

B. C. STICKNEY.
TYPE WRITING MACHINE.

No. 576,329.

Patented Feb. 2, 1897.

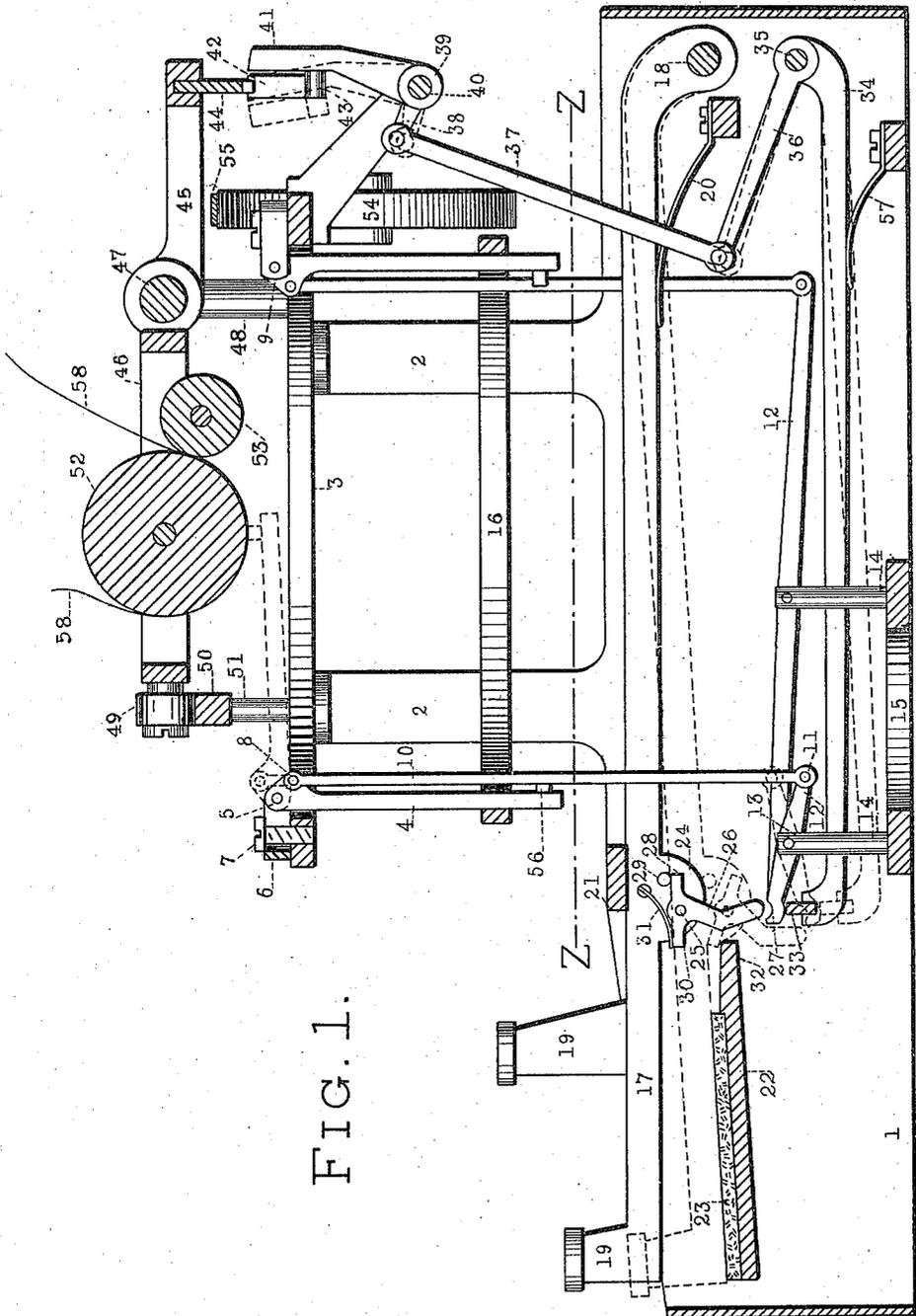


FIG. 1.

