July 17, 1923. 1,461,731

E. L. HARMON

TYPEWRITING MACHINE

Original Filed Sept. 17 1920 4 Sheets-Sheet 1

Fig. 1.

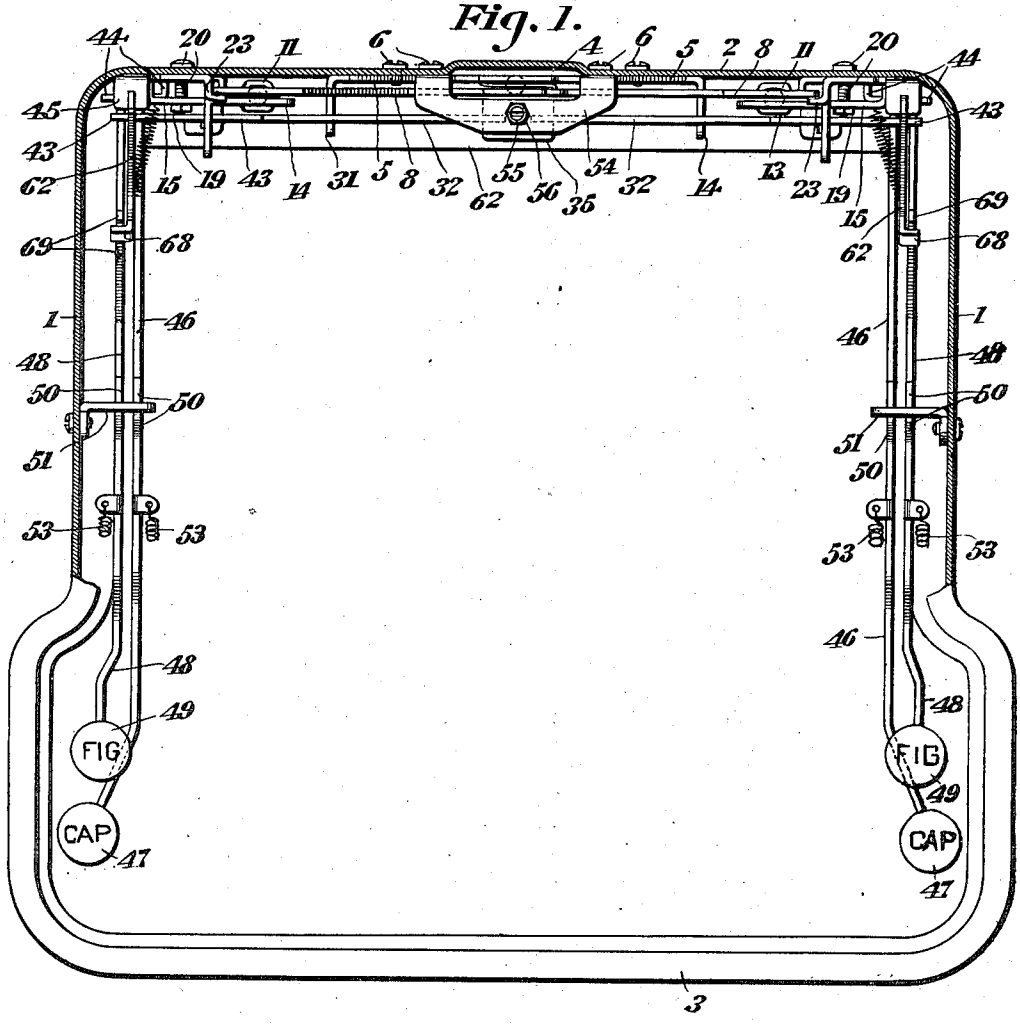
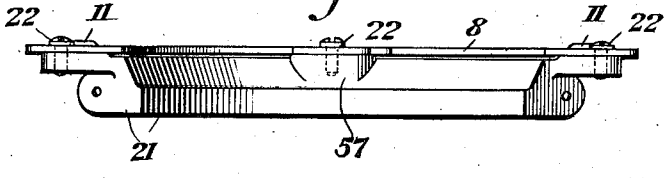


Fig. 2.



Inventor
Edwin L. Harmon

By Davis Davis

Attorneys

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Fig. 3.

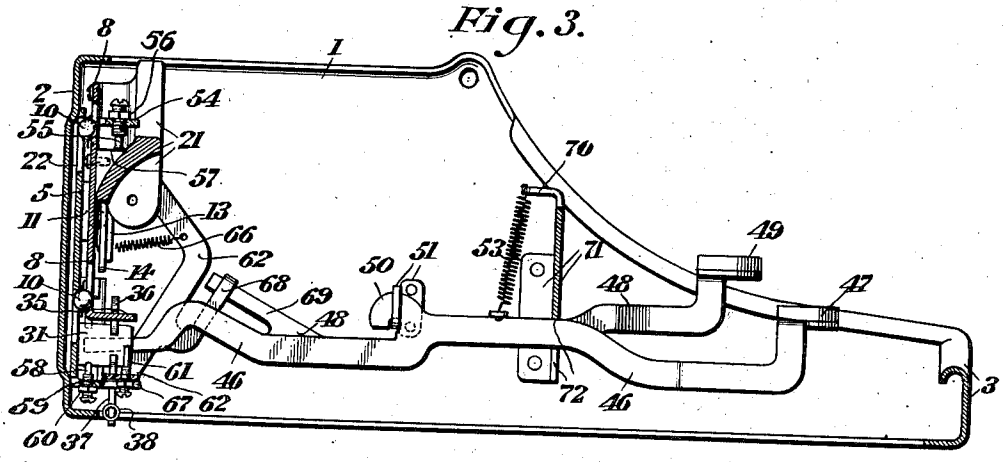


Fig. 4

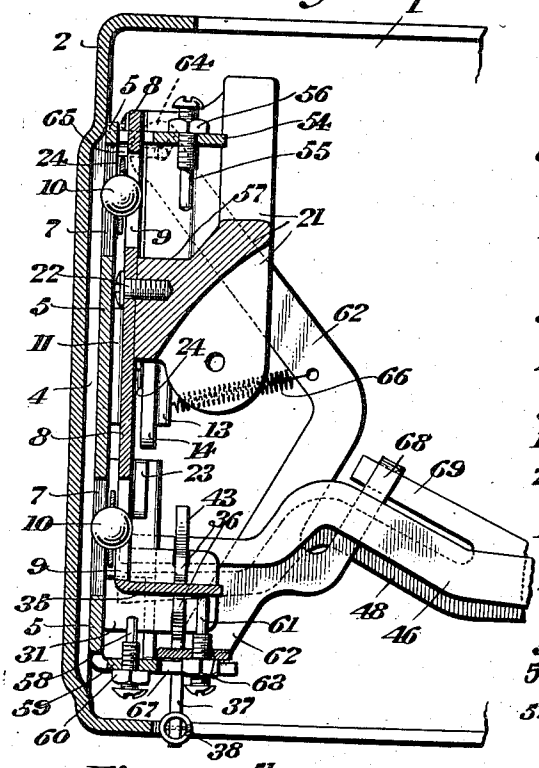


Fig. 5.

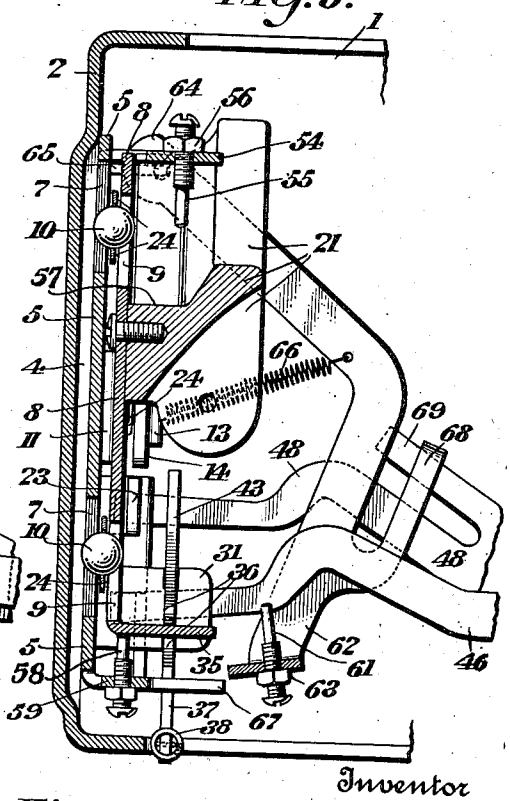
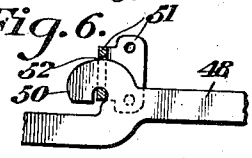


Fig. 6.



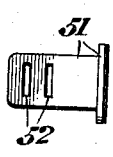


Fig. 7. Edwin L. Harmon

Inventor

By Davis & Davis

Attorney

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E. L. HARMON

TYPEWRITING MACHINE

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Fig. 8.

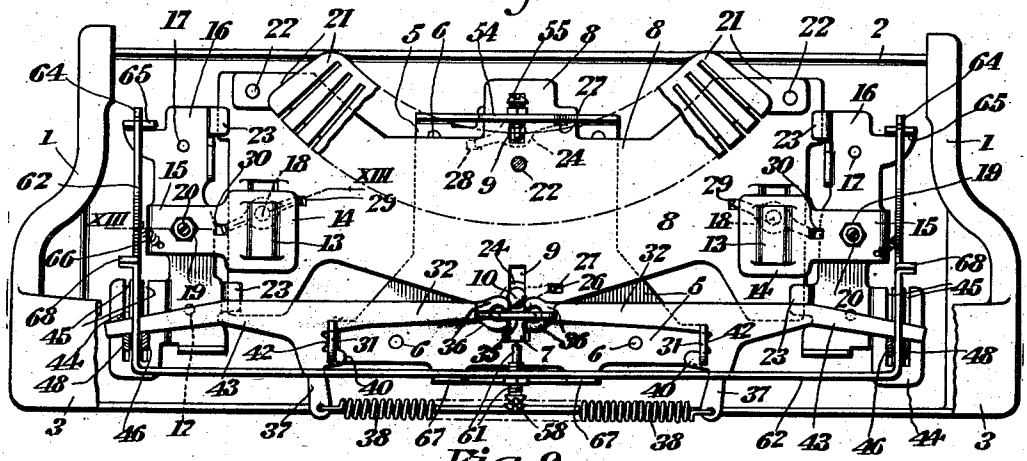


Fig. 9.

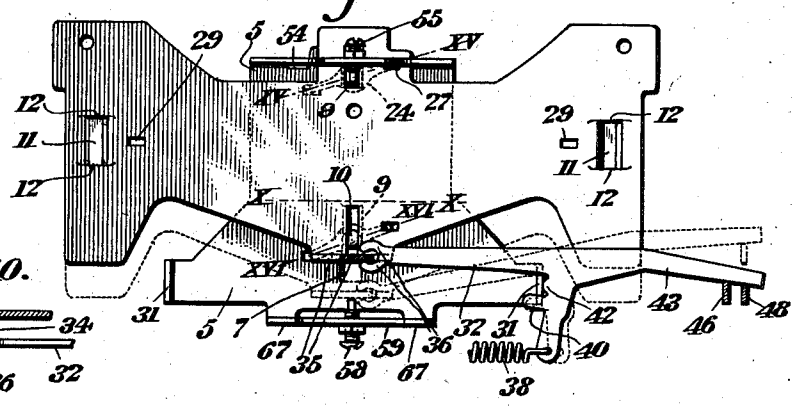


Fig. 10.

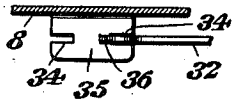
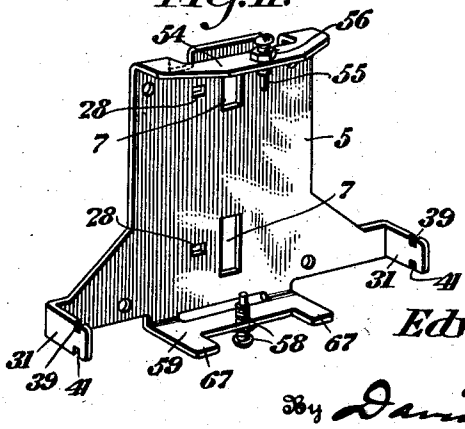


Fig. 11.



Inventor

Edwin L. Harmon

By

Attorney

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E. L. HARMON

TYPEWRITING MACHINE

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Fig. 12.

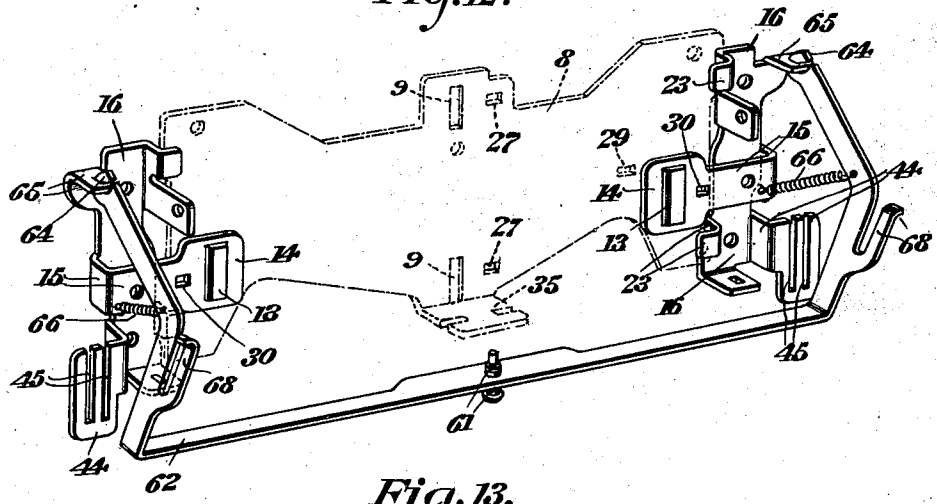


Fig. 13.

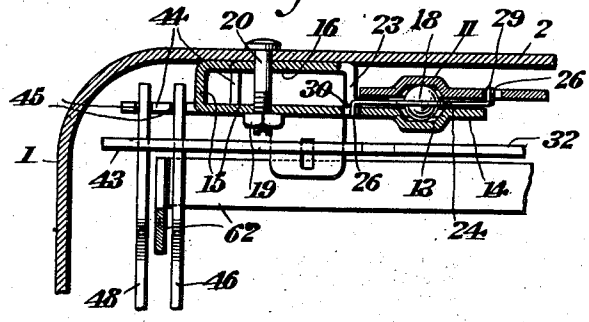


Fig. 14.

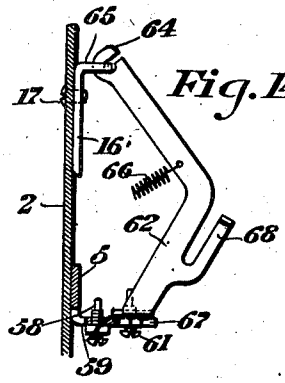


Fig. 17.

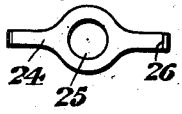
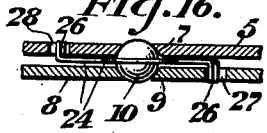


Fig. 15.



Fig. 16.



Inventor

Edwin L. Harmon

By Davis Davis

Attorneys

Patented July 17, 1923. 1,461,731

UNITED STATES PATENT OFFICE.

EDWIN L. HARMON, OF GROTON, NEW YORK, ASSIGNOR TO CORONA TYPEWRITER COMPANY, INC., OF GROTON, NEW YORK, A CORPORATION OF NEW YORK.

TYPEWRITING MACHINE.

Application filed September 17, 1920, Serial No. 410,947. Renewed January 18, 1923.

To all whom it may concern:

Be it known that I, EDWIN L. HARMON, a citizen of the United States, and resident of Groton, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to improvements in typewriting machines, and more particularly to means for varying the relation between the type-carriers and the printing point to permit the printing of letters or characters of different case from a single type-carrier in machines having type-carriers each of which is provided with a plurality of types. In the preferred embodiment of the invention shown, the change of case is effected by shifting the type-bar hanger or segment, and means is provided for imparting a double or multiple shift to the segment in a vertical plane, the construction shown being designed for use in a front-strike machine.

The invention has for its objects to provide improved means for imparting a double case-shift movement to a type-bar hanger or segment; to provide improved mechanism for positively arresting the segment in its several adjusted positions; to provide a segment-carrier or support and anti-friction guiding means therefor of simple, light, compact and inexpensive construction; to provide segment-carrying and guiding means, key-operated means for shifting the segment-carrying means, and an intermediate stop controlling means for a double case-shift mechanism, practically all of which mechanism may be readily formed of sheet metal; and to provide improved means whereby a case-shift movement may be imparted to the type segment from two pairs of "Cap." and "Fig." shift keys arranged at opposite sides of the keyboard.

In the accompanying drawings, Fig. 1 is a plan view of the case-shift mechanism, the segment being removed to more clearly show the operating parts;

Fig. 2 a plan view of the segment-carrier or support with the segment mounted thereon;

Fig. 3 a vertical longitudinal sectional view taken through the center of the machine, the segment being shown in its normal or uppermost position;

Figs. 4 and 5 detail views taken on the same line as Fig. 3 showing the segment in its intermediate or "Cap." shift position and its lowermost or "Fig." shift position, respectively;

Figs. 6 and 7 detail views showing the pivotal mounting of the shift levers;

Fig. 8 a front elevation, parts of the shift levers and frame being broken away;

Fig. 9 a front elevation of the segment-carrier and part of the mechanism for shifting the carrier;

Fig. 10 a section on the line X—X of Fig. 9;

Fig. 11 a perspective view of the stationary plate or member at the rear of the segment-carrier;

Fig. 12 a perspective view of the stationary members at the ends of the carrier and the intermediate stop bail;

Fig. 13 a section on the line XIII—XIII of Fig. 8;

Fig. 14 a detail view showing the bail carrying the intermediate stop in end elevation in its normal position;

Figs. 15 and 16 detail sectional views taken on the lines XV—XV and XVI—XVI, respectively, of Fig. 9, showing the upper and lower center bearings for the carrier; and

Fig. 17 a detail view of one of the ball-retainers.

The mechanism shown is especially designed for use in a small folding typewriting machine of the front-strike type in which the carriage is foldable to a compact position over the keyboard as in the "Corona" typewriting machine, but it will be obvious that the improvements are adapted for use in both non-compactible and compactible machines of various constructions.

As shown, the main frame of the machine is formed of pressed steel and has side walls 1 connected by an integral rear wall 2 and an integral front rail 3. The rear wall 2 of the frame is pressed rearwardly midway its ends to form a central recess 4, and a sheet metal plate 5 is secured to the rear wall of the frame over said recess by four screws 6. Plate 5 is provided with a pair of ball races 7 arranged in the same vertical plane cen-

trally of the plate and midway between the side walls 1 of the machine frame, one of the races being adjacent the upper edge of the plate and the other adjacent the lower edge thereof. The races 7 comprise vertically elongated apertures or slots the vertical side edges of which are beveled, as more clearly shown in Figs. 8, 11, 15 and 16, the beveled edges of the slots or races 7 facing forwardly. A flat sheet metal segment-supporting plate or carrier 8 extends transversely of the frame in a vertical plane in front of, and close to, the plate 5 and is provided with a pair of vertically aligned ball races 9 midway its ends. The races 9 comprise slots having beveled side edges facing rearwardly, and two anti-friction balls 10 are interposed between plate 5 and the segment carrier 8 so as to roll in the raceways formed by the slots 7 and 9.

The segment-carrier 8 is provided with a pair of ball races or vertically extending channels 11 facing toward the front of the machine. The channels 11 are located adjacent opposite ends of the carrier in a horizontal plane which intersects the vertical plane in which races 9 are located at a point substantially midway between the races 9. Each channel 11 is formed by slitting the carrier plate 8 along parallel horizontal lines 12 and pressing the metal intermediate said slots toward the rear of the plate to form a channel having a flat rear wall and forwardly and outwardly flaring side walls, as more clearly shown in Figs. 9 and 13. The races 11 cooperate with a pair of races 13 formed in a similar way in the enlarged inner ends 14 of a pair of angular arms 15 formed integrally with sheet metal brackets 16 held to the rear wall 2 of the machine frame by screws 17 at opposite sides of the machine. A pair of antifriction balls 18 travel in the raceways formed by each two complementary channels 11 and 13.

