Dec. 3, 1957 A. DEMMEL ET AL 2,815,109

TYPEWRITER ESCAPEMENT MECHANISM

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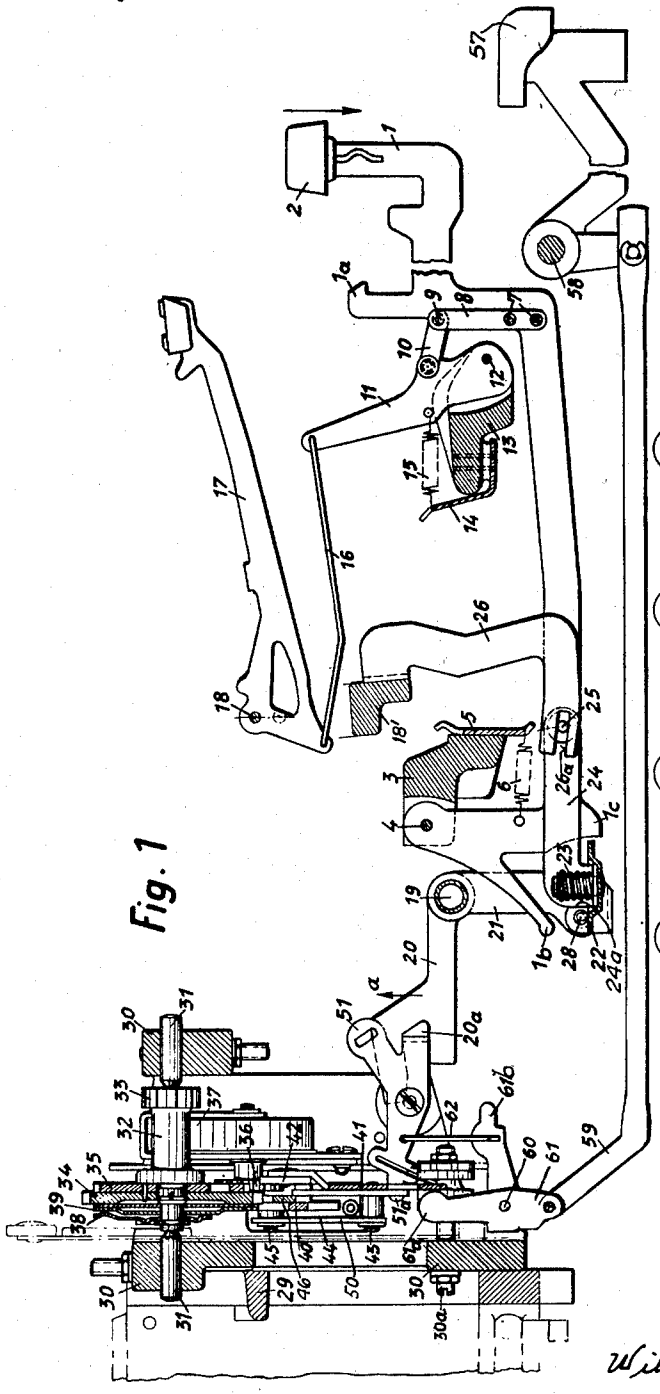


Fig. 1

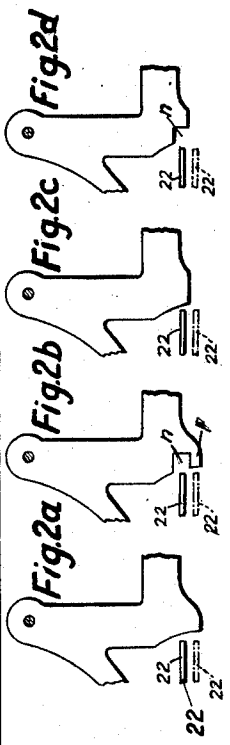


Fig.2d Fig.2c Fig.2b Fig.2a

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TYPEWRITER ESCAPEMENT MECHANISM