WITNESSES:

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INVENTOR

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 BY
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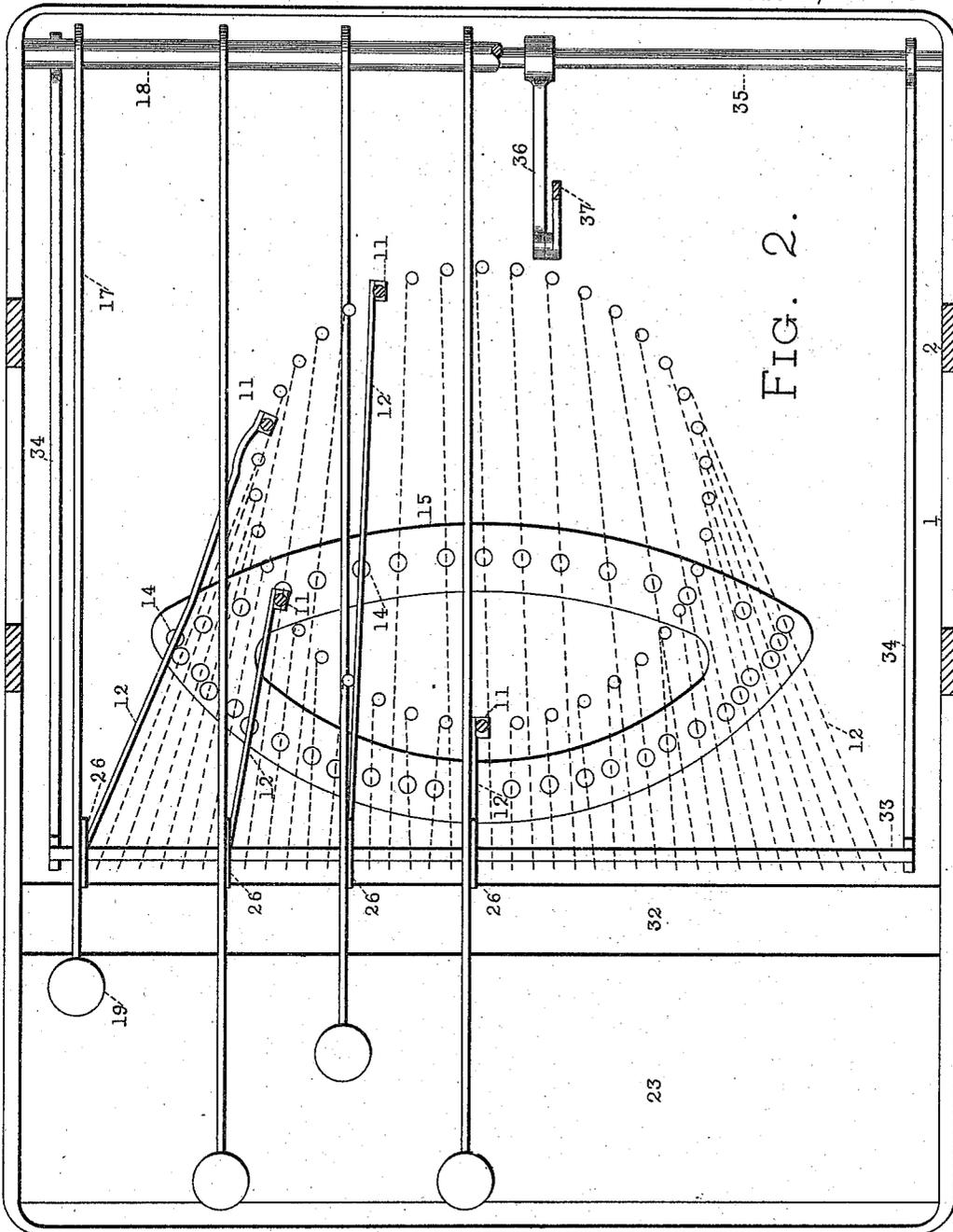


FIG. 2.

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UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF BROOKLYN, NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 576,329, dated February 2, 1897.

Application filed February 17, 1893. Serial No. 462,689. (No model.)

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention has for its main object the production of a practicable type-writing machine of the bar or lever class in which the finger-keys are so connected to the type bars or levers as that the latter may be successively and arbitrarily moved from their normal positions of rest to their printing positions without interfering one with the other and then automatically returned to their normal positions in the order of actuation independently of any releasing movement of the hand or fingers or rise of the finger-keys which had to be depressed to move the type bars or levers to their printing positions. In other words, the most important object I have in view is to provide a type-bar machine wherein the operator may strike or depress one key after another without the necessity of first raising the finger or fingers from and permitting the rise of the previously struck or depressed key or keys, and wherein the type-bar connected with each key may, when said key is struck or depressed, move to a position where its type may strike the common printing-point and after such type has left its impression return then at once to its normal position of rest independently and in advance of the finger-key. By such a construction of machine the art of type-writing may be more readily learned, since the necessity of training a special set of nerves and muscles in order to be able to raise one finger promptly before depressing another is wholly avoided and a more natural movement of the hands and fingers permitted or provided for. Again, such a construction of machine permits of writing with greater speed and with a less expenditure of muscular power, thus not only increasing the capacity of the machine, but rendering the work far easier and less laborious to the operator. In carrying out this main object I have discovered that it is absolutely essential that the paper-carriage shall move a letter-space distance for each key and

