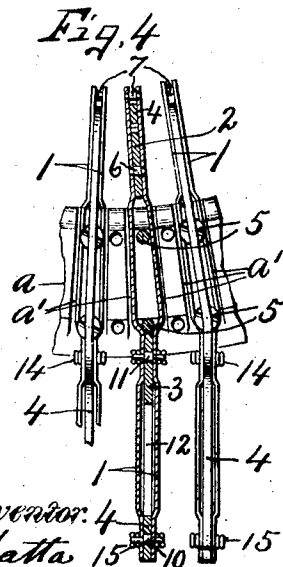
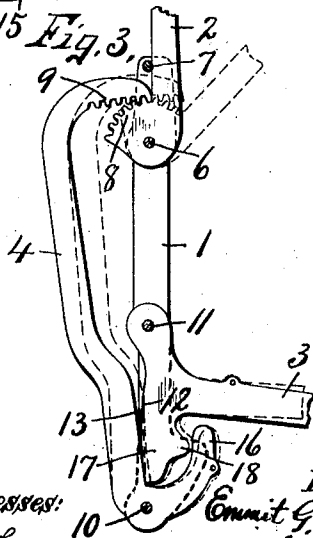
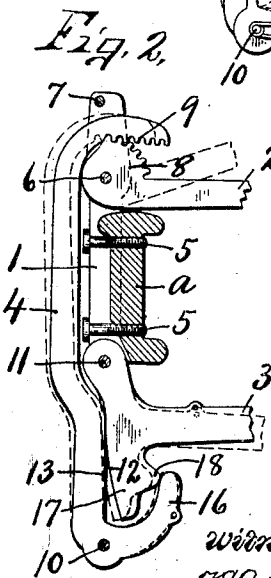
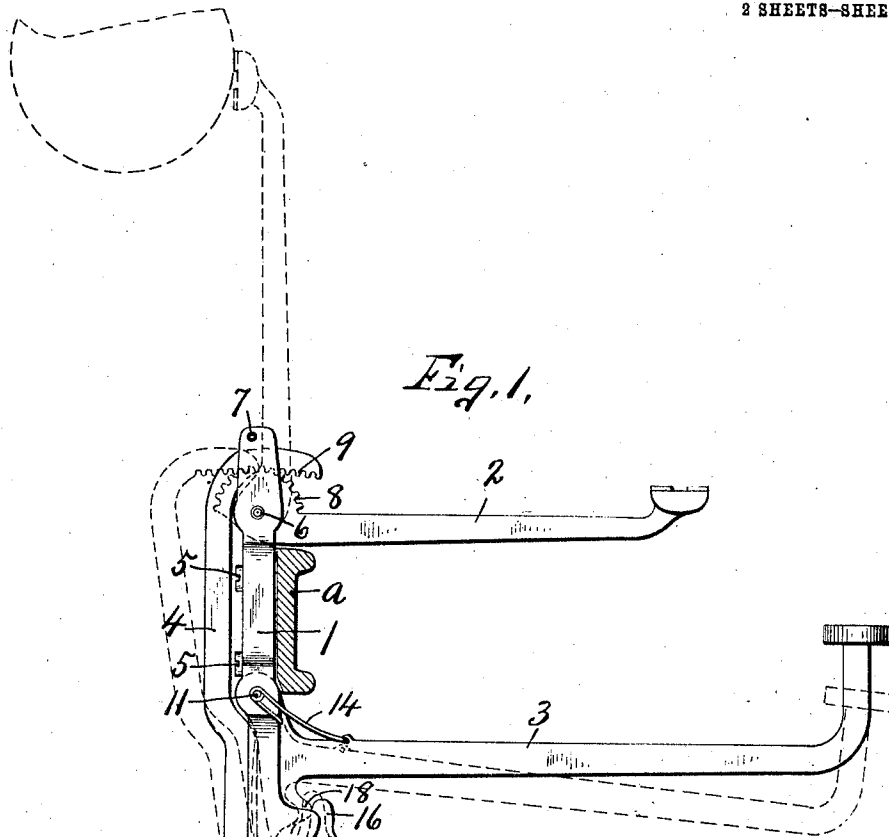


E. G. LATTA.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 6, 1905.

1,025,752.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

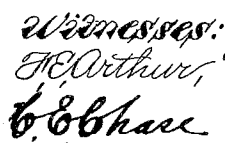


Witnesses:
H. Arthur.
B. G. Robinson

Inventor: Emmet G. Latta
By Howard P. Brinson
Attorney.