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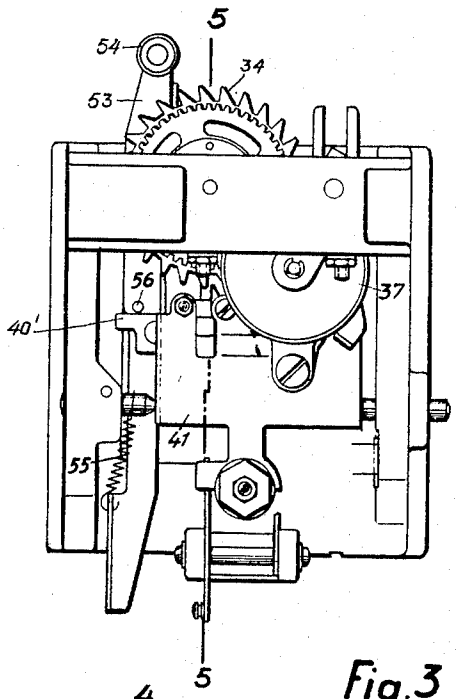


Fig. 3

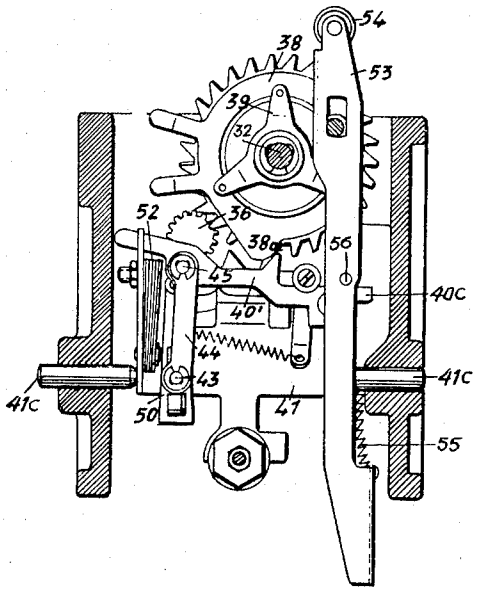


Fig. 4

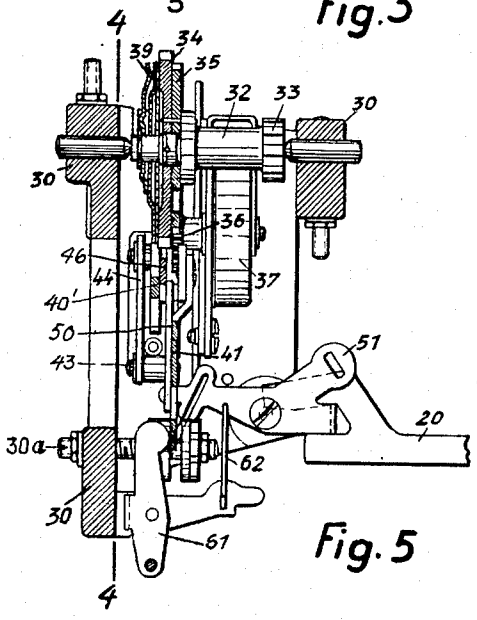


Fig. 5

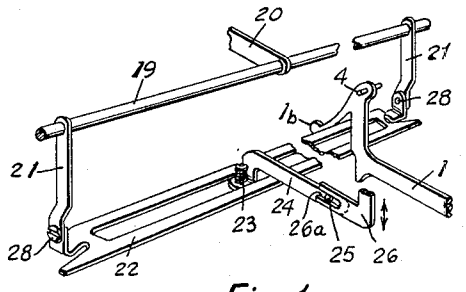


Fig. 1a

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Fig. 6

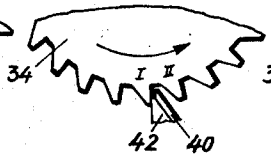


Fig. 7



Fig. 6a

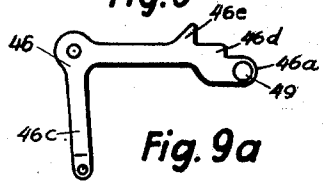


Fig. 9a

