

April 13, 1937.

D. P. ROWLAND ET AL

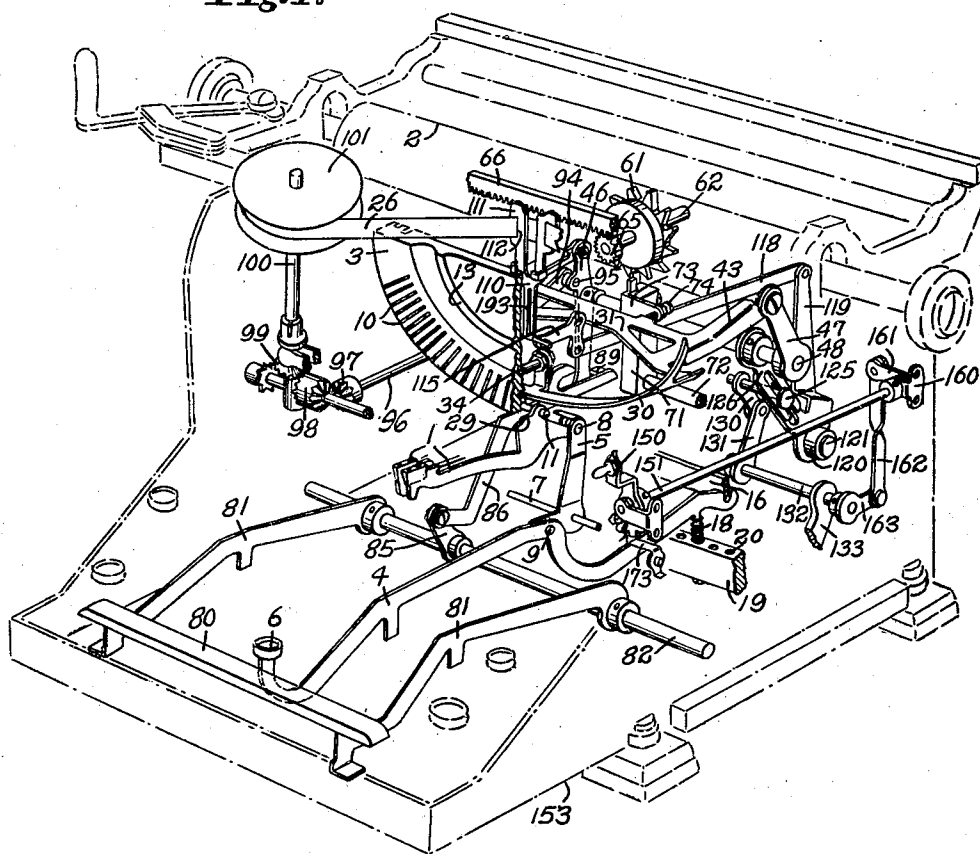
2,076,746

TYPEWRITER

Filed March 9, 1933

5 Sheets-Sheet 1

Fig. 1.



INVENTORS
Dwight P. Rowland
BY Conrad C. Dahl
Nector Hibben, David E. Macauley
ATTORNEYS

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D. P. ROWLAND ET AL

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5 Sheets-Sheet 2

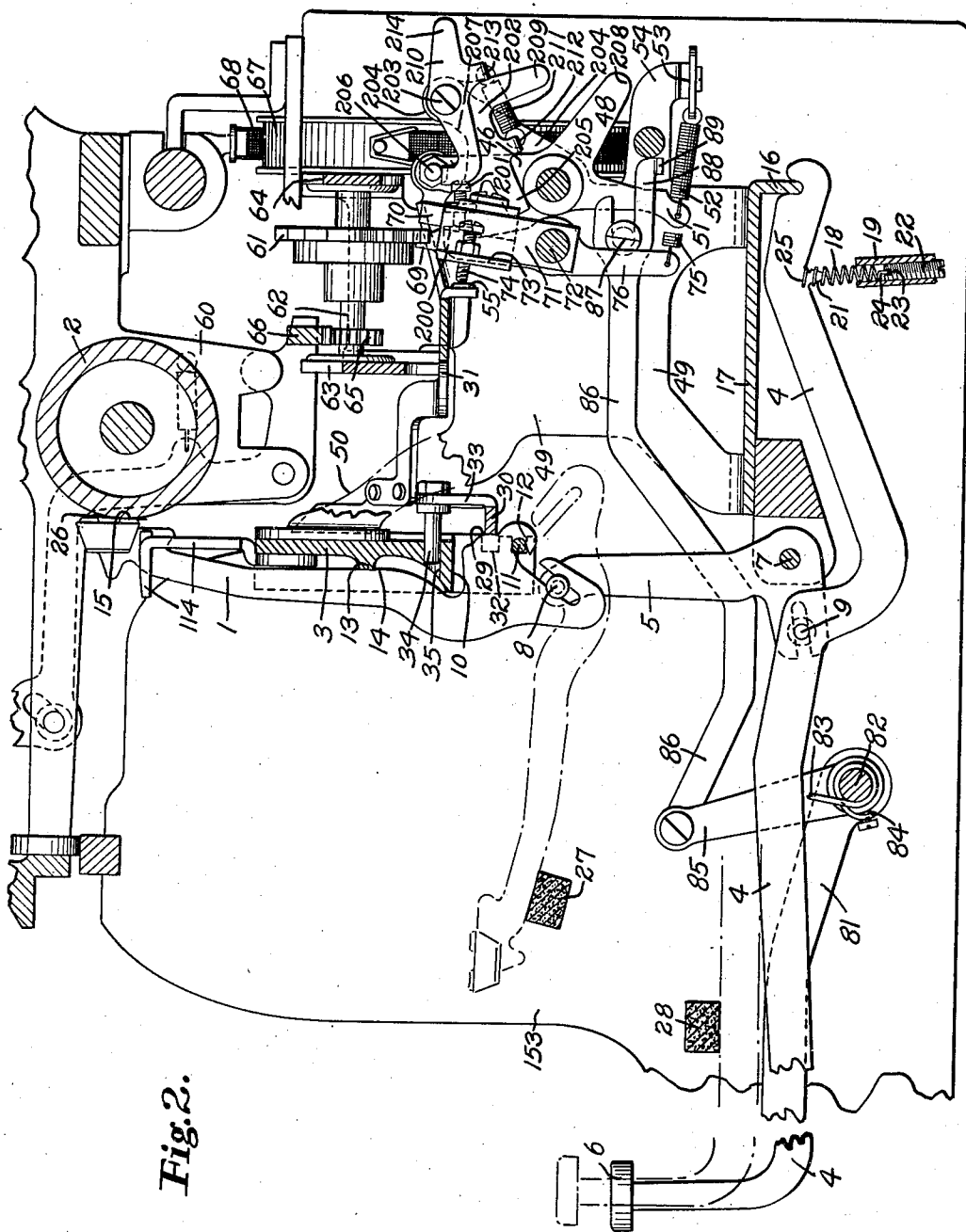


Fig. 2.

