, and adjustable connection between the said plate and lever.

10. In a type-writer, the combination with a slotted anvil, of a plurality of shuttles mounted therein and each having at each end a fin the edges of which are beveled to hold the shuttles against the outward thrust of centrifugal force, and the said shuttles being combined to oscillate together while one of them is used in printing and to be shifted in position in the anvil to bring any one of them into printing position; and means for driving the shuttles in printing.

11. In a type-writer, the combination with a one-piece

anvil having a passage-way extending entirely around it to permit a group of shuttles to make the entire circuit of the anvil in one direction or the other; of a plurality of shuttles mounted in the anvil so as to oscillate together while one of them is being used in printing and adapted as a group to be shifted in position in the anvil so as to bring any one of them into printing position; and means for automatically driving the shuttles in printing.

12. In a type-writer, the combination with a one-piece anvil comprising a ring bisected by a circumferential slot and a plurality of arms the outer ends of which are formed with clearance openings, the said slot and openings forming a passage-way extending entirely around the anvil to permit a group of shuttles to make circuit of the anvil in either direction; of a plurality of shuttles mounted in the anvil and each provided with a fin extending through the said slot and cleared by the said clearance openings, whereby the shuttles are permitted to make the entire circuit of the anvil in either direction as described; and means for driving the anvil in printing.

13. In a type-writer, the combination with a slotted anvil constructed to permit a group of shuttles to make the entire circuit of its slots in one direction or the other, of a plurality of shuttles mounted in the anvil and each provided with an inwardly projecting driving fin and with an inwardly projecting selecting-fin, and the said shuttles being combined to oscillate together while one of them is being used in printing and adapted to be shifted in the slot in the anvil to bring any one of them into position for printing; means to co-act with the driving-fin of any one of the shuttles to drive them in printing; and means to co-act with the selecting-fin of any one of the shuttles for shifting the entire group of shuttles upon the anvil to select any one of them for printing.

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

GEORGE DANA LORD.

Witnesses:

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E. M. CARTER.