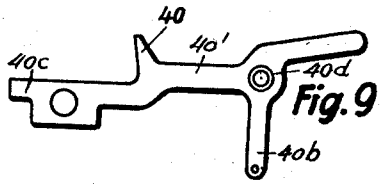


Fig. 9b

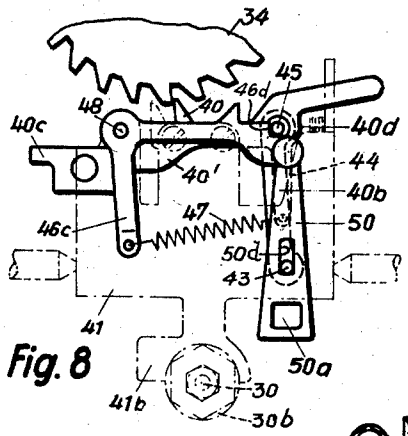


Fig. 8

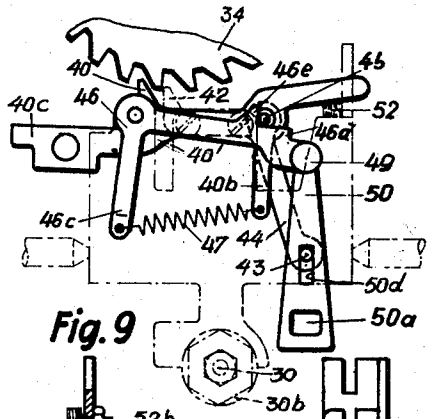


Fig. 9

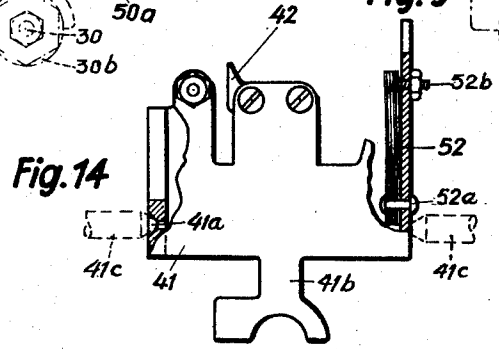


Fig. 14

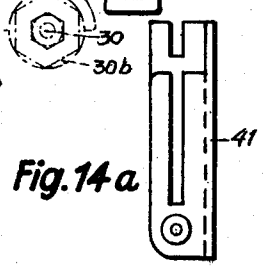


Fig. 14a

Fig. 10



Fig. 11

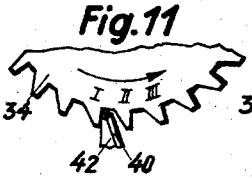
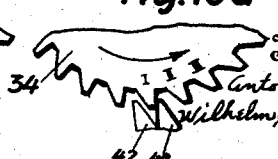


Fig. 10a



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TYPEWRITER ESCAPEMENT MECHANISM

