April 28, 1931. B. M. DES JARDINS 1,802,500

TYPEWRITING MACHINE

Filed March 28, 1925 2 Sheets-Sheet 1

Fig. 5.

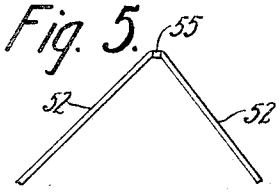

Fig. 1.

Fig. 2.

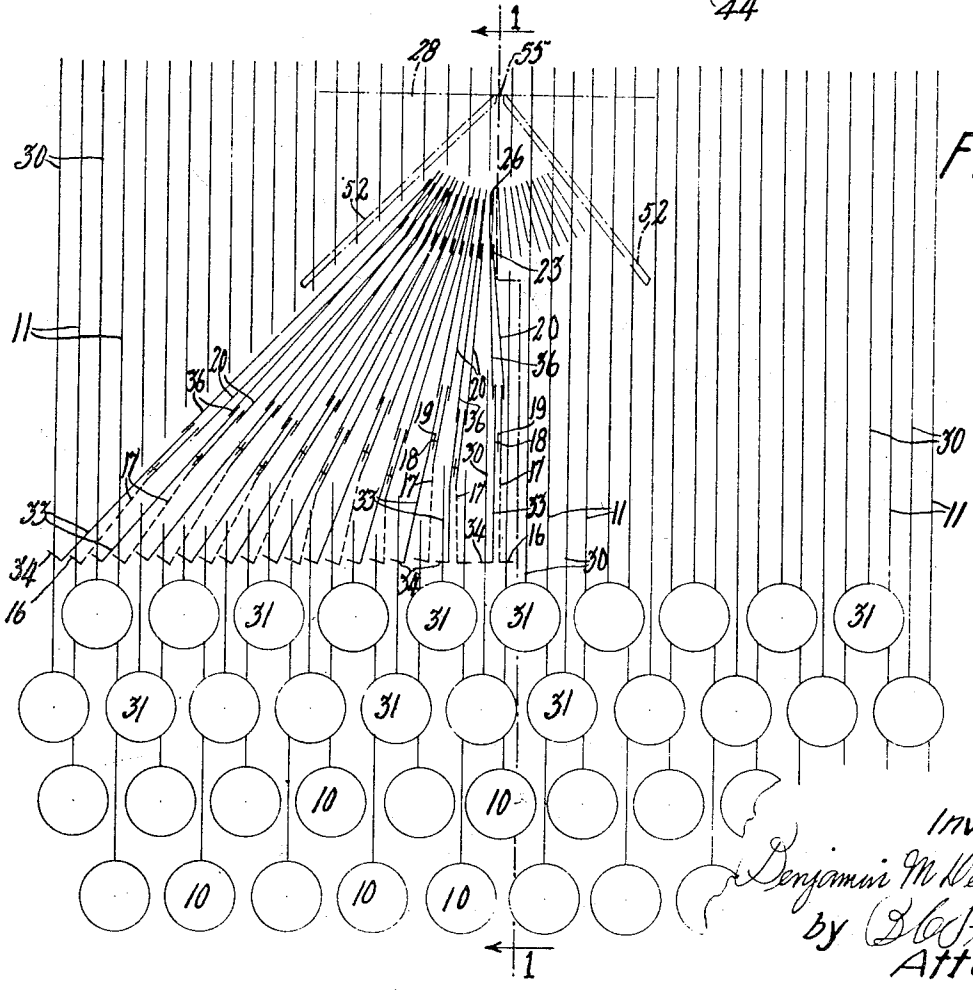

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Fig. 3.

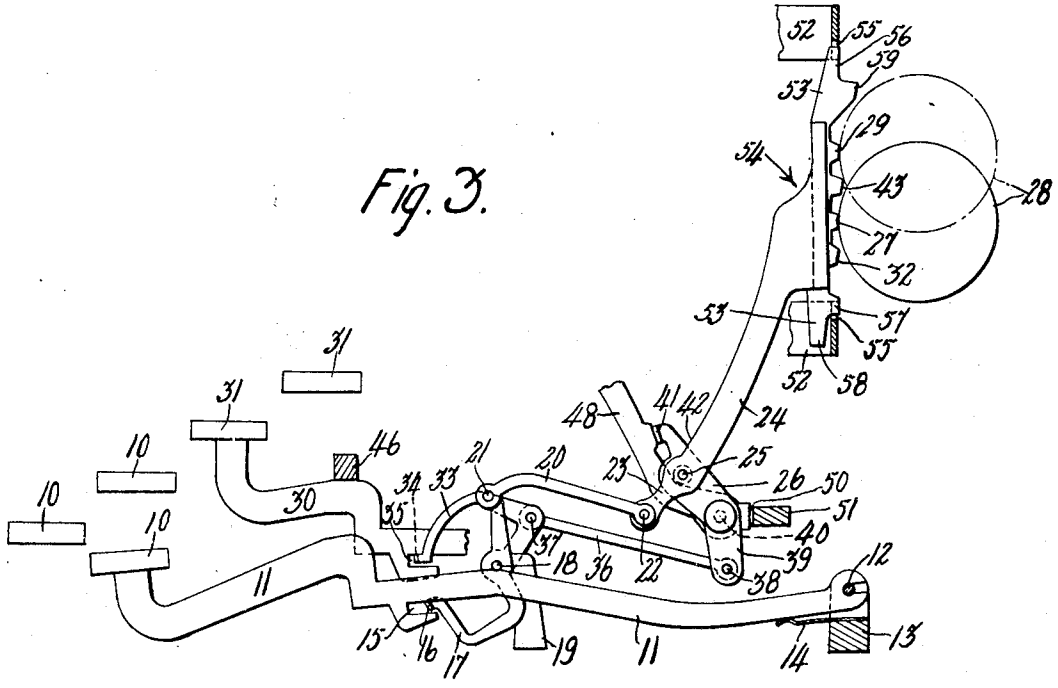
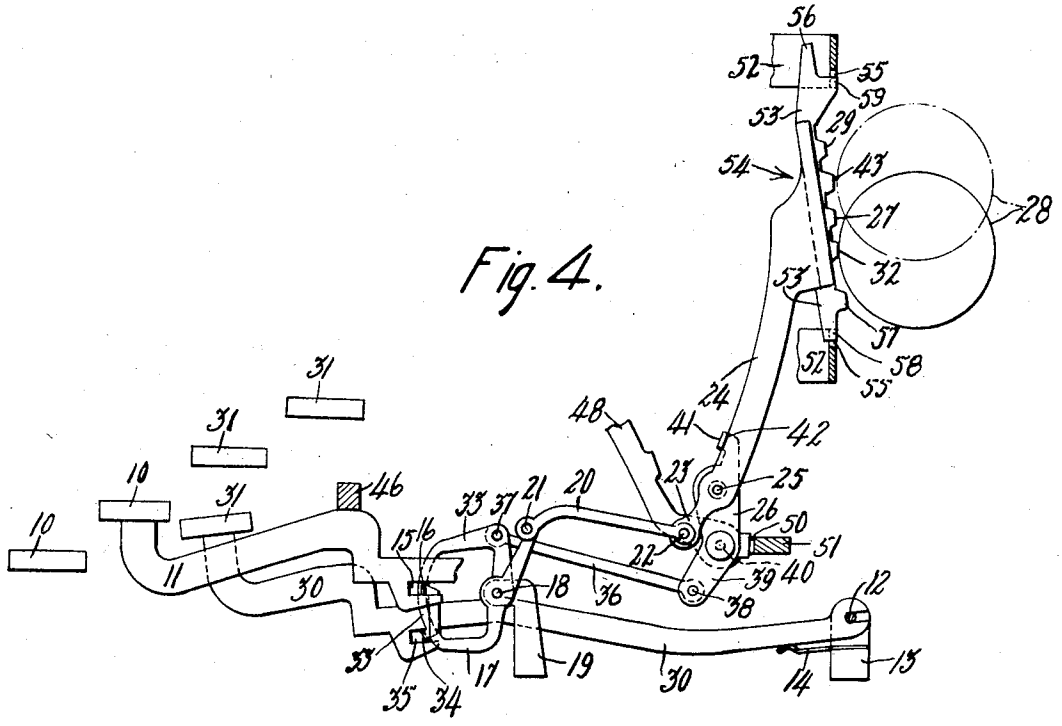


Fig. 4.



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1,802,500

UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE

Application filed March 28, 1925. Serial No. 18,989.

This invention relates to an improved type-action for typewriting machines, and more particularly to type-actions in which two keys are operatively connected to each type-bar to thus reduce the number of type-bars required relatively to the keys.

One of the features of the invention relates to the provision of a standard keyboard with this type of type-bar action, which, due to its general design, is adaptable to small, portable machines, without undue increase of the striking angle of the type-bars.

For compactness the type-bars stand on end directly in front of the platen, the bars being pivotally mounted at their lower ends, and swinging in substantially vertical converging planes to the printing point. Four types are placed upon each type-bar, and two keys are connected thereto. The type-bar is automatically given a shifting action by one of the type-keys. Hence the type-bar system is extremely compact, while a standard size four-row keyboard is employed. While the type-bars swing in planes which converge to the printing point, still the angles in which the outside bars strike the platen are not excessive; the bars being guided at their type-ends, and caused to strike the platen perpendicularly, sufficient lateral play of the bars on their pivots being allowed, thereby permitting slight lateral play for this purpose. The key-levers may all extend backwardly in substantial parallelism, and the system of key-levers may be many times wider than the system of type-bars; connections extending rearwardly from the key-levers and converging to the type-bars, said connections comprising convergent bell-cranks operated by the key-levers and convergent links extending from the bell-cranks to the type-bars. The bell-cranks may be connected to the key-levers along a line just in rear of the keyboard, and the connections may converge above the set of key-levers. The outer connections in the system extend at angles of about 45 degrees to the key-levers and nearly parallel to the type-bars, to avoid binding and twisting of the parts; but the angle of the outer type-bars may appear less than 45 degrees. Each key-lever is preferably positively connected to its type-bar, and the same may be caused by one key-lever to swing from normal position about a single pivot to the platen, while the other type-key lever may cause the type-bar to swing about another pivot, whereby different types upon the type-bar are selected for operation.

Four types are provided for each type-bar, and each type-bar is operatively connected to two depressible key-levers. Each of the two key-levers is provided with an independent linkage to effect the printing of two types, which two types are selectively printed upon a work-sheet.

In order that each type-bar may be selectively caused to print in either upper or lower case characters, by the depression of either of the two associated key-levers, there is provided an intermediate rocking arm pivotally mounted adjacent the free end of a hanger, there being a hanger for each arm. The type-bar is pivotally mounted upon said arm in such a manner that when one of the key-levers is depressed, the type-bar is swung to print one lower-case character, and when the other key-lever is depressed, said arm is swung, carrying with it the type-bar, to print another lower-case character.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a cross-sectional view, in elevation, through the center of the machine on a plane indicated by the line 1—1 of Figure 2, showing the type-action in its normal position.

Figure 2 is a diagrammatic plan view of the type-action showing the linkage connecting the type-bars and the key-levers.

Figure 3 is a cross-sectional view, in elevation, through the center of the machine, showing the type-action and the type-bar in upper-case position.

Figure 4 is a cross-sectional view, in elevation, through the center of the machine, showing the type-action and the type-bar in lower-case position.

Figure 5 is a plan view of the type-aligning piece.

The present invention includes a standard keyboard of four banks of keys 10 and 31, provided with key-levers 11 and 30, respectively, extending to the rear of the machine in uniform parallel planes to be removably hung upon a fulcrum-rod 12 and spaced apart by transverse slots in a cross-bar 13 and provided with individual restoring springs 14 secured to the cross-bar. The key-levers are further guided by a front comb 45.

It will be noted at Figure 2 that the standard arrangement of the keyboard provides for a uniform spacing of the key-levers 30 of the two upper banks of keys 31, and provides for uniform spacing of the key-levers 11 of the two lower banks of keys 10, the key-levers 11 being spaced between the key-levers 30; hence, if the key-board is divided into pairs of adjoining key-levers, each pair will consist of one key-lever 11 and an adjoining key-lever 30. The purpose of this pairing of the key-levers will presently appear.

Each key-lever 11 and 30 is formed with a slot 15 opening rearwardly, and the slots of all the keys are uniformly the same distance from the fulcrum-rod 12. The slot 15 of each lever 11 engages a tongue 16 formed by bending over the end of one arm of a bell-crank 17 that is vertically disposed at one side of the key-lever, and is supported at one side of a hanger 19 upon a pivot 18 carried by said hanger. The other arm of the bell-crank 17 rises above the plane of the key-levers and the free end is pivotally connected to a link 20, which, in turn, is pivotally connected to a short arm 23 of a type-bar 24. The type-bar is provided with a pivot 25 carried by a lever 26, said lever, in turn, being pivoted at 40 to the free end of a type-bar hanger 48.

As shown at Figure 1, the machine-frame includes a cross-bar 47 positioned in front of the type-bars to support a system of type-bar hangers, there being one hanger for each type-bar, and all the hangers may be mounted within radial slots through said bar, to direct each type-bar towards a point below the printing position of the platen and secured to said bar by individual screws 49. Each hanger 48 extends downwardly and rearwardly from the cross-bar 47, and the free end of each hanger enters a spacing slot 50 in the cross-bar 51 of the machine-frame. It will be understood that the two cross-bars 47 and 51 are arcuate to the printing position on the platen, and that their slots converge towards the same position.

The base-plate 44 of the machine supports the cross-bar 13, the comb-plate 45 and a series of bell-crank hangers 19. As previously described, the key-levers 11 and 30 are paired to actuate a type-bar. To this end, a bell-crank hanger 19 is positioned midway between each pair of key-levers, the pivot 18 thereof projecting from each side of the hanger, supporting the bell-crank 17 upon one side of the hanger, and also supporting a second bell-crank 33 at the opposite side of the hanger. This construction positions the bell-crank 17 adjacent the side of the key-lever 11, so that the tongue 16 will enter the slot 15 thereof, and positions the bell-crank 33 adjacent the side of the key-lever 30 with the tongue 34 engaging the slot 15 of said lever. In arranging a hanger 19 between each pair of key-levers 11 and 30, said hangers may be positioned to assume a proper plane across the system of key-levers, and each hanger may be set at an angle parallel to the angular plane of the associated type-bar; hence the connections from the bell-cranks to a type-bar will be short at the center of the system and progressively increase in length towards the outer key-levers. The bell-crank 33 operated by the key-lever 30 has a pivotal connection 37 to a link 36 that is pivotally connected to the arm 39 of the lever 26 that supports the type-bar. The lever 26 is provided with a bent-over ear 41, which engages the back of the type-bar as a back stop at 42, and also forces the type-bar to swing with the lever when the lever is rocked upon its supporting pivot 40 by the pull of the link 36. The lever and the type-bar are thus operatively connected only when the lever is swung, but the lever remains stationary when the type-bar is directly operated by the link 20. In this manner the radial sweep of the type-bar is shorter when the type-bar is operated singly about the pivot 25 than when the type-bar is swung as a unit with the lever 26 about the pivot 40.

The platen may be shifted up and down in any well-known manner from the full-line or lower-case typing position to the dot-and-dash line or upper-case typing position, the platen in the lower-case position receiving lower-case type-impressions from the two adjoining type-faces 27 and 32, and at the upper-case shift position receiving impressions from adjoining upper-case characters 29 and 43.

In the assembly of a typing system, as in the present invention, the type-bars have a uniform normal resting position against the ears 41 that rest against the type-bar hanger, and the key-levers bear against a pad 46 from the restoring tension of the spring 14. Each key-lever is made demountable from the machine by a forward drawing-out movement to withdraw the rear end of the lever from the fulcrum-rod 12 and withdraw the slot 15 from the tongue 16 or 34.

In order to prevent the sliding of the

types upon the work-sheet, and thus blur the impressions thereon, especially when the outer type-bars, which strike the platen in a more oblique angle, are operated, there are provided aligning pieces 52, which serve as a means to straighten the travel of the type-bars and to deviate their oblique travel. To this end, the aligning pieces 52 are provided with slots 55 engaging with the downwardly and upwardly extending prongs 53 forming an integral part of the type-blocks 54, into which the types are formed. The type-bars are loosely mounted upon their pivots 25 to afford the type-bars a small side play when the prongs 53 engage the slots 55, and thus strike the platen perpendicularly.

Referring more particularly to Figures 3 and 4, it will be noted that the prongs 53 are designed to engage the slots 55 in the aligning pieces at two different heights, depending on the position of the type-bars when engaging the slots, which position, in turn, depends on the shift of the type-bars. In Figure 3 the type-bar is shown striking the platen with an upper-case type, and is guided by the uppermost end 56 of the type-block and by a stepped portion 57 in the lower prong of the type-block, both engaging with the slots 55. In Figure 4 the type-bar is shown striking the platen with a lower-case type, and the type-block is then laterally guided by the lowermost end 58 of the type-block and by a stepped portion 59 in the upper prong of the type-block.

It will be noted that in this invention a short-swing-type-bar mechanism is illustrated, which is particularly adaptable to be used with a small portable machine. However, it is not desired to limit the scope of this invention to this particular type of mechanism, which is illustrated only as an application of my invention, which substantially reduces the striking angle of the outer type-bars by reducing the number of type-bars required.

It will be noted that the system of key-levers is divided into operating pairs for each type-bar; that the bell-cranks operated by each pair of key-levers are arranged in pairs also; that the links 20 and 36 are arranged in parallel pairs; that the key-actuated bell-cranks of all the keys operate to pull the connections to the type-bar and to the lever 26 in the same forward direction; and that each type-bar is restored to normal position by the spring 14 bearing against the associated key-lever 11 or 30.

It will also be noted that each pair of key-levers 11 and 30 is provided with a pair of bell-cranks pivotally connected to a hanger, which may be secured to the base-plate 44, to provide for straight forward pulling connections that are aligned to the angular position of the type-bar; that each hanger 48 serves as a back stop for its associated type-bar 24; and that each type-bar includes four type-faces, the two lower adjoining faces being lower-case characters, and the two upper adjoining type-faces having types of upper-case characters.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a platen, a front-striking type-bar, and a type-bar hanger secured to a support in front of the type-bar and extending rearward and downward below the platen, of a lever pivotally mounted on the hanger to pivotally support the type-bar, means formed upon the lever to engage and drive the type-bar, and a pair of keys, one key operatively connected to the type-bar and the other key operatively connected to said lever.

2. In a typewriting machine, the combination with a platen, a front-striking type-bar, and a type-bar hanger secured to a support in front of the type-bar and extending rearward and downward below the platen, of a lever pivotally mounted on the hanger to pivotally support the type-bar, a back stop formed upon said lever to engage the type-bar on the opposite side of its pivotal support, and a pair of keys, one key operatively connected to the type-bar and the other key operatively connected to said lever to advance the back stop to advance the type-bar to the typing position.

3. In a typewriting machine, the combination with a platen, a front-striking type-bar, and a hanger secured to a support in front of the type-bar and extending rearward and downward toward the platen, of a lever pivotally mounted at the free end of the hanger, a pivot at one end of said lever to support and guide the type-bar and conditioned to become a type-bar unit to positively actuate the type-bar, a pair of key-levers in adjoining parallel planes, a pair of bell-cranks, each bell-crank operable by a key-lever, and a pair of forwardly-pulling links, one link connecting one bell-crank to the type-bar and the other link connecting the other bell-crank with said type-bar supporting lever.

4. In a typewriting machine, the combination with a platen and a series of segmental front-striking type-bars having a plurality of types and a system of key-levers extending rearwardly under the type-bars in parallel planes and divided into adjoining pairs, one pair for each type-bar, of a pair of bell-cranks having a common axis and connected to each pair of key-levers, one bell-crank for each lever, and a pair of connections between each pair of bell-cranks

and a type-bar, each pair of connections assuming parallel planes directed to the plane of their type-bars, and each connection of any pair operated by a forward pull derived from the depression of adjoining key-levers, to type different characters from the same type-bar.

5. In a typewriting machine, the combination with a platen, a segmental series of front-striking type-bars, and a segmental series of type-bar hangers secured to a support in front of the type-bars and each hanger converging rearward and downward below the platen, of a lever pivoted to the free end of each hanger having a pivot to support a type-bar and means to drive said type-bar, and keys divided into pairs, one key of each pair operatively connected to drive said type-bar about its pivot on said lever, and the other key of the pair operatively connected to said lever to drive the type-bar about the pivot of said lever to transfer the center of rotation for the associated type-bar to present different type-faces on the same type-bar to the typing position.

6. In a typewriting machine, the combination with a platen, a segmental series of front-striking type-bars, and a segmental series of type-bar hangers secured to a support in front of the type-bars that converge rearward and downward below the platen, of a lever pivoted to the free end of each hanger having a pivot at one end to guide one type-bar to a printing position, and conditioned to independently actuate the type-bar for another printing position, a system of key-levers that extends rearwardly under the type-bars in uniform parallel planes, hangers positioned between each pair of adjoining key-levers in a plane across the system of levers, a pair of bell-cranks fulcrumed on each hanger and engageable with adjoining key-levers, and a link pivoted to each bell-crank to be drawn forwardly, one link of each pair of bell-cranks connecting the type-bar, and the other link of the pair connecting the associated type-bar supporting and type-bar actuating lever.

7. In a typewriting machine, the combination of a platen, a front-striking type-bar having a pair of type-faces, a pair of pivots for the type-bar to direct either type-face to the printing position, a pair of adjoining key-levers, a pair of bell-cranks pivotally hung between the key-levers and directly operable thereby, and mechanism intermediate the bell-cranks and type-bar to automatically predetermine which type-face shall be thrown to the printing position.

8. In a typewriting machine, the combination of a platen, a type-bar hanger, a lever pivoted to said hanger and having a pivot at one end thereof, a type-bar mounted upon said pivot to be swung about the pivot or to be swung with the pivot and lever to type, a pair of key-levers, a hanger between the key-levers, a pair of bell-crank levers pivotally mounted upon said last-mentioned hanger, means for operatively connecting one bell-crank to each key-lever, and a pair of links, one link operatively connecting one bell-crank to the type-bar and the other link operatively connecting the other bell-crank with the type-bar supporting and type-bar actuating lever.

9. In a typewriting machine, the combination of a type-bar, a pair of pivots for the type-bar, a pair of bell-crank levers forwardly of the type-bar and operatively connected thereto to vibrate the type-bar about either pivot, and a demountable key-lever operatively connected to each bell-crank lever by an open slot permitting any key-lever to be directly withdrawn from the machine without hindrance from connecting parts.

10. In a typewriting machine, the combination with a frame having a horizontal bar in front of the platen, a hanger secured to said bar to extend downwardly and rearwardly toward said platen, and a front-striking type-bar, of a pair of pivots for said type-bar, one pivot secured to the free end of said hanger, and the other pivot supported by means carried by the first pivot for supporting the type-bar, a pair of horizontally-disposed key-levers, and individual connections between each key-lever and the type-bar, said connections being individually operative through a forward pull derived from a depressed key-lever which determines the pivot the type-bar shall swing upon to type.

11. In a typewriting machine, the combination with a series of segmental type-bars fulcrumed below the platen to strike a common center at the front of the platen, and a series of depressible key-levers underlying the type-bars in uniform planes and arranged in pairs, one pair for each type-bar, of connections intermediate each pair of key-levers and the same type-bar, including means operative to translate the down motion of the key-levers into forward horizontal pulls for said connections that are operatively connected to variably actuate their type-bar to type different characters.

12. In a typewriting machine, the combination of a type-bar having a pair of type-characters, two links either of which is arranged to operate said type-bar, both links having forward pulls uniformly the same in extent of movement and direction, and each link effective to drive the type-bar in the same direction and selectively present either character to type, a bell-crank connected to the forward end of each link and arranged in a pair upon the same supporting axis for a uniform transmission of motion to the

type-bar, and a pair of key-levers, each key-lever having a connection to depress one bell-crank to pull one link while the other key-lever and its bell-crank remain stationary.

13. In a typewriting machine having a platen, a segmental series of front-striking typing mechanisms including hangers that converge rearwardly and downwardly under the platen, a lever pivotally supported by each hanger and each lever pivotally supporting a two-character type-bar, bell-cranks aligned to the segmental planes of the hangers and arranged in pairs, each pair of bell-cranks having parallel links connected to actuate the same type-bar to present either character to the platen, a bracket pivotally supporting each pair of bell-cranks, and a series of key-levers having a standard keyboard spacing and arranged in parallel horizontal planes under the type-bars, said key-levers grouped in pairs and each pair of levers having connections to operate either one of a pair of bell-cranks when the other bell-crank is idle.

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