

Oct. 23, 1962

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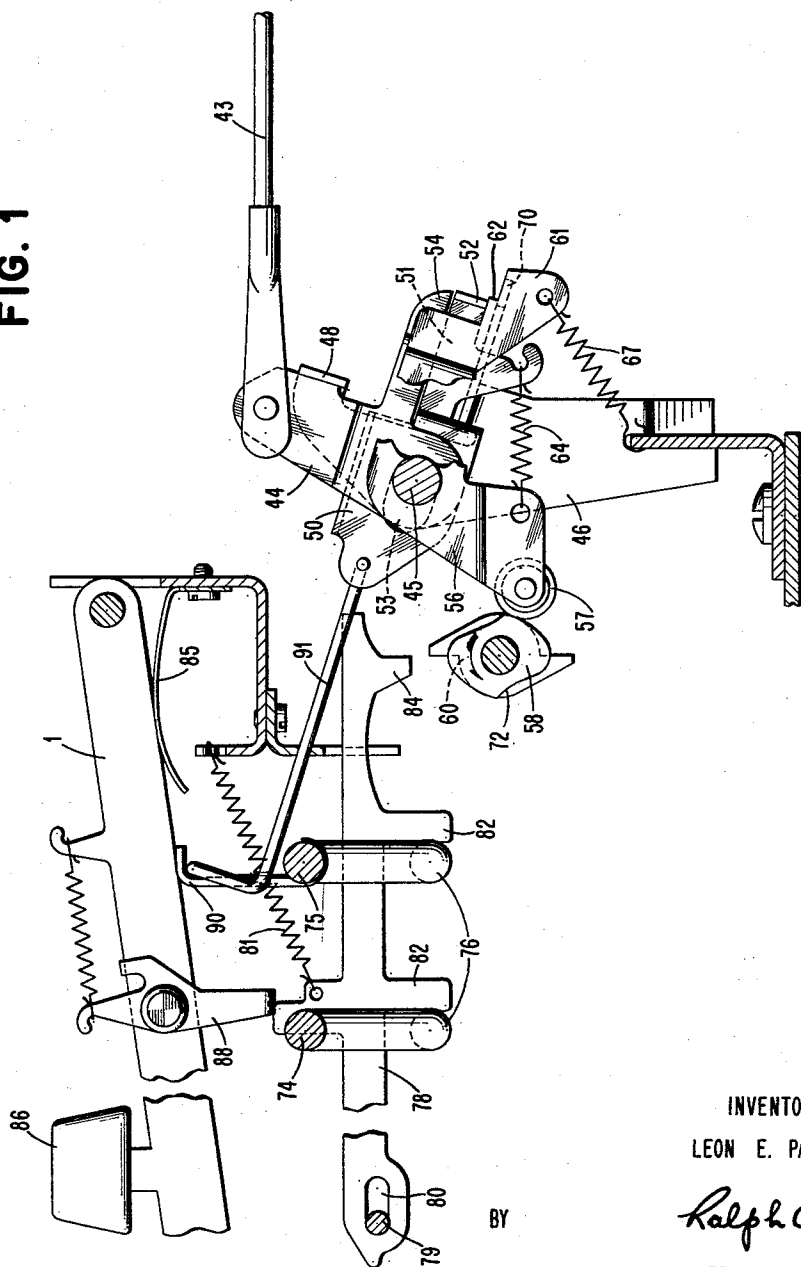
3,059,751