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Fig. 12

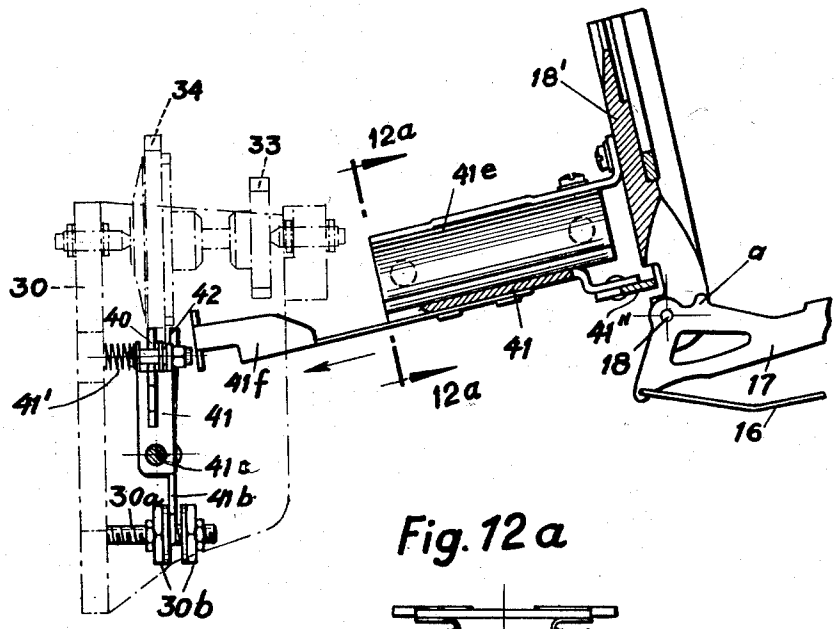


Fig. 12a

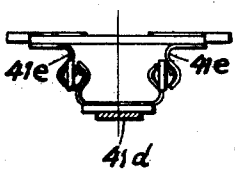
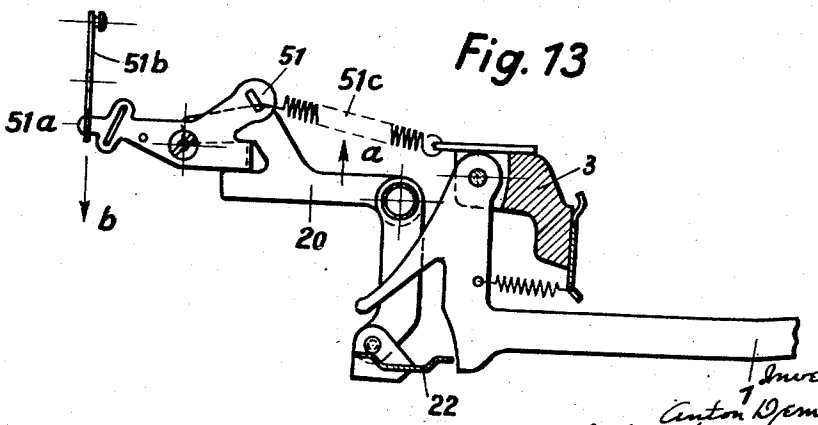


Fig. 13



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United States Patent Office 2,815,109 Patented Dec. 3, 1957

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TYPEWRITER ESCAPEMENT MECHANISM

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Application July 9, 1954, Serial No. 442,372

Claims priority, application Germany July 9, 1953

3 Claims. (Cl. 197—84)

This invention relates to a typewriter and more particularly to an escapement mechanism for typewriters for oriental languages whose characters have varying width so that escapement-step widths of different size corresponding to the individual character sizes must be provided.

Objects of the invention are to provide particularly simple and efficient escapement mechanism with shift paths of different lengths both in the upper and in the lower writing position of a typewriter having a normal upper case-lower case shifting arrangement. An object is to provide a typewriter escapement mechanism including a tilting rocker plate carrying pawls for engagement with the escapement ratchet wheel, one pawl being on a movable pawl lever which is adjustable selectively by a control lever actuated by the typewriter keys to determine the escapement step width in accordance with the character printed by the depressed key. More specifically, an object is to provide an escapement mechanism of the type stated in which the movable pawl lever is slidably and pivotally supported on the rocker plate and the control lever has stop shoulders engaged by the hinge pin of the movable pawl lever to determine the position thereof.

These and other objects and the advantages of the invention will be apparent from the following specification when taken with the accompanying drawings, in which:

Fig. 1 is a longitudinal section through a typewriter having an escapement mechanism embodying the invention;

Fig. 1*a* is a fragmentary view in perspective of a portion of the mechanism;

Figs. 2*a*–2*d* are fragmentary views showing different key lever constructions for determining the width of the escapement step for upper and lower characters of the key levers;

Fig. 3 is a front elevation of the escapement mechanism;

Fig. 4 is a vertical section through the same as seen on the plane of line 4—4 of Fig. 5;

Fig. 5 is a vertical section taken on the planes of line 5—5 of Fig. 3;

Figs. 6, 6*a* and 7 are schematic views illustrating the operation of the escapement mechanism for a narrow escapement step;

Figs. 8 and 9 are fragmentary views, on a larger scale, of the control elements mounted on the rocking frame of the escapement mechanism, and adjusted, respectively, for a narrow and for a wide escapement step;

Figs. 9*a* and 9*b* are elevations of the control lever and of the moving pawl member, respectively;

Figs. 10, 10*a* and 11 are schematic views illustrating the operation of the escapement mechanism for a wide escapement step;

Fig. 12 is a fragmentary section showing a type lever and mechanism actuated thereby to tilt the rocking plate of the escapement mechanism;

Fig. 12*a* is a fragmentary section on line 12*a*—12*a* of Fig. 12;

Fig. 13 is a fragmentary section showing the connection

of the escapement lever to the draw link which adjusts the control lever of the escapement mechanism;

Fig. 14 is an elevation, with parts in section, of the rocking plate; and

Fig. 14*a* is a side view of the same.

In the drawings, the reference numeral 1 identifies a key lever 1 having a key head 2 which carries in conventional manner representations of the characters to be typed when the segment carrier is in its respective positions of vertical adjustment. Each key lever is supported in a beam 3 by a key-lever shaft 4 and is retained in normal position by a spring bar 5 and a spring 6. The key lever has a projection 1*a* for cooperation with a key locking device, not shown, and an arm 1*b* which actuates the mechanism, not shown, for advancing the typewriter ribbon. Rivets 7 secure to key lever 1 a leaf spring 8 which bears against a short pin 9 to retain thereon a link 10 which couples the key lever to an intermediate lever 11 which is mounted on a shaft 12 carried by a beam 13. A spring bar 14 is fixed to the beam 13, and tension springs 15 extend between the bar and the intermediate levers 11 to restore them to normal position. A tie wire 16 extends between the upper end of each intermediate lever 11 and its associated type lever 17 which is journalled on shaft 18 of a segment carrier 18'.

As shown in Figs. 1 and 1*a*, a horizontal shaft 19 is pivotally mounted at its ends in bearings (not shown) in the typewriter frame. A shift lever 20 is rigidly secured to the middle portion of shaft 19 and is connected to the escapement mechanism to be hereinafter described. Vertical bearing brackets 21 are rigidly secured at their upper ends to opposite ends of shaft 19. The lower ends of bearing brackets 21 serve to support between them a shift rail 22, the ends of rail 22 being connected to brackets 21 by means of pivot pins 28 which permits the rail to move pivotally about its end supports. As shown in Fig. 1, a guide arm 26 is fixed to and depends at the middle of the segment carrier 18' where the type lever 17 is journalled so that the guide arm 26 performs the same vertical movement as the segment carrier 18'. The lower end of arm 26 is turned through 90° so as to extend toward the rear of the machine and is provided with a slot 26*a* in which is received a pivot pin 25 secured at the front end of a guide lever 24. The rear end of lever 24 is provided with a depending portion 24*a* which is elastically connected with the shift rail by means of a helical spring 23.

As shown in Figs. 3–5, the rear wall 29 of the typewriter casing supports the frame 30 of the escapement mechanism. Bolts or pins 31 extend through the opposite sides of the frame 30 to support a shaft 32 which carries a pinion 33 in mesh with a rack bar, not shown, of the typewriter carriage and a ratchet wheel 34. A pinion 35 is rigidly connected to ratchet wheel 34 for meshing with a gear 36 of a centrifugal brake 37 in known manner to reduce shocks when the carriage is advanced by substantial distances through actuation of the tabulator mechanism, not shown. A disk 38 is loose on the shaft 32 and held in frictional engagement with the ratchet wheel 34 by a three-armed spring washer 39 so that, in known manner, on return movement of the carriage the disk 38 is carried along so far by friction that its projection 38*a* engages the pawl 40 to move it out of engagement with ratchet wheel 34, thus insuring a noiseless return movement of the carriage, see Fig. 4.

The pawl 40 is an integral projection of a lever 40' which is adjustably supported on a plate or frame 41 carrying a fixed pawl 42 and having conical recesses 41*a* in its opposite sides and above its lower end 41*b* to receive pivot pins 41*c* which support the plate 41 for rocking movement.

The plate 41 is normally retained in upright position

on its pivot pins by a spring 41', see Fig. 12, and is guided for rocking movement by its arched lower end 41*b* which fits loosely over a bolt 30*a* fixed in the escapement frame 30 and carrying nuts 30*b* which limit the angular movement of the rocking plate.

A pin 43 is fixed to the rocking plate 41 to support one end of a link 44 which has a pivot pin 45 fixed in its upper end to pass through the opening in portion 40*d* of, and pivotally support, lever 40'. The lower end of arm 40*b* of lever 40' is connected to the depending arm 46*c* of a bell-crank lever 46 by a spring 47, the lever 46 being journalled on a pin 48 fixed to the rocking plate 41. The lever 46 has spaced shoulders 46*d*, 46*e* against which pivot pin 45 seats to determine the position of the adjustable pawl 40 of lever 40', and a stud 49 is fixed in the end of arm 46*a* to support a draw link 50 which has an aperture 50*a* for receiving the headed end of a link 51*b* secured to the end 51*a* of a lever 51 which is pivoted on the central arm 20 of shaft 19 and normally held in raised position by a spring 51*c*, see Figs. 1 and 13. Link 50 is provided with a slot 50*d* through which pivot pin 43 extends to guide the link 50 for rectilinear movement between raised position, Fig. 8, in which shoulder 46*d* of control lever 46 seats against pivot pin 45 to condition the escapement mechanism for a single step advance of the typewriter carriage, and lowered position, Fig. 9, in which shoulder 46*e* of the control lever 46 is engaged by pin 45 to provide a two-step advance of the carriage. A sheaf of thin leaf springs 52 is secured to a side flange of the rocker plate 41 by a rivet 52*a* and is prestressed by a screw 52*b* to form a resilient buffer for the sliding lever 40' which carries the adjustable pawl 40.

As shown in Figs. 12 and 12a, a bow 41'' is positioned to be struck by lugs *a* of the type bars 17, the bow having secured thereto a strap 41*d* which is supported by ball bearings for sliding movement on rails 41*e* secured to the segment carrier 18' and has fixed thereto a pusher arm 41*f* for engagement with the plate 41 to rock it upon the axis of pins 41*c*.

Reverting to Figs. 1 and 2*a*–2*d*, the adjustment of control lever 46 to provide a wide escapement step is effected by the key lever arms 1*c* which are shaped to strike the rail 22 only when the typed character is relatively wide. As shown in Fig. 1 and schematically in Fig. 2*a*, the key lever 1 has a relatively long arm 1*c* which will strike the rail 22 whether the segment carrier 18' is in normal upper position for typing lower-case characters or is shifted to lower position for typing upper-case characters. In Figs. 2*a*–2*d*, the relative position of rail 22 with respect to the key lever arms is shown in solid line for the upper position of the segment carrier, and in broken line for the lower position of the segment carrier. With a relatively long arm 1*c*, as shown in Fig. 2*a*, the rail 22 will be rocked to turn shaft 19 and arm 20, thereby drawing slide 50 downward to position control lever 46 as shown in Fig. 9, to effect a double unit escapement for both characters typed by the associated key lever. When only the upper case character is wide, the arm 1*c* takes the form shown in Fig. 2*b*, with a notch *n* above a projection *p* which strikes the rail 22 only upon shifting the segment carrier to type the upper-case character. The short form of arm 1*c* shown in Fig. 2*c* is employed when only the lower-case character is relatively wide, and this is modified, as in Fig. 2*d*, by providing a notch *n* to clear the rail 22 when both characters of the associated type bar are relatively narrow.

The method of operation of the escapement mechanism is as follows. The pawl 40 of movable lever 40' is normally engaged with a tooth of the ratchet wheel 34, for example tooth II as shown in Figs. 6, 7 and 6*a*. On depressing a key lever 1, the lug *a* of the associated type lever 17 strikes the bow 41'' and forces the pusher arm 41*f* against the rocking plate 41 to tilt the latter and thereby move the pawl 40 out of engagement with

tooth II of the ratchet wheel 34, and to move the fixed pawl 42 into position for engagement by tooth I, see Fig. 7. Rocking plate 41 is immediately restored to vertical position by spring 41', thus bringing pawl 40 into position to engage tooth I as the carriage is advanced one escapement step by the carriage spring, not shown, and positioning the fixed pawl 42 somewhat to the left of tooth I. In the double step movements for wide characters, the ratchet wheel 34 is first held stationary by the engagement of the moving pawl 40 with a tooth III as shown schematically in Fig. 10. Upon the depression of a key lever 1, the rail 22 is struck by the arm 1*c* of the key lever, thereby rocking arm 20 in the direction of arrow *a*, Figs. 1 and 13, to rock lever 51 and move the draw link 50 downward, as indicated by arrow *b* in Fig. 13, to release shoulder 46*d* of control lever 46 from pivot pin 45 of the moving pawl lever 40'. When projection *a* of type lever 17 strikes the escapement rail 41'' rocking plate 41 is tilted by pusher arm 41*f*, and the moving pawl lever 40' is drawn to the left by spring 47 until its pivot pin 45 seats against shoulder 46*e* of control lever 46, see Fig. 9. Pawl 40 is thus shifted into position, see Fig. 11, to engage with tooth I upon restoration of rocking plate 41 to vertical position, and fixed pawl 42 is then to the left of tooth I, see Fig. 10*a*. The carriage thus advances two escapement steps when the typed character is relatively wide. Upon return of rocking plate 41 to vertical position, the control lever 46 is returned to normal position, Fig. 8, by the spring 47 and the escapement mechanism is thereby reset for either a single space or a double space movement upon the next key impact.

