

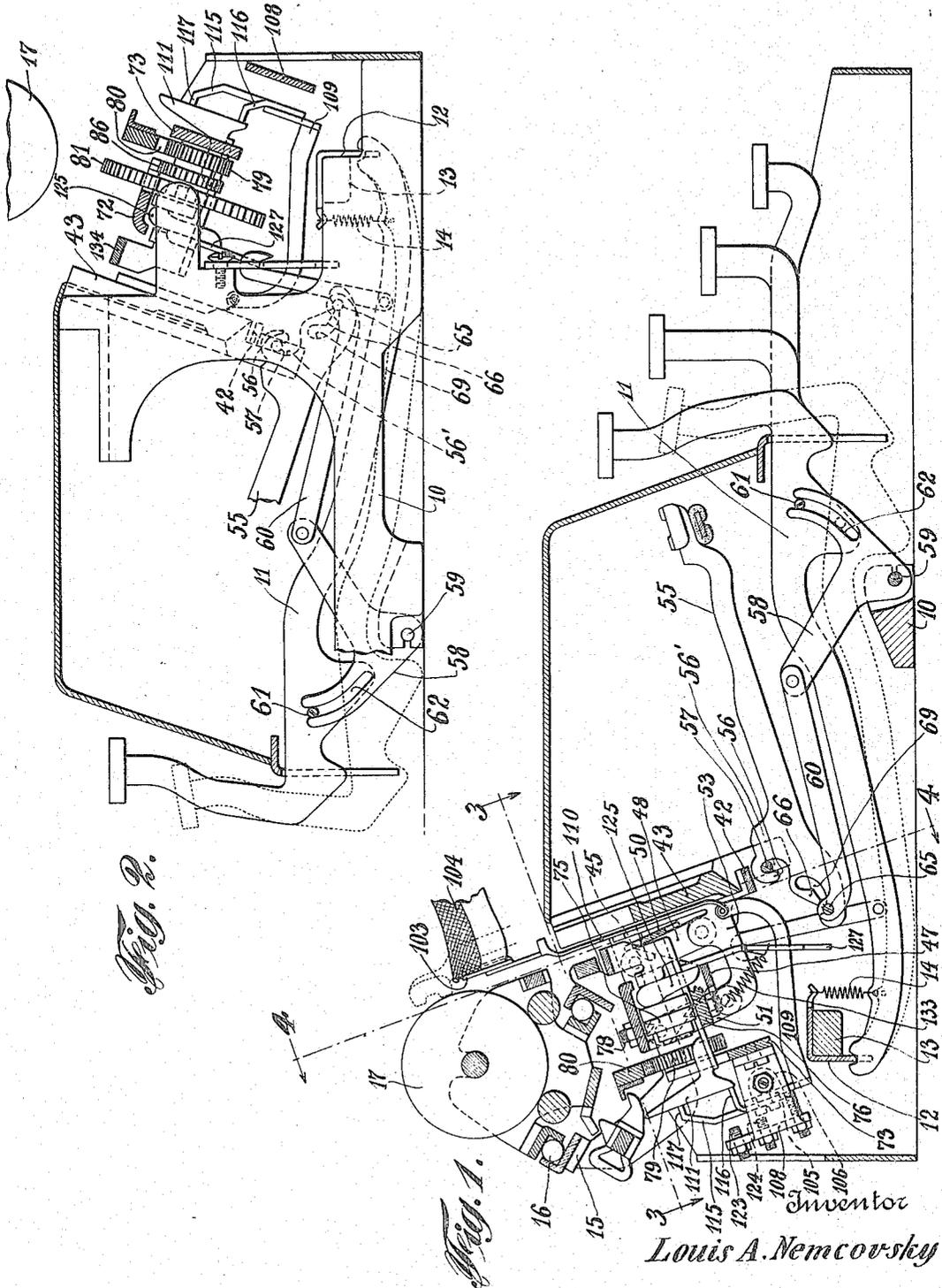
Aug. 5, 1924.

1,504,198

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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

Original Filed Sept. 21, 1922 7 Sheets-Sheet 1



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Aug. 5, 1924.

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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

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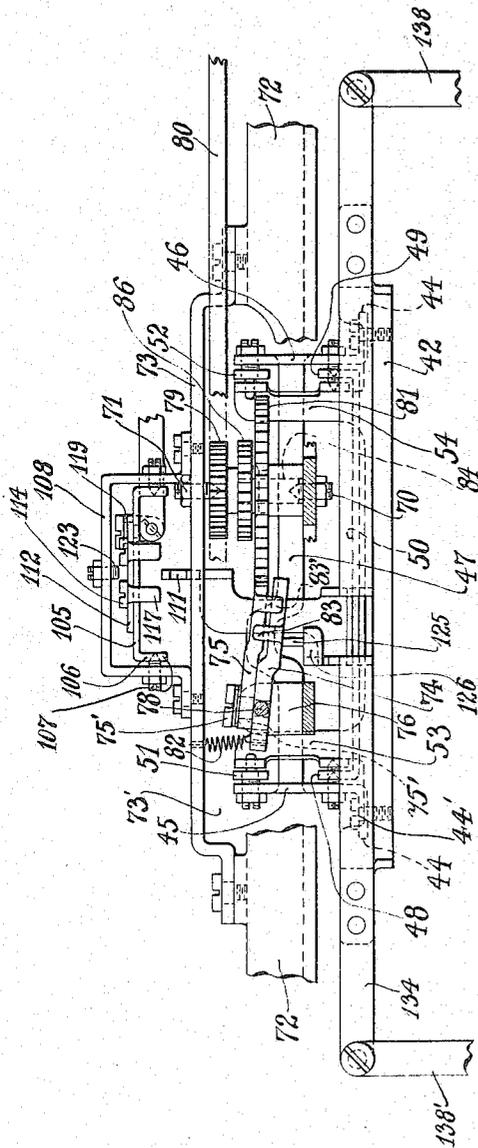


Fig. 3.

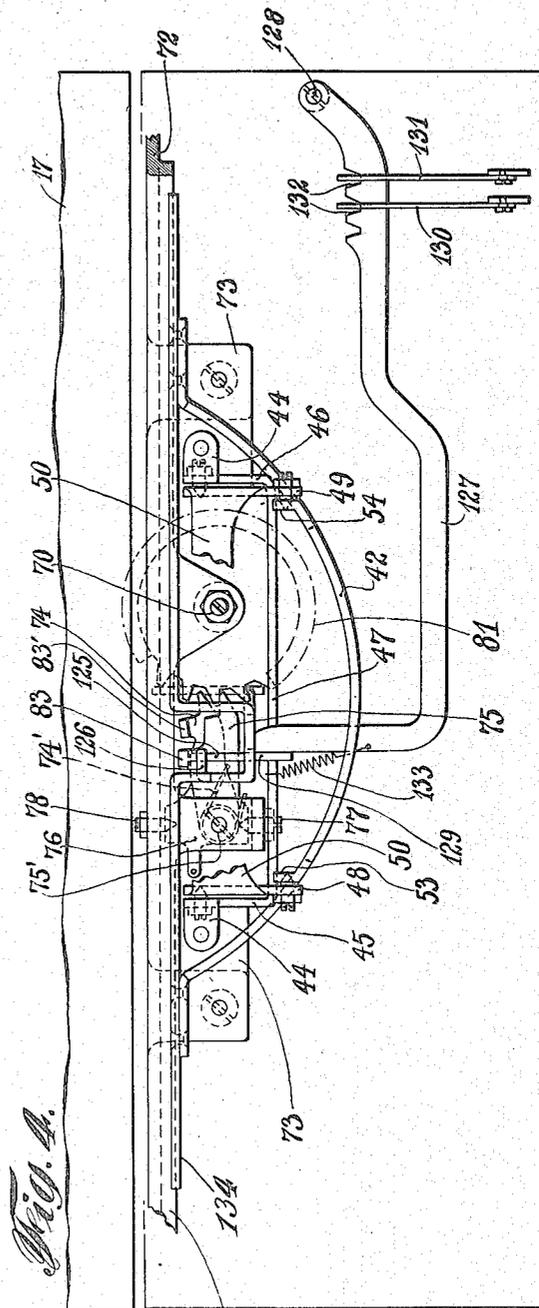


Fig. 4.