1,025,752.

2 SHEETS—SHEET 2.



Inventor.
Emmit G. Latta
By
Howard P. Atkinson
Attorney.

UNITED STATES PATENT OFFICE.

EMMIT G. LATTA, OF SYRACUSE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION
OF NEW JERSEY.

TYPE-WRITING MACHINE.

1,025,752.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed October 6, 1905. Serial No. 281,661.

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Type-Writing Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in typewriting machine of the "front-strike" class, and refers more particularly to the structure, and manner of mounting the various parts of the type-bar action, and to the relative association of these actions one with the other. In this class of machines, in which the type-bars are thrown upwardly and rearwardly from their normal to their printing positions, the available space for the reception and action of the type-bars is necessarily small and the radial planes through which the type-bars swing are unavoidably brought in close juxtaposition. It, therefore, becomes important to not only reduce the number and weight of the parts of each individual type-bar action, but also to cause each type-bar to respond quickly and easily under a comparatively light pressure of the finger upon its actuating key-lever, and at the same time to avoid any objectionable lost motion or involuntary action of the type-bar during its travel to and from its printing position so as to permit a rapid action of the several type-bars without liability of interfering one with the other.

My first object, therefore, is to reduce the number of the parts, weight and cost of production of each type-bar action to a minimum, and to enable such actions to be assembled within the limited space in such manner as to leave ample clearance of one type-bar from another in its travel to and from the printing position, and particularly, when leaving its normal position of rest and returning from the printing position.

A further object is to make use of the compact arrangement of the various parts of each type-bar action in producing an accelerated motion of the type-bar from its position of rest to the printing point, which,

incidentally, requires a much lighter touch on the key to bring the type-bar to the printing position.

Another object is to utilize portions of the essential elements of each action for locking the type-bar against objectionable rebound when returned to their normal positions.

A still further object is to utilize portions of the hanger for guiding the type-bar to sustain it against lateral vibration during the printing operation, or while at the printing point.

Other objects relating to the specific construction and operation of the parts will be brought out in the following description.

In the drawings—Figure 1 is a longitudinal vertical sectional view, from front to rear, of a portion of a "front-strike" typewriting machine showing the type-bar supporting segment and my improved type-bar action in its normal position, as indicated by full lines, and in its printing position, as indicated by dotted lines. Fig. 2 is a similar view of the same parts, except that one of the hanger-plates is removed, and portions of the type-bar and key-lever are broken away. Fig. 3 is a similar view of the same parts seen in Fig. 2, but showing the parts in full lines as they appear when the type bar is in the printing position. Fig. 4 is a rear face view of a portion of the type-bar supporting segment and a series of type-bar actions mounted thereon, one of which is shown in section, and alternate hangers are omitted for clearness of illustration. Fig. 5 is a view similar to Fig. 1, showing a modified form of type-bar action, involving substantially the same principle as the construction shown in Figs. 1 to 4 inclusive. Fig. 6 is a similar view of a still further modified construction of the type-bar action in which the key-lever is fulcrumed below the pivotal point of the auxiliary lever. Fig. 7 is a horizontal sectional view through a portion of the segment and individual type bar hangers with their fastening screws.

It will be observed that in each of these type-bar actions, the accelerated movement of the type-bar is produced by a rolling con-

tact of the key-lever with its auxiliary lever between the fulcrums of said levers and in each case, this contact changes or shifts from the fulcrum of the key-lever toward the fulcrum of the auxiliary lever, as the key-lever is depressed to throw the type-bar to the printing position which is an important feature of my invention.