The inwardly extending portions of the angular arms 15 are slightly resilient and as these arms extend in front of the carrier plate it will be obvious that by adjusting or flexing these inwardly extending parts of the arms fore and aft of the machine wear in the four antifriction bearings and slight inequalities in manufacture of parts may be compensated for. The inwardly extending portions of the arms are held in adjusted position by nuts 19 on bolts 20, said bolts extending through the rear wall 1 of the frame, brackets 16 and the inwardly extending portions of the angular arms 15.

The type-bar hanger or segment 21 is detachably held to the front face of the carrier 8 at the upper edge of the carrier by three screws 22, the upper edge of the carrier being preferably cut away as shown intermediate the ends of the segment 21 to reduce weight. The brackets 16 are each provided with a pair of angular arms or stops 23 having forwardly extending portions lying close to but normally out of contact with the side edges of the segment-carrier and inwardly extending portions lying close to but normally out of contact with the front face of the carrier. These stop arms 23 serve to prevent sidewise, forward, or tilting movements of the segment and carrier when these parts are subjected to shocks or excessive pressure and relieves the bearings of undue strain in such cases. The arrangement of the four antifriction bearings shown prevents movement of the segment and carrier in any direction except vertically. I have shown ball-retainers 24 for positively maintaining the balls 10 and 18 in the same relative positions at all times, but it will be obvious that these retainers 24 may be omitted if desired or that other means may be provided than that shown for maintaining the relationship of the four antifriction balls. Each retainer 24 has a ball-receiving eye or aperture 25 and the ends of the retainer are bent in opposite directions to form lugs 26. The lugs 26 at one end of the retainers for balls 10 engage loosely in horizontally elongated apertures 27 in the segment-carrier 8 and the lugs 26 at the opposite ends of these retainers engage loosely in similar apertures 28 in plate 5. The lugs 26 at the inner ends of the retainers for balls 18 engage loosely in horizontally elongated apertures 29 in the segment-carrier 8 and the lugs at the outer ends of these retainers engage loosely in similar apertures 30 in the inwardly extending portions of the angular arms 15 on the brackets 16. The apertures 27, 28, 29 and 30 are sufficiently long horizontally to permit the retainers to swing vertically as the segment-carrier is shifted.

In the construction shown, the segment and its carrier are shiftable downwardly from a normal or lower-case-character printing position to an intermediate "Cap." shift printing position or to a still lower "Fig." shift printing position and mechanism is provided operable by either of two sets of shift keys arranged at opposite sides of the keyboard for shifting the segment and carrier. It will be obvious, however, that the "Cap." and "Fig." shift key levers at either side of the keyboard may be omitted if desired and that the mechanism may be readily adapted for use in machines in which the segment has only lower and upper case printing positions. The segment-carrier 8 is normally forced to and held in its uppermost position, or lower-case-character printing position, by a pair of three-arm carrier-actuating levers fulcrumed on forwardly extending arms 31 formed integrally with

plate 5. The inwardly extending arms 32 of these levers engage in slots 34 in a farwardly extending lug or foot 35 formed on the lower edge of the segment-carrier 8 midway the ends of the carrier, and said arms are each provided with a pair of jaws 36 which loosely embrace the lug 35 between the inner ends of slots 34. The depending arms 37 of the levers are connected together by a coiled tension spring 38 which serves to return the segment to normal position and hold it there. The arms 32 of the carrier-actuating levers extend through slots 39 in the upper edges of arms 31, while the arms 37 of the levers are provided with lugs or fingers 40 which extend through slots 41 in the lower edges of arms 31, and with rounded portions 42 which rock on the outer faces of arms 31. The tension spring 38 holds the rounded fulcrum portions 42 of the carrier-actuating levers against the outer faces of pivot arms 31 and the engagement of the levers in slots 34, 39 and 41 prevents lateral and vertical displacement of the levers. The third arm 43 of each carrier-actuating lever extends outwardly from the fulcrum of the lever to a point adjacent the side of the machine in front of a guide comb 44. The two guide combs 44 for the two sets of shift key levers are formed integrally with the brackets 16 and comprise angular arms extending forwardly and then outwardly from the lower ends of said brackets, the outwardly extending portion of each comb 44 being provided with two vertical key-lever guide slots 45.

The "Cap." or intermediate case shift levers 46 are provided with keys 47 and the "Fig." shift levers 48 are provided with keys 49, and all of said shift levers are provided with hook-like portions or pivot lugs 50 intermediate their ends for pivotally supporting the two sets of levers on brackets 51 held to the side walls 1 of the frame, said hook lugs extending through slots 52 in brackets 51. The rear ends of the levers engage under the arms 43 of the carrier-actuating levers and extend through the slots 45 in guide combs 44, and suitable restoring springs 53 are provided connected at one end to the shift levers forward of the fulcrums of the levers and secured at their other ends to lugs 70 on the key-lever guide comb 71 which extends transversely of the machine and is secured at its ends to the side walls 1 of the main frame. The guide comb 71 is provided with slots 72 in which the shift key levers move up and down, said key levers being normally held up against the closed upper ends of the slots by the springs 53.

The tension spring 38 and the pair of three-arm carrier-actuating levers normally force the carrier and segment upwardly and hold the same in a lower-case-character printing position determined by an adjustable stop 55 in the form of a screw threaded through a yoke or bracket 54 formed integrally with plate 5. The stop screw 55 is locked in adjusted position by a lock nut 56 and is adapted to engage an abutment 57 on the type-bar segment to limit the upward movement of the segment and carrier. The lowermost or "Fig." shift position of the carrier and segment is determined by an adjustable stop screw 58 threaded through a yoke or bracket 59 formed integrally with plate 5. Stop screw 58 is locked in adjusted position by a lock nut 60 and is adapted to be engaged by the foot or projection 35 on the segment-carrier 8 to limit the downward movement of the segment and carrier when either of the shift keys 49 is depressed.

The intermediate or "Cap." shift position of the segment and carrier is determined by an intermediate movable stop 61 in the form of an adjustable stop screw threaded through the horizontal or transverse member of a swinging sheet metal bail 62 and locked in adjusted position on the bail by a lock nut 63. The side arms of the bail 62 are pivotally connected at their upper ends with angular arms or lugs 65 on the brackets 16, the upper ends of the side arms of the bail being slotted to form hook-like portions 64 passed through apertures in the lugs 65. The side arms of the bail are bowed forwardly and the transverse stop-carrying member of the bail normally lies in a horizontal plane parallel with and a very slight distance above the upper surface of horizontally extending lugs 67 projecting forwardly from the stop-supporting yoke or bracket 59.

The bail 62 is yieldably held in its normal position by tension springs 66 connecting the side arms of the bail with the angular arms 15 on brackets 16, in which position it will be observed that the rear edge of the transverse member of the bail is slightly forward of a vertical plane through the pivotal points of the bail (see Figs. 3, 4 and 14). With this arrangement it will be obvious that the bail will freely move under the influence of springs 66 to the position shown in Figs. 3 and 14 without danger of binding of the transverse member of the bail upon the upper sides of lugs 67, the under face of said member being tangential to the perimeter of a circle of which the pivotal point of the bail is the center. The side arms of bail 62 are each provided with a forwardly and upwardly extending projection or lug 68 bent laterally at its upper end to form an abutment normally engaging against the upper edge of an upwardly and rearwardly extending finger or projection 69 on the adjacent "Fig." shift lever 48. This engagement of the abutments on lugs 68 with fingers 69 on key levers 48 not only provides means whereby

the bail 62 may be shifted to render stop 61 ineffective, as hereinafter described, but also serves to arrest the bail in normal position. It will be obvious that the bail-restoring springs cannot pull the bail rearwardly beyond the position shown in Fig. 3 owing to the engagement of lugs 68 with fingers 69 and the engagement of key levers 48 with the closed upper ends of slots 72 in comb 71.

The "Cap." shift levers 46 have no projections or fingers similar to fingers 69 and do not move the bail 62 when operated but merely rock the three-arm carrier-actuating levers. As both three-arm levers are connected with the carrier at their inner ends and have their arms 37 connected by spring 38, it will be obvious that both levers move in unison whenever the arm 43 of one of them is forced upwardly by the rear end of any one of the four shift key levers. When either of the "Cap." shift levers 46 is actuated by depressing its key 47 the carrier and segment move downwardly until foot 35 on the carrier strikes stop 61 on bail 62, said bail remaining stationary. When foot 35 strikes stop 61, the long transverse member of the bail will flex slightly until it rests on the rigid lugs 67 which serve to firmly support said member and stop 61 in proper position as long as the shift key is held down. When the key 47 is released spring 38 restores the parts to normal position. When either "Fig." shift lever 48 is operated by depressing its key 49, finger 69 on the lever rocks bail 62 forwardly and upwardly, as shown in Fig. 5, and carries stop 61 out of the path of foot 35 so that the carrier may continue its downward movement until foot 35 strikes stop 58.

Any suitable locking means may be provided for locking the segment in either of its shifted positions, if desired. The jaws 36 on the three-arm levers are spaced apart vertically a distance slightly greater than the thickness of foot 35 to permit the necessary pivotal movement of the levers, and the upper jaws force the carrier 8 downwardly while the lower jaws force the carrier upwardly. The fingers 69 formed on the sheet metal key levers 48 are permanently bendable up or down to permit adjustment of the parts so that the bail 62 will be arrested at the proper point under foot 35 on the carrier.

What I claim is:

1. In a typewriting machine, the combination of a vertically shiftable type support, a lever extending transversely of the machine and connected at its inner end to said support, means pivotally supporting said lever intermediate its ends to swing in a vertical plane, a spring connected with said lever to normally hold the type support in elevated position, and a key-operated lever fulcrumed intermediate its ends extending fore and aft of the machine and loosely engaging under the outer end of said transversely extending lever at the rear of the fulcrum of the key-operated lever.

2. In a typewriting machine, the combination of a vertically shiftable type support, a pair of levers extending transversely of the machine and connected at their inner ends with said support centrally of the machine, means pivotally supporting the levers intermediate their ends to swing in vertical planes, a spring connected with both of said levers to normally hold said support in an elevated position, and key-operated means connected with the outer ends of said levers for rocking the levers in opposition to said spring to lower the support.

3. In a typewriting machine, the combination of a support shiftable to vary the relation between type-carrying means and a platen, a pair of antifriction bearings therefor located at one face of the support and spaced apart transversely of the machine, an antifriction bearing for the support located at the opposite face of the support midway between the sides of the support, a lever connected with the support substantially midway the sides of the support, a spring for normally swinging the lever in one direction, and a shift key operatively connected to swing the lever in the opposite direction.

4. In a typewriting machine, the combination of a support shiftable to vary the relation between type-carrying means and a platen, means for guiding said support, a lever pivotally connected with the support at its inner end and extending transversely of the machine, means for pivotally supporting the lever intermediate its ends, a spring for moving the support in one direction, and a shift key lever loosely engaging the outer end of said transversely extending lever for shifting the support against the tension of said spring.

5. In a typewriting machine, the combination of a support shiftable to vary the relation between type-carrying means and a platen, means for guiding the support, a pair of levers extending transversely of the machine connected at their inner ends with the support for shifting the support, means for pivotally supporting said levers intermediate their ends, a single spring connecting said levers, and a shift key lever adapted to engage one of said levers adjacent its outer end to simultaneously rock the levers in opposition to said spring and shift the support.

6. In a typewriting machine, the combination of a support shiftable to vary the relation between type-carrying means and a platen, means for guiding the support, a pair of levers extending transversely of the

machine connected at their inner ends with the support for shifting the support, means for pivotally supporting said levers intermediate their ends, a single spring connecting said levers, and a pair of shift key levers located at opposite sides of the machine each of which is adapted to engage one of said spring-connected levers adjacent the outer end thereof and rock the same in opposition to the spring.

7. In a typewriting machine, the combination of a part shiftable to change case, a pair of transversely extending levers connected at their adjacent ends to said part substantially midway the sides of the machine, means pivotally supporting said levers, a restoring spring connected with both levers to move the shiftable part to normal position and hold it there, and key-operated means cooperating with said levers to shift said part in opposition to said spring to change case.

8. In a typewriting machine, the combination of a vertically shiftable segment-carrier, a type-bar segment mounted on the carrier, means for guiding the carrier, a pair of carrier-operating levers extending transversely of the machine connected at their inner ends with the carrier, means for pivotally supporting the levers intermediate their ends to rock in a vertical plane, a single tension spring connecting said levers, and shift key levers located at opposite sides of the machine adapted to engage the carrier-operating levers adjacent their outer ends and rock the levers against the tension of said spring.

9. In a typewriting machine, the combination of a vertically shiftable segment-carrier, a type-bar segment mounted on the carrier, means for guiding the carrier, a pair of carrier-operating levers extending transversely of the machine connected at their inner ends with the carrier, means for pivotally supporting the levers intermediate their ends to rock in a vertical plane, each of said levers having a depending arm adjacent its pivotal point, a coiled spring connected at its ends with the depending arms of said levers for holding the carrier in a normal elevated position, and shift-key-operated means for moving the carrier downward.

10. In a typewriting machine, the combination of a vertically shiftable segment-carrier, a type-bar segment mounted on the carrier, means for guiding the carrier, a pair of carrier-operating levers extending transversely of the machine connected at their inner ends with the carrier, means for pivotally supporting the levers intermediate their ends to rock in a vertical plane, each of said levers having a depending arm adjacent its pivotal point, a coiled spring connected at its ends with the depending arms of said levers for holding the carrier in a normal elevated position, and a pair of shift key levers located at opposite sides of the machine engaging adjacent their rear ends under the carrier-operating levers adjacent the outer ends of the carrier-operating levers, and means pivotally supporting the shaft key levers intermediate their ends.

11. In a typewriting machine, the combination of a vertically shiftable segment-carrier, a type-bar segment mounted on the carrier, means for guiding the carrier, a pair of carrier-operating levers extending transversely of the machine connected at their inner ends with the carrier, means for pivotally supporting the levers intermediate their ends to rock in a vertical plane, each of said levers having a depending arm adjacent its pivotal point, a coiled spring connected at its ends with the depending arms of said levers for holding the carrier in a normal elevated position, and two sets of "Cap." and "Fig." shift key levers pivotally supported intermediate their ends at opposite sides of the machine with the rear ends of both levers of each set engaging under the outer end of the adjacent carrier-operating lever, a stop normally adapted to arrest the carrier in "Cap." shift position, and means operable by either "Fig." shift lever for shifting said stop to an inoperative position.

12. In a typewriting machine, the combination of a type-bar segment, a shiftable support for the segment, and antifriction means for guiding said support comprising a pair of rolling elements located midway the sides of the support and spaced apart in the direction of travel of the support, a pair of rolling elements located adjacent opposite sides of the support in a plane intersecting the plane of the other rolling elements intermediate said elements, and means for positively maintaining all of said rolling elements in fixed relation with each other.

13. In a typewriting machine, the combination of a vertically shiftable type-bar-segment-carrier, a segment mounted on the carrier, antifriction supporting and guiding means for said carrier embodying two pairs of spaced balls located at opposite faces of the carrier, one pair of said balls being arranged in a vertical plane and the other two balls being arranged in a horizontal plane intersecting the plane of the vertically spaced balls at a point intermediate said vertically spaced balls, and means for positively maintaining said balls in fixed relation with each other at all times.

14. In a typewriting machine, the combination of a part shiftable to change case, a pair of transversely extending levers connected at their inner ends with said part substantially centrally of the machine, means pivotally supporting the levers to

swing in vertical planes, a spring connected with both levers to hold said part in normal elevated position, a pair of "Cap." and "Fig." shift keys, connections between said keys and one of said levers for shifting said part downwardly, and a movable "Cap." shift stop controlled by one of said keys and adapted to arrest the shiftable part intermediate its normal and lowermost positions.

15. In a typewriting machine, the combination of a vertically shiftable type support, a pair of levers extending transversely of the machine and connected at their inner ends with said support, means pivotally supporting the levers intermediate their ends to rock in vertical planes, a spring for normally forcing the support upwardly, "Cap." and "Fig." shift levers pivotally supported intermediate their ends and engaging under the outer end of one of said transverse levers at the rear of their fulcrums, a bail pivotally supported to swing fore and aft of the machine, a stop on said bail adapted to arrest the support in "Cap." shift position, and a spring connected with the bail to normally hold said stop in effective position, said bail having a part thereof engaged by the "Fig." shift lever at the rear of the fulcrum of said lever to swing the bail forwardly when the "Fig." shift lever is actuated.

16. In a typewriting machine, the combination of a frame, a type-bar segment, a support for the segment shiftable up and down relatively to the frame, means for guiding said support, means for normally forcing the support upwardly, a stationary stop for limiting the upward movement of the support, a stationary stop for determining the maximum downward movement of the support, a bail pivotally supported in the frame to swing fore and aft of the machine, a stop on the bail, a spring normally swinging the bail in one direction to maintain the stop thereon in position to arrest the support at a point intermediate the positions determined by the stationary stops, and a pair of shift key levers each adapted to engage and operate the support-elevating means to force the support downwardly, one of said key levers being also adapted to engage and swing the bail to carry the stop thereon out of support-arresting position.

17. A one-piece sheet metal segment-supporting plate having antifriction ball races formed directly in opposite faces of the plate.

18. A sheet metal segment guiding member having a pair of longitudinally aligned narrow and elongated rectangular antifriction-ball-race openings therein, the two longer side edges of each opening being beveled to form surfaces along which a ball may roll.

19. A sheet metal type-bar-segment-supporting plate having a pair of vertically elongated openings therein adjacent its upper and lower edges, the vertical side edges of said openings being beveled, and the body of the plate being pressed laterally adjacent opposite side edges of the plate to form two vertically extending channels, said openings and channels forming ball races.

20. A flat one-piece sheet metal segment support having a pair of short longitudinally aligned ball-races in one face thereof midway the side edges of said support and a pair of short transversely aligned ball races in the opposite face of the support parallel with the first mentioned ball races and adjacent opposite side edges of the support.

21. In a typewriting machine, the combination of a main frame, a plate held to said frame provided with a pair of longitudinally aligned vertical ball races midway the sides of the frame, a case shift support in front of said plate having longitudinally aligned vertical ball races midway its side edges cooperating with the races in the plate, a pair of brackets held to the frame at opposite sides of the support and each having a resilient arm extending in front of said support and provided with a vertically extending ball race, said support having a pair of vertically extending ball races in its front face cooperating with the races in said arms, balls in the raceways, means for adjusting the arms fore and aft of the machine, a pair of levers extending transversely of the machine and fulcrumed intermediate their ends on said plate, connections between the inner ends of the levers and the case shift support substantially centrally of the machine, a spring connected with both levers for moving the support in one direction, and key-operated means for shifting said support through the medium of said levers in opposition to said spring.

22. In a typewriting machine, the combination of a support shiftable to change case, a pair of levers extending transversely of the machine, supporting means for said levers, separably interlocked rocking connections between said levers and the lever supporting means, separably interlocked connections between the inner ends of the levers and the shiftable support, a spring connected with the levers to move the shiftable support in one direction and holding said levers against separation from their supporting means and from the case shift support, and key-operated means for shifting the case shift support in opposition to said spring.

23. In a typewriting machine, the combination of a support shiftable to change case, a pair of levers extending transversely of the machine, supporting means for said levers, separably interlocked rocking connections between said levers and the lever supporting means, separably interlocked con-

nections between the inner ends of the levers and the shiftable support, a spring connected with the levers to move the shiftable support in one direction and holding said levers against separation from their supporting means and from the case shift support, and key-operated means connected with said levers to shift the support in opposition to said spring.

24. In a typewriting machine, the combination of a support shiftable to change case, a pair of levers extending transversely of the machine, supporting means for said levers, separably interlocked rocking connections between said levers and the lever supporting means, separably interlocked connections between the inner ends of the levers and the shiftable support, a spring connected with the levers to move the shiftable support in one direction and holding said levers against separation from their supporting means and from the case shift support, and a shift key lever loosely engaging one of said levers for shifting the support in opposition to said spring.

25. In a case shift mechanism, the combination of a support shiftable vertically to change case, a central guide for said support, side guides for the support independently adjustable fore and aft of the machine, and key-operated means connected with said support centrally thereof for shifting the support.

In testimony whereof I hereunto affix my signature.

EDWIN L. HARMON.