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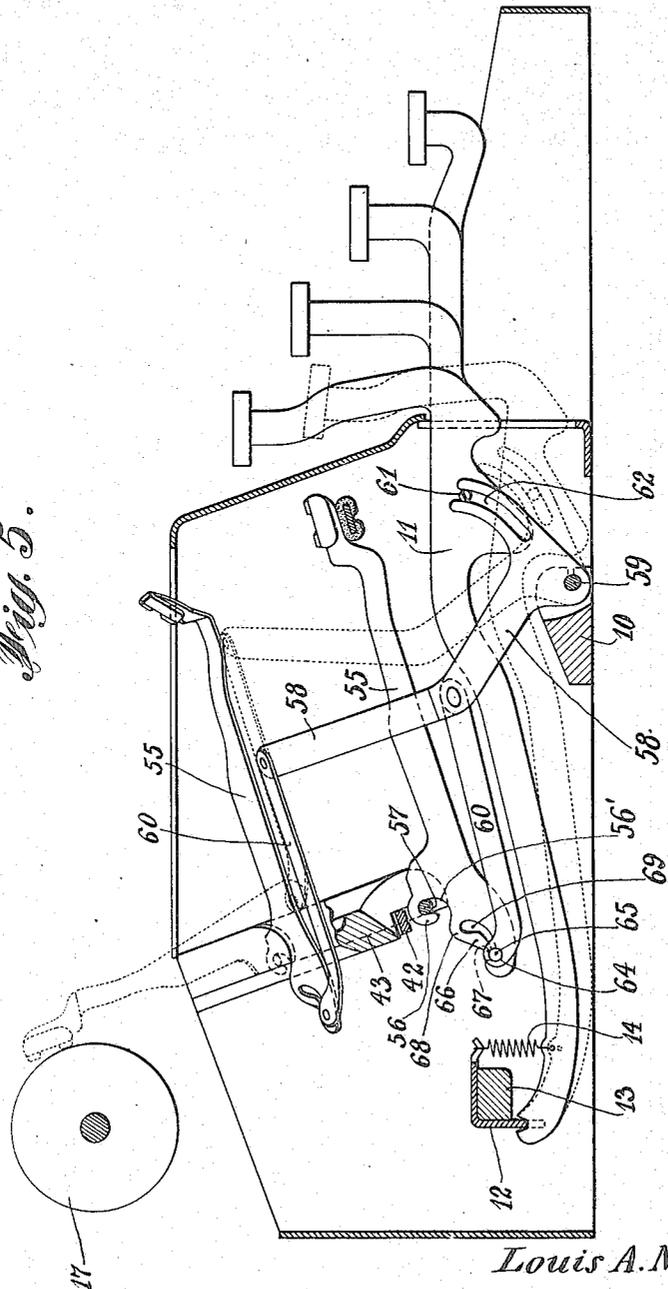
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Fig. 5.



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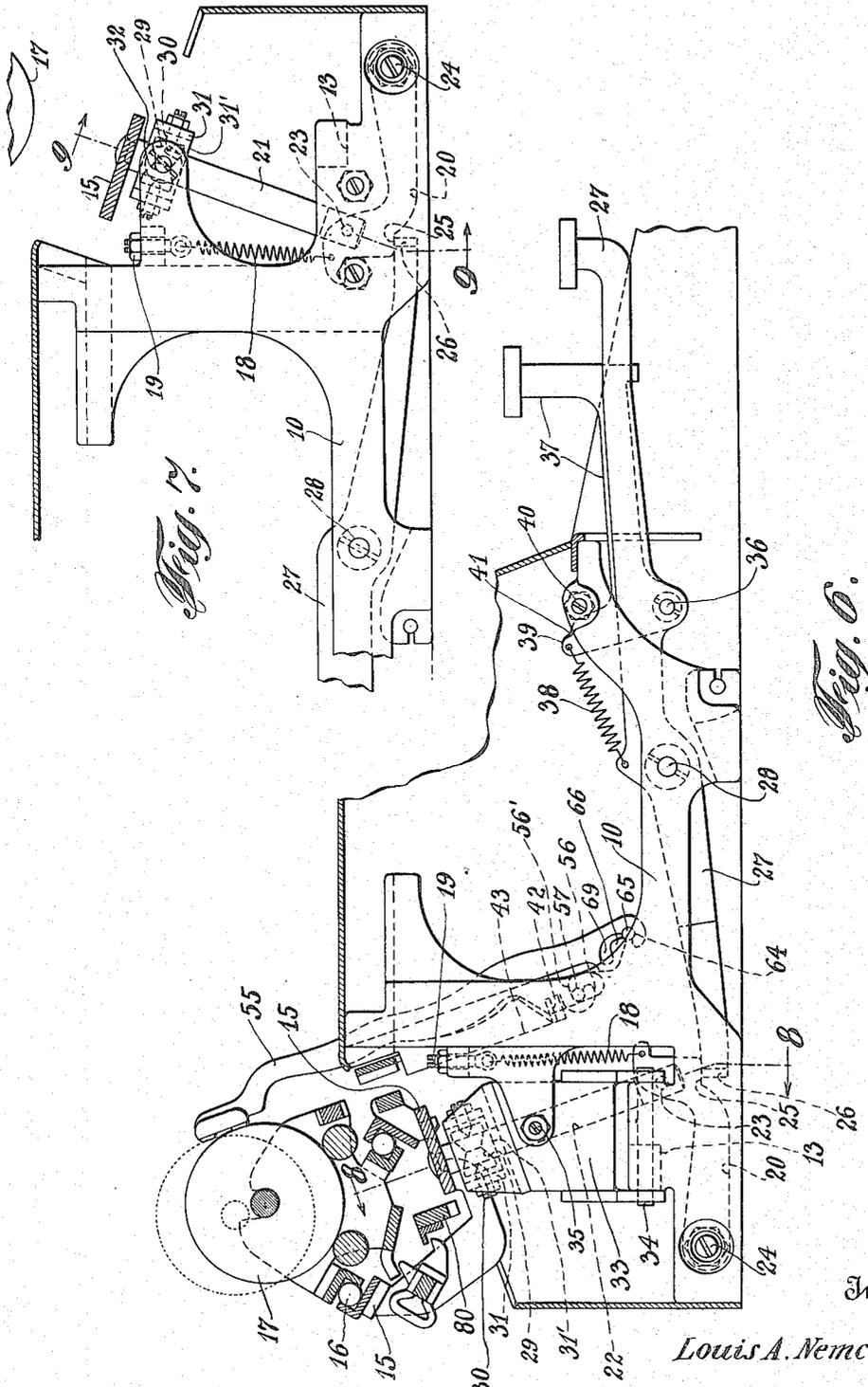
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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

Original Filed Sept. 21, 1922 7 Sheets-Sheet 4



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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

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Fig. 8.

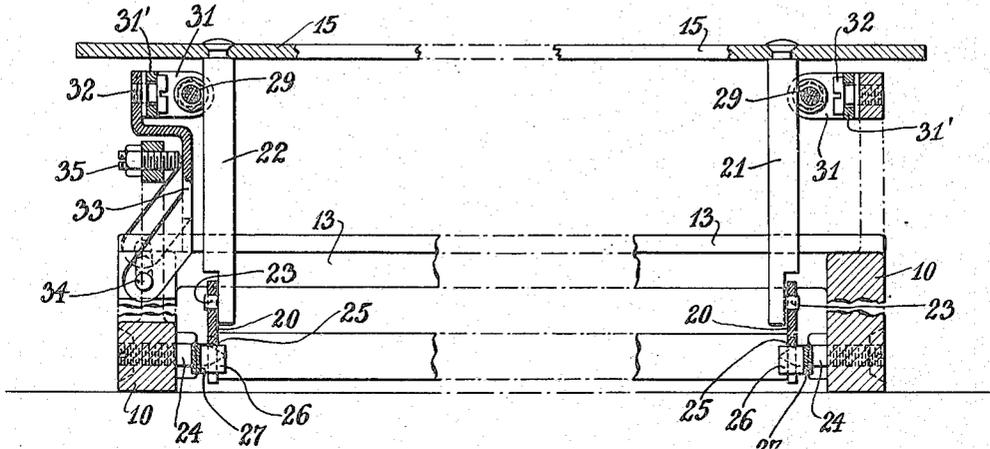


Fig. 9.

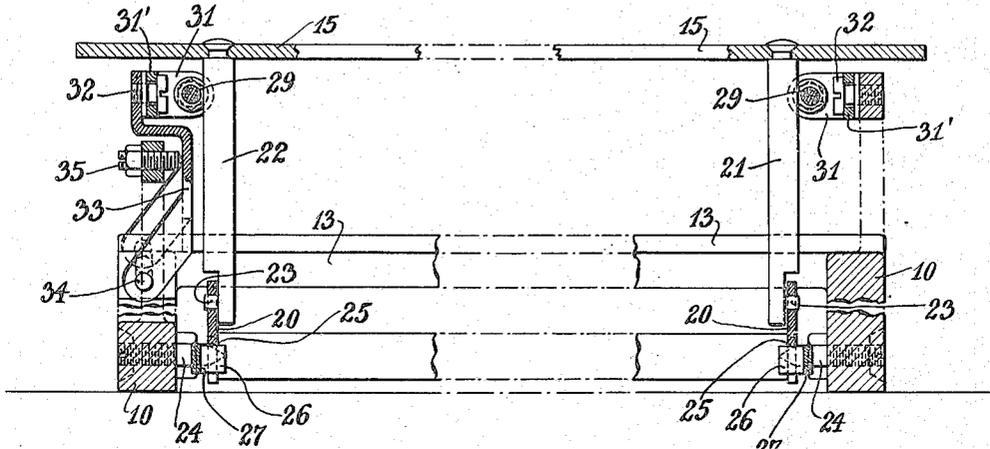


Fig. 10.

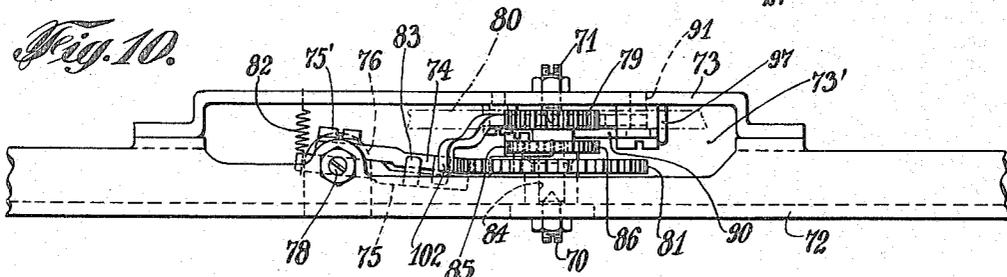


Fig. 11.