In Figs. 1 to 4 inclusive, I have shown a type-bar action consisting of a hanger—1—; a type-bar—2—; a key-lever—3— and an auxiliary or sub-lever—4— for transmitting motion from the key-lever to the type-bar, all of which parts are made of sheet metal, stamped to the desired form, and assembled in a manner hereinafter described, and supported by a suitable segment—*a*—. This segment—*a*— is constructed and especially adapted for use in connection with my improved type-bar action, and for this purpose is provided with a series of slots—*a'*— cut in its rear face in radial planes converging at the printing point for receiving and supporting the hangers—1—. Each of these hangers—1— is composed of two opposite, comparatively thin, metal plates or strips of somewhat greater vertical length than the vertical width of the segment—*a*— to which they are secured, each slot—*a'*— receiving the contiguous hanger plates or sides of two adjacent hangers, and the intermediate portions of the plates of each hanger are, therefore, spaced apart and serve to receive suitable fastening means, as screws,—5—, which are screwed into the segment—*a*— and have their ends or heads engaged with the rear edges of their hanger-plates. I have described that these segment slots are radial with the printing point, and it, therefore, follows that the portions of the hanger plates which are seated in said slots are also radial with the printing point and are extended upwardly some distance above the segment—*a*— in substantially radial lines for receiving between them the adjacent end or heel of the corresponding type-bar—2—. The opposite plates of each hanger above the segment—*a*— are rigidly connected by shouldered rivets—6— and—7—, which not only serve to tie the upper ends of the plates together, but also hold them spaced apart a sufficient distance to receive and permit the free action of the type-bar—2— and the upper end of its actuating lever—4—. The type-bar—2— is journaled directly upon the pivotal rivet—6— and is provided with a toothed segment—8— which meshes with a similar toothed segment—9— on its actuating lever—4—, the toothed segment—8— being concentric with the type-bar pivot—6— while the segment—9— is concentric with the fulcrum of the lever—4—, which will be hereinafter described.

The upper ends of the opposite side plates

of each of the hangers—1— extend some distance above the toothed segments—8— and—9— and above the upper end of the lever—4— so as to form a guide for the upper end of said lever—4— to hold its toothed segment—9— in mesh with the segment—8— of the type-bar, and also to afford additional guide or support for guiding and sustaining the type-bar against undue lateral vibration when moved to the printing position. The tie rivet—7— serves to reinforce or stiffen the upper end of the hanger-plates to prevent their spreading apart, such rivet being located above the upper end of the lever—4— and a sufficient distance at the rear of the front edges of the hanger-plates to leave an open slot or space for the reception and guidance of the type-bar when thrown to the printing position. Each hanger—1— is secured to the segment, preferably by two of the screws—5—, one near the upper edge and one near the lower edge of the segment—*a*— which affords a comparatively long radial bearing for the hanger and enables me to use comparatively light sheet metal without sacrificing the rigidity of the hanger.

The type-bars—2— are pivoted in a vertical arc struck from the printing point and the upper portions of the hangers as well as the segment are preferably arranged in a similar arc, but the lower portions of the hangers extend some distance below the lower edge of the segment—*a*— for receiving and supporting the key-levers—3— and auxiliary levers—4—, both of the levers for each type-bar action being mounted upon and between the downwardly extending portions of the opposite plates of their respective hangers so that the same hanger in the action seen in Figs. 1 to 4 inclusive, serves to support the type-bar—2—, key-lever—3— and auxiliary lever—4—.