INVENTORS
Dwight P. Rowland
BY Conrad C. Dahl
Rector, Hibben, Davis & Macaulay
ATTORNEYS

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D. P. ROWLAND ET AL

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5 Sheets-Sheet 3

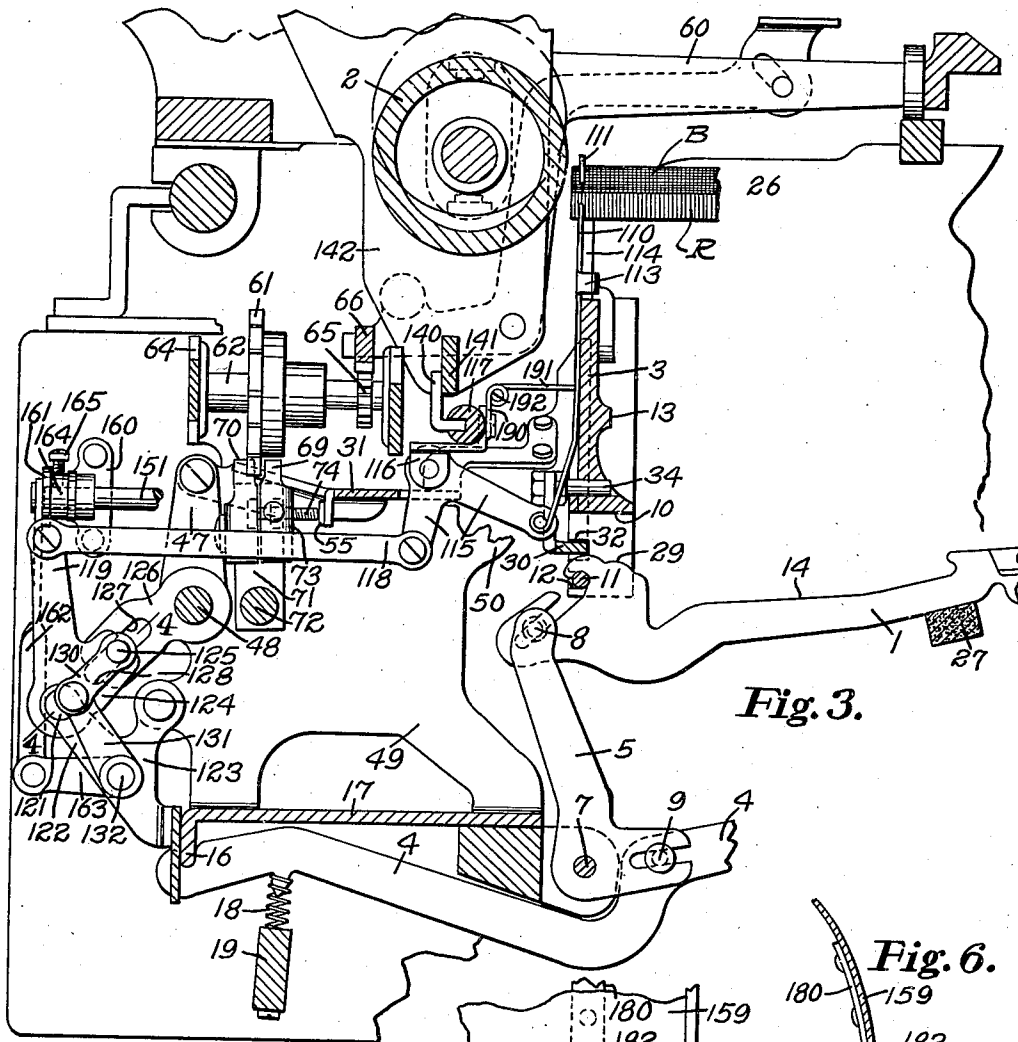


Fig. 3.

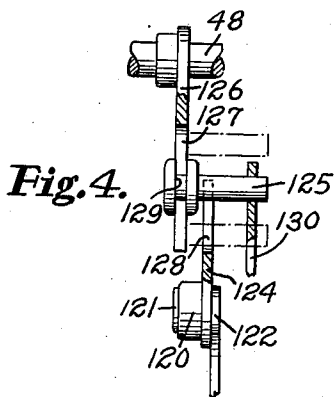


Fig. 4.

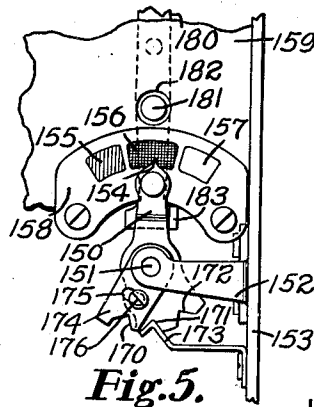


Fig. 5.

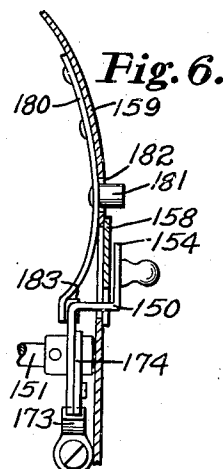


Fig. 6.

INVENTORS
Dwight P. Rowland
BY Conrad C. Dahl
Rector, Hibben, Davis & Macaulay
ATTORNEYS

April 13, 1937.

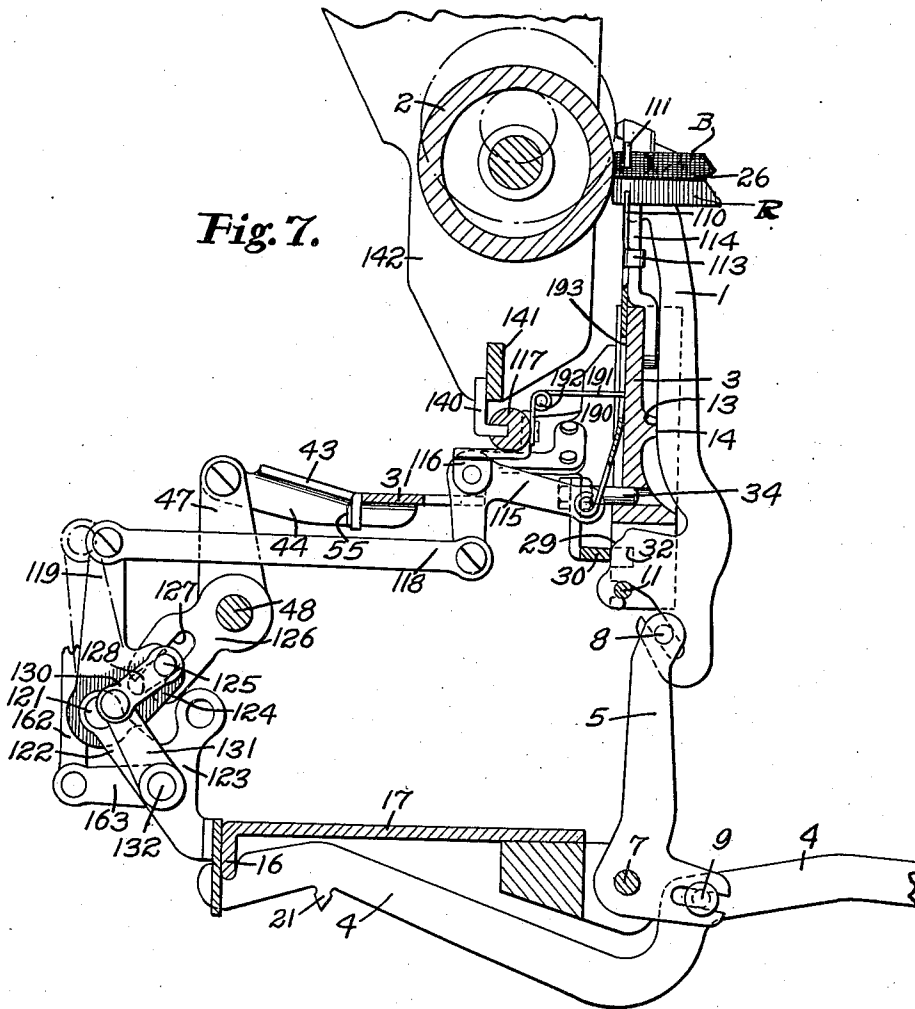
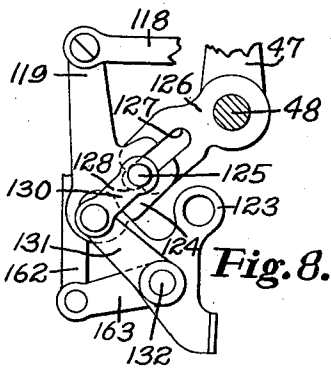
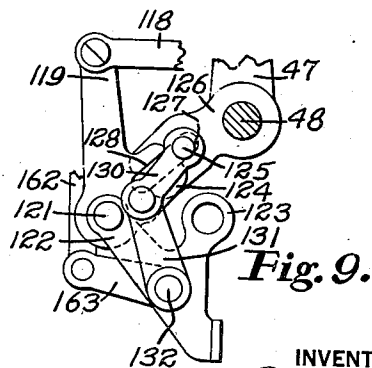
D. P. ROWLAND ET AL

2,076,746

TYPEWRITER

Filed March 9, 1933

5 Sheets-Sheet 4



INVENTORS
Dwight P. Rowland
BY Conrad C. Dahl
Pector, Hibben, Davis & Macaulay
ATTORNEYS

April 13, 1937.