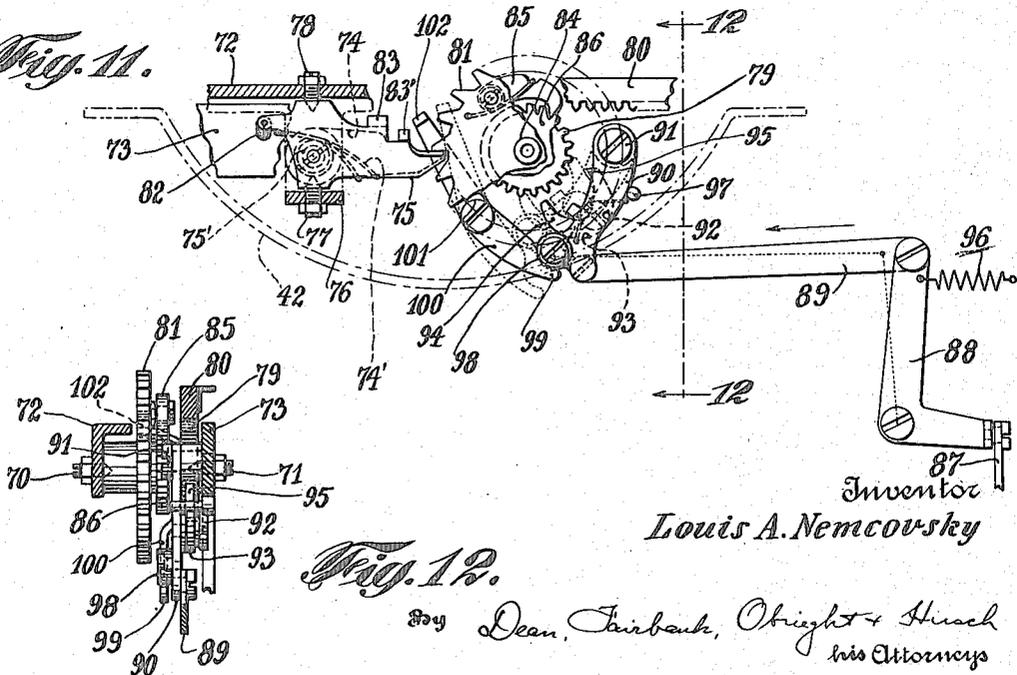


Fig. 12.

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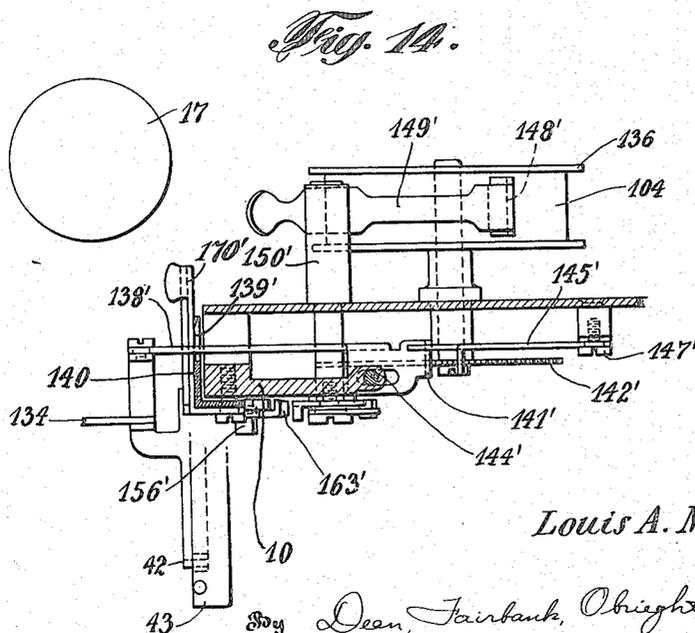
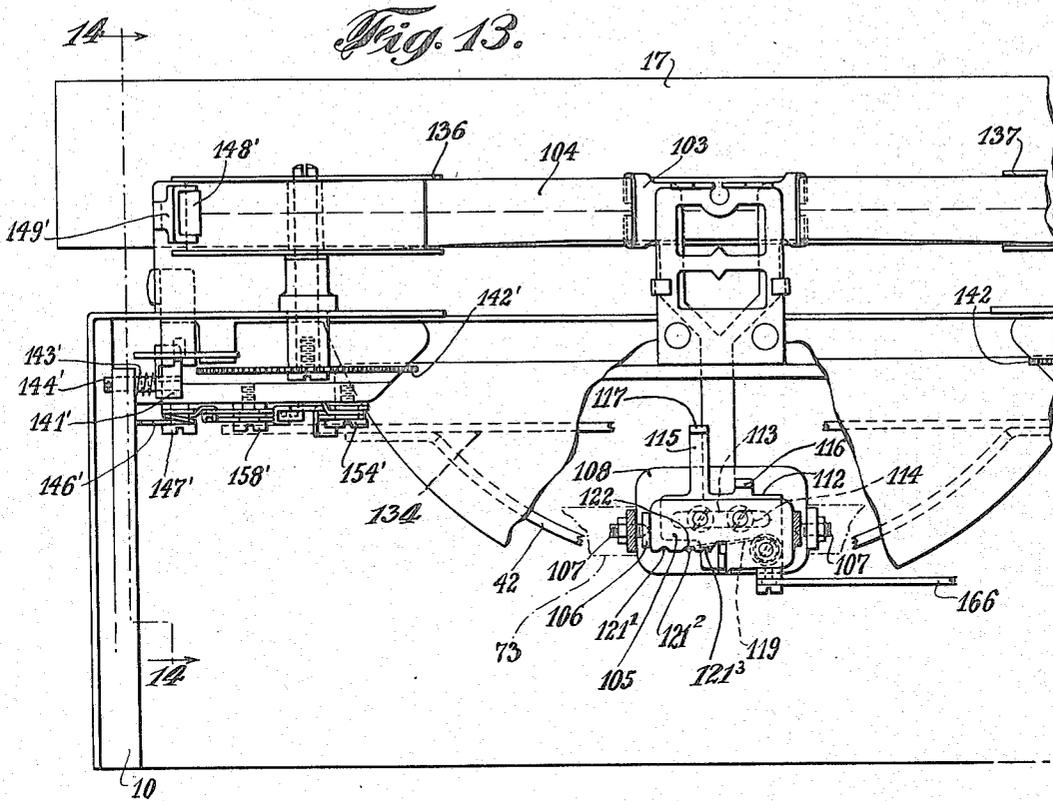
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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

Original Filed Sept. 21, 1922 7 Sheets-Sheet 6



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TYPEWRITING MACHINE AND THE ELEMENTS THEREOF

Original Filed Sept. 21, 1922 7 Sheets-Sheet 7

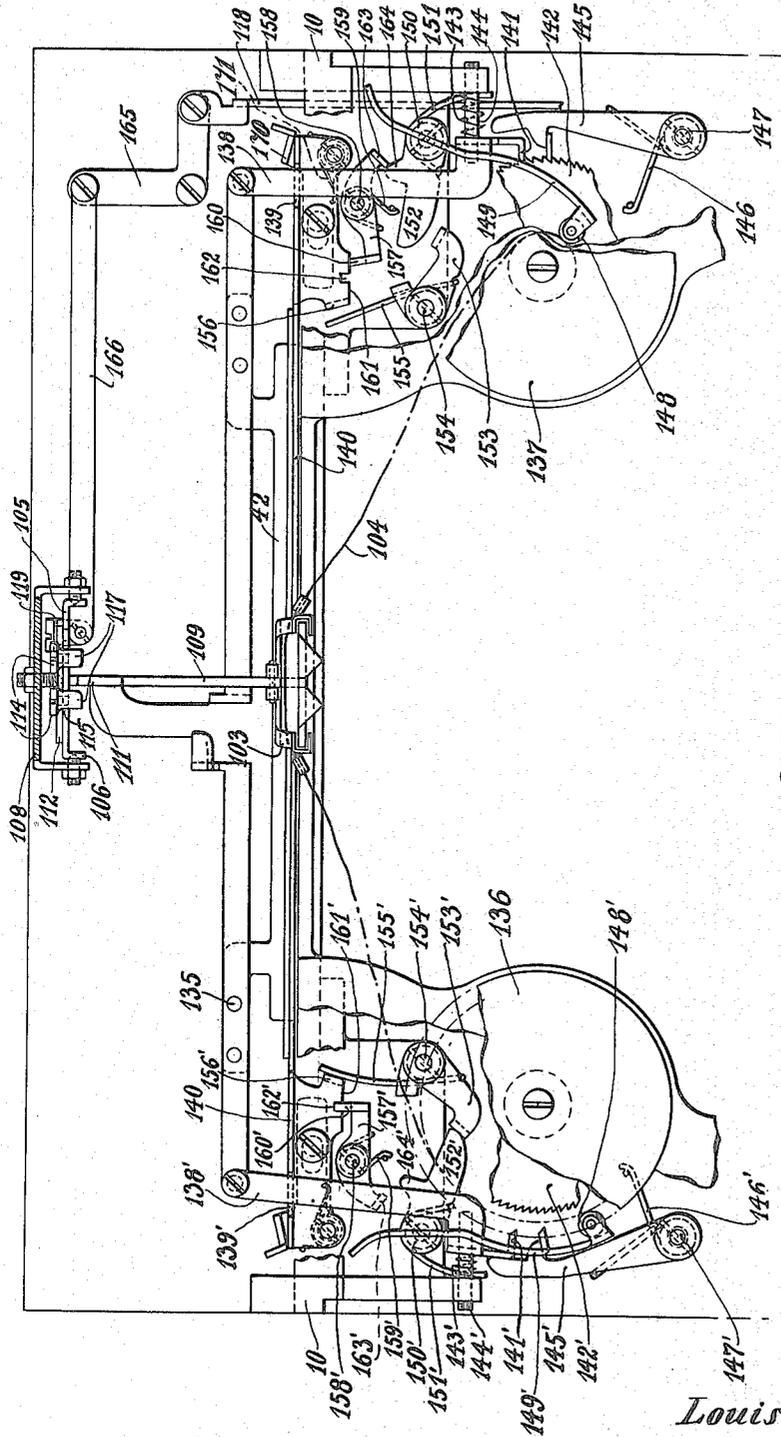


Fig. 15.

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UNITED STATES PATENT OFFICE.

LOUIS A. NEMCOVSKY, OF NEW YORK, N. Y.

TYPEWRITING MACHINE AND THE ELEMENTS THEREOF.

Application filed September 21, 1922, Serial No. 589,571. Renewed June 28, 1924.

To all whom it may concern:

Be it known that I, LOUIS A. NEMCOVSKY, a citizen of the United States, and resident of New York City, in the county of New York and State of New York, have invented certain new and useful Improvements in Typewriting Machines and the Elements Thereof, of which the following is a specification.

My present invention relates to typewriting machines and in its more specific application to machines of the type designated as portable. Portable typewriting machines equipped with keyboards departing from standard, are difficult to operate by typists ordinarily trained to operate on standard key boards, while portable typewriters designed to be collapsed for enclosing into the box and set up for use may be lacking in the durability of non-collapsible typewriters and are more likely to become out of order.

It is an object of my invention to provide a portable typewriter having a standard key board of usual dimensions, which typewriter shall be light in weight, non-collapsible and correspondingly durable in construction and of small exterior dimensions, so that it can be enclosed in normal operative condition within a small case.

According to a feature of the invention, the parts of the typewriting machine are assembled in a particularly compact relation to confine the outside dimensions of the machine within minimum proportions. In the preferred embodiment the universal bar is actuated by the type bars and is assembled to the segment plate and has an open structure to afford space for accommodating the escapement pinion and associated devices which are mounted on the movable carriage base plate. The platen is raised in an oblique direction for the case shift and the segment plate is disposed at the same inclination, thereby limiting the height of the machine and affording space below the carriage for the ribbon shift mechanism, which is preferably mounted on the carriage base plate and is actuated from the rear of the universal bar, the shift mechanism including a link extending forward between the universal bar and the key levers therebelow.

The type bar supporting bail on the segment plate is disposed with its central or lowermost part substantially at the level of the upper edges of the bank of key levers, so

that the machine is correspondingly low, the connecting linkage from the bank of key levers to the type bar heels occupying little space otherwise useful, said linkage being disposed largely in the spaces between the key levers and below the upper edges thereof.

Another object of my invention is to provide simple and effective printing mechanism and actuating linkage therefor, in which impact printing shall be assured with the type well aligned and in which the type bars or printing levers may be readily installed in and removed from the machine, without the need for any special tools, both in original assembly and in repair of the machine.

In the preferred embodiment, each key lever actuates the corresponding printing lever or type bar through linkage, including a sub-lever and a pitman connecting the latter to the heel of the printing lever, a pin on the key lever sliding in a slot in the sub-lever curved in such manner as to bring about a rapid acceleration of the printing lever toward the end of its printing stroke. The hook on each type bar straddles the support bail with substantially no clearance in the direction of the length of the bar, so that accurate alignment of the printed type is assured.

The type bar is removably anchored to the linkage by providing a projection in the latter fitting into a corresponding groove in the heel of the former, the type bar heel having an integral pointed tongue to maintain the projection against egress from the groove, said tongue affording sufficient flexibility to permit application and removal of the type bar.

Another object of my invention is to provide simple, easily operating case shifting means, easy to assemble and readily and delicately adjustable to properly regulate the shift.

In the preferred embodiment the typewriter carriage has a pair of rods at right angles to the length thereof, roller bearings being provided therefor in the base frame, said roller bearings being automatically adjustable about appropriate axes for ready adaptation to the travel of the rods.

In the preferred embodiment the roller bearing for one of the rods is mounted in a bracket pivoted about an axis such as to permit displacement of the roller bearing

from the rod, whereby the carriage can be easily assembled upon the frame and the bracket thereupon returned to bring the roller bearings into coaction with the rod, appropriate means being provided to maintain it in set position.

In the preferred embodiment, the rods are supported upon pivoted levers raised by the depression of the case shift key and adjustable screw stop elements are provided to determine the lowermost and the uppermost position of said lever and therefore of the platen.

Another object of the invention is to provide a universal bar which shall operate in an accurately determined path with a minimum of friction. In the preferred embodiment, the universal bar is suspended from a rocker mounted on the segment plate and an additional link at each side parallel to the rocker arms, to effect a parallel link movement of the universal bar.

Another object is to provide a ribbon shift mechanism of simple construction which is adapted to be readily set for bringing into the path of the type, any portion of the width of the ribbon, one special application being to the selective use of either color on a two-color ribbon, the construction having preferably a third or inoperative setting for stencil writing or cutting where the ribbon is maintained out of the path of operation of the type bars. In the preferred embodiment, the ribbon shift mechanism includes a pivoted lever, one of the arms of which has fingers of different lengths, adjustment means being provided to bring any of said fingers into the path of operation of the universal bar.

Another object is to provide combined escapement and back spacing mechanism of simple construction, in which, each function can be performed without interference from the parts of the mechanism which perform the other. In the preferred embodiment, the back spacing mechanism includes an escapement for rotating the usual escapement pinion in reverse direction, a locking lever being provided actuated by operation of the back space mechanism to lock the star wheel of the advancing mechanism against reverse rotation.

Another object is to provide a typewriting machine in which the operation of certain keys, such as accent, umlaut or cedilla keys is effected by simple mechanism, so that any of these characters may be printed in the same space with the associated letter, without need for performing a back spacing operation.

In the preferred embodiment, a member is interposed between the universal bar and the escapement pawls, through which the thrust from the former is transmitted to the latter, said interposed member being con-

nected to the non-escapement keys so that upon actuating one of the latter, the interposed member is moved out of the path to the universal bar, whereby the latter will move in the intervening space without operating the escapement.

Another object of the invention is to provide an automatic ribbon reverse mechanism of simple, durable and compact construction not likely to become out of order. In the preferred specific embodiment, the universal bar actuates a pair of pawls near the opposite ends of the rod for cooperation with the ratchet wheels associated with the typewriter ribbon spool, the position of a control bar determining which of the pawls is in operative connection and which in inoperative. Means is provided actuated by the thickness of ribbon on the spool for automatically shifting the control bar to effect the ribbon reverse, and alternative means may be provided for effecting ribbon reverse, whenever desired by a manual operation. The automatic ribbon reverse means comprises a feeler member pressed against the outer convolution of the ribbon and operating through a pivot lever to actuate a spring, controlled by a shifting member to shift the control bar, and a locking or positioning member to prevent movement of the control bar beyond either set position.

Another object of the invention is to provide a case shift lock mechanism of particularly simple and reliable construction. This mechanism preferably comprises a lock key pivoted upon the shift key, a fixed pin across the front of the machine coacting with a shoulder on said lock key when set to maintain the shift key depressed.

In the present application I claim the general arrangement of the parts of the machine. The ribbon reverse mechanism is claimed in my copending application, Serial No. 607,766, filed December 19, 1922, the type action in my copending application, Serial No. 647,776, filed June 26, 1923 and other features, including the universal bar, the case shift mechanism, the escapement, the back spacer, the ribbon shift mechanism and the accent key mechanism, are each claimed per se in my copending application, Serial No. 726,063 filed July 15, 1924.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of this invention,

Fig. 1 is a view in longitudinal cross-section through a preferred form of typewriting machine,

Fig. 2 is a fragmentary view similar to Fig. 1 showing some of the parts removed to better reveal the construction of other parts,

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1,

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 1,

Fig. 5 is a view in longitudinal cross-section showing only the details of the type bar and the operating linkage therefor,

Fig. 6 is a view in longitudinal cross-section showing the details of the case shift structure and case shift lock mechanism at one side of the machine,

Fig. 7 is a fragmentary detail view, partly in section, showing the case shift mechanism at the other side of the machine,

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 6,

Fig. 9 is a sectional view taken along the line 9—9 of Fig. 7,

Fig. 10 is a detail plan view showing the escapement and back space mechanism and the mounting means therefor,

Fig. 11 is a front elevation of the mechanism shown in Fig. 10,

Fig. 12 is a sectional view taken along the line 12—12 of Fig. 11,

Fig. 13 is a fragmentary rear elevation of the machine,

Fig. 14 is a sectional view taken along the line 14—14 of Fig. 13, and;

Fig. 15 is a plan view of the ribbon shift and ribbon vibrating mechanism.

Similar reference characters refer to similar parts throughout the several views of the drawings.

General construction.

The general layout of the machine will now be set forth, the separate constituent sub-combination elements making up the mechanism being described in greater detail under corresponding separate headings below.

