Nov. 17, 1959 E. NEUMANN 2,913,091

NOISELESS ESCAPEMENT MECHANISM FOR TYPEWRITING MACHINES

Filed Dec. 23, 1955 2 Sheets-Sheet 1

Fig.1

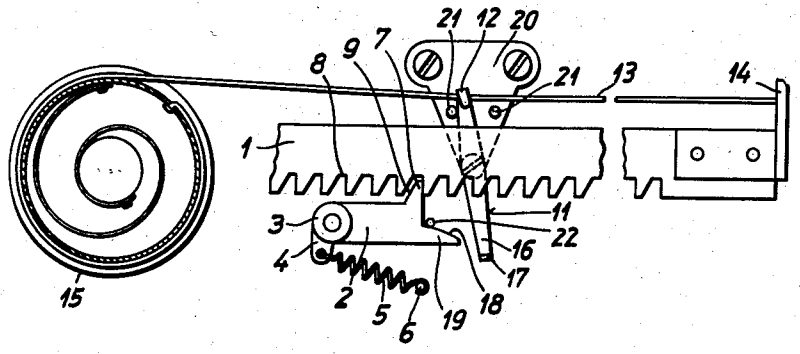
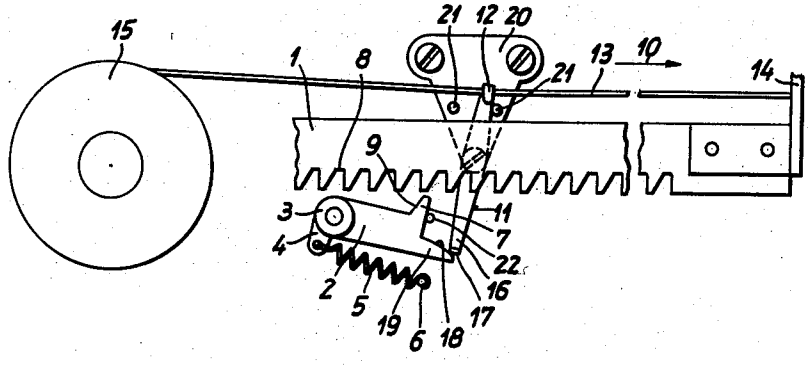


Fig.2



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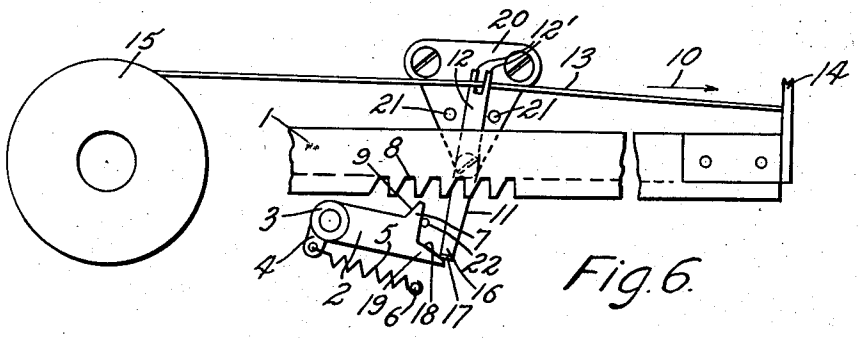


Fig. 6.

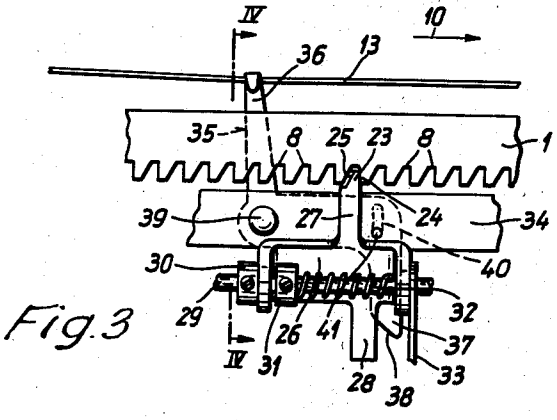
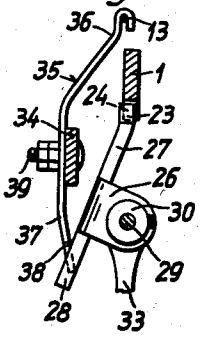


Fig. 3

Fig. 4.



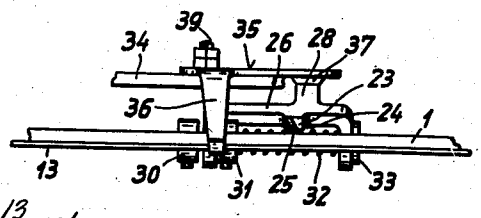


Fig. 5

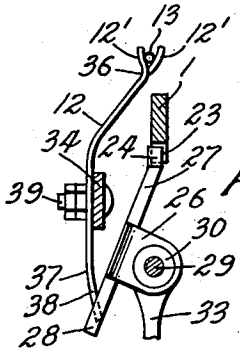


Fig. 7

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NOISELESS ESCAPEMENT MECHANISM FOR TYPEWRITING MACHINES

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13 Claims. (Cl. 197—82)

This invention relates to a mechanism for typewriting or like machines, more particularly portable typewriting machines, of a kind where in a double-armed lever operated by frictional contact with the carriage draw-band or cord locks the carriage detent which cooperates with a rack, a ratchet wheel, or the like, against re-engagement after said detent has been disengaged by the manual return of the carriage so that the manual return of said carriage can be noiselessly performed.

In a known mechanism of this kind the double-armed lever is fulcrumed on the spindle of the mainspring drum for the carriage draw-band or cord. A friction roller mounted on one of the lever arms projects between the means for drawing the carriage and the drum of the mainspring, whereas the other arm acts upon a spring-loaded detent which engages a ratchet wheel. The mechanism operates in such a manner that, when the lever tilts, the detent urged by its spring snaps into a neutral position from which it must be subsequently re-erected.

A mechanism of the kind above described requires numerous parts all of which must be machined to accurate dimensions and are therefore costly to manufacture. Known mechanisms also suffer from the disadvantage that the carriage must be retracted against the counter-pressure of the lever spring. This imposes an additional frictional load upon the carriage draw-band or cord and a correspondingly increased amount of tensional stress upon the mainspring in its drum so that the carriage return mechanism is subjected to increased wear while the carriage movement tends to be sluggish and the writing speed to be materially reduced. Moreover, the greater tension of the carriage mainspring subjects the parts—and particularly the arresting parts—to a greater impact load and thereby exposes them to rapid wear and frequently to greater risk of breakage.

It is therefore the principal object of this invention to produce a mechanism which overcomes the disadvantages above set forth by making use of fewer and also cheaper parts which will not be subjected to hard wear. It is a further object of the invention to provide a mechanism which permits the paper carriage to be manually retracted without noise and which does not impair the writing speed of the machine.

According to the present invention these objects are achieved mainly by the use of oblique or slanting surfaces for disengaging the detent which must be locked against re-engagement by the double-armed lever when the carriage is retracted by hand.

Since in forms of construction according to this invention the disengagement of the detent does not depend upon the magnitude of the friction between the double-armed lever and the draw means for the carriage the friction required is comparatively low so that premature wear of the draw means (band or cord) is most unlikely. The small amount of friction required and the consequent low tension of the carriage mainspring afford the additional advantage of reducing the manual effort necessary

to retract the paper carriage, in other words, the paper carriage can be conveniently and quickly returned, a factor which also contributes towards higher working speeds. The fact that the carriage mainspring need be preset to only a small amount of initial tension at the same time ensures a smooth and noiseless operation of the machine.

Further features of the present invention will be hereinafter described with reference to two alternative illustrative forms of construction shown in the accompanying drawings:

Fig. 1 is a view of the novel mechanism from above, showing the mechanism in the position before a key is depressed;

Fig. 2 shows the same mechanism during the manual return of the carriage;

Fig. 3 is a view from above of a modified form of construction likewise shown in the position before a key is depressed;

Fig. 4 is a section taken on line IV—IV in Fig. 3;

Fig. 5 is the mechanism shown in Figs. