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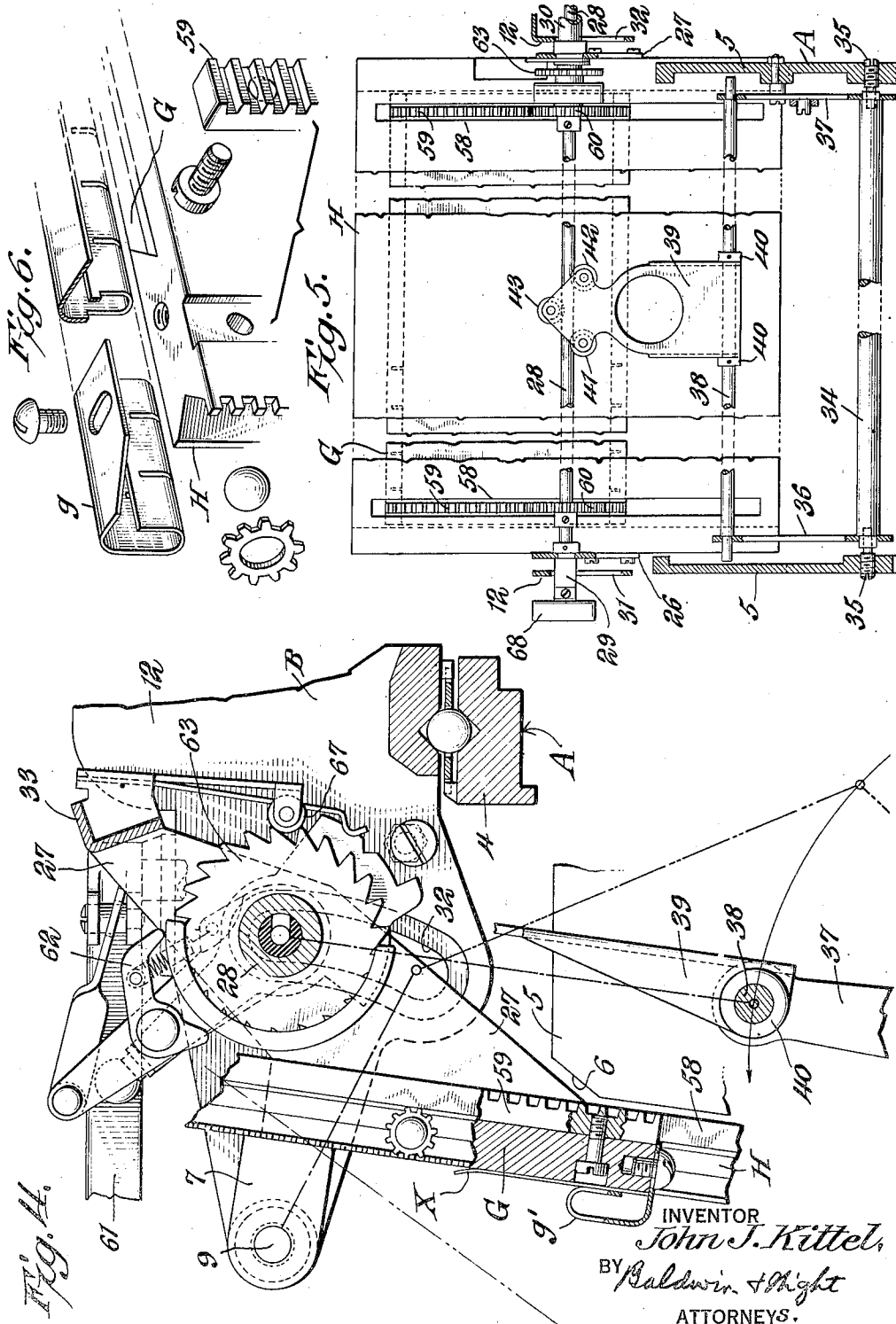
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TYPEWRITING MACHINE

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## UNITED STATES PATENT OFFICE

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## TYPEWRITING MACHINE

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This invention relates to new and useful improvements in typewriting machines of the type especially adapted for use in writing on cards or other flat work sheets, and embodies certain improvements over the co-pending application of Edward B. Hess Serial No. 506,807, filed Jan. 5, 1931, and my co-pending application Serial No. 539,919, filed May 25, 1931.

Among the several objects of the Hess invention are to provide a typewriting machine in which each card will be retained in its flat condition while it is in the machine; to provide such a machine with a flat platen on which the card is supported in flat condition during printing operations; to provide type carriers each having flat upper and lower case types arranged at an angle to each other; to provide means for normally supporting the platen in a plane parallel to the printing face of the lower case type when the latter is in printing position; and to provide means for moving the platen into parallelism with the face of the upper case type when the latter is in printing position and for elevating the platen together with the card whereby the same printing line on the card will be presented to the upper case type.

In my co-pending application above identified, means are provided for locking the platen in one printing position against swinging movement toward the other printing position. Means are provided for locking the platen in both upper and lower case positions, and means are provided for releasing both locks prior to either case shifting movement of the platen. Means are also provided for line spacing the platen and for fractional line spacing thereof.

Among the several objects of the present invention are to provide a carriage having a flat platen mounted thereon to swing about an axis located at a point relative to the line of impact of the platen whereby the employment of either a vertically shiftable platen or type segment is eliminated; to provide means for adjusting the axis of the platen whereby the flat line of impact of the platen may be adjusted in all directions to thereby properly true the platen relative to the printing face

of either upper or lower case type when the type bar is in printing position; to provide the platen supporting frame with a supplemental frame for supporting the line spacing mechanism; to provide novel means for swinging the platen from one printing position to another and for locking the platen in either printing position; to provide means for cushioning the shift key lever after the platen has been swung to its full extent, and to provide such a machine which is composed of comparatively few parts and is therefore simple in construction and cheap to manufacture.

Other objects of the invention are to provide a machine in which the platen is swingable about an axis disposed in alinement with the printing face of the platen whereby the angle of movement of the platen and the angular relation between the upper and lower types on each type bar will be reduced to a minimum, and to provide a vertically movable type bar segment and means for effecting the lowering of the same to position the line of writing on the platen in proper writing relation with respect to the upper types.

In the drawings:—

Figure 1 is a vertical sectional view of a typewriting machine constructed in accordance with my invention,

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a detail sectional view of one of the adjustable pivots for the platen supporting frame,

Figure 4 is an enlarged vertical sectional view taken on the line 4—4 of Figure 2,

Figure 5 is a rear view of the platen supporting frame,

Figure 6 is a perspective view showing a part of the platen supporting frame and associated parts in separated relation,

Figure 7 is a diagrammatic view illustrating the positions of the line of writing on the platen relative to the upper and lower case types in the different extreme printing positions of the platen,

Figure 8 is a view similar to Figure 1 but showing a modification of my invention

wherein the type bar segment is movable vertically, and

Figure 9 is a diagrammatic view of the modified construction illustrating the positions of the line of writing on the platen relative to the upper and lower case types in the different extreme printing positions of the platen.

Referring to the accompanying drawings, the machine includes a main frame A, a shiftless carriage B which is movable for letter space movements along a lower rail 4 fixed to the main frame, an escapement mechanism C for the carriage, a shiftless type bar segment D fixed to the main frame, a plurality of type bars or carriers E which are pivoted on the segment, and a plurality of key levers F for actuating the type bars.

The main frame A includes side plates 5, 5 which are formed with downwardly extending passages or slots 6, 6 arranged in registry in a transverse plane directly in rear of the segment D.

A flat platen G is disposed in rear of the segment D and is supported on a flat platen-supporting frame H for vertical line spacing movements therealong. Rigidly secured centrally to the side portions of the frame H and projecting forwardly therefrom on opposite sides of the platen G and above the segment D are arms 7, 7 having aligned bearing openings 8, 8 for receiving bearing pins 9, 9, which project laterally into aligned openings 10, 10 formed in bushings 11, 11 fixed to the end plates 12, 12 of the carriage B, the diameter of each opening 10 being greater than the diameter of the associated pin 9. Threadably engaged in each bushing 11 and located approximately 120° apart, are three radially extending adjusting set screws 13 which engage the periphery of the associated pin and thereby securely clamp the same in any position of adjustment. Thus by means of these screws 13, the impact line of the platen G may be readily aligned, that is, disposed in exact parallelism with the type face when the type bar is in printing position. Each type carrier or bar E is pivoted at its heel as at 14 to the segment D and includes a head 15 having flat upper and lower case types 16 and 17 respectively, whose printing faces are in planes at an obtuse angle to each other. The printing face of the lower case type 17 is disposed in parallelism with the longitudinal axis of the type bar. The type bars in their normal position are supported by a head rest 18 secured to the main frame. The platen G is normally upwardly and rearwardly inclined as shown by full lines in Figure 1, and is normally disposed in parallelism with the printing face of the lower case type 17 when the latter is in printing position, while at this time the printing face of the upper case type 16 is in a plane at an acute angle to the printing surface of the platen and consequently the