D. P. ROWLAND ET AL

2,076,746

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Filed March 9, 1933

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Fig.10.

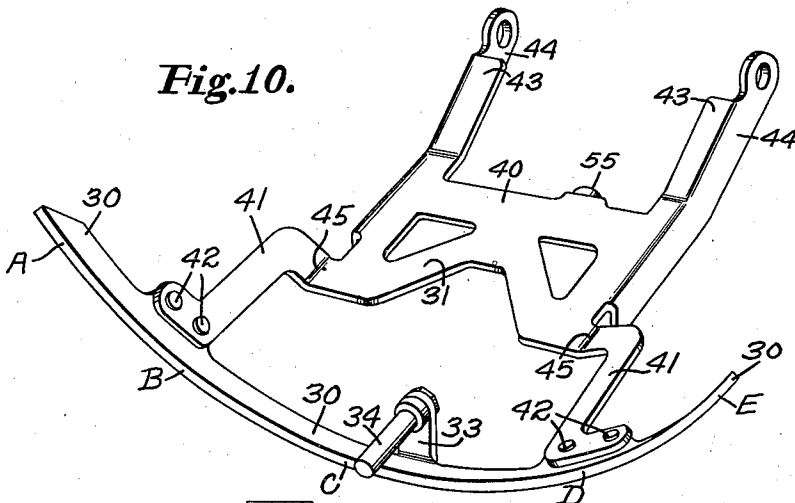


Fig.11.

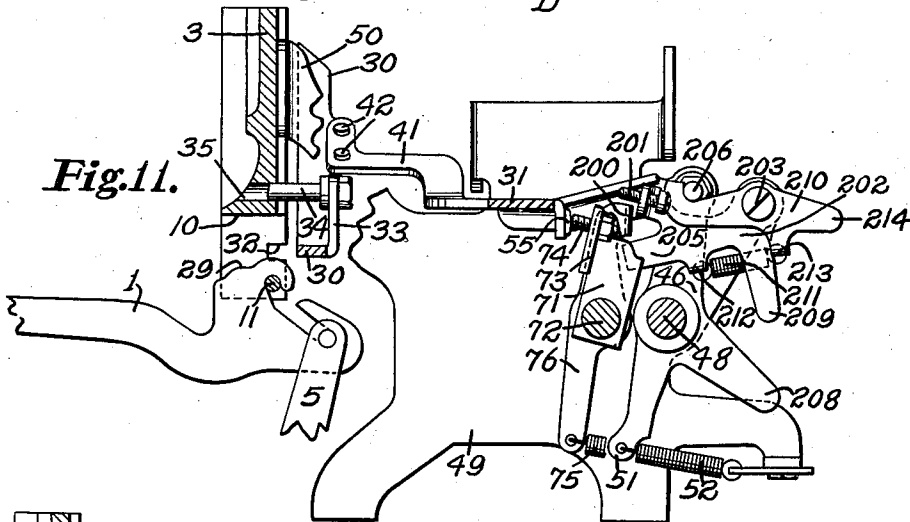
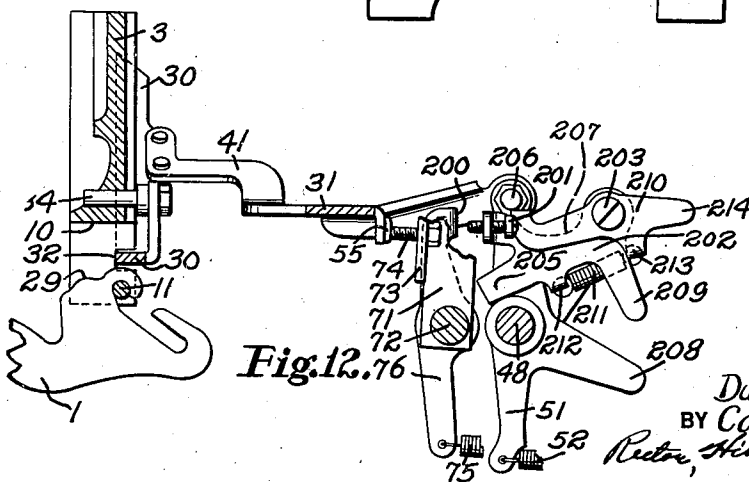


Fig.12.



INVENTORS
Dwight P. Rowland
BY Conrad C. Dahl
Rector, Allen, Davis & Macaulay
ATTORNEYS

UNITED STATES PATENT OFFICE

2,076,746

TYPEWRITER

Dwight P. Rowland and Conrad C. Dahl, Detroit, Mich., assignors to Burroughs Adding Machine Company, Detroit, Mich., a corporation of Michigan

Application March 9, 1933, Serial No. 660,163

13 Claims. (Cl. 197—97)

This invention relates to a typewriter, and it has to do more particularly with type bar, universal bar and ribbon vibrator mechanisms therefor.

The general object of the invention is to provide an improved typewriter construction.

Another object is to provide an improved universal bar mechanism of a character adapted to be actuated by the type bars to, in turn, actuate the carriage escapement and ribbon vibrator mechanisms.

A further object is to provide an improved ribbon vibrator mechanism by which the different color fields of a bi-chrome ribbon or different zones of a single-color ribbon are moved in an improved manner to and from the printing point in all case-shift positions of the typewriter.

Another object is to provide an improved construction wherein the type bars are normally locked against removal by the universal bar and wherein novel means is provided for moving the universal bar to and locking it in an inoperative condition in which the type bars are released for removal of the same for repair and replacement.

Additional objects are to provide improved means for regulating the tension of the type bar levers and for insuring uniformity in key touch; to provide an improved universal bar and mounting therefor that avoids distortion of the same as it is contacted by the type bars, and insures that each type bar will operate the carriage escapement mechanism at the same relative instant or position in its movement toward the platen; to provide improved means preventing overthrow of the ribbon vibrator; to provide improved spring means for effecting carriage escapement without actuation of the type bar; to provide improved means for adjusting and controlling the throw of the ribbon vibrator, and to provide structure for carrying out the foregoing objects which is simply and durably constructed, and which is composed of parts which are readily accessible and which may be easily and quickly adjusted and operated.

Other objects and advantages will become apparent as this description progresses and by reference to the drawings illustrating one embodiment of the invention wherein:

Figure 1 is a perspective view of the universal bar and its associated mechanisms, all of the parts thereof being shown in normal condition, and the typewriter frame carriage and platen being shown in dot and dash lines;

Fig. 2 is a right side sectional elevation of the

structure of Fig. 1 with the type bar shown in printing position;

Fig. 3 is a left side sectional elevation of the structure of Fig. 1, the parts being shown in normal non-printing position;

Fig. 4 is a separated sectionalized, detailed rear view taken substantially on line 4—4 of Fig. 3, and showing the connections between the universal bar and ribbon vibrator for operating the latter;

Fig. 5 is a fragmentary front view of the structure for adjusting and controlling the throw of the ribbon vibrator connections;

Fig. 6 is a sectional side elevation of the structure shown in Fig. 5;

Fig. 7 is a left side elevational view, partially in section, illustrating the ribbon vibrator and its operating connections adjusted to move the black field of a red and black ribbon to the writing point, the parts being shown in printing position;

Fig. 8 is a left side detail elevational view of the ribbon vibrator operating connections of Fig. 7 in adjusted condition for moving the red field of the ribbon into printing position upon depression of a key;

Fig. 9 is a view similar to Fig. 8 except that the connections are shown in position for non-printing;

Fig. 10 is a perspective view of the universal bar and its supporting frame;

Fig. 11 is a separated, side elevational view of the connections for locking the universal bar in inoperative condition to permit removal of the type bars, the universal bar being shown locked out of operation, and

Fig. 12 is a view similar to Fig. 11 except illustrating the parts in normal, non-locking condition.