The portions of the hangers—1— projecting below the segment—*a*— are disposed in substantially vertical planes and all terminate in substantially the same horizontal plane some distance below the horizontal plane of the key-levers—3—, as best seen in Figs. 1 and 4 of the drawings, the lower ends of the side plates of each hanger being rigidly connected, but spaced apart by shouldered rivets—10— a sufficient distance to receive between them the lower end of the corresponding auxiliary lever—4—, which, in this instance, is fulcrumed upon the pivotal rivet—10—. The key-lever—3— is fulcrumed at its rear end between the sides pieces or plates of its hanger—1— upon a suitable pivotal bearing, as a shouldered rivet—11—, similar to the rivets—6—,—7—, and—10— which also serves to tie the hanger-plates together and still to space them apart sufficiently to permit an easy swinging action of the key-lever.

It will be observed that the pivotal axes of the key-lever and auxiliary lever are disposed in substantially the same vertical plane, one over the other, and that in the form of type-bar seen in Figs. 1 to 4, the pivotal bearing of the key-lever is located some distance above the fulcrum of the auxiliary lever —4—, and is, therefore, interposed between the fulcrums —6— and —10—.

Owing to the fact that the lower ends of the hangers all terminate in substantially the same horizontal plane, it is clearly evident that the portions of such hangers below the segment gradually increase in length from the center toward the ends of such segment and the side pieces which form the hangers are, therefore, bent at the intersection of the radial with the vertical lines of such hangers, as best seen in Fig. 4. This difference in length of the portions of the hangers below the segment is therefore made to correspond with the curvature of the segment, and the key-levers and auxiliary levers are fulcrumed or pivoted in the vertical portions of their respective hangers and are located one in front of the other between the side pieces of such hangers, each in the swinging path of the other. It is now obvious that each key-lever and the lower portion of its auxiliary lever swing in the same vertical plane, but the upper portion of each auxiliary lever is radially disposed to correspond to the radial portion of its hanger and to allow it to play freely between the side pieces of such hanger. The auxiliary levers are practically co-extensive in length with their respective hangers and, therefore, the portions of such auxiliary levers below the segment gradually increase in length from the center toward the ends of the segment and swing in vertical planes while the upper portion having operative connection with the type-bars travel in radial planes coincident with those in which their respective type-bars swing.

The rear end of each key-lever is elongated vertically, thus forming an angular extension or bell-crank having its rear face —12— convexed or curved from its fulcrum, as —11—, toward the fulcrum, as —10— of its corresponding auxiliary lever —4—, thereby establishing a rolling contact with the front face —13— of the auxiliary lever, which contact, is normally near the fulcrum of the key-lever, but gradually changes from said fulcrum toward the fulcrum of the auxiliary lever as the key-lever is depressed. This manner of connection between the key-lever and its auxiliary lever causes the upper end of the latter lever and its type-bar to move from the normal to the printing position with an accelerated action, and at the same time, enables the type-bar to be started from its normal position of rest to-

ward its printing position under a comparatively light touch upon the key-lever, and although the speed of action of the type-bar gradually increases under continued depression of the key-lever, which implies that greater power is required to produce such accelerated motion, it must be borne in mind that the momentum given to the type-bar at the beginning of the key-lever stroke, compensates in a measure, for the extra power required to bring the type-bar to the printing position, and that owing to this momentum the pressure upon the key-lever is nearly uniform through its entire stroke.

The key-lever and auxiliary lever —4— are returned to their normal position by separate springs —14— and 15— respectively, either or both of which operate incidentally to return the type-bar to its normal position of rest through the medium of the connections between said levers and type-bar. The means for preventing objectionable rebound of the type-bar when forcibly returned to its position of rest consists in providing the lower end of the auxiliary lever with a forwardly and upwardly projecting extension —16— forming a loop which embraces a depending portion —17— of the key-lever —3— and bears upon the front face or edge of a boss —18— projecting forwardly from the pendant —17—.

The boss or projection —18— bears against the inner end of the extension —16— above the fulcrum —10— of the auxiliary lever, but only when the type-bar and its actuating levers are at rest, because the recess or loop in which the pendant —17— plays is so formed as to permit the boss —18— to free itself from contact with said extension as soon as the key-lever starts on its down-stroke. This allows a free action of the type-bar and its actuating levers to and from their positions of rest, but prevents any objectionable rebound of the type-bar when returned to such position and thereby enables the type-bars to be nested close together without liability of interfering one with the other under rapid action. It will be observed that the lower ends of the sides of each hanger —1— are extended forwardly to lap upon the sides of the extension —16— and pendant portion —17— of the levers —3— and —4— respectively and serve to guide and sustain such parts in operative connection while in action. The retracting springs —14— and —15— of the levers —3— and —4— are mounted on the axially projecting ends of their respective pivotal pins —11— and —10— with their ends interlocked with the hanger —1— and their intermediate portions attached to their respective levers —3— and —4— for returning the latter to their normal positions after each printing operation.

The action seen in Fig. 5 is similar to

that seen in Figs. 1 to 4 inclusive, except that the type-bar, as 2', key-lever as 3', and auxiliary lever, as 4' are pivotally mounted on separate supports, 20, 21— and 22— respectively, the supports —20— consisting of separate hangers, one for each type-bar which are removably secured to the segment, as —b—, by screws 5'. In this device the upper ends of each auxiliary lever is connected to its type-bar by a link 8' and the pivotal pins, as 11' and 10' for the key-lever 3' and auxiliary lever 4' respectively are disposed in the same vertical plane at the rear of the plane in which the pivot, as 6' of the type-bar is located, and the supports —21— and —22— are disposed in parallel horizontal planes, one above the other, thereby bringing the fulcrums 10' and 11'— in parallel horizontal planes.

The key-lever 3' is provided with a convex rear edge or rocker-face 12'— having rolling contact with the front edge of the adjacent vertical portion of the auxiliary lever 4' between the fulcrums 10' and 11', and the auxiliary lever is also provided with a forwardly and upwardly curved extension 16' which is engaged by a boss or projection —18'— when the parts of the type-bar action are at rest, said key-lever and auxiliary lever being returned to their normal positions by separate springs 14'— and 15' respectively.

In Fig. 6 I have shown a type-bar action comprising a type-bar 30, a key-lever 31— and an auxiliary lever 32—, the type-bar being pivoted at 33— upon a suitable hanger 34, which in turn, is removably secured by screws —35— to a supporting segment —36—, while the levers —31— and —32— are pivoted at —37— and —38— respectively to separate horizontal supports —39— and —40—. In this latter device, the pivots —33—, —37— and 38— are disposed in the same vertical plane, as in Fig. 1, but the fulcrum of the key-lever is below that of the auxiliary and the two levers are connected by a suitable retracting spring —42—, while the key-lever is provided with an upward terminal extension —42— having a rocker face —44— which engages the adjacent rear edge of a pendant portion —45— of the auxiliary lever, and the latter lever is pivoted at —46— with a lost motion directly to the type-bar. It will be observed that in each of these several devices the rocker arm of the key-lever is normally in contact with its auxiliary or sub-lever at a point near the fulcrum of the key-lever and that such contact points shift progressively toward the fulcrum of the auxiliary lever, and in a direct line between the fulcrums of said levers as the key-lever is depressed for the purpose of producing an accelerated action of the type-bar. It will thus be noted that the parts are con-

structed and arranged so that a single transverse vertical plane cuts the pivots of the key lever and sublever and the point of rocking contact between the key lever and sublever. It is now clear that this direct rolling contact between the key-lever and its auxiliary or sub-lever enables me to produce an accelerated action of the type-bar with a minimum number of parts; that the sliding action and consequent friction between such contacting parts is practically eliminated; that the type-bar is locked in its normal position of rest without the use of separate parts, and that the entire action in either case involves practically only three parts, viz: the type-bar, key-lever and auxiliary lever, thus permitting all of the active parts to be brought into close compact relation without interference one with the other.