Referring now to the drawings, I have shown a portable typewriter comprising a base frame 10 upon which are mounted in the manner usual with desk typewriting machines, the typing key levers 11 of a standard key board having four rows of keys. Each key lever is mounted in the manner usual with desk typewriting machines by pivoting at its rear end on an angle bar 12 resting upon a cross bar 13, the lever being maintained in elevated position by coil spring 14 connecting the lever to a tongue on the end of the angle bar.

As shown in the drawings, the segment plate 42 is disposed relatively low, the central or lowest point of the type bar supporting bail 57 thereon being substantially at the level of the upper edges of the bank of key levers 10. The connecting linkage from the key levers to the type bar heels occupies little space otherwise useful, said linkage being disposed largely in the space between the key levers and below the upper edges

thereof. The height of the machine is preferably further reduced by inclining the segment plate rearward, in the embodiment shown in the drawings about 20 degrees, leaving ample space, back of the lower or forward part of the segment plate for the escapement and related mechanism, which latter is preferably mounted on the carriage base plate and extends within the boundaries of the universal bar, between the segment plate and the rear of the machine.

The typewriter carriage includes the usual base plate 15 having ball bearings 16 on which is mounted the platen 17. The counterbalance springs (see Figs. 6 and 7) are shown at 18 secured to the frame 10 each by an eye bolt and nut 19 and at the opposite end each to a lever 20 through which the carriage is elevated for case shift by mechanism to be described below. By adjustment of nuts 19, the tension of springs 18 may be regulated to accurately set the counterbalance.

The case-shift mechanism.

The shift key mechanism comprises a pair of rods 21 and 22 rigid with the typewriter carriage base and extending at right angles to the axis thereof and inclined from vertical, as shown, at an angle of about 20 degrees to extend parallel to the segment plate. The rods are pivoted as at 23 to a pair of the levers 20 rigidly connected together and pivoted about an axis 24 near the rear of the machine, one of said levers having a depression 25 coacting with a tongue 26 at the rear end of the usual shift key lever 27 which is pivoted to the frame as at 28.

The rods 21 and 22 are preferably mounted in roller bearings to permit elevation of the carriage for shifting, with a minimum of friction. In the preferred embodiment, the bearings for one of the rods 21 comprise a pair of rollers 29 pivoted on screws 30 in the arms of a U-shaped bracket 31, the latter pivotally mounted on the side frame by a screw 32 through its cross-piece 33. It will be seen, therefore, that in the application of the carriage in assembly and in the shifting operation, the rollers will readily adapt themselves by rotation about the screw 32 for easy, relatively frictionless operation.

The roller bearings 29 for the other rod 22 are preferably identical with those described but instead of being mounted direct upon the side frame, said bearings are similarly secured to a carrying bracket 33 pivoted as at 34 about an axis parallel to that of the roller bearings 29, the bracket in its entirety being shifted about pivot 34 to shift the corresponding roller bearings 29 away from the roller bearings for rod 21, so that the carriage can be readily mounted in position on the base frame without danger of

jamming or binding the rods 21 and 22 between the the two sets of roller bearings. A stop screw 35 extending through the main frame coacts with bracket 33 to dispose the roller bearing into proper coaction with the rod 22, after the carriage has been set into the base frame. If desired, two or more sets of roller bearings may be provided for each rod.

Pivoted upon the shift key lever 27 as at 36 is the shift key lock lever 37 maintained in normal raised position by a coil spring 38 connecting integral tongue 39 of the lock member to the shift key lever. A fixed rod 40 extends across the frame of the machine and a notch 41 near the upper forward edge of tongue 39 is arranged to extend under rod 40 for locking the shift key in depressed position. Thus, to lock for capitals, the lock lever 37 is depressed, lowering the shift key lever 27 with it, the lock lever moving about its support pin 36 on the shift key lever, to dispose the notch 41 thereof below the rod 40, so that the vertical arm of the lock key lever serves as a strut, to maintain the shift key in depressed position.

To release the lock, the shift key is depressed, the resilience of the material permitting the slight depression, so as to release the grip of the strut on the cross bar 40, allowing the spring 38 to retract the lock lever 37.

The universal bar.

The universal bar comprises an arcuate member 42 extending immediately below and assembled to the segment plate 43 which is mounted at an inclination to the vertical, parallel to the case shift rods 21 and 22. In the present embodiment, as shown in the drawings, the segment plate is curved in the plane thereof and is inclined at an angle of substantially 20 degrees from the vertical. The universal bar is supported in a special manner to reduce the frictional losses to a minimum and to eliminate inaccuracies resulting from wear. For this purpose, I provide a support bracket 44 upon the frame preferably secured as by screws 44' to the segment plate 43 and having a pair of parallel arms 45 and 46 extending rearward and connected by a bar 47. In the preferred embodiment, the suspension comprises a rocker formed of a pair of parallel links 48 and 49, depending respectively from bracket arms 45 and 46 and rigidly connected by a cross bar 50. A pair of separate and distinct links 51 and 52 are pivoted to the rearward or free ends of bracket arms 45 and 46. The universal bar is formed with integral lugs 53 and 54 extending rearward from the arcuate segment 42 thereof, and supported respectively from bracket arms 45 and 46 by parallel links 48 and 51 and links 49 and 52. The escapement and

associated mechanisms mounted on the carriage base plate extend into the free space thus provided back of the segment plate and between the universal bar supporting links, as will be more fully described hereinafter. The universal bar, as will be hereinafter described, has separate elements for initiating a plurality of separate and distinct operations of the machine. It will be seen that in operation of the universal bar, the same moves by a parallel link movement, the links advancing and returning by movement parallel to each other. The displacement of the universal bar is by movement strictly parallel to itself without danger of cocking or inclination and without engendering appreciable friction or wear.

The type bar mechanism.

The type bars or printing levers 55 are provided with integral hooks 56 at their heels straddling the arcuate support bail 57 which is carried in the usual manner by the segment plate and extends below the universal bar segment 42, as shown. Each type bar is connected with the corresponding key lever by a linkage, which preferably comprises a bell crank sub-lever 58 pivoted to the base of the frame as at 59 and connected to the heel of the key lever by a pitman 60. The key lever has a pin or lug 61 to ride in an arcuate slot 62 in the adjoining arm of the sub-lever, the shape of the arcuate slot being such that as the key lever is depressed, the initial movement of the sub-lever will be relatively slow, but as the pin approaches the lower end of the arcuate slot, the latter will be more nearly at right angles to the path of the pin, so that the lost motion between the pin and the slot will be reduced and the sub-lever will move about its pivot more rapidly than at the outset, effecting an accelerated operation of the type bar, so that effective impact printing results. As shown in the drawings, the angle of movement of the type bars is preferably about 95 degrees.

The type bars are preferably formed and arranged to be readily removable and replaceable from the machine. For this purpose, each type bar is provided with a notch 64 at its heel, into which fits a lug 65 which may be a rivet at the adjacent end of the pitman lever 60, the heel of the type bar being also formed with an integral tongue 66 having a point 67 extending toward the notch 64. The tongue 66 has a reduced root 68 to render the same slightly flexible thereabout, so that the rivet 65 can be forced into the notch, the tongue yielding sufficiently to allow the diameter of the rivet to pass the same and then blocking egress of the rivet 65 from notch 64. In the operation of the machine, it will be seen that the rivet on the pitman tends to move towards the inner end of the slot 69 formed between

the tongue 66 and the main body of the type bar heel. For removal of the type bar, it is merely necessary to force the yielding tongue 66 inward slightly about its reduced root 68 to allow removal of the pitman lever rivet 65 therefrom, whereupon the lever hook 56 may be lifted from the support bail 57 and the replacement of the type bar will proceed in a manner obvious from the foregoing description.

The slot 56' is preferably no wider than the diameter of the support bail, and is straight for the major portion of its length, which extends at right angles to the length of the type bar. It follows that there is no likelihood of shifting of the type bar upward or downward with respect to bail 57, and the typed characters will be accurately aligned.

The escapement and back space mechanism.

The pivot pins 70 and 71 for the escapement and back space mechanism are mounted respectively in an angle bar 72 secured to the base plate of the carriage, and a backing bar 73 bolted to said angle bar, and affording a space 73' therebetween for accommodating said escapement and back space mechanism. The tight and limber escapement pawls 74 and 75 respectively, also are disposed between angle bar and backing bar, pivots 77 and 78 supporting the tight pawl 74 by ears 76 formed integrally therewith. The limber pawl 75 is pivoted as at 75' upon the fixed pawl 74, and a spring 82 connected to the tail of pawl 74 urges the limber pawl 75 into cooperation with the wheel, while the tight pawl normally extends in front of the star wheel, out of mesh therewith. Spring 74' urges pawl 75 to an elevated position limited by tongue 83 on fixed pawl 74. The carriage spring drum (not shown) urges the limber pawl 75 downward against the resistance of spring 74', tongue 83' on said pawl limiting said movement by its engagement with the edge of fixed pawl 74. The angle and backing bar assembly is located on the carriage base, to the rear of the front end of bracket arms 45 and 46 and of universal bar lugs 53 and 54, and projects downward therefrom below the upper end of the universal bar and to the rear of the segment 42 thereof. The escapement and back space mechanism together with the actuating pawls 74 and 75 are thus disposed within the space determined by bracket arms 45 and 46 and lugs 53 and 54, as will appear clearly from Figs. 3, 4 and 10 of the drawings. The escapement mechanism includes the usual escapement pinion 79 enmeshed with rack 80 on the carriage. The tight and limber pawls 74 and 75 coact with the teeth of the star wheel 81, which is rotated for the step by step advance of the carriage, by energy from the spring drum

(not shown). In the usual manner, the limber pawl 75 is normally in coaction with the teeth of the star wheel 81 and the tight pawl 74 is to the front thereof, out of mesh therewith. Upon shift of said pawls as a unit about pivot pins 77 and 78 as an axis, the limber pawl will be released from engagement with the star wheel, the expansion of its spring 74' moving it upward about its pivot through the width of one star wheel tooth, and the tight pawl enters into engagement with the star wheel. When the universal bar returns to normal position, spring 82 returns the limber pawl into mesh and the fixed pawl out of mesh with the star wheel, and the carriage spring drum overcomes the resistance of spring 74', advancing the star wheel through the width of one tooth limited by contact of tongue 83' on the pawl 75 with the upper edge of the fixed pawl 74.