type-bar actuated, and I have therefore so organized the various machines devised by me as that the paper-carriage will feed a letter-space distance each time a key is struck, and whether or not the previously-operated key has been relieved of pressure and has returned to its normal position. In other words, the carriage-feeding mechanism is arranged to be actuated each time a finger-key and type-bar are actuated and to be restored to its initial position, with the type-bar moved, independently and in advance of the finger-key of such type-bar.

Other objects and advantages of my invention will appear in the course of the following description.

My invention consists in certain features of construction and combinations of devices and mechanisms, all as will be hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a central vertical section of a type-writing machine embodying my improvements. Fig. 2 is a horizontal section taken at the line *z z* of Fig. 1, but omitting the cross-bar against which the key-levers normally press.

The same parts will be found designated by the same numerals of reference.

Referring to the drawings, 1 designates the bed or base of the machine, from which rise posts or standards 2, that support at their upper ends a top plate or type-ring 3, upon and around which are mounted the type bars or levers 4. Each type-bar is preferably pivoted at 5 in a hanger 6, which is secured to the type-ring adjustably by a set-screw 7, and pivoted at 8 to an inwardly-extending ear of the type-bar is a vertically-arranged connecting-rod 10, whose lower end is pivoted at 11 to a sublever 12, which is pivoted at 13 on a post 14, extending upwardly from a supporting-plate 15, secured at the bottom of the machine. The type-bar in its normal position hangs perpendicularly and parallel with the connecting-rod 10 and bears against a rest or ring 16. The connecting-rod, being arranged on the inside, must be attached to one side of the type-bar or arranged to stand at one side of the plane of travel of the type-bar when moving from its normal position of rest to its printing position.

17 designates the key-levers of the machine, which are pivoted upon a cross-bar 18 at the back of the machine, and each key-lever is provided with a key 19, preferably made integral with the lever, and said key is provided with a button-shaped cap or head upon which the character of the type to which it is connected is inscribed. For each key-lever there is provided a returning-spring 20, and over all of the key-levers is arranged a fixed cross-bar 21, against which all of the levers are pressed in their normal condition.

Beneath the key-levers is arranged a fixed cross bed or plate 22, which on its upper side is provided with a soft or yielding pad or cushion 23. This bed or plate is of a length to extend entirely across the keyboard and of a width sufficient to include the several banks or rows of keys, as the key-levers are of different lengths.

Each key-lever is provided with a downwardly-extending lug 24, on oneside of which is pivoted at 25 a lever or piece 26, which I denominate a "trip," the lower depending end of which stands normally slightly above a depression 27 in the forward end of the sub-lever 12. The upper end of the trip is T-shaped, one of the arms, 28, thereof bearing against a pin 29, projecting laterally from the key-lever, and the other arm, 30, thereof receiving the pressure of the free end of a flat spring 31, secured to said lever.

32 designates a stop preferably extending entirely across the machine to serve as a common or universal stop for all of the trips 26 and which is also preferably made integral with the bed or plate 22, though of course it may be made separate therefrom.

The sublevers 12 are of different lengths, according to the positions of the connecting-rods which are attached thereto, and the forward ends of all of the sublevers 12 are arranged in line transversely of the machine and over and upon a universal bar 33, which extends across the machine and which at its ends is connected to the forward ends of levers 34, arranged at the sides of the machine and secured to a rocking bar 35 at the rear end of the machine. The said universal bar 33 and the said levers 34 may be designated as a pivoted or vibratory universal frame, and, as heretofore, this contrivance forms part of the paper-carriage-feeding mechanism.