In Figs. 1 to 4 inclusive, it will be seen that the entire system of type-bars and their actuating mechanisms are assembled upon and supported by the segment —a— and that each type-bar action is supported wholly upon one of the hangers —1— so that the complete system may be assembled upon the segment —a— and then placed in position or removed from the machine or each separate action with its hanger may be removed or replaced separately from the others. In this class of machines, the type-bar is usually provided with two type, and either the platen or segment is made to shift to bring one or the other of the type to the printing point, but this shifting-means forms no part of my present invention, and it is therefore, unnecessary to illustrate or describe the same further than to state that in the device seen in Figs. 1 to 4 inclusive and Fig. 6, the platen is preferably shifted, while in Fig. 5, the key-levers and auxiliary levers are mounted on supports, separate from the type-bar-supporting segment to enable said segment to be shifted relatively to the platen. The key-levers for the different rows are usually of different lengths, while the type-bars swing through substantially the same arc, or degree of movement, and in order that the dip, or amount of depression, or stroke of the key-levers may be substantially the same, the curve of the rocker face for each of those type actions which has the longer sub-levers is struck from a longer radius than the rocker faces of those type actions which have the shorter sub-levers, or in other words, this radius of each successive rocker face is gradually reduced from the sides toward the center of the system. The auxiliary levers, as —4—, are preferably made in pairs, two at a given distance from the center of the segment of the same length, but as the two levers of each pair are connected to key-levers of two adjoining banks and consequent slightly dif-

ferent length, the rocking parts may be of slightly different curvature if exactly the same dip is obtained, the difference in curve, however, is so slight that the curved parts may be made in pairs without material difference in dip.

In operation, the depression of the key-lever, as —3—, against the action of its spring, as 14—, causes the rocker-face, as 12—, on the rear end of said lever to contact with the upright face 13— of the auxiliary lever —4—, which contact gradually shifts from the fulcrum of the key-lever toward the fulcrum of the auxiliary lever, thereby imparting an accelerated movement to the auxiliary lever, which accelerated movement is transmitted to the type-bar through the connection between the auxiliary lever and type-bar, said auxiliary lever being actuated against the action of its retracting spring, as 15—, which, together with the retracting spring for the key-lever operate to return the key-lever, auxiliary-lever and its type-bar to their normal positions of rest, in which position, the type-bar is locked against objectionable rebound by contact of the boss or projection 18— with the adjacent face or edge of the extension —16—.

What I claim:

1. In a typewriting machine, a type-bar arranged to swing upwardly and rearwardly, a detachable type-bar hanger supporting the bar, a key-lever, and auxiliary lever both pivotally connected to and removable with the hanger.

2. In a typewriting machine, a slotted segment, a series of type-bar hangers detachably seated in the segment slots, a type-bar, auxiliary lever, and key-lever pivotally connected to each of the hangers, the type-bar and key-lever being mounted upon their hangers and removable therewith from the segment.

3. In a typewriting machine, a segment and hangers thereon, a series of self-contained type-bar actions, each consisting of a type-bar, a key lever, and an auxiliary lever, each pivotally connected to its hanger and removable therewith from the segment.

4. In a typewriting machine, a type-bar arranged to swing upwardly and rearwardly, a supporting segment, and a hanger consisting of a pair of opposite side plates pivotally connected to the type-bar, the hanger plates being connected to the segment below the type-bar pivot, and having upward extensions rigidly connected by a separate part above said pivot.

5. In a typewriting machine, a type-bar arranged to swing upwardly and rearwardly, a supporting segment, and a hanger consisting of a pair of separate side plates pivotally connected to the type-bar, the hanger plates being connected to the segment below the type-bar pivot, and having

their upper ends extended above said pivot and rigidly connected to form an open guide for the type-bar when at the printing point.

6. In a typewriting machine, a hanger and a type-bar action comprising a type-bar, key-lever and auxiliary lever all fulcrumed on the hanger and operatively connected.

7. In a typewriting machine, a series of radially arranged upwardly and rearwardly swinging type-bars, a series of vertically movable key-levers, a series of auxiliary levers operatively connecting the type-bars to the key-levers, and a series of hangers each acting to support and guide one of said type-bars, auxiliary levers, and key levers.