The typewriter mechanism as a whole includes the requisite parts usually employed in the making of a complete typewriter mechanism including a traveling paper carriage, a case-shiftable platen and a type-bar-controlled universal bar which actuates escapement, ribbon feed and ribbon vibrator mechanism. However those parts not necessary for an understanding of this invention have not been illustrated in detail and they will be referred to only in a brief manner.

Type bar mechanism

The type bar mechanism includes a plurality of type bars 1 (Fig. 1) supported for swinging movement toward and from the platen 2. Each type bar is mounted and operated in the same

manner and but one such mounting will be described in detail.

The type bar is actuated by a depressible key lever 4 connected to the type bar by a crank 5. A key 6 is mounted at the forward end of the key lever for the depression of the latter. The crank 5 is supported by a cross shaft 7 and it is connected to the respective type bar 1 and key lever 4 by slot-and-pin connections 8 and 9, respectively.

The segment 3 is provided with a plurality of slots 10 (Figs. 1, 2, and 3) in each of which is disposed a type bar pivotally supported upon a curved shaft 11 mounted in a groove 12 in the segment and intersecting the slots 10.

The segment 3 is further provided on its face with an anvil like ridge 13 adapted to be engaged by the forward edge 14 of the type bar very slightly before the type face engages the paper around the platen 2, thereby imparting a percussive blow against the platen of uniform force by the respective type bars; that is to say, that the engagement of any type bar 1 with the anvil ridge 13 before striking the platen tends to uniformize the striking blow of all the type bars.

The key lever 4 is pivotally supported at its rear end upon the depending flanged edge 16 of a cross plate 17 (Fig. 2) that is fixedly supported in any suitable manner (not shown) by the typewriter frame. The forward end of key lever is normally swung upwardly about its pivotal support and in a depressible condition by a compression spring 18 carried by a cross bar or spring beam 19 having its ends (not shown) rigidly supported in any desired manner.

The key levers 4 are necessarily of different lengths, dependent upon the position of a particular key 6 in the keyboard and the tension of the springs 18 is varied to meet this condition so that a uniform key touch is provided. It is also highly desirable that an adjustment of the key touch once made should be maintained. This invention contemplates the provision of a novel mounting for the compression spring 18 wherein these advantages are fully attained.

The spring holding bar or beam 19 is provided with a plurality of openings 20 (Figs. 1 and 2), each of which is adapted to receive one end of its respective compression spring 18. The key lever 4, directly above the spring holding bar 19, is provided with a depending spear-head like projection 21 which receives the other end of the spring 18. The spring holding bar openings are threaded to receive a screw plug 22 having a cross slot 23 in its inner end for the reception of a vertical eye formed in the end coil 24 of the spring 18, which end coil is bent to form a diametrically disposed ball or eye for the engagement stated. In this manner, the screw plug 22 and the spring 18 are positively engaged to drive as a unit, so that rotation of the plug 22 to screw the same into the bar opening 20 causes rotation of the spring 18 upon the projection 21 of the key lever 4. The spring 18 is wound in a direction to permit free rotation of the spring in clockwise direction when tensioning the spring 18; however, the cut-off end 25 of the spring 18 engages the side of the lever 4 above the spear head 21 and prevents rotation of the spring 18 and plug 22 in the opposite direction. More particularly, the plug 22 may be readily screwed inwardly to increase the tension of the spring 18 and, consequently, the touch of key 6, and the particular adjustment made, will be maintained by virtue of the inability of the spring 18 to ro-

tate in a direction to lessen the tension of said spring 18. That is to say, by increasing the tension of the spring 18, the resistance of the key lever 4 against depression and the touch of the key 6 may be increased intentionally, but the tension of the spring 18 will not be accidentally or unintentionally decreased. The parts for effecting decrease in tension of the spring 18 are readily accessible and adjustment may be carried out easily and quickly without removing any of the parts. The tension of spring 18 may be lessened by inserting a spring hook to pull the end coil 25 of the spring 18 downwardly so that such end coil will clear the lower edge of the key lever 4 and permit the spring 18 to be turned counter clockwise with the plug 22.

Depression of the key 6 moves its respective type bar 1 to a position wherein its type face 15 strikes the platen 2 with a percussive blow (Fig. 2) and provides, through the medium of the usual ribbon 26, the impression on the paper. Upon release of the key 6, the spring 18, the universal bar 30, the spring 52, and the rebound of the type bar from the anvil return the type bar through the connections above described to normal inoperative position where it engages and rests upon a cross strip 27 formed of felt or other suitable rebound preventing and sound deadening material. During this latter action, the key lever 4 is moved to its uppermost normal position where it engages and seats against a cross strip 28 formed of felt or other suitable sound-deadening material.

The type bar 1 is provided with a cam face 29 at that end which is journaled in the segment slot 10 (Figs. 1 and 2). As the type bar is moved toward the platen, and just prior to its engagement therewith, its cam face contacts with and actuates a universal bar 30. The universal bar, in turn, actuates the carriage escapement mechanism as well as the ribbon feed and ribbon vibrator mechanisms which will be referred to more fully hereinafter.

Universal bar mechanism

The universal bar mechanism includes the segmentally-shaped universal bar 30, its supporting frame 31, and certain other parts through which the carriage escapement, ribbon vibrator and other associated mechanisms are actuated.

The type bar segment slots 10 are disposed along the periphery of the segment and are so positioned that each type bar prints in exactly the same location when its respective key is depressed. The universal bar 30 is curved similarly to the segment and has its forward edge mounted in a correspondingly shaped groove 32 (Fig. 2) in the rear of the segment intersecting the type bar slots 10 so that the forward edge of the universal bar will be engaged by the cam face 29 of the type bar for rearward movement of the universal bar as the type bar is actuated. The universal bar is provided with an upstanding lug 33 supporting a pin 34 adapted to be slidably received in an aligned opening 35 in the segment for forward guidance of and assisting the support of the universal bar in its back and forth movements.

The universal bar is engaged and actuated by each of the type bars, regardless of the position of the type bar on the segment 3, upon depression of the respective key 6. The universal bar is, therefore, subjected to pressure at numerous points along its forward edge and from a wide variety of angles depending upon the position of

the particular type bar actuated. Due to this condition, there is a tendency, unless guarded against, to twist and distort the universal bar as different type bars are actuated. This action, is obviously, amplified by variable pressure with which the operator may depress the keys 6.

Since the universal bar actuates the carriage escapement mechanism, twisting, flexing or distortion of the universal bar will result in variation in the time of actuation of the escapement mechanism as different type bars are actuated with obvious improper escapement movement of the paper carriage.

Uniformity and accuracy in the operation of a typewriter depend very materially upon positive and uniform escapement of the paper carriage, and this invention insures uniformity and accuracy by the provision of a novel form of universal bar and supporting structure which is sufficiently strong and rigid to avoid detrimental twisting, flexing and distortion thereof. In other words, this invention contemplates a universal bar so constructed that it will operate the carriage escapement mechanism exactly at the same instant of movement or position of the type bar with respect to the platen, regardless of the segment position of the type bar and its point of contact with the universal bar. This assures uniform speed of operation.

The universal bar frame 31 (Fig. 10) is provided with a flat web-shaped body 40 having arms 41 extending forwardly thereof for securement to the universal bar by rivets, or other suitable fastening devices 42. This frame is also provided with rearwardly extending arms 43 which are provided with side flanges 44 which continue along and are integrally joined to the sides of the frame body 40. The angular form of the arms 43 and the sides of the frame body 40 render these parts sufficiently rigid to oppose bending, flexing or distortion in any direction upon engagement of the type bar with the forward edge of the universal bar.

The arms 41 which connect the frame body to the universal bar 30 are formed of flat-stock material and they are disposed flatwise for endwise reception of the thrust of the universal bar. These arms are free of angular bends or offsets in the plane thereof or in the plane of movement thereof, and the possibility of yielding or flexing of the same when the universal bar is struck by a type bar is eliminated. Each arm 41 is connected to the frame by a short right-angled arm 45; but, since the axis of the bend between the arms 41 and 45 is parallel to the direction of thrust, no flexing or bending takes place at that point when the universal bar is actuated.

The construction just described is quite rigid and is not distorted regardless whether a type bar strikes the universal bar at points A, B, C, D, E, or elsewhere along its forward edge. The universal bar is thusly moved with uniformity to effect each escapement movement with uniformity as each type bar is actuated, thereby insuring uniformity in the timing of the escapement.

The frame arms 43 are pivotally connected at their rear ends to arms 46 and 47 which, in turn, are secured to the opposite ends of a rock shaft 48 (Fig. 1). The shaft 48 is rockably supported by a pair of upright frame members 49 (Figs. 2 and 3) secured in laterally spaced relation to the cross plate 17. The plates 49 are provided with upwardly and forwardly extending arms 50 which are secured to the rear portion of the segment 3 thereby serving as a support for the latter. Plates

49 also serve to support the carriage escapement mechanism as well as universal bar service lock mechanism which will be described further hereinafter.

The arms 46 and 47, together with the pin 34, serve as the sole supports for the universal bar in its backward and forward movements under the control of the type bar 1. The arm 46 is provided with a downward extension 51 to which is attached one end of a spring 52. The other end of this spring is releasably and adjustably attached to the end 53 of a rearwardly extending arm 54 on one of the frame members 49. This spring is constantly under tension urging the arms 46 and 47 counterclockwise and universal bar 30 forwardly. Spring 52 yieldably opposes rearward movement of the universal bar and it serves to return the universal bar to its normal position in the segment slot 30 upon release of the type bar.

The universal bar frame 31, intermediate its arms 43, is provided with a hardened lug 55 which engages a part of the carriage escapement mechanism in the rearward movement of the universal bar for initiating the escapement movement.

Carriage escapement mechanism

The escapement mechanism, under the control of the universal bar, serves to cause the paper carriage 60 to space toward the left a predetermined distance each time a key is depressed and released in order to present a new printing position on the platen 2 for the next type impression.

Briefly, the escapement mechanism includes an escapement wheel 61 (Fig. 2) supported by a shaft 62 journaled in a pair of spaced plates 63 and 64 on the frames 49. The shaft 62 drives the escapement wheel by an internal pawl (not shown). The shaft 62 also has fastened thereon a pinion gear 65 that meshes with a carriage rack 66 which, together with the carriage 60, is constantly urged toward the left (as viewed in Fig. 1) by the spring drum 67 and carriage-tape connection 68. By this arrangement, the escapement wheel is constantly urged in counterclockwise direction and its movement is opposed by a pair of escapement dogs 69, 70 (Figs. 2 and 3).

The dogs 69, 70, one of which is movable and the other fixed, as will be well understood, are carried by an escapement block 71 fixed upon a cross shaft 72 having its ends journaled in the frames 49.

A plate 73 (Figs. 2 and 3) is secured to the forward face of the block 71 and it supports an adjustable abutment screw 74 which is adapted to be engaged by the universal bar lug 55 in the rearward movement of the universal bar. Rearward swing movement of the escapement block 71 is opposed by an adjustable spring 75 between the lower end of an arm 76 fixed to the rock shaft 72 and the frame extension 54 (Fig. 2).

The escapement dogs 69, 70 are mounted upon the block 71 in a laterally-spaced, diagonal fashion and the pivoted dog 70 is normally engaged with one of the teeth of the escapement wheel 61. Rearward movement of the universal bar swings the block 71 in clockwise direction to release the dog 70 and to, in turn, engage the dog 69 with the escapement wheel thereby effecting a partial escapement in an obvious manner. Return movement of the universal bar to normal position permits counterclockwise movement of the block 71 to its normal position and re-engagement of the dog 70 with the escapement wheel and consequent completion of the escapement movement.

Escapement movement of the paper carriage is also accomplished by space bar mechanism which is arranged to actuate the universal bar mechanism independently of the type bars.

Space bar mechanism

The space bar mechanism illustrated in the drawings (Figs. 1 and 2) includes a space bar 80 located at the front of the machine in the usual manner. The space bar is connected by a pair of arms 81 to a frame-carried rock shaft 82. Shaft 82 is constantly urged in a clockwise direction by a spring 83 on one end of the shaft 82. The spring 83 has one of its ends releasably secured to a collar 84 adjustably fastened upon the shaft 82 and its other end is engaged with the machine frame in any suitable manner (not shown), so that rotation of the shaft 82 counterclockwise by the space bar 80 increases the tension of the spring and conditions the same for quick return of the space bar to its normal position after the usual spacing depression.

The shaft 82 fixedly supports a rocker arm 85 to which the forward end of a link 86 is pivoted. The rear end of link 86 is forked for supporting slide engagement with a stud 87 carried by the left hand (Fig. 2) frame plate 49. The stud 87 is channeled to receive and confine the forked end of link 86 against lateral displacement, while permitting of free longitudinal slide movement thereon. The lower forked arm 88 of the link 86 is extended rearwardly and is provided with a lug 89 extending laterally across the rear edge of the bottom extension 51 on universal bar supporting arm 46.

With the foregoing arrangement, depression of the space bar 80 rocks the arm 85 counterclockwise and shifts the link 86 forwardly. Forward movement of link 86 causes its lug 89 to engage the arm 51 and rock the arm 46 clockwise. Clockwise movement of arm 46 moves the universal bar 30 rearwardly and the spring 52 returns it as hereinabove described with resultant escapement movement.

Ribbon feed mechanism

The ribbon feed mechanism is actuated by the universal bar to effect a step by step ribbon movement. The details of this mechanism are not essential to an understanding of this invention, and will be referred to but briefly.

The ribbon feed mechanism includes a link 94 pivotally connected at 95 to the universal bar supporting arm 46. Link 94 is connected to a ratchet mechanism (not shown) of any suitable form by which rotary motion is imparted to a shaft 96 as the universal bar is moved rearwardly. The shaft 96 through gears 97, 98, and 99, imparts rotary motion to shafts 100 supporting ribbon spools 101. Two ribbon spools 101 and similar gear connections are employed for supporting the ribbon 26, but only the left hand of these spools is shown (Fig. 1). The ribbon 26 is supported intermediate the spools 101 by a ribbon vibrator.

Ribbon vibrator mechanism

The ribbon vibrator 110 is actuated by the universal bar to move the ribbon to cover and uncover the writing point or to move the proper colored portion of the ribbon to the printing point. It is so supported and actuated that any selected zone of a single color or a bi-chrome ribbon may be projected to the writing point and accurately positioned with respect thereto re-

gardless of the position of the platen which is shiftable vertically in its carriage to print upper and lower case letters.

The ribbon vibrator 110 (Fig. 1) is provided at its upper end with a pair of spaced arms 111 having openings 112 therein through which the ribbon 26 is threaded. The spacing of the arms 111 permits the type bar to strike the ribbon and platen therebetween. A pair of lugs 113 (Figs. 1 and 3) at the sides of the ribbon vibrator are turned over to slidably engage the side edges of the type bar guide 114 for guidance and support of the ribbon vibrator in its vertical movements. The type bar guide is rigidly secured to the upper forward portion of the type bar segment 3.

The lower end of the ribbon vibrator is extended slightly rearward (Fig. 3) and it is bifurcated for pivotal reception of the forward end of crank 115 which is, in turn, pivotally supported by a bracket 116 fixedly secured to the platen shift shaft 117. The rear arm of the crank 115 is pivotally connected to a horizontally disposed and rearwardly extending link 118 adapted to be actuated by the universal bar through certain connections which will now be described.

The rear end of the link 118 is pivotally connected to the upper end of an upstanding lever 119. The lower end of lever 119 is provided with a hub 120 (Fig. 1) which is pivotally mounted upon a stud 121 carried by the upwardly extending arm 122 of a bracket 123 rigidly secured to the bottom plate member 17.

The lower end of the lever 119 is provided with an upwardly-extending forked arm 124 which is operatively connected by a coupling stud 125 to another forked arm 126 fixedly secured to the rock shaft 48 which is rocked by the universal bar through the supporting arms 46, 47.

The arm 126 is forked and is so positioned on the shaft 48 that it extends downwardly substantially parallel with the lever arm 124 to align the slot 127 formed by its forked portion with the slot 128 formed by the forked portion of the arm 124. The coupling stud 125 is provided at one end with a channeled head 129 (Fig. 4) which is received in the slot of arm 126 with the sides of its channel head straddling the fork sides of the arm 126 to prevent sidewise displacement of the stud therefrom but permitting free slide movement of the same backwardly and forwardly in the slot 127. The intermediate portion of the stud 125 (Figs. 4, 7, 8, and 9) is freely and slidably received in the slot 128 of the other arm 124 and its opposite end is pivotally supported by the upper end of a link 130 which is, in turn, connected at its other end to a lever 131 having a hub portion secured to a lateral shaft 132 rockably supported by the bracket 123 and a laterally spaced bracket 133 (Fig. 1). The link 130 and lever 131 constitute a toggle which serves not only as a support for the coupling stud 125 but also as means through which such stud is adjusted in the arm slots 127, 128 to vary the throw of the ribbon vibrator.

In the operation of the structure just described, assuming that the arms 124 and 126 are coupled together by the stud 125, rearward movement of the universal bar rocks the arm 126 through the medium of the shaft 48 counterclockwise and the lever 119 clockwise through the stud 125 and the arm 124. This motion of the lever 119 moves the link 118 forwardly and raises the ribbon vibrator 110 through the crank 115. As the universal bar is released for return movement to its normal position, the ribbon vibrator is positively lowered

to uncover the writing point by reversed operation of the connections just described.

The position of the ribbon vibrator relative to the platen is not changed by case shifting movement of the platen. The platen is shiftable vertically in the carriage 60 by any suitable mechanism (not shown) adapted to raise and lower the shift shaft 117.

The shift shaft 117 is secured by brackets 140 to a cross bar 141 that is carried by a pair of end plates (only one shown) 142. These plates 142 support the platen 2 in its various movements relative to the carriage. Since the vibrator crank 115 is supported by the shift shaft 117, such crank 115 together with the ribbon vibrator is shifted with the platen without change in the position of the vibrator with respect to the platen. The link 118 connecting the crank 115 and the non-shiftable vibrator operating connections permits of the vibrator-and-platen shift movement without disturbing the throw of the vibrator as predetermined by such connections.

The ribbon 26 may have a single color field, such as all-black, or a plurality of color fields, such as red and black. It may be desirable to use different zones of a single color ribbon or different color fields of a bi-colored ribbon, or it may be desirable to cut out the operation of the ribbon vibrator, as when using the typewriter for stencil, and other work where no inked impression is required. This invention provides novel means for accomplishing these advantages in all case positions of the platen.

In the structure illustrated, the coupling stud 125, by virtue of its toggle support, is shiftable backwardly and forwardly in the arm slots 127 and 128. The slots 127, 128 are of such relative length that the open end of slot 127 coincides substantially with the closed end of slot 128, but slot 127 extends substantially beyond the open end of slot 128. By this arrangement, the coupling stud 125 cannot be shifted inwardly of the slot 128 a distance sufficient to disconnect it from the arm 126, but it may be shifted in the opposite direction to disconnect it from the arm 124.

The position of the coupling stud 125 in the slots 127, 128 determines the operating length of arm 126 and the extent of throw of the link 118 and ribbon vibrator when the universal bar is operated. When the coupling stud is in the position shown in Figs. 3 and 7, the throw of the vibrator 110 is such as to move the black field B of the ribbon into writing position. Adjustment of the coupling stud 125 inwardly of the slot 128, as in Fig. 8, increases the operating length and leverage of the arm 126 and, in turn, the extent of movement of link 118 and the throw of the ribbon vibrator which is sufficient to move the red field R of the ribbon to the writing point. Adjustment of the coupling stud inwardly of the slot 127 and beyond the end of the arm 124, as in Fig. 9, disconnects the arms 124 and 126 so that the lever 119, link 118 and ribbon vibrator remain stationary upon movement of the arm 126 by the universal bar.

The throw of the ribbon vibrator is controlled readily and easily by the operator from the forward part of the typewriter. This control is effected by a manually operable color shift lever 150 (Fig. 5) which is secured to a rearwardly-extending shaft 151 that is connected to the ribbon vibrator operating connections above described.

Shaft 151 is journaled at its forward end in a bracket 152 secured to the forward portion of

the machine frame 153 so that it is rocked by moving the color shift lever 150 laterally to cause its pointer 154 to register with red, black or non-print positions 155, 156, and 157, respectively, of a color scale plate 158 secured to the forward wall 159 of the machine.

The shaft 151 (Figs. 1 and 3) is journaled at its rear end in a frame-carried bracket 160. The rear end of shaft 151 is secured to the hub of a lever 161 (Fig. 1) extending at right angles thereto so that this lever is swung up and down as the shaft 151 is rocked. Lever 161 is connected by a vertical link 162 to a lower arm 163 which extends forwardly and at right angles to the upper lever 161. The lower lever 163 is, in turn, fixedly secured to the rock shaft 132 described above as connected to and supporting the lever 131 of the stud supporting toggle 130, 131. The connections just described serve to position the coupling stud 125 according to the ribbon position desired as determined by the position of the color shift lever 150. That is to say, movement of the color shift lever 150 from its black ribbon position 156 of Fig. 5 to the red ribbon position rocks the shaft 151 counterclockwise and the shaft 132 (Fig. 1) clockwise to shift the coupling stud 125 to the position of Fig. 8. Movement of the color shift lever 150 to the non-print position 157 rocks the shafts 151 and 132 in opposite directions to move the coupling stud 125 to the position of Fig. 9.

The throw of the ribbon vibrator must be accurately adjusted to insure that the intended field of the ribbon will be moved to the writing point. That is to say, in the use of a bi-colored ribbon, the throw of the vibrator must be such that the type will strike the ribbon so as to print only in one color field; or, in the use of a single color ribbon, so that the type will print only in a particular zone. This feature is accomplished in part by an adjustable connection between the shaft 151 and the lever 161.

The lever 161 is provided with a hub 164 (Fig. 3) which is adjustably secured to the shaft 151 by a set screw 165. It will be seen that by loosening the set screw 165 and rotating the lever 161 upon the shaft 151, the extent of throw of lever 161, and consequent extent of rocking movement of shaft 132, is varied for any particular rocking movement of the shaft 151 under the control of the color shift lever 150. That is to say, by thus varying the position of lever 161 the complete throw of the vibrator is varied due to the consequent change in location and movement of the coupling stud 125 in the slots 127, 128. This adjustment simultaneously changes the throw of the ribbon vibrator in its several ribbon color positions without change in the relative throw of the vibrator in these positions.