Near the middle of the rocker-bar 35 is secured an upwardly and forwardly extending arm 36, to the free end of which is pivoted the lower end of a link 37, whose upper end is pivotally connected to the front end of a rocker-arm 38 on a trunnion or rocker 39, whose pivot is represented at 40. From said trunnion or rocker extend upwardly two feed-dogs 41 and 42, the former being a rigid dog and the latter a yielding or vibratory one, having a pivot at 43. These dogs cooperate with a vertically-arranged feed-rack 44, depending from a vibratory frame 45, which is

connected to the paper-carriage 46 in about the usual manner.

47 designates the paper-carriage and rack-frame hinge-and-guide rail, and said rail is preferably supported at each end by posts 48, extending upwardly from the top plate. The forward end of the paper-carriage is provided with a roller 49, which rides upon a track or way 50, supported by posts 51, also extending upwardly from the top plate. The paper-carriage bears, as usual, a platen 52 and a feed-roller 53. The paper-carriage and the rack-frame may be driven or propelled by any suitable power mechanism, but I prefer the usual spring-drum 54 and cord or strap 55. One end of the latter is attached to the spring-drum and the other to the carriage or the rack-frame. The tendency of the spring-drum is, as customary, to pull the carriage and rack-frame toward the left, the action being so governed by the feed-dogs as that the movement of the carriage takes place intermittently or step by step.

At Fig. 2 the broken lines indicate the sublevers 12, the large circles the fulcrum-posts 14 of the sublevers, and the small circles the positions of the type-bar links or connecting-rods 10. From this view it will be observed that the sublevers are of different lengths and that they extend from a common line transversely of the machine over the universal bar 33 rearwardly in various directions or at different angles to meet and be connected to their respective connecting-rods 10, the latter, like the type-bars, being all arranged in a circle centrally of the machine. In order that the sublevers of varying lengths may all have the same leverage, it will be observed that the fulcrum-posts 14 are so disposed upon or about the plate or support 15 as that this desideratum may be obtained.

I shall now describe the mode of operation of the machine shown, it being understood, of course, that for the sake of clearness and to avoid complication of the drawings I have omitted to show all of the key-levers, as well as the inking-ribbon and other devices necessary or desirable in the complete machine.

When a finger-key 19 is depressed, the key-lever 17 is vibrated downwardly, and after having descended a short distance the lower free end of the trip 26 engages the forward free end of the sublever 12, and said sublever in turn, by the descent of its forward arm, is caused to depress the universal-bar frame and by the ascent of its rearward arm to lift or thrust upwardly the connecting-rod 10. The depression of the universal-bar frame effects, through the arm 36, a downward movement of the link 37 and an oscillation of the rocker or trunnion 39 to an extent sufficient to move the pivoted dog 42 out of engagement with the rack and carry the rigid dog 41 into engagement therewith. When this action takes place, the pivoted dog 42 (which, as usual, is actuated by a spring) is caused

to move to the right to subsequently, on its return stroke, enter the next notch in the rack and enable the driving power (represented by the spring-drum) to feed the carriage a letter-space distance. During the action of the driving power the pivoted spring-actuated dog 42 is vibrated toward the left by said power and against a fixed stop in advance of the dog, by which the movement of the carriage is arrested. The rigid dog 41 serves, as customary, to resist the driving power and hold the carriage when the vibratory or feed dog is out of engagement with the rack. When the connecting-rod 10 is elevated, the type-bar 4 is swung thereby from its normal position of rest upwardly in an arc of a circle in order that its type 56 may be carried to the common printing-center or impression-point of the machine and leave the imprint of its character upon the paper on the platen. During the descent of the key-lever and at a predetermined time the arm 30 of the trip meets and is arrested by the stop 32, which thereafter during the continued depression of the key-lever forms an abutment for the trip and causes it to vibrate to effect a separation between the lower end of the trip and the forward end of the sublever, which at the same time is moving downwardly. By causing the arm 30 to contact with the stop 32 the lower end of the trip is forced to swing forwardly and release the sublever and its attachments and the universal bar and its connections and the paper-carriage.

By dotted lines at Fig. 1 I have shown the trip action described, from which it will be observed that the key-lever has come to a rest against its cushion, the trip has parted company with the sublever, the type-bar has been released and its type brought to strike the paper on the platen, and the feed-dog moved out of and the holding-dog 41 moved into engagement with the carriage-rack. At this time it will be observed that the type-bar and the carriage-feeding devices have been released from the finger-key, and that they may return at once to their normal positions independently of and before the finger-key or the key-lever.