ESCAPEMENT MECHANISM FOR TYPEWRITER

Filed Dec. 20, 1960

4 Sheets-Sheet 1

FIG. 1



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FIG. 2

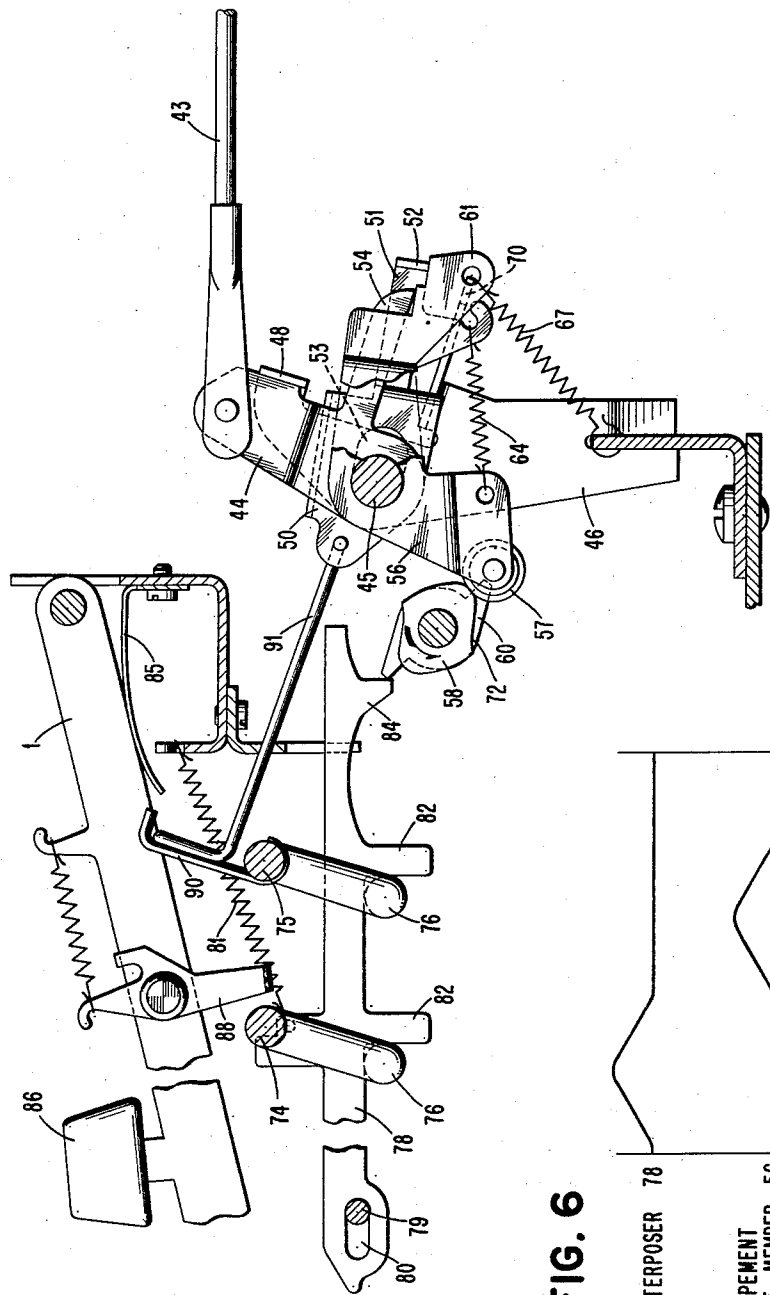
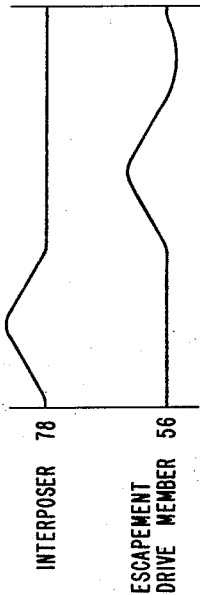


FIG. 6



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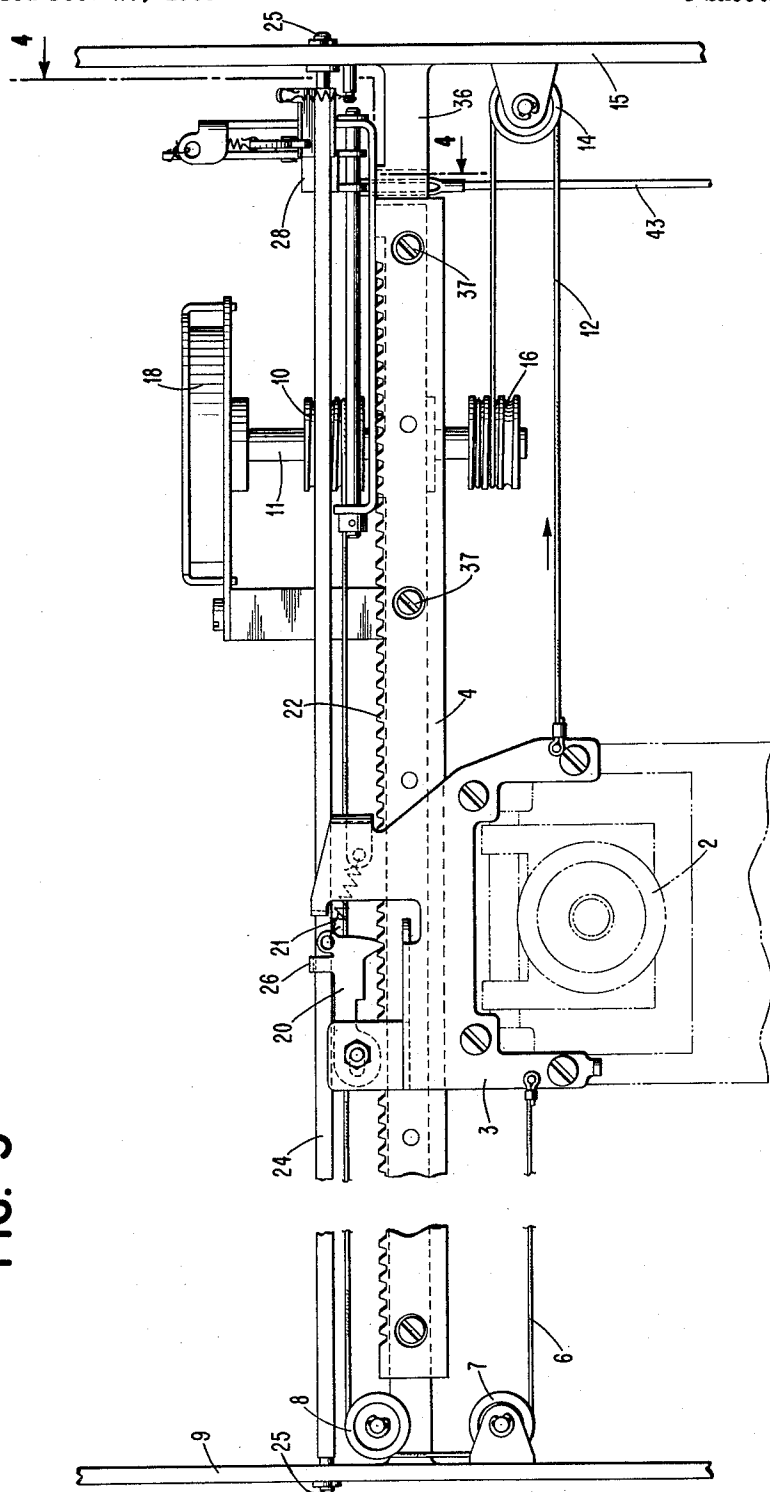
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FIG. 3



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FIG. 4

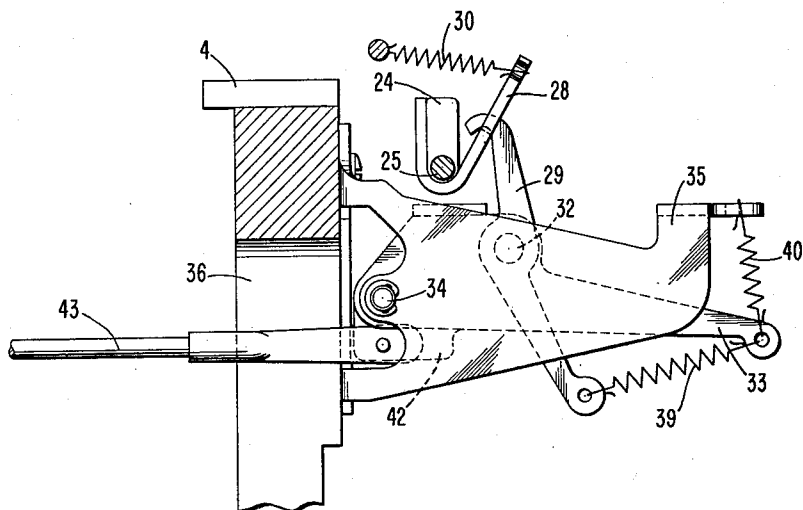
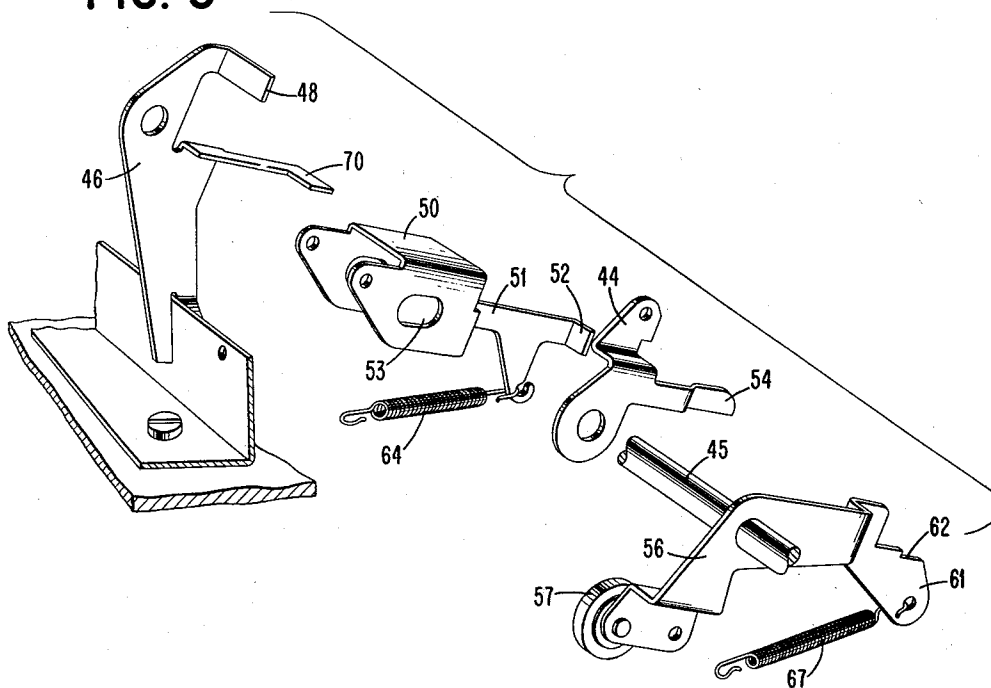


FIG. 5



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ESCAPEMENT MECHANISM FOR TYPEWRITER
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6 Claims. (Cl. 197—83)

This invention relates to typewriters, and more particularly to escapement mechanisms adapted for use with typewriters. Some alphabetic characters, especially when used in certain foreign languages, may or may not have one or another of several marks placed above them to indicate the sound which is to be given to the character. It is not practical and in some cases is impossible, to provide a typewriter with a keyboard having keys which may be actuated to effect a direct printing of these characters with each of the marks that may be needed. By providing keys which may be operated selectively to type any one of the marks in a position above a normal character position, then any character key could be operated to type its character under the mark. Normally, an escapement takes place after the actuation of a type key to place the next index point on a line in position for receiving a typed character. If escapement took place when any one of the special marks is typed, then it is necessary to backspace so an alphabetic character may be typed under the mark. By providing an escapement mechanism which operates on actuation of any alphabetic type key but is made inoperative when any special mark key is actuated, then the mark may be typed first and the character placed under it without a backspace operation.

An object of this invention is to provide an improved escapement mechanism for a typewriter.

Another object is to provide an improved mechanism which operates normally to effect escapement of a typewriter on actuation of a type key but is made inoperative by actuation of predetermined keys.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

FIG. 1 is a cross sectional view of a keyboard having an improved escapement drive mechanism associated therewith.

FIG. 2 is a view like FIG. 1 but showing parts in different positions resulting from depression of a key lever.

FIG. 3 is a plan view of a carrier for a type member and mechanism for effecting its escapement.

FIG. 4 is a vertical sectional view taken on the plane of the line 4—4 in FIG. 3.

FIG. 5 is an exploded view of the escapement drive mechanism shown in FIG. 2.

FIG. 6 is a timing diagram.

The improved escapement mechanism shown herein forms part of a typewriter which is similar to that shown and described in Patent No. 2,919,002, issued to L. E. Palmer on December 29, 1959. This typewriter includes a keyboard having key levers, such as the lever 1 in FIG. 1, which may be actuated to effect operation of a single element print head 2, shown in outline in FIG. 3, for printing characters corresponding to the levers actuated. The mechanisms for driving the head have not been shown since they form no part of the present invention. Print head 2 is mounted on a carrier 3 which is slidably supported by a bar 4 extending transversely of the typewriter. Connected to one side of the carrier is a flexible cable 6 which passes around pulleys 7 and 8 attached

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to a side frame 9, and then is wrapped about a pulley 10 fixed to a shaft 11. Another cable 12 is connected to the carrier and passes around a pulley 14 on a frame 15 at the opposite side of the machine. Cable 12 is then wrapped about a pulley 16 which is also fixed to the shaft 11. A spring motor 18 is connected to the shaft 11 and tends to rotate the latter in a direction to wind up cable 12 while paying out cable 6. It will be seen that this effects movement of the carrier 3 from left to right along the bar 4. Pivotaly mounted on the carrier is a dog 20 which is urged by a spring 21 into engagement with teeth 22 on the bar 4 for holding the carrier against movement by the motor 18 acting on the cables 6 and 12. When the dog 20 is moved out of engagement with one of the teeth 22 and then immediately released, the carrier 3 moves to the right until the dog engages the next adjacent tooth. This results in a movement of the print head 2 to its next printing position.

For moving the dog away from the teeth 22, there is provided a bail 24, FIGS. 3 and 4, which is pivotaly supported at its ends by studs 25 engaging the side frames 9 and 15. Formed on the dog is a projecting portion 26 hooking over the top edge of the bail so a rocking of the latter in a clockwise direction in FIG. 4 results in pivoting of the dog away from the teeth 22. Adjacent the right end of the bail, as shown in FIG. 3, is a plate 28 which is bent into the shape shown in FIG. 4 and is attached to the bail by any suitable means. A hooked arm on a lever 29 extends through a notch in the plate 28 and engages the latter for positioning the bail against the action of a spring 30. The lever 29 is pivotaly supported at a point between its ends on a stud 32 carried by a member 33 which, in turn, is pivotaly supported at 34 on a bracket 35 attached to a cross plate 36 fixed to and extending between the side frames 9 and 15. The bar 4 is attached to the upper edge of the plate 36 by screws 37 (FIG. 3). Lever 29 is urged by a spring 39 in a direction to maintain its engagement with bail plate 28, and the member 33 is urged by a spring 40 in a direction to permit movement of the bail 24 to its upright position.

Formed on the member 33 is a downwardly projecting portion 42 to which one end of a link 43 is connected. Link 43 extends forwardly through an opening in the plate 36 and is connected at its other end to a member 44 (FIGS. 1, 2 and 5) which is pivotaly mounted on a pin 45 carried by a stationary bracket 46. Formed on the bracket is a flange 48 engageable by the member 44 for limiting its pivotal movement in a clockwise direction. This also limits through link 43 the upward swinging of member 33 under the action of spring 40. Arranged on the pin 45 is an interposer 50 having a rearwardly extending arm 51 with a portion 52 at its end bent at right angles to the arm. The interposer is provided with an elongated slot 53 receiving the pin 45, thereby permitting movement of the interposer relative to the pin. When the interposer is moved forwardly to the position shown in FIG. 1, its bent portion 52 lies directly under the end of a rearwardly projecting arm 54 on the member 44. Pivotaly mounted on the pin 45 is another member 56 carrying a roller 57 which engages a cam 58 on a fluted shaft 60 described in the Palmer patent mentioned above. Formed on the member 56 is a rearwardly extending arm 61 having a stepped portion 62 on its upper surface. The bent portion 52 on the member 50 normally rests upon the upper level of the stepped portion 62 as shown in FIG. 1 and is held in engagement with the latter by a spring 64 connected between the arm 51 and the member 56. The member 56 is yieldingly urged by a spring 67 in a direction to hold the roller 57 in engagement with the cam 58.

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If the member 56 is rocked in a counter clockwise direction while the interposer 50 is in the position shown in FIG. 1, the bent portion 52 acts on the arm 54 to rock the member 44 in the same direction. This pulls the link 43 forwardly to rock the member 33 downwardly against the action of spring 40. Lever 29 moves downwardly with the member 33 and rocks the bail 24 in a direction to disengage the dog 20 from the teeth 22 and effect escapement. When the interposer 50 is moved rearwardly to the position shown in FIG. 2, the bent portion 52 lies beyond the end of the arm 54 and rests upon the lower level of the stepped portion 62. If the mechanism moving the interposer rearwardly immediately releases it for return motion under the action of spring 64, the stepped portion 62 will be engaged by the bent portion 52 and prevent its return to a position under the arm 54. An upward swinging of the arm 61 at this time will have no effect on the member 44 since the interposer portion 52 is moved clear of the arm 54 and the member 44 will not swing far enough to actuate the arm 54 directly.

It is necessary that the interposer 50 be released from the stepped portion 62 at the end of an operating cycle so it may return to its home position shown in FIG. 1. For disengaging the bent portion 52 of the interposer from the stepped portion 62, there is provided a finger 70 on the bracket 46 extending under the bent portion 52 and lying in the same plane as the lower level of the stepped portion 62 when the member 56 is held by the cam 58 in the position shown in FIG. 1. On each actuation of a key lever, the fluted shaft 60 is caused to rotate 180° counterclockwise by means described in the Palmer patent. It will be noted that the cam 58 is shaped to rotate the member 56 from its home position in a counterclockwise direction and then back again. Just before the cam completes 180° of rotation, a low portion 72 on the cam surface permits the member 56 to rock in a clockwise direction far enough to bring the lower level of the stepped portion 62 slightly below the plane in which it lies when at home position. The bent portion 52 on the interposer engages the finger 70 and is prevented from following the arm 61 as it drops below home position. The movement of the arm 61 below its home position is sufficient to release the stepped portion 62 from the bent portion 52 on the interposer so the latter may be returned by the spring 64 to the position shown in FIG. 1. It will be appreciated that a driving of the member 56 while the interposer 50 remains in the position of FIG. 1 results in an operation of the link 43 to effect escapement. If the interposer is moved rearwardly to the position shown in FIG. 2, however, a driving of the member 56 will have no effect on the link 43 and no escapement will take place.

As shown in FIGS. 1 and 2 (also shown and described more completely in the Palmer patent), a plurality of rods (only two numbered 74 and 75 being shown herein) are pivotally supported in positions extending transversely of the typewriter under the key levers. Each rod is provided with an offset portion 76 under each key lever. Associated with each key lever is an interposer 78 which is supported for both pivotal and longitudinal movement by a pin 79 extending through a slot 80 in the interposer at its forward end. A spring 81 normally holds the interposer 78 in a rearward position on the pin 79 with its right end raised above the fluted shaft 60. Formed on each interposer 78 are one or more downwardly projecting portions 82 which act on the offset portions 76 of the transverse rods for rocking the latter when the interposer is moved rearwardly. Adjacent the rear end of each interposer is a heel portion 84 which moves into the path of one of the flutes on the shaft 60 when the interposer is rocked downwardly about the pin 79. Each key lever is normally held in a raised position by a spring 85 but may be depressed by manual actuation of a key button 86. Mounted on each key lever is

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a member 88 which acts on the associated interposer for swinging the latter downwardly when the key button is depressed.