The carriage may be shifted to any desired position upon depressing a rail on the carriage, not shown, to depress the slide 53 by its engagement with the slide roller 54, see Figs. 3 and 4. The slide is normally held in raised position by a spring 55 and has a stud 56 which extends over the end 40*c* of movable pawl 40' to depress the same and release the escapement when the carriage is to be shifted arbitrarily to a desired position.

A space bar 57 is mounted on a shaft 58 which is connected by bar 49 to a shaft 60 mounted in the escapement mechanism frame 30. A bridge 61 on shaft 60 has an end 61*a* bearing against the lower end 41*b* of the rocking plate 41 to tilt the same in the same manner as the pusher arm 41*f*. This construction results in a one-step escapement movement of the carriage but, if the customer prefers a wider movement for each actuation of the space bar 57, arm 61*b* of bridge 61 is coupled to the lever 51 by a wire loop 62, whereby the rocking of shaft 60 by depressing the space bar 57 effects a rocking of lever 51 to lower the draw link 50 and set control lever 46 for a two-step escapement movement of ratchet wheel 34.

The described escapement mechanism makes it possible to type oriental languages, for example Indian, Ceylonese or Urdu languages with their diversity of characters, in normal manner on a typewriter having a relatively simple and economical escapement mechanism. The necessary changes in or additions to conventional escapements can be made without the use of expensive machine parts.

While the escapement mechanism is described with reference to a typewriter for oriental languages, it will be apparent that it may be incorporated in machines for typing other languages when different escapement widths are desired for different characters.

We claim:

1. An escapement mechanism for a typewriter comprising a ratchet wheel, a rocking plate having a pawl in fixed position thereon, a movable pawl lever carrying a pawl for normal engagement with said ratchet wheel to hold the same stationary, means slidably and pivotally supporting said movable lever on said rocking plate, a control lever pivoted on said rocking plate and having

two positions of adjustment for determining two positions of adjustment of said movable pawl lever, said control lever being arranged between said movable pawl lever and said rocking plate, means actuated by a typewriter key for shifting said control lever to the adjusted position appropriate for the character to be typed, and means for tilting said rocking plate to free said movable lever pawl from engagement with said ratchet wheel and to engage said fixed pawl therewith.

2. An escapement mechanism for a typewriter comprising a ratchet wheel, a rocking plate having a pawl in fixed position thereon, a movable pawl lever carrying a pawl for normal engagement with said ratchet wheel to hold the same stationary, means including a link pivoted upon said rocking plate and carrying a pivot pin for slidably and pivotally supporting said movable pawl lever on said rocking plate, a control lever pivoted on said rocking plate and having two positions of adjustment for determining two positions of adjustment of said movable pawl lever, said control lever having two stop shoulders thereon for selectively seating against said movable pawl lever pivot pin in alternative adjustments of said control lever, spring means biasing said control lever and said

movable pawl lever towards their alternative positions which provide a relatively wide escapement step, means actuated by a typewriter key for shifting said control lever to the adjusted position appropriate for the character to be typed, said key actuated means including a draw link for rocking said control lever from seating engagement of one stop shoulder thereof with said movable pawl lever pivot pin to free said movable pawl lever to seat against the other stop shoulder of said control lever, and means for tilting said rocking plate to free said movable pawl lever from engagement with said ratchet wheel and to engage said fixed pawl therewith.

3. An escapement mechanism as defined in claim 2 wherein said movable pawl lever and said control lever have arms between which said spring means is connected.

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