The star wheel 81 is freely mounted upon the support shaft 84, but is connected through spring pawl 85 to the ratchet wheel 86, rotatable as a rigid unit with the pinion 79, upon the common axis of said elements. Advance thus takes place by the rotation of pinion 79 through rack 80 and with it of ratchet wheel 86, the latter effecting rotation of the star wheel 81 through the pawl 85, as above described.

For the back spacing operation, I provide a back space key 87 operating through a bell crank lever 88 and a pitman 89 upon a link 90 pivoted as at 91 adjacent the pinion 79 and having pivoted thereon as at 92, a double ended escapement pawl 93, having two arms 94 and 95. The spring 96 which maintains the back space key mechanism in normal position acts to normally maintain link 90 against its stop 97. The link also has the roller 98 at its free end to coact with the notched end 99 of a locking lever 100 pivoted near its center about screw 101 and having a locking tongue 102 normally displaced from the star wheel but adapted to come into coaction therewith as indicated in dotted lines.

Upon operation of the back space key, the bell crank lever 88 is rotated in counterclockwise direction, drawing the pitman 89 in the direction of the arrow, to shift the link 90 about its pivot 91 and through said link to shift lever 100 about its pivot 101 and bring its hook 102 into locking coaction with the star wheel 81 to prevent reverse movement. In this operation, the escapement pawl 93 is brought toward and into mesh with the pinion 79 and rotates the latter in clockwise direction to back space the carriage, arm 95 preventing overthrow or backlash. The ratchet wheel 86 rotates as a unit with pinion 79 to which it is rigidly connected and, accordingly, readily ratchets over pawl 85. The locking lever restrains

the star wheel 81 throughout this operation against clockwise rotation with the ratchet wheel, so that the pawls 74 and 75 and the universal bar are not affected by the back spacing operation.

The ribbon shift mechanism.

This mechanism is preferably mounted on the carriage base plate rather than on the frame. The ribbon 104 is held in the usual bracket holder 103 and adjacent the platen and below the path of the type on the type bars. The shift of the ribbon for raising it to printing position is effected through linkage attached to the carriage base plate in the path of movement of the universal bar and extending, as indicated in the drawings, under the universal bar between the latter and the key levers, so that the mechanism does not add materially to the over-all dimensions of the machine. The linkage 108 comprises a plate element 105 having integral ears 106 pivoted as at 107 in yoke bracket 108, the latter secured to the rear of the backing bar 73, which is secured on the carriage base plate as heretofore described. Integral with plate 105 is an arm 109 extending forward therefrom and terminating adjacent the segment plate 43. A rod 110 is pivotally connected to the forward end of arm 109 and supports the ribbon bracket frame 103 at its upper end. The pivoted link 105 is in the character of a bell crank lever having an arm extending upward from the pivot 107 and into the path of the nose 111 formed integrally at the rear of the universal bar plate 134 which is riveted as at 135 to the arcuate element 42 of said bar. Although this lever arm may be formed with a fixed point to be engaged by the nose 111 in order to raise the ribbon through a fixed range at each operation, I have shown an arrangement providing for two alternative degrees of elevation of the ribbon and particularly useful for a two-color ribbon shift mechanism, and affording a third setting out of the path of operation of the universal bar, for stencil writing. In the preferred embodiment shown, the pivot plate 105 has mounted thereon an adjustment plate 112 provided with an elongated slot 113 secured to the pivot plate 105 by screws 114 extending through the slot 113 into plate 105. The auxiliary plate 112 carries a pair of integral upstanding tongues 115 and 116 of different lengths, having forwardly projecting ends 117, either of which tongue ends may be brought into the path of the nose 111 of the universal bar by corresponding shift of the auxiliary plate 112 along pins 114.

A coil spring 119 carried on the plate 105 has an end hook 120 to snap into any one of three notches 121¹, 121², and 121³ in the auxiliary plate 112, for accurately positioning the same in any setting, the central of

said notches corresponding to stencil setting in which both fingers 115 and 116 are maintained out of the path of operation of the universal bar and the ribbon is not vibrated. Notches 121¹ and 121³ correspond to the two operative or ribbon vibrating settings, in which tongues 115 and 116 respectively are in the path of the universal bar. Stops 123 and 124 are provided upon yoke bracket 108 for limiting the displacement of the tongues 115 and 116 respectively, and these stops may be adjustable screws, as shown.

In the preferred embodiment, the usual shift lever (not shown) is employed to set the ribbon vibrator in any of its alternative positions, said member serving to shift the auxiliary plate 112 through a transmission including link 118, bell crank lever 165 and link 166 (Fig. 15).

It will be seen that the ribbon vibrating linkage affords substantial multiplication of displacement, by reason of the long lever arm of link 109 compared to that of the tongues 115 or 116 actuated by the universal bar. Therefore, the elevation of the ribbon will be substantially greater than the shift of the universal bar. The ribbon vibrating mechanism, however, does not add substantially to the bulk of the machine, since the linkage is fitted into spaces otherwise unoccupied below the platen to the rear of the universal bar and between the latter and above the key levers.

It will readily be understood that when the longer arm 115 is arranged to be in the path of the universal bar, the link will be shifted by the operation of the universal bar through a lesser range about its pivot 107 than when the shorter tongue 116 is thus arranged.

It will be understood that by adjustment of screw stops 123 and 124, the shift of the ribbon may be readily and accurately adjusted, thereby obviating the likelihood of typing the upper half of a letter in one color and the lower in another, which may otherwise occur in the use of two-color ribbons.

If desired, more than two stops 115 and 116 of graduated lengths may be provided to afford a plurality of changes of printing zone on a ribbon, so that any selected portion of the width of a ribbon of any width may be placed in the path of the printing type. By such construction, the entire width of a single color ribbon may be used without need for removing the ribbon from the machine for adjustment.

Assembly.

The ribbon vibrating mechanism is first positioned in approximately correct position on the previously assembled base structure. The carriage base frame 15 with the combined escapement and back-space mechanism previously assembled thereon is now

applied to the base frame by first loosening bracket screw 35 and passing shift rods 21 and 22 on the carriage downward, along the roller bearing guides 29. The escapement and back space mechanism is thus disposed in the space afforded between the universal bar supporting rocker and the rear support links 51 and 52, and plate 105 on the ribbon shift mechanism extends between the sides of yoke bracket 108. Pivot screws 107 are now tightened to pivotally support the ribbon shift linkage from the yoke bracket in the manner previously described. The assembly is completed by establishing the pivot connections between the lower ends of rods 21 and 22 and levers 20, and by tightening screw 35 to move bracket 33 and with it the corresponding roller bearing into coaction with the associated rod 22.

The accent key mechanism.

More particularly in foreign languages, there is occasion to type certain auxiliary marks, such as accents, umlauts and cedillas, in the same space with the usual letters. With the ordinary typewriter, it is necessary after printing a letter to operate the back space key in order to realign for then printing the auxiliary character in the same space. According to my invention, I arrange those keys that correspond to the auxiliary marks to effect the regular universal bar operation, but to omit the operation of the escapement.

For this purpose, the thrust from the universal bar to the escapement pawls 74 and 75 is transmitted through an interposed piece 125 normally maintained in place but automatically removed while one of the said non-escapement keys is depressed, so that the universal bar will operate all of the control mechanism in the normal fashion with the exception only of the escapement mechanism.

In the preferred specific embodiment, the universal bar plate 134 is provided with an escapement operating tongue 126 and a long lever 127 pivoted as at 128 near one end of the machine has a tongue 129, the end of which constitutes the piece 125, normally maintained interposed between the tongue 126 on the universal bar and the escapement pawl 74, so that in normal operation, the thrust is transmitted therethrough to the escapement pawls from the tongue 126 on the universal bar. The said non-escapement keys are preferably connected to lever 127 by links such as 130 and 131 fitting in corresponding notches 132 in the lever, so that upon depression of any of said keys, the lever 127 will be depressed about its pivot against the resistance of spring 133 to remove piece 125 from between the universal bar tongue 126 and the pawl 74, so that in

the continued movement of the key as the printing occurs and the universal bar is shifted, the shift of tongue 126 on the latter will take place in the gap left in advance thereof by the removal of the interposed element 125, wherefore the escapement pawl will not be released and the carriage will not be advanced.

It will be understood that in operation of the typewriter, the auxiliary accent, umlaut, cedilla or other character would be printed first, so that after printing, the typewriter carriage would remain in the same position, whereupon the associated regular character would be printed in the same space and the usual escapement advance would be effected automatically immediately thereafter.

The automatic ribbon reverse mechanism.

The usual spools 136 and 137 are provided between which the ribbon is fed through the holding bracket 123 therefor immediately in advance of the platen.

Having reference to the right-hand spool, the construction of which is identical with that of the left, corresponding parts bearing like reference characters, those at the left being primed, the universal bar plate 134 has pivoted to the one end thereof, a link 138 extending through a corresponding notch 139 in a transverse control bar 140, said link carrying at its forward end a pawl 141. A coil spring 143 encircles guide pin 144 and presses link 138 toward the left, so that pawl 141 is urged and maintained in operative coaction with ratchet 142 coaxial of spool 136. A detent pawl 145 is maintained in coaction with the ratchet wheel 142 by a coil spring 146 encircling its pivot 147.

Thus it will be seen that as the universal bar oscillates in the normal operation of the typewriter, the pawl 138 thereon in the return stroke thereof, after the type bar has printed, effects rotation of the ratchet wheel 142 to feed the ribbon 104 thereto from the spool 136, which is maintained in idle condition, the control bar 140 when in the position shown, maintaining the corresponding link 138' at the left deflected toward the left and the corresponding pawl tooth 141' and detent pawl 145' out of engagement with the left ratchet wheel 142'.

For effecting a shift of the control bar 140 to disengage the pawl and ratchet connection at the right hand spool 137 and to concurrently engage the pawl and ratchet at the left hand spool 136 in order to effect reverse feed of the ribbon from the full right hand spool to the empty left hand spool, I provide mechanism now to be described.

In the preferred specific embodiment, this mechanism comprises a feeler roller 148 mounted at the end of an arm 149 and con-

tacting the outer convolution of the ribbon wound upon the spool, said arm being firmly anchored by fitting into a slot in a rotary pivot post 150, the latter having an encircling spring 151 to urge the feeler roller 148 firmly against the ribbon roll. Rigid with the pivot post 150 is an arm 152, which is rotated thereabout by the outward movement of the feeler roller 148 and the associated arm 149 as the thickness of the ribbon on the spool 137 increases. The operating arm 152 is free to coact with an arm 153 mounted adjacent thereto about a pivot 154 and having coiled thereabout a spring 155, the free end of which projects toward a shoulder or lug 156 formed integrally with the control bar 140. In addition to arm 153, there is a locking lever 157 pivoted as at 158 and encircled by coil spring 159 to urge its locking tongue 160 against the edge 161 of the control bar 140 and into notch 162 therein when the latter is aligned therewith, a tongue 163 at the free end of the locking lever being in the path of operation of a lug 164 on arm 152.

In the operation of the device, as the thickness of ribbon wound upon the spool 137 increases, the feeler arm 148 moves outward therewith, rotating arm 152 in counterclockwise direction, and finally contacting and shifting arm 153. After a predetermined thickness of ribbon has been wound on the spool, arm 153 will be shifted to such extent as to exert a considerable pressure through spring 155 against lug 156 on the control bar 140, to shift the entire control bar toward the right. This shift will not be impeded, for lock lever 157 is not aligned with notch 162, and the ribbon on the spool at the left being of small diameter, arm 152' is urged by its spring 151' in counterclockwise direction from the position shown, finger 164' contacting locking lever 157' and urging its locking tongue 160' out of notch 162'. The control bar, therefore, shifts to the right until the tongue 160 on the lock lever 157 comes into alignment with notch 162 on control bar 140, whereupon the spring 158 will snap lug 160 into engagement within the notch 162 to arrest the control bar against further advance.

By shift of the control bar toward the right, as set forth, the edge of notch 139 is brought into contact with link 138 and the latter is shifted thereby toward the right against the resistance of spring 143 and spring 146, displacing the pawl tooth 141 and the detent pawl 145 toward the right out of engagement with the ratchet wheel 142, into substantially the position shown at the left. Concurrently with this operation, the left end of the control bar 140 which has moved toward the right will no longer retain the link 138' pressed toward the left, so that the expansion of coil spring 143' will

urge link 138' toward the right and pawl 141' into coaction with the ratchet wheel 142', the detent pawl 145' being concurrently released to allow its spring 146' to effect corresponding coaction thereof with the ratchet wheel.

The corresponding spool being practically empty, the various levers will now have the relative position of the parts shown at the right-hand spool, so that the operation now proceeds in the identical manner heretofore described, the left-hand spool being rotated by the pawl and the ribbon being fed from the right-hand spool which is now idle.

Preferably, a releasing lever 170 is pivoted to control bar 140 and maintained by spring 171 above the upper edge of locking lever 157. By depression of finger pieces 171 formed integral with releasing lever 170, the latter is depressed to disengage locking lever 157 from locking notch 162 in control bar 140, and the latter is shifted to effect reverse manually, at any stage of the left to right ribbon feed, so as to feed from right to left. A similar releasing lever 170' is also provided for operating the left-hand locking lever 157' when it is desired to manually disconnect the operating pawl for the left-hand spool and to connect the right-hand spool for receiving the ribbon.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as new and desire to secure by Letters Patent is:

1. In a typewriting machine, in combination, a frame including a segment plate, a universal bar assembled to said frame adjacent said segment plate and extending to the rear thereof, escapement mechanism and ribbon shift mechanism to the rear of said segment plate, both actuated from said universal bar, part of said universal bar actuated mechanism extending between the front and rear of said universal bar.

2. In a typewriting machine, in combination, an inclined plane segment plate, a universal bar curved about said segment plate and extending to the rear thereof, and movable in a path substantially at right angles to said segment plate, a shift frame and carriage base mounted above and to

the rear of the segment plate, and escapement and ribbon shift mechanism fitting in the space under the carriage base and to the rear of the lower or forward end of the inclined segment plate.

3. In a typewriting machine, in combination, a segment plate, a universal bar extending to the rear thereof, escapement mechanism to the rear of said segment plate and between the front and the rear of said universal bar, and ribbon shift mechanism having a portion to the rear of said universal bar and actuated thereby, said shift mechanism including linkage extending forward toward said segment plate.

4. In a typewriting machine, in combination, a casing, an inclined segment plate therein, a universal bar to the rear of said segment plate, escapement mechanism below the upper end of said universal bar and between the forward and rear portions thereof, and ribbon shift mechanism actuated by the rear end of said universal bar, said ribbon shift mechanism including a link extending forward towards said segment plate and a second link connected thereto and coacting with the ribbon.

5. In a typewriting machine, in combination, a casing, an inclined segment plate therein, a universal bar curved about said segment plate and extending to the rear thereof, escapement mechanism below the upper end of said universal bar and between the forward and rear portions thereof, ribbon shift mechanism actuated by the rear end of said universal bar, said ribbon shift mechanism including a link extending forward toward said segment plate and a second link connected thereto and coacting with the ribbon, a shift carriage mounted on said casing and extending above the segment plate and in front of the rear of the machine, said escapement mechanism and ribbon shift mechanism being disposed entirely in front of the rear of the shift carriage, behind the lower or forward portion of the inclined segment plate.

6. In a typewriting machine, in combination, a casing, a plurality of key levers extending from the forward to the rear end thereof, an inclined segment plate, type bars actuated from said key levers, a universal bar extending below said segment plate to be actuated by said type bars, a ribbon shift mechanism to the rear of the rear point of said universal bar to be actuated thereby, said shift mechanism including a link extending forward below said universal bar and above said key levers, means connecting said link to the ribbon and escapement mechanism fitted within the space between the upper and lower end and the forward and rear end of said universal bar.

7. In a typewriting machine, in combination, a casing, a segment plate, a universal

bar, curved about said segment plate and extending to the rear thereof, a frame structure, rotary escapement means pivotally mounted in said frame structure, a yoke bracket secured to said frame structure, and ribbon vibrating mechanism pivotally mounted in said yoke frame, both said escapement mechanism and said ribbon vibrating mechanism mounted in the path of movement of said universal bar.

8. In a typewriting machine, in combination, a base frame, a segment plate thereon, a universal bar curved about said segment plate and extending to the rear thereof, a frame structure, rotary escapement mechanism mounted in said structure, said universal bar having an open structure to afford space for said escapement mechanism, a yoke frame mounted on said frame structure, a ribbon vibrating mechanism pivoted in said yoke frame and actuated by the rear part of the universal bar, said ribbon vibrating mechanism including a link element extending forward from said frame below said universal bar.

9. In a typewriting machine, in combination, a frame including a segment plate, a bracket mounted upon said plate, a universal bar mounted upon said bracket and curved about said segment plate to be operated by the type bars, and ribbon shift mechanism to the rear of the universal bar and including a link extending forward toward the segment plate for connection to the ribbon.

10. In a typewriting machine, in combination, a frame including a segment plate, a bracket mounted upon said plate, said bracket having arms extending to the rear of the segment plate, a universal bar pivoted to said arms, curved about said segment plate, to be operated by the type bars, and having an open structure between said arms, a carriage, and an escapement therefor extending into the open structure of said universal bar.

11. In a typewriting machine, in combination, a segment plate, a bracket member to the rear of said segment plate, said bracket member including a pair of parallel arms extending toward the rear of the machine, a universal bar suspended from said bracket arms, said universal bar including a segment element adjacent said segment plate, and a pair of arms extending rearward therefrom and adjacent said bracket arms, two pairs of parallel links, one pair pivoted to each of said bracket arms, and pivotally secured to the respective universal bar arms, a ribbon vibrating mechanism having an element actuated by the rear part of the universal bar, said ribbon vibrating mechanism including a link element extending forward from said element below said universal bar, and back space and escapement means dis-

posed in the space between said universal bar arms and above said ribbon vibrating link.