8. In a typewriting machine, a series of radially arranged upwardly and rearwardly swinging type-bars, a series of hangers each consisting of two opposable parts, a series of auxiliary levers operatively connected to the type-bars at their upper ends and to the hangers at their lower ends, with a series of key-levers each having a rolling contact with one of the auxiliary levers between the opposable parts of one of the hangers.

9. In a typewriting machine, a series of radially arranged upwardly and rearwardly swinging type-bars, a series of vertically movable key-levers, a series of hangers each forming a pivotal support for one type-bar and key lever, with means to transmit and accelerate the motion of the key-levers to the type-bars.

10. In a typewriting machine, a series of radially arranged upwardly and rearwardly swinging type-bars, a series of vertically movable key-levers, and a series of hangers of graduated lengths each forming a pivotal support for one type-bar and key-lever, with means to transmit motion from the key lever to the type-bar.

11. In a typewriting machine, a series of radially arranged upwardly and rearwardly swinging type-bars, a series of vertically movable key-levers, and a series of hangers each forming a pivotal support for one type-bar, auxiliary lever, and key lever, the upper portions of the hangers being arranged in radial lines and the lower portions in substantially parallel vertical lines.

12. In a typewriting machine, the combination of a type bar, a sub-lever, and a key lever having a rocking contact with said sub-lever to effect an acceleration of the type bar as it approaches the printing position, the parts being constructed and arranged so that a single transverse vertical plane cuts the pivots of the key lever and sub-lever and the point of rocking contact between the key lever and sub-lever.

13. In a typewriting machine, the combination of a type bar, a sub-lever, a key lever having a rocking contact with said sub-lever to effect an acceleration of the type bar as it approaches the printing position,

the parts being constructed and arranged so that a single transverse vertical plane cuts the pivots of the key lever and sub-lever and the point of rocking contact between the key lever and sub-lever, and co-acting means on the key lever and sub-lever which coöperate when the parts are in normal position to lock the type bar against rebound.

10 14. In a typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of upright sub-levers, and a series of key levers having a rocking contact on the sub-levers to effect an acceleration of each type bar as it approaches the printing position, the pivots of the type bars, sub-levers and key levers and the points of contact between the key levers and sub-levers being cut by a single transverse vertical plane.

15 15. In a typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of upright sub-levers, a series of key levers having a rocking contact on the sub-levers to effect an acceleration of each type bar as it approaches the printing position, the pivots of the type bars, sub-levers and key levers and the points of contact between the key levers and sub-levers being cut by a single transverse vertical plane, and co-acting means on the key levers and sub-levers which coöperate when the parts are in normal position to lock the type bars against rebound.

16. In a typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of upright sub-levers which increase in length from the center to the sides of the system, a

series of key levers, and curved rocker faces or treads formed on one series of said levers for rocking contact on the other series of levers to effect an acceleration of the type bars as they approach the printing position, the pivots of the key levers and sub-levers and the points of engagement between the two sets or series of levers being cut by a single vertical transverse plane and the curve of each tread being gradually reduced or on a smaller radius as the center of the system is approached.

17. In a typewriting machine, the combination of a series of upwardly and rearwardly striking type bars, a series of upright sub-levers which increase in length from the center to the sides of the system, a series of key levers, curved rocker faces or treads formed on one series of said levers for rocking contact on the other series of levers to effect an acceleration of the type bars as they approach the printing position, the pivots of the key levers and sub-levers and the points of engagement between the two sets or series of levers being cut by a single vertical transverse plane and the curve of each tread being gradually reduced or on a smaller radius as the center of the system is approached, and co-acting means on the key levers and sub-levers which coöperate when the parts are in normal position to lock the type bars against rebound.

In witness whereof I have hereunto set my hand this 3d day of October 1905.

EMMIT G. LATTA.

Witnesses:

OSCAR C. KAVLE,
H. E. CHASE.