It is also desirable in certain instances to change the relative throw of the ribbon vibrator in different ribbon field positions. To this end, the structure shown in the drawings includes one form of structure whereby the individual ribbon color positions may be independently varied.

The color shift lever 150 (Fig. 5) is provided at its bottom with a plurality of notches 170 (red), 171 (black), 172 (non-print) adapted to be selectively engaged with a frame-carried spring detent 173 whereby the shift lever and its connections are releasably held in any position to which such lever may be moved.

The red ribbon notch 170 is formed in a plate 174 rotatably supported upon shaft 151 and having an elongated slot 175 for reception of a screw 176 carried by the bottom part of lever 150.

Loosening of the screw 176 permits the plate 174 to be adjusted laterally with respect to the lever 150 and the notch 171 thereby varying the red ribbon position of lever 150 relative to the black position thereof.

The foregoing ribbon vibrator adjustments insure material advantages in the operation of the machine. The throw of the vibrator may be accurately fixed for various kinds of ribbons and for movement of any desired part of the ribbon field to the writing point. The adjustable connections are readily accessible and adjustments may be made easily and quickly.

A further feature of the invention is the provision of novel locking means that prevents the vibrator adjustment connections from shifting accidentally to a non-print condition. Specifically, as shown in Figs. 5 and 6, a flat spring 180 is secured at its upper end to the inner face of the front frame plate 159. The lower part of spring 180 is slightly bowed away from the plate 159 and its central part supports a button 181 that projects through an opening 182 in the plate 159 where it is accessible for depression by the operator. The lower end of spring 180 extends rearwardly and it is provided with a forwardly turned lug 183 which normally lies in the path of the color shift lever 150 whose upper end is bent at right angles to project through an arcuate slot in the front panel plate 159. The lug 183 prevents clockwise adjustment of such lever from the black ribbon position of Fig. 5. To adjust the ribbon vibrator connections to a non-print condition, the operator merely depresses the button 181 to move the lower part of the spring 180 and its lug 183 rearwardly out of the path of the lever 150, and the latter may then be moved clockwise to the non-print position 157 wherein the detent 173 releasably engages the lever notch 172. When the color shift lever 150 is moved to its non-print position, the spring lug 183 is engaged with the rear thereof and is held in its depressed condition, and upon return of the indicator to either of its other positions, the spring and its lug will automatically return to their normal position preventing movement of the indicator and associated connections to the non-print condition.

It will be obvious from the foregoing that, in the use of a bi-chrome ribbon, the operator may readily and quickly set the ribbon vibrator control mechanism for printing in either of the color fields of such ribbon; or, in the case of a single color ribbon, different zones of the color field may be thus brought into play by mere adjustment of the color shift lever 150. The ribbon vibrating mechanism may be disabled merely by depressing the button 181 and moving the color shift lever 150 to its non-print position. The throw of the ribbon vibrator mechanism may be varied without changing the relative color field positions of this mechanism by adjustment of the shaft 151 relative to the lever 161. Or, if relative throw adjustment is desired as between the color fields of the ribbon, this may be accomplished by adjustment of the plate 174 upon the color shift lever 150.

In the use of a bi-colored ribbon, for example red and black, the red color field R is usually at the bottom of the ribbon. A greater throw of the ribbon vibrator is obviously required for movement of the red or lower ribbon field to the printing point. The vibrator is shifted with the platen and is moved to its extreme upper position when the ribbon shift lever 150 is set in its lower

or red ribbon position and the platen is shifted to its upper case position. Unless guarded against, there is the possibility of overthrow of the ribbon vibrator when operating under the latter condition. The ribbon vibrator mechanism includes a yieldable stop adapted to be engaged by the vibrator to avoid overthrow of the latter. The yieldable vibrator stop includes a spring member having a pair of right angled arms 190 and 191 connected together by a coiled portion 192. The spring arm 190 is secured to the forward edge of the case shift shaft 117 and the other arm 191 projects horizontally forward toward the ribbon vibrator. The mid-portion of the ribbon vibrator is provided with an elongated slot 193 (Fig. 1) into which the forward end of spring arm 191 projects. The vibrator slot is so located that its lower end strikes the arm 191 at about the time the vibrator reaches its uppermost throw position. The spring arm not only prevents overthrow of the vibrator, but also acts as a noiseless cushion stop avoiding detrimental shock and wear of the vibrator and tending to increase the life and efficiency of the same.

Universal bar service lock

It is necessary at times to remove the type bars for servicing of the same to the end of best typewriter operation. Since they are locked normally against removal by the universal bar, it is necessary that the universal bar be moved away from its segment slot 32 a distance sufficient to permit the bar to be unhooked from its segment shaft 11. It would be quite inconvenient for the operator to manually hold the universal bar in an inoperative condition while removing the type bar, and this invention contemplates the provision of novel means by which the universal bar may be readily and quickly retracted to and held in an inoperative position wherein the type bar may be freely removed.

In the illustrated embodiment of the invention, the universal bar is normally limited in its rearward movement by the upper end of arm 76 on the escapement block shaft 72 (Fig. 11). The upper end of arm 76 is provided with a lateral lug 200 (Figs. 11 and 12) which is adapted to engage the end of an adjustable abutment screw 201 carried by a lever 202 pivotally supported by a stud 203 carried by a rearward extension 204 of the left-hand frame member 49. The forward end of lever 202 is provided with a downwardly extending arm 205 which is adapted to engage the hub of the universal bar supporting lever 46 to hold the adjustment screw 201 in the path of the lug 200. The screw 201 may be readily adjusted to predetermine the normal rearward throw of the universal bar.

The lever 202 and its abutment screw 201 are normally prevented from clockwise movement to a position above the abutment 200 on arm 76 by a spring 211 connected at one end to the lug 213 on the lever 210 and at its other end to the lug 212 on lever 202. The lever 202, rearwardly of its abutment screw 201, is provided with a cutaway portion 207 so that upon rearward movement of the universal bar supporting lever 46 and stud 206, the lever 202 may be elevated to move its abutment screw 201 above the path of the abutment 200 on arm 76. The universal bar supporting arm 46 is provided with a rearwardly extending arm 208 which may readily be grasped by the operator to rock the universal bar rearwardly a greater distance than provided for in

the normal operation of the machine. This extended movement of the universal bar is accomplished by depressing simultaneously with arm 208 a rearwardly extending arm 209 on lever 202 to elevate the screw 201 out of abutting position with the abutment 200 as the universal bar is moved rearwardly.

The foregoing parts are held in the inoperative condition just described by a latching lever 210 pivotally supported upon the stud 203 which supports the lever 202. This latch lever is provided with a hook-like forward end which is adapted to automatically swing upwardly and hook-engage the stud 206 when the parts are manually moved to the type bar removing position stated.

The latch lever is automatically moved to a latching position upon depression of arms 208 and 209 by a spring 211 secured to lugs 212 and 213 on the levers 202 and 210, respectively. When the lever 202 is manually actuated to an elevated position, the spring 211 is placed under tension tending to swing the forward end of the latch lever 210 upwardly into the latching position shown in Fig. 11. The latch lever lug 213 is adapted to seat against the manually operated arm 209 of lever 202 and hold the screw 201 on lever 202 in its fully elevated position out of the way of abutment 200.

With the universal bar thus moved rearward beyond its normal limit, the type bars 1 may be readily unhooked from the segment shaft 11 and may also be readily and quickly replaced therein. When it is desired to return the parts to normal operating position, it is only necessary to rotate the latch lever 210 in counterclockwise direction by grasping its manually operable arm 214 and elevating the same. This action disengages the latch lever from the stud 206 and permits the universal bar return spring 52 to move the universal bar and associated parts to their normal positions. The spring 211 connecting the latch lever and lever 202 during this movement returns and holds the forward end of the lever 202 in its normal, home position.

It is to be understood that the structure shown is for purposes of illustration only and that variations may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. In a typewriter having type bar mechanism, universal bar mechanism which comprises a universal bar operatively connected with said type bar mechanism, means for supporting said universal bar for backward and forward movement including a pair of spaced members, a rock shaft journaled in said members, a pair of arms secured to said shaft and pivotally connected directly to the rear of said universal bar for support of the latter in its backward and forward movement, said arms being so mounted that they are movable rearwardly beyond their normal operating limit to move said universal bar to an inactive position out of operative connection with the type bar mechanism for removal of the latter, an extension on one of said arms projecting beneath said shaft, a spring interposed between said extension and one of said spaced members constantly urging said arms forwardly, and a manually engageable member on one of said arms for moving both said arms rearwardly beyond their said normal operating limit.

2. In a typewriter including a plurality of accurately positioned type bars movable towards

and from a printing position, universal bar mechanism which includes an arcuate-shaped universal bar adapted to be engaged and actuated by said type bars as the latter are moved toward the printing point, and means supporting said universal bar which includes a frame having a substantially flat body spaced a substantial distance from said universal bar, a pair of comparatively long flat arms projecting flatwise from the forward part of said body, said arms being so shaped and being so connected to said universal bar as to avoid angular bends therein in the plane of movement thereof which would cause sufficient flexing of said arms to vary the position of said universal bar with respect to said body, and arms of right-angled cross-section projecting rearwardly and upwardly from said body, the vertical webs of said arms being continued forwardly as an integral part of the sides of said body and extending substantially throughout the sides of the latter to said flat arms, the horizontal webs of said arms being continued forwardly as an integral part of the flat body.

3. In a typewriter, the combination of a frame, type bars, a segment supporting said type bars, universal bar mechanism adapted to be actuated by said type bars and finding support upon said segment, carriage escapement mechanism adapted to be actuated by said universal bar mechanism, and a single pair of spaced plate members mounted within said frame and adapted to support said segment, said universal bar mechanism and said escapement mechanism in their cooperative operating relationship.

4. In a typewriter, the combination of a frame, type bars, a segment supporting said type bars, universal bar mechanism adapted to be actuated by said type bars, carriage escapement mechanism adapted to be actuated by said universal bar mechanism, mechanism for manually moving and latching said universal bar mechanism in an inoperative condition, and a pair of spaced members mounted within said frame and supporting said segment and said universal bar, escapement and moving and latching mechanisms in their cooperative operating relationship.

5. In a typewriter, universal bar mechanism which includes a universal bar movable rearwardly and forwardly, means for supporting said universal bar for said movement which includes a support member, an arm rockably carried by said support member and pivotally connected at one end to said universal bar, spring means between said arm and support member constantly urging said arm in counterclockwise direction to move said universal bar forwardly, and means for rocking said arm in clockwise direction to move said universal bar rearwardly which includes a link member slidably mounted on said support member, said link member having a lateral lug disposed behind said arm and adapted to engage the other end of said arm and rock it clockwise when said link member is moved forwardly, and means for moving said link member forwardly to engage said lug with said arm.

6. In a typewriter, universal bar mechanism which includes a universal bar movable rearwardly and forwardly, means for supporting said universal bar for said movement which includes a support member, an arm rockably carried by said support member and pivotally connected to said universal bar, spring means between said arm and support member constantly urging said arm in counterclockwise direction to move said universal bar forwardly, and means for rocking said

arm in clockwise direction to move said universal bar rearwardly which includes a stud on said support member, a link having a forked end slidably engaged with said stud with one of its fork arms extended, a lug on said extended fork end extending transversely in the path of said arm, and means, including a space bar for shifting said link on said stud to engage said lug with said arm and rock the latter clockwise to move said universal bar rearwardly.

7. In a typewriter, the combination of a type bar, universal bar mechanism including a universal bar adapted to be moved rearwardly by said type bar, means for supporting said universal bar including an arm rockably supported and connected to said universal bar, a spring urging said arm counterclockwise and said universal bar forwardly, and means for moving said universal bar rearwardly independently of said type bar which includes a longitudinally shiftable link, means on said link to engage and move said arm clockwise as the link is moved forwardly, and means including a space bar at the forward part of the typewriter for moving said link to move said universal bar rearwardly.

8. In a typewriter, a universal bar, means for moving said universal bar forwardly and rearwardly within predetermined limits, means normally limiting rearward movement of said universal bar and adjustable to an inoperative non-limiting position, means for moving said universal bar rearwardly to an inoperative position upon adjustment of said limiting means to its non-limiting position, and latch means operatively connected with said limiting means and automatically operative by movement of said limiting means to its non-limiting position to lock said universal bar and limiting means in their inoperative positions upon movement of the same to such positions.

9. In a typewriter, universal bar mechanism including a universal bar, means supporting said universal bar for movement backwardly and forwardly, means for normally limiting the rearward movement of said universal bar, said limiting means including a stop member adjustable to vary the normal rearward limit of said universal bar, and also shiftable out of universal bar limiting position to permit movement of said universal bar rearwardly to an inactive position beyond its intended normal rearward limit of movement, and latch means actuated through said limiting means as it is moved out of its normal limiting position and positively engaging said universal bar supporting means as said universal bar is moved to its rearward inactive position for holding both said universal bar and its movement limiting means in an inactive position.

10. In a typewriter, universal bar mechanism including a universal bar, supporting means by which said universal bar may be moved backwardly and forwardly, reciprocable means for normally limiting the rearward movement of said universal bar, means for reciprocating said limiting means to permit movement of said universal bar to a rearward and inactive position, means for actuating said supporting means to move said universal bar rearwardly beyond its normal rearward position upon actuation of said reciprocating means, and latch means operatively associated with said reciprocating means for automatically engaging said supporting means

and holding the same in an inactive rearward position when said universal bar is moved to its rearward inoperative position.

11. In a typewriter, universal bar mechanism including a universal bar, means for supporting said universal bar for movement thereof forwardly and rearwardly between predetermined operating limits, means for limiting the normal rearward operating movement of said universal bar including a member manually operable to move the same out of universal bar stopping position to permit movement of said universal bar beyond its rearward predetermined operating limit, means for manually moving said universal bar rearwardly beyond its normal operating limit when said stop member is manually moved out of stopping position, and latch means positioned by said movement of said stop member to engage the universal bar supporting means when said universal bar is moved beyond its normal rearward operating position, said latching means being manually adjustable independently of said member to release said universal bar supporting mechanism for returning said universal bar within its normal operating limits.

12. In a typewriter, the combination of a type bar, a support for said type bar, a universal bar having its forward end slidably carried by said support and arranged normally to prevent detachment of said type bar, means supporting said universal bar for movement by said type bar within predetermined operating limits, means including an independently reciprocable stop member for limiting the rearward movement of said universal bar, said stop member being reciprocable in one direction to permit movement of said universal bar rearwardly out of normal operating position and out of engagement with said type bar for removal of said type bar, and latch means associated with and operated by said stop member and operable upon reciprocation of the latter to positively engage the universal bar supporting means when the universal bar is moved rearwardly beyond its normal operating limit, to hold the latter in that position until said latching means is manually released.

13. In a typewriter, the combination of type bar mechanism including type bar, universal bar mechanism actuated by said type bar, the latter being normally held non-detachable by the former, escapement mechanism operated by said universal bar mechanism and including a rockable stop-abutment, a stop member normally positioned to be engaged by said stop-abutment to limit rearward movement of said universal bar mechanism to a predetermined extent, said stop member being reciprocable out of the path of said stop-abutment to permit movement of said universal bar mechanism rearwardly beyond its normal rearward position and out of locking engagement with said type bar, and latch means operatively controlled by said stop member and adapted to automatically engage said universal bar mechanism when it is moved beyond its normal rearward position to hold the latter in that position for detachment of said type bar.

DWIGHT P. ROWLAND.
CONRAD C. DAHL.