12. The combination set forth in claim 11 in which the segment plate and the universal bar are inclined, and the path of displacement of the various elements actuated by the universal bar is substantially at right angles to the segment plate, and in which the ribbon vibrating mechanism and escapement means extend in the space between the lower or forward end of the inclined segment plate and the rear of the machine.

13. In a typewriting machine, in combination, a base frame, a segment plate thereon, a universal bar, a carriage base plate, a frame secured to said carriage base plate, an escapement mechanism mounted in said frame, said universal bar having an open structure to afford space for said escapement mechanism when the carriage is applied to the base frame.

14. In a typewriting machine, in combination, a base frame, having a segment plate, a universal bar and key levers therebelow, a carriage having a base plate, ribbon shifting linkage mounted on said base plate, said linkage extending in the path of operation of said universal bar when the carriage base plate is assembled in position, said linkage including an element extending forward between said universal bar and said key levers toward said segment plate for actuating the ribbon.

15. In a typewriting machine, in combination, a base frame having a segment plate, a universal bar, key levers, a carriage base plate, a frame element supported thereon near the rear end thereof, ribbon shift linkage pivoted to said frame including a link extending forward between said universal bar and said key levers toward said segment plate and including a second link rigid therewith in the path of operation of the universal bar.

16. In a typewriting machine, in combination, a base structure having a segment plate, a universal bar, mounting means therefor, a plurality of key levers extending therebelow, a carriage base plate, frame elements secured thereto, escapement mechanism mounted on said frame means, said universal bar and the mounting means therefor having an open structure to afford space for said frame and said escapement, a ribbon shift linkage pivoted to said frame to the rear of said universal bar and having operating link means in the path of operation of the rear of said universal bar and including a link extending forward therefrom between said universal bar and said key levers, toward said segment plate, and a second link connected to the forward end thereof through which the ribbon is shifted.

17. The combination set forth in claim 16

in which the segment plate is inclined and in which the ribbon shift is pivotally assembled near the rear of the machine for operation by the rear of the universal bar, and includes a link extending forward to the vicinity of the segment plate.

18. In a typewriting machine, in combination, a frame including a segment plate, bracket means mounted thereon on said frame and having a pair of rearwardly extending arms and a cross-bar connecting the same, a universal bar pivotally mounted upon said arms, and including a connecting cross bar, one of said cross-bars extending close to the segment plate and the other of said cross-bars extending relatively low, and universal bar actuated mechanism extending into the space above and behind said cross-bars and between said bracket arms.

19. In a typewriting machine, in combination, a frame including a segment plate, a universal bar carried by said segment plate for actuation by the type bars, a carriage base mounted in the frame, escapement mechanism carried by said carriage base, said universal bar having an open structure to accommodate the escapement mechanism.

20. In a typewriting machine, in combination, a base frame, including a segment plate, bracket means mounted on said frame and having arms extending rearward therefrom, a universal bar pivotally mounted with respect to said bracket arms and curved about said segment plate for actuation by the type bars, said universal bar and bracket having an open structure between the bracket arms, a carriage base, a frame structure mounted thereon, escapement mechanism carried by said frame structure, said structure and escapement mechanism extending into the open structure of said universal bar.

21. In a typewriting machine, in combination, a frame including an inclined segment plate, a bracket secured to said segment plate and having arms extending rearward therefrom, a universal bar pivotally suspended from said bracket arms and having an open structure between said bracket arms, a carriage base mounted on said frame, escapement mechanism mounted on said carriage base and extending into the open structure of said universal bar, and ribbon shift mechanism pivotally mounted upon the carriage base and having a part in the path of operation of the rear portion of the universal bar, said ribbon shift mechanism including a link extending forward under the universal bar toward the segment plate and including connection means with the ribbon, said escapement mechanism and said ribbon shift extending entirely in the space between the rear of the carriage and the lower portion of the inclined segment plate.

22. A carriage structure for a typewriter including a carriage base plate, frame means

rigidly secured thereto, rotary escapement members mounted in said frame, and ribbon shifting transmission means supported by said frame means.

23. In a typewriting machine, in combination, a base frame, a system of parallel key levers terminating in a keyboard, a segment plate, a bail curved thereabout having the lowermost portion of the arc thereof at substantially the level of said key levers, type bars pivotally mounted upon said bail, connecting linkage from the key levers to the type bar heels, disposed in the space between the key levers and below the type bar heels, a universal bar assembled to said segment plate and extending to the rear thereof, mechanism to the rear of said segment plate actuated from said universal bar, part of said universal bar actuated mechanism extending between the front and rear of said universal bar.

24. In a typewriting machine, in combination, a base frame, a system of parallel key levers terminating in a keyboard, an inclined plane segment plate, a universal bar curved about said segment plate and extending to the rear thereof and movable in a path substantially at right angles to said segment plate, a bail mounted on said segment plate and curved about said universal bar, said segment plate having an elevation such that the lowermost portion of the arc of the bail extends at substantially the level of said key levers, type bars pivotally mounted upon the bail, connecting linkage from the key levers to the type bar heels, disposed in the space between the key levers and below the type bar heels, a shift frame and carriage base mounted above and to the rear of the segment plate, and escapement and ribbon shift mechanism fitting in the space under the carriage base and to the rear of the lower or forward end of the inclined segment plate.

25. In a typewriting machine, in combination, a base frame, a system of parallel key levers terminating in a keyboard, a segment plate thereon, a universal bar mounted on said segment plate and extending to the rear thereof, a bail curved about said universal bar and segment plate and having the lowermost portion of the arc thereof at substantially the level of said key levers, type bars pivotally mounted upon said bail, a carriage base plate, a frame secured to said carriage base plate, an escapement mechanism mounted in said frame, said universal bar having an open structure to afford space for said escapement mechanism when the carriage is applied to the base frame.

26. In a typewriting machine, in combination, a base frame, a system of parallel key levers terminating in a keyboard, a segment plate, a universal bar mounted thereon, a

bail curved thereabout and having the lowermost portion of the arc thereof at substantially the level of said key levers, type bars pivotally mounted upon said bail, connecting linkage from the key levers to the type bar heels, disposed in the space between the key levers and below the type bar heels, a carriage having a base plate, ribbon shift linkage mounted on said base plate, said linkage extending in the path of operation of said universal bar when the carriage base plate is assembled in position, said linkage including an element extending forward between said universal bar and said key levers toward said segment plate for actuating the ribbon.

27. In a typewriting machine, in combination, a base frame, a system of parallel key levers terminating in a keyboard, said base frame including an inclined segment plate, a universal bar pivotally mounted with respect thereto and curved thereabout for actuation by the type bars, a type bar supporting bail curved about said segment plate and having the lowermost portion of the arc thereof at substantially the level of said key levers, connecting linkage from the key levers to the type bar heels, disposed in the space between the key levers and below the type bar heels, said universal bar having an open structure, a carriage base mounted on said frame, escapement mechanism mounted on said carriage base, ribbon shift mechanism pivotally mounted upon the carriage base, said ribbon shift mechanism including a link extending forward under the universal bar toward the segment plate, said escapement mechanism and ribbon shift extending entirely in the space between the rear of the carriage and the lower portion of the inclined segment plate, and into the open structure of said universal bar.

28. In a typewriting machine, in combination, a base frame, a system of key levers terminating in a keyboard, an inclined segment plate, a bail curved thereabout having the lowermost portion of the arc thereof at substantially the level of said key levers, type bars pivotally mounted upon said bail, connecting linkage from the key levers to the type bar heels, a universal bar associated with said segment plate, extending to the rear thereof and actuated from the type bars for oblique movement substantially at right angles to said segment plate, and mechanism to the rear of said segment plate actuated from said universal bar.

29. In a typewriting machine, in combination, a frame including a segment plate, a universal bar assembled to said frame adjacent said segment plate, and extending to the rear thereof, escapement and back space mechanism to the rear of said segment plate

both actuated from said universal bar, part of said mechanism extending between the front and the rear of said universal bar.

30. In a typewriting machine, in combination, an inclined plane segment plate, a universal bar curved about said segment plate and extending to the rear thereof and movable in a path substantially at right angles to said segment plate, a shift frame and carriage base mounted above and to the rear of the segment plate and escapement and back space mechanism extending into the space under the carriage base and to the rear of the lower or forward end of the inclined segment plate.

31. A carriage structure for a typewriter including a carriage base plate, frame means rigidly secured thereto, escapement and back space mechanism mounted in said frame, and ribbon shift transmission means supported by said frame means.

32. In a typewriting machine, in combination, a frame including a segment plate, bracket means mounted upon said frame, said bracket means including arms extending to the rear of the segment plate, a universal bar pivoted to said arms, curved about said segment plate, to be operated by the type bars and having an open structure

between said arms, a carriage, an escapement and back space mechanism therefor, both said latter elements extending into the open structure of said universal bar.

33. In a typewriting machine, in combination, a segment plate, bracket means mounted to the rear thereof and including arms determining an open structure therebetween, a universal bar including an arcuate element adjacent said segment plate, said bar having a pair of generally parallel arms and two pairs of links arranged in parallelism, each of said links pivoted at one end to the bracket means and at the other end thereof to the arms of the universal bar, to sustain the latter for parallel motion thereof, and mechanism actuated from said universal bar and extending into the open space determined by the arms and the pairs of links.

34. The combination set forth in claim 18 in which the universal bar is supported from the bracket means by two pairs of pivoted parallel links.

Signed at New York in the county of New York and State of New York this 19th day of September 1922.

LOUIS A. NEMCOVSKY.