upper case type 16 will not print when the lower case type is printing. When it is desired to print with the upper case type 16, the platen is swung about the axis 9 to the other printing position as shown by the dotted lines in Figure 1, wherein the printing face of the platen is disposed in parallelism with the printing face of said upper case type. At this time, the printing face of the lower case type 17 lies in a plane at an acute angle to the printing surface of the platen, and consequently the lower case type will not print when the upper case type is printing. Thus it will be observed that the printing line of the platen, when the latter is in lower case position, is below the horizontal plane containing the forwardly disposed pivot or axis 9, and consequently when the platen is swung to the upper case position the printing line of the platen will be elevated a distance equal to the distance between the upper and lower types, thereby insuring the impact of the upper case type on the same printing line of the platen. It will be furthermore observed that by swinging the forwardly extending arms 7 about the fixed axis 9, I am enabled to swing the platen from one extreme position to the other without the necessity of employing in addition thereto either a vertically movable shift frame or a vertically movable type bar segment.

Each type action includes a front link 19 which is pivoted to a front link bracket 18, a link 20 which is pivoted to the heel of the type bar E and to the front link 19, and a link 21 which is connected to the key lever F and to the front link 19.

The escapement mechanism C is actuated upon the depression of each key lever F through the medium of a universal frame 22 common to the front links 19, a pendant arm 23 pivoted to the main frame adjacent the escapement mechanism and normally held out of engagement therewith by a spring 24, and a link 25 which connects the universal frame and the pendant arm.

A supplemental frame which is rigidly secured centrally to the side edges of the platen-supporting frame H by screws or the like, comprises rearwardly extending wings or arms 26 and 27 in which are journaled a line-spacing shaft 28 through the medium of bushings 29, 30 respectively secured to the wings or arms 26 and 27. The bushings project outwardly through arcuate clearance slots 31, 32 respectively formed in the end plates 12, 12 of the carriage, the slots having for their center the axis 9 of the platen G whereby when the frame H is swung from one printing position to the other, the shaft 28 will be free to bodily move therewith. The rear ends of the wings or arms 26, 27 are rigidly connected by a tie bar 33.

Disposed below the shaft 28 and also below

the platen-supporting frame H, is a toggle which includes a horizontal rock shaft 34 having its ends journaled to the side plates 5, 5 of the main frame through the medium of pivot screws 35, 35, and rigidly secured to the rock shaft 34 are spaced and upwardly extending arms 36, 37. A tie rod 38 is attached to the upper ends of the arms 36, 37. Thus, the shaft 34, the arms 36, 37 and the tie rod 38 constitute a rocking frame or the lower lever arm of the toggle. A plate 39 which forms the upper lever arm of the toggle, is centrally located between the side plates 5, 5 of the main frame, and has its lower end pivotally supported centrally on the tie rod 38. The arm or plate 39 is held against longitudinal movements along the rod 38 by collars 40, 40 fixed to the rod. Journaled on the upper end of the arm or plate 39 are three grooved and staggered rollers 41, 42, 43 having rolling contact with the shaft 28, the rollers 41, 42 being disposed below the shaft and the roller 43 being disposed above the shaft and located centrally of the lower rollers. When the platen G is in its normal or lower case position, the toggle levers will be out of alinement as shown by full lines in Figure 1. When the lower lever arm 34, 36, 37, 38 of the toggle is swung forwardly to the dotted line position in Figure 1, the toggle levers will be brought into alinement and the platen-supporting frame H will be swung about its axis 9 to the upper case printing position. Adjustable eccentric stops *a* are mounted on the end plates 12, 12 of the carriage and are engageable by the rearwardly extending arms 26, 27 of the supplemental frame to limit the swinging movement of the platen-supporting frame H in one direction, and similar stops *b* are mounted on the side plates 5, 5 of the main frame and are engageable by the arms 36, 37 of the lower toggle lever to limit the swinging movement of the platen-supporting frame in the opposite direction.

A shift key lever 44 for swinging the platen-supporting frame H is secured on a transverse shaft 45 pivoted to the side plates of the main frame, and is provided with an upward extension 46 to which the front end of a pull link 47 is connected. The other end of the link has a pin and slot connection 48 with the arm 37 and terminates in a downwardly and rearwardly extending arm 49. A locking lever or latch 50 is pivoted intermediate its ends to an adjustable eccentric pivot 51 mounted on the side plate 5 of the main frame, and the throat 52 at the upper end of the latch lever is adapted to normally engage the tie rod 38 and thereby lock the platen-supporting frame H in its normal or lower case position, as shown by the full lines in Figure 1. A link 53 is connected at its ends to the downwardly extending arm 49 and to the lower arm of the latch lever 50.

The link 47 is a two-part link, and the inner ends of the parts are connected by a flexible coupling or cushion 54. A spring 55 connected at one end to the arm 46 of the shift key lever 44 and at its other end to a plate 56 fixed to the main frame, functions to return the various parts to the initial positions upon release of the shift key lever. A lock arm 57 similar to that shown in the patent to Handley 1,244,729, Oct. 30, 1917, is associated with the shift key lever 44 and shift lock lever 55<sup>a</sup> to lock the latter in its depressed position to thereby retain the platen-supporting frame H in its other printing position.

Upper and lower spring clips *g* and *g'* are attached to the platen G for retaining a card X or other flat work sheet against the printing face of the platen.

The platen-supporting frame H is recessed in its front face to receive the platen G, and in rear of the platen the frame is provided with spaced vertical slots 58, 58 into which project rack bars 59, 59 fixed to the platen. Fixed to the line spacing shaft 28 are gear pinions 60, 60 which are in constant mesh with the rack bars whereby upon rotation of the shaft the platen will be moved vertically along the frame H. A line spacing lever 61 which is pivoted on the supplemental frame 27, 28, 33 secured to the platen-supporting frame H, actuates a spring pawl 62 which engages a ratchet wheel 63 loosely mounted on the shaft 28. Fixed to the ratchet wheel is a driving clutch member 64 which is normally in clutched engagement with a driven clutch member 65 keyed to the shaft 28. A spring 66 is interposed between the adjacent gear pinion 60 and the driven clutch member 65 to normally retain the later in driving engagement with the driving clutch member 64. By means of a roll detent 67 which is mounted on the rod 33 and engages the ratchet wheel 63, the platen is retained against dropping by gravity in any line space position thereof. Thus, upon manipulation of the hand lever 61, the ratchet wheel 63 will be rotated a predetermined distance, and the platen will be correspondingly line spaced.

In order to fractionally line space the platen, I have provided manually operable means for separating the clutch members 64, 65 and thereby permit the operator to rotate the shaft 28 at will by means of either of the hand wheels 68, 69 which are respectively fixed to the opposite ends of the shaft 28. To this end, a plunger 70 is mounted in a longitudinal groove 71 in the shaft 28 and I have provided a finger piece 72 at the outer end thereof adjacent the hand wheel 69. The driven clutch member 65 is provided with a tongue 73 which projects through a slot 74 formed in the shaft 28 and into the groove 71, whereby upon inward movement of the plunger 70 the driven clutch member 65 will be separated from the driving clutch member

64. Upon release of the plunger, the spring 66 will return the clutch members into clutching engagement.

From the foregoing, it will be observed that the platen is mounted on the carriage and is swingable about a fixed axis thereon; that the carriage is mounted on a fixed lower rail for line space movements; that the type bar segment is fixed to the main frame; that the axis of the platen is disposed in front of the platen and above the segment; that the writing line of the platen is moved from its normal lower case writing position wherein it cooperates with the lower case type to its upper writing position wherein it cooperates with the upper case type; that neither a vertically shiftable carriage nor a vertically shiftable type bar segment is employed; that the platen is swung from one position to another through the medium of a toggle which is connected to the shift key lever; that in the normal position of the platen and toggle a latch cooperates with the toggle to lock the platen in said normal position; that said latch is automatically released upon depression of the shift key lever whereupon the platen is immediately thereafter swung to its other printing position; that the platen supporting frame carries the line spacing mechanism for bodily movements therewith; that the line spacing mechanism includes a horizontal shaft to which the upper end of the toggle is pivotally connected by a plurality of staggered rollers, and that the line spacing mechanism includes means for fractionally line spacing the platen whenever desired.

In the modification shown in Figures 8 and 9, the platen-supporting frame H is mounted on the carriage B to swing about a fixed horizontal axis 75 which is disposed in alinement with the printing or impact face of the platen. As a result, the printing line of the platen is not moved upwardly when the platen is swung from its normal printing position to its other printing position. It will be observed, however, that the angle of movement of the frame H is considerably less than the angle of movement of the frame shown in the preferred form. The upper and lower types 76 and 77 which are carried by each type bar 78 have their printing faces disposed at an angle to each other corresponding to the angle of movement of the platen-supporting frame H. The bars 78 are pivoted on a segment 79 which is supported on the main frame A for vertical movements. Each type bar 78 is connected to a front link 19 through the medium of an intermediate lever 80 and links 81 and 82. The platen in its normal position as shown in full lines in Figure 8, is disposed in parallelism with the face of the lower type 77 when the latter is in printing position, and the platen in its other printing position, as shown by the dotted lines in

Figure 8, is disposed in parallelism with the face of the upper type 76. It is, therefore, necessary for the segment 79 to be normally in its extreme upper position in order for the lower type 77 to print on the writing line of the platen, and whenever it is desired to print the upper case type 76 it is necessary not only to lower the segment 79 a distance equal to the distance between the upper and lower types, but also swing the platen to its other printing position. Attached to the lower end of the platen-supporting frame H are two rearwardly extending plates 83, respectively provided with slots 84. A rocking frame 85 includes a rock shaft 86 which is pivoted to the side plates 5, 5 of the main frame A, upwardly extending lever arms 87, and a tie rod 88 which is connected to the upper ends of the lever arms 87 and has its ends disposed in the slots 84 of the plates 83. One of the lever arms 87 projects below the rock shaft 86 to form a forked arm 88<sup>a</sup> engaging a roller (not shown) on a tie rod 89 forming part of a lower lever 90 which is fixed to a rock shaft 91 journaled on the side plates 5, 5 of the main frame. Fixed to the rock shaft 91 is a forwardly extending arm 92 and to the forward end of this arm is pivotally connected the lower end of a lift link 93, the upper end thereof being pivotally connected to the segment 79. The rear end of the arm 92 is provided with an upstanding integral arm 94 to which one end of a counterbalancing spring 95 is connected, the other end of said spring being adapted to be connected to the rear plate of the main frame A. The spring 95 functions to normally retain the segment 79 in its extreme upper position and to also retain the platen H in its normal printing position. A stop 96 is fixed to the main frame A and cooperating with this stop are upper and lower cushion stops 97 and 98 carried by the segment 79 for the purpose of limiting the extreme upward and downward movements of said segment. In order to rock the lower lever 90 forwardly and thereby not only swing the platen H to its other printing position but also lower the segment 79, there is provided a link 99 which is connected at its rear end by a slot 100 to the tie rod 89 and at its front end to a lever 101 mounted on the arm 46 of the shift key lever 44. Thus upon depression of the shift key lever 44 the link 99 will swing the lever 90 forwardly and thereby effect the swinging of the platen to its other printing position and also effect the lowering of the segment 79. It is desirable to lock the segment 79 in its normal or extreme upper position and for this purpose a latch 102 is pivotally mounted on the main frame A for engaging under the stop lug 96 and is connected to the lever 101 by a link 103. Thus upon the first part of the depression of the shift key lever 44, the latch 102 will be

released from the stop lug 96 before the frame H is swung and before the segment 79 begins to lower. The releasing of this latch at this time is due to the slot 100 and its connection with the tie rod 89.

5 The line spacing mechanism for the platen is identical with that shown and described in connection with the preferred form and is mounted on the supporting frame H for bodily movements therewith and therefore it is thought unnecessary to redescribe this line spacing mechanism.

I claim:—

1. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other.

2. In a typewriting machine, the combination with a type carrier pivoted to swing about a fixed axis from a position of rest to a printing position and having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other.

3. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally upwardly and rearwardly inclined and disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, the axis of the platen being located in a horizontal plane above the writing line of the platen when the latter is in its normal position, and means for swinging the platen from one printing position to the other.

4. In a typewriting machine, the combination with a type carrier pivoted to swing about a fixed axis from a position of rest to a printing position and having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally upwardly and rearwardly inclined and located in rear of the type carrier, said platen in its normal position being disposed in a plane

parallel to the face of one type when said type is in printing position, the platen being supported to swing about a fixed axis located in front of the platen and above the type bar pivot to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other.

5. In a typewriting machine, the combination with a type carrier pivoted to swing about a fixed axis from a position of rest to a printing position and having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally upwardly and rearwardly inclined and located in rear of the type carrier, said platen in its normal position being disposed in a plane parallel to the face of one type when said type is in printing position, the platen being supported to swing about a fixed axis located in front of the platen and above the type bar pivot to position the platen in a plane parallel to the face of the other type when said other type is in printing position, the axis of the platen being located in a plane perpendicular to the face of the platen at the line of writing, and means for swinging the platen from one printing position to the other.

6. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other comprising a shift key lever, a toggle connected with the platen, and a link connection between the shift key lever and the toggle.

7. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other including a shift key lever, a toggle disposed below the platen and including upper and lower pivotally connected lever arms, the lower arm being fulcrumed to swing about a fixed pivot and the upper arm having a pivotal connection with the platen, the arms being normally disposed out of alignment, and a link connecting the shift key lever and one of said arms.

8. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, and means for swinging the platen from one printing position to the other including a shift key lever, a toggle disposed below the platen and including upper and lower pivotally connected lever arms, the lower arm being fulcrumed to swing about a fixed pivot and the upper arm having pivotal connection with the platen, the arms being normally disposed out of alignment, a latch lever fulcrumed to swing about a fixed axis and normally engaged with the toggle to lock the platen in its normal printing position, and a link connecting the shift key lever and one of said arms and having connection with the latch lever for releasing the latter from the toggle.

9. In a typewriting machine, the combination with a type carrier pivoted to swing about a fixed axis from a position of rest to a printing position and having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally upwardly and rearwardly inclined and located in rear of the type carrier, said platen in its normal position being disposed in a plane parallel to the face of one type when said type is in printing position, the platen being supported to swing about a fixed axis located in front of the platen and above the type bar pivot to position the platen in a plane parallel to the face of the other type when said other type is in printing position, the axis of the platen being located in a plane perpendicular to the face of the platen at the line of writing, and means for swinging the platen from one printing position to the other comprising a shift key lever, a toggle connected with the platen, and a link connection between the shift key lever and the toggle.

10. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen supporting frame swingable about a horizontal axis from one printing position to another, a flat platen slidably mounted on the frame for line space movements therealong, the platen being normally disposed in parallelism with the printing face of the lower type when the latter is in printing position, means including a horizontal shaft mounted on the frame for bodily swinging movements therewith and having operative connections with the platen for line spacing the latter upon rotation of said shaft, and means for swinging the frame to the upper printing position wherein the

platen will be disposed in parallelism with the printing face of the upper type when the latter is in printing position, said swinging means including a shift key lever, a toggle including upper and lower pivotally connected arms, rollers carried by the upper arm for rolling contact with said shaft, and a link connection between the shift key lever and the toggle.

11. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, a flat platen slidably mounted on the front face of the platen-supporting frame for line space movements, means mounted on the platen-supporting frame and bodily movable therewith for line spacing the platen, and means for swinging the frame from one printing position to the other.

12. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, a flat platen slidably mounted on the front face of the frame for line space movements, a line spacing shaft located in rear of the frame and rotatably supported thereon for bodily movements therewith, operative connections between the shaft and the platen for line spacing the latter upon rotation of the former, and means for swinging the frame from one printing position to the other.

13. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, said frame being provided with spaced vertical slots, a flat platen slidably mounted on the front face of the frame for line space movements, racks secured to the platen and projecting into the slots of the frame, a line spacing shaft located in rear of the frame and rotatably supported thereon for bodily movements therewith, gears fixed to the shaft and meshing with said racks for line spacing the platen upon rotation of the shaft, and means for swinging the frame from one printing position to the other.

14. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, said frame being provided with spaced vertical slots, a flat platen slidably mounted on the front face of the frame for line space

movements, racks secured to the platen and projecting into the slots of the frame, a line spacing shaft located in rear of the frame and rotatably supported thereon for bodily movements therewith, gears fixed to the shaft and meshing with said racks for line spacing the platen upon rotation of the shaft, means for rotating the shaft including a ratchet wheel fixed to the shaft and a hand lever pivotally supported on the frame and having operative connections with the ratchet wheel, and means for swinging the frame from one printing position to the other.

15. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, said frame being provided with spaced vertical slots, a flat platen slidably mounted on the front face of the frame for line space movements, racks secured to the platen and projecting into the slots of the frame, a line spacing shaft located in rear of the frame and rotatably supported thereon for bodily movements therewith, gears fixed to the shaft and meshing with said racks for line spacing the platen upon rotation of the shaft, means for rotating the shaft including a ratchet wheel mounted on the shaft, a normally effective clutch between the ratchet wheel and the shaft, and a manually operable lever pivotally supported on the frame and having operative connections with the ratchet wheel, manually operable means for rendering the clutch ineffective and for turning the shaft for fractionally line spacing the platen, and means for swinging the frame from one printing position to the other.

16. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen-supporting frame disposed in rear of the type carrier and swingable from one printing position to another, a flat platen slidably mounted on the front face of the frame for line spacing movements, a supplemental frame extending rearwardly from and rigidly secured to the platen-supporting frame, a line spacing mechanism supported on the supplemental frame and operatively connected to the platen, and means for swinging the frame from one printing position to the other.

17. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, means for swinging the

platen from one printing position to the other, and separate means for locking the platen against swinging in its extreme printing positions.

18. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, normally effective means for locking the platen in its normal printing position against swinging movement, and means for releasing said locking means and for swinging the platen to its other printing position.

19. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, normally effective means for locking the platen in its normal printing position against swinging movement, and means for releasing said locking means for swinging the platen to its other printing position, and for locking the platen in its other printing position.

20. In a typewriting machine, the combination with a main frame, of a type bar segment fixed thereto, a plurality of type bars pivotally mounted on said segment, each type bar being provided with upper and lower types arranged at an angle to each other, a carriage mounted on the frame for letter space movements, a flat platen-supporting frame mounted on the carriage to swing about a horizontal axis, said frame being disposed in rear of the type bar segment, a flat platen slidably mounted on the platen-supporting frame for line space movements therealong, the axis of the platen-supporting frame being disposed in front of the platen and arranged in a plane perpendicular to the face of the platen at the line of writing thereon, said platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower type when the latter is in printing position, and means connected to the platen supporting frame for swinging the latter whereby the platen will be positioned in parallelism with the printing face of the upper type when the latter is in printing position.

21. In a typewriting machine, the combination with a main frame, of a type bar segment fixed thereto, a plurality of type bars

pivotaly mounted on said segment, each type bar being provided with upper and lower types arranged at an angle to each other, a carriage mounted on the frame for letter space movements, a flat platen-supporting frame mounted on the carriage to swing about a horizontal axis, said frame being disposed in rear of the type bar segment, a flat platen slidably mounted on the platen-supporting frame for line space movements therealong, the axis of the platen-supporting frame being disposed in front of the platen and arranged in a plane perpendicular to the face of the platen at the line of writing thereon, said platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower type when the latter is in printing position, line spacing mechanism disposed in rear of the platen-supporting frame and mounted thereon for bodily swinging movements therewith, said line spacing mechanism including a horizontal shaft, and means for swinging the frame to a position whereby the platen will be disposed in parallelism with the printing face of the upper type when the latter is in printing position, said swinging means including a shift key lever, a toggle including upper and lower levers, the lower lever being fulcrumed on the main frame of the machine and the upper lever having sliding contact with the line spacing shaft, and a link connecting the shift key lever with one arm of said toggle.

22. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, means for swinging the platen from one printing position to the other, and means for adjusting the axis of the platen to true the impact face thereof relative to the face of either type when the latter is in printing position.

23. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, means for swinging the platen from one printing position to the other, and means for radially adjusting the axis of the platen in all directions to true the impact face thereof relative to the face of either type when the latter is in printing position.

24. In a typewriting machine, the combination with a type carrier having flat upper and lower types thereon and disposed at an angle to each other, of a flat platen normally disposed in a plane parallel to the face of one type when said type is in printing position and supported to swing about a fixed axis to position the platen in a plane parallel to the face of the other type when said other type is in printing position, means for swinging the platen from one printing position to the other, and means for adjusting the axis of the platen to true the impact face thereof relative to the face of either type when the latter is in printing position, said adjusting means including a pivot pin, a fixed bushing having a bearing recess for receiving the pivot pin, the diameter of the recess being greater than the diameter of the pin, and a plurality of radially adjustable set screws threaded into the bushing and engaging the periphery of said pin.

25. In a typewriting machine, the combination with a main frame, of a type bar segment mounted on the main frame for vertical movements, a carriage supported on the main frame for letter space movements, a flat platen rockable about a horizontal axis on the carriage, a plurality of type bars pivoted on the segment, upper and lower case types mounted on each type bar and having their printing faces disposed at an angle to each other, the platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower case type when the latter is in printing position, and means for effecting the lowering of the type bar segment and for swinging the platen-supporting frame whereby the platen will be disposed in parallelism with the printing face of the upper case type when the latter is in printing position and the same printing line of the platen will be presented to said upper case type.

26. In a typewriting machine, the combination with a main frame, of a type bar segment mounted on the main frame for vertical movements, a carriage supported on the main frame for letter space movements, a flat platen rockable about a horizontal axis on the carriage, the axis of the platen being in substantial alinement with the printing face of the platen, a plurality of type bars pivoted on the segment, upper and lower case types mounted on each type bar and having their printing faces disposed at an angle to each other, the platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower case type when the latter is in printing position, and means for effecting the lowering of the type bar segment and for swinging the platen-supporting frame whereby the platen will be disposed in parallelism with the printing face of the upper case type when the lat-

ter is in printing position and the same printing line of the platen will be presented to said upper case type.

27. In a typewriting machine, the combination with a main frame, of a type bar segment mounted on the main frame for vertical movements, means for normally latching the segment in the upper limit of its movement, a carriage supported on the main frame for letter space movements, a flat platen rockable about a horizontal axis on the carriage, a plurality of type bars pivoted on the segment, upper and lower case types mounted on each type bar and having their printing faces disposed at an angle to each other, the platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower case type when the latter is in printing position, and means for releasing the latch to effect the lowering of the type bar segment and for swinging the platen-supporting frame whereby the platen will be disposed in parallelism with the printing face of the upper case type when the latter is in printing position and the same printing line of the platen will be presented to said upper case type.

28. In a typewriting machine, the combination with a main frame, of a type bar segment mounted on the main frame for vertical movements, a carriage supported on the main frame for letter space movements, a flat platen-supporting frame disposed in rear of the type bar segment and swingable about a horizontal axis from one printing position to the other, a flat platen slidably mounted on the front face of the platen-supporting frame for line space movements, a plurality of type bars pivoted on the segment, upper and lower case types mounted on each type bar and having their printing faces disposed at an angle to each other, the platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower case type when the latter is in printing position, means for lowering the type bar segment and for swinging the platen-supporting frame whereby the platen will be disposed in parallelism with the printing face of the upper case type when the latter is in printing position and the same printing line of the platen will be presented to said upper case type, and means mounted on the platen-supporting frame and bodily movable therewith for line spacing the platen.

29. In a typewriting machine, the combination with a main frame, of a type bar segment mounted on the main frame for vertical movements, a carriage supported on the main frame for letter space movements, a flat platen-supporting frame disposed in rear of the type bar segment and swingable about a horizontal axis from one printing position to the other, the axis of the platen being in

substantial alinement with the printing face of the platen, a flat platen slidably mounted on the front face of the platen-supporting frame for line space movements, a plurality of type bars pivoted on the segment, upper and lower case types mounted on each type bar and having their printing faces disposed at an angle to each other, the platen being normally inclined upwardly and rearwardly and disposed in parallelism with the printing face of the lower case type when the latter is in printing position, means for lowering the type bar segment and for swinging the platen-supporting frame whereby the platen will be disposed in parallelism with the printing face of the upper case type when the latter is in printing position and the same printing line of the platen will be presented to said upper case type, and means mounted on the platen-supporting frame and bodily movable therewith for line spacing the platen.

30. In a typewriting machine, the combination with a main frame, of a lower rail fixed to the main frame, a carriage mounted on the fixed rail for letter space movements, a plurality of type bars pivotally mounted on the main frame and disposed in front of the carriage, each type bar having upper and lower types disposed at an angle to each other, a flat platen supported on the carriage to swing about a fixed horizontal axis, the platen being located in rear of the type bars and normally disposed in a plane parallel with the face of one type when said type is in printing position and swingable into parallelism with the face of the other type when the latter is in printing position, and means for swinging the platen from one printing position to the other.

31. In a typewriting machine, the combination with a main frame, of a lower rail fixed to the main frame, a carriage mounted on the fixed rail for letter space movements, a type bar segment mounted on the main frame for vertical movements, a plurality of type bars pivotally mounted on the segment and disposed in front of the carriage, each type bar having upper and lower types disposed at an angle to each other, a flat platen supported on the carriage to swing about a fixed horizontal axis, the platen being located in rear of the type bars and normally disposed in a plane parallel with the face of one type when said type is in printing position and swingable into parallelism with the face of the other type when the latter is in printing position, and means for swinging the platen from one printing position to the other and for moving the segment vertically to present the same line of writing on the platen to said other type.

In testimony whereof, I have hereunto subscribed my name.

JOHN J. KITTEL. 130