Each key lever which is operable to effect the printing of a special mark over a character position will have associated with it an interposer 78 having a projection 82 which actuates the rod 75. It may also have one or more additional projections 82 for actuating one or more of the other rods. Connected to the rod 75 is an arm 90 which acts against the end of an elongated member 91 connected to the interposer 50. When the rod 75 is rotated in a clockwise direction by a projection 82 on the interposer 78 acting against an offset 76 on the rod, the arm 90 acts against the member 91 for moving the interposer 50 to the position shown in FIG. 2. As the cam 58 rocks the member 56 in a counterclockwise direction, no escapement takes place since the bent portion 52 on the interposer is no longer between the arms 54 and 61. Having typed the special mark, any key lever for another character to be typed under the mark may be actuated. This key lever will swing downwardly an interposer 78 having projections 82 which actuate one or more transverse rods except the rod 75. As the fluted shaft 60 turns 180° in response to the actuation of this key lever, the member 56 is driven and operates through the bent portion 52 to rock the member 44 for pulling the link 43 rearwardly and effecting escapement. The cam 58 is shaped to permit a return of the operating parts to their home positions quickly enough so the dog 20 engages the next tooth 22 on the bar 4 and stops the carrier 3 in its next index position. As a low portion 72 on the cam comes opposite the roller 57, the member 56 swings in a clockwise direction far enough to release the interposer 50 if the latter had previously been moved to a position in which it was latched by the stepped portion 62.

While there has been shown in this application one form which the invention may assume in practice, it will be understood that it may be modified and embodied in various other forms without departing from the scope of the invention.

What I claim is:

1. In a typewriter having a single element type head which is positioned for typing selected characters and special marks in response to the actuation of key levers, an escapement mechanism for said head comprising, in combination, means slidably supporting said type head for movement transversely of said typewriter, means yieldingly urging said type head in one direction along said supporting means, teeth formed along one edge of said supporting means, a dog engageable with said teeth, means mounting said dog for movement with said head, means yieldingly urging said dog into engagement with said teeth for holding said head against movement along said supporting means, means normally operating on actuation of said key levers for moving said dog momentarily out of engagement with said teeth to effect escapement of said head, and means operating on actuation of any of said key levers for said special marks for disabling said normally operating means.

2. The mechanism of claim 1 in which said normally operating means includes first and second members supported for pivotal movement about a common axis, an interposer supported for both pivotal and bodily movement between active and inactive positions, means yieldingly urging said interposer toward its active position, said interposer having a portion lying, when in its active position, between said first and second members for transmitting motion from said first to said second member, means operating on actuation of any key lever for pivoting said first member, means connecting said second member to said dog for disengaging the latter from said teeth when said second member is pivoted about said axis by said first member, and means operating on actuation of a key lever for a special mark for moving said interposer to its in-

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active position in which said interposer portion is removed from between said first and second members.

3. The mechanism of claim 2 in which said first member has a stepped portion engageable by said interposer on movement to its inactive position for latching the latter in such position, and means operating on return of said first member to a home position for releasing said interposer from said stepped portion.

4. The mechanism of claim 2 in which said first mentioned operating means includes a cam engaging said first member and operating on actuation of a key lever for rocking said first member from a home position and permitting its return to home position again.

5. The mechanism of claim 1 in which said normally operating means includes first and second members supported for pivotal movement about a common axis, an interposer resting against and movable with said first member, said interposer also being movable relative to said first member between active and inactive positions, said interposer having a projecting portion lying between said first and second members when in its active position and lying in a position free of said second member when moved to its inactive position, said first member having a stepped portion engageable by said interposer on movement to its inactive position and operating to latch said interposer in such position, means operating on actuation

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of any key lever for pivoting said first member in a direction to drive said second member through said portion of said interposer when the latter is in its active position, means connecting said second member to said dog for disengaging the latter from said teeth when said second member is driven by said first member, and means operating on actuation of a key lever for a special mark for moving said interposer to its inactive position.

6. The mechanism of claim 5 in which said first member is pivoted from a home position in one direction and then is pivoted in the opposite direction to a point beyond its home position before coming to rest in its home position, and a stop engageable by said interposer to limit its movement with said first member in said opposite direction at home position, the movement of said first member beyond home position in said opposite direction being sufficient to unlatch said interposer from said stepped portion.

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