If the key-lever be held down to its dotted-line position, the trip 26 must also occupy the position indicated by dotted lines. In this position it offers no obstruction to the return of the sublever and universal bar to their first positions, and hence the type-bar and the escapement or feed mechanisms of the carriage may be restored to their positions of rest immediately the type has made its impression. During the return of these devices the carriage is feeding for a letter-space distance. The type-bar and its connecting-rod have a tendency to return by gravity, but are assisted by a spring or springs 57, employed to return the universal bar and its connections to their normal positions. On releasing the finger-key the key-lever 17 is caused to ascend by the reaction of the spring 20, and

during this ascent the trip 26 is vibrated about its pivot 25 by the reaction of its spring. During the upward movement of the trip its inner edge rides against the front end of the previously-restored sublever under the pressure of the spring 31, and when the lowermost end of the trip has risen above the plane of the sublever the said spring completes the vibratory movement of the trip and restores it to normal position, with its lower operating end over the forward end of the sublever and with its stop-arm 24 bearing against the pin or stop 29.

By reference to the dotted-line position of the lowermost end of the trip and the forward end of the sublever it will be observed that these devices are separated or arranged apart a distance greater than is necessary to effect the release of the various sets of devices or mechanisms of which they form part, while at the same time it will be observed that the type has struck and rests against the paper 58 on the platen. This illustration is to indicate that the trip takes place just before the type makes its impression, approximately when the type-bar is about a quarter of an inch from the paper on the platen, or previous to the completion of the downward movement of the key, which is limited by the stop or cushion 23.

In practice I have so organized my machine that the trip or release of the type-bar and carriage-feeding mechanism occurs just previous to the impact of the type, and this arrangement of the parts I have found in practice effects a decided improvement in the machine, especially in the touch of the finger-keys. A soft blow or push, as in the piano, is better suited to the operator where steady work extending over a long period of time is necessary, and by having the release or trip take place when the type is near or close to the platen practically no power is required to be stored up in the type-bar to carry it the remainder of the distance after being released, and hence the soft blow or push referred to may be readily obtained. Of course the trip may be arranged to take place after the type-bar has made its impression, but in such a case there would be a pressure between the releasing parts, which would cause unnecessary friction and compel the operator to strike the keys harder than necessary to print, in order to insure the release or trip taking place.

It is desirable to have the driven parts (such as the type-bar mechanism and the carriage feeding mechanism) continue in motion a short distance after having been released from the driving part (namely, the trip) and before the type strikes the platen, so that the trip may operate without friction, and I have also so organized my machine that this desideratum is secured.

From the foregoing description of the operation of the machine it will be seen that the type-bar mechanism and the carriage spacing

mechanism are simultaneously released from the finger-key and simultaneously returned to normal position independently of said key, and it will also be seen that by reason of this construction and arrangement the operator may strike any number of keys successively and as rapidly as desired without releasing the key or keys previously actuated, and that each type-bar as actuated will move from its normal to its printing position and return at once, and that simultaneously with such forth-and-back movement of each type-bar the universal spacing mechanism will also be reciprocated or moved from its normal position and returned. In consequence of this capacity of the machine all of the main objects of my invention are achieved.

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

1. In a type-writing machine, the combination of a lever having a key or head at its forward end, a trip pivoted upon the body of said lever, a type-bar, and means for swinging said type-bar, said means being arranged in the path of and adapted to be actuated by and released from said trip, substantially as set forth.

2. In a type-writing machine, the combination of a lever having a key or head at its forward end, a trip pivoted upon the body of said lever, a type-bar, a universal bar of the spacing mechanism, and means between said key-lever and said type-bar for actuating both the type-bar and the universal bar, said means being arranged in the path of and adapted to be actuated by and released from said trip, substantially as set forth.

3. In a type-writing machine, the combination with a type-bar and a lever, as 12, operatively connected thereto, of a key-lever and a trip vibrating in a plane substantially parallel with said key-lever and extending from one said lever to the other and arranged to act directly upon the type-bar-actuating lever when the key-lever is depressed, substantially as set forth.

4. In a type-writing machine, the combination of a series of key-levers, a series of type-bar-operating levers connected to a series of type-bars, and a series of trips pivoted to the key-levers and extending therefrom directly to the type-bar-operating levers so as to actuate them upon depression of the key-levers, substantially as set forth.

5. In a type-writing machine, the combination, with a type-bar, of a type-bar-operating lever, and a key-lever having a part that extends directly to said type-bar-operating lever and that bears and slides upon and off from the type-bar-operating lever, thereby actuating and releasing the same, substantially as set forth.

6. In a type-writing machine, the combination of a paper-carriage, a feeding mechanism therefor including a universal bar, a series of type-bars, a series of operating-levers connected to said type-bars and also operatively

connected to said universal bar, a series of key-levers, and a series of trips operatively connected to said series of type-bar-operating levers, whereby when any key-lever is depressed its associated trip acts upon its associated type-bar-operating lever and upon the universal bar and then releases the said universal bar, the said type-bar-operating lever and its connected type-bar, substantially as set forth.

7. In a type-writing machine, the combination of a series of substantially parallel key-actuated levers carrying each a pivoted trip, each said trip being arranged to vibrate in a plane substantially parallel with the lever to which it is pivoted, a universal stop-bar, as 32, extending transversely of the machine to act upon said trips, a series of type-bars, and connections between the type-bars and the trips, substantially as set forth.

8. In a type-writing machine, the combination of a series of key-actuated levers carrying each a pivoted trip, a universal stop-bar, as 32, extending transversely of the machine to act upon said trips, a series of type-bars, a series of connecting-rods, a series of type-bar-operating or sub levers, and a transverse universal bar extending under the forward ends of said type-bar-operating or sub levers and connected to the escapement mechanism, substantially as set forth.

9. In a type-writing machine, the combination with a series of circularly-arranged type-bars, of a set of levers for operating the same, a set of key-levers, both said sets of levers being arranged beneath the type-bars and lengthwise of the machine, one set of the levers being arranged above the other set, and a series of trips arranged between the two sets of levers, substantially as set forth.

10. In a type-writing machine, the combination of a circular series of type-bars, a series of horizontally-arranged levers of varying lengths, a series of rods connected at their upper ends to the type-bars and at their lower ends to the rear ends of the said horizontally-arranged levers of varying lengths, a series of key-levers and a series of trips attached thereto and adapted to act upon the forward ends of the said horizontally-arranged levers of varying lengths, substantially as set forth.

11. In a type-writing machine, the combination of a series of longitudinally-arranged key-levers, a series of type-bars arranged in a circle, a series of connecting-rods also arranged in a circle, a series of type-bar-operating levers of varying lengths terminating at one set of their ends in a circle and pivotally connected thereat to the said connecting-rods, and terminating at the other set of their ends in substantially a straight line transversely of the machine, and a series of trips arranged between the series of key-levers and the series of type-bar-operating levers and also arranged in substantially a straight line transversely of the machine and

coincident with the free ends of the type-bar-operating levers extending from side to side of the machine, substantially as set forth.

12. In a type-writing machine, the combination of a series of key-levers, a series of levers connected to a series of type-bars to operate them, a series of trips, and a straight transverse universal bar adapted to be operated by all of the said type-bar-operating levers and connected to the spacing mechanism of the paper-carriage, substantially as set forth.

13. In a type-writing machine, the combination of a paper-carriage, a letter-spacing mechanism, a series of key-levers, a series of levers connected to a series of type-bars to operate them and all extending in substantially the same direction and terminating in substantially a straight line transversely of the machine, a transverse universal bar of the spacing mechanism, and a series of trips, each of said trips being arranged to release both its associated type-bar and the universal bar, substantially as set forth.

14. In a type-writing machine, the combination of a paper-carriage, a letter-spacing mechanism, a series of type-bars, a series of levers for operating the type-bars, a series of key-levers, detachable connections between the key-levers and the type-bar-operating le-

vers, and a universal bar of the spacing mechanism coincident with the series of detachable connections and with the type-bar-operating levers, substantially as set forth.

15. In a type-writing machine, the combination of a paper-carriage, a letter-spacing mechanism, a circular series of type-bars, a circular series of vertical thrust-rods connecting them to the ends of a series of horizontal operating-levers of the first order, the free ends of said levers having a uniform motion, a series of key-levers, a series of trips, and a universal bar of the spacing mechanism, the trips and universal bar being arranged coincident with said free ends of the type-bar-operating levers, substantially as set forth.

16. The combination of a carriage, a letter-spacing mechanism including a universal bar, a type-bar, a lever, and a trip pivoted thereon and adapted to transmit the motion of said lever to both the universal bar and the type-bar and to then release them, substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 16th day of February, A. D. 1892.

BURNHAM C. STICKNEY.

Witnesses:

JACOB FELBEL,
I. C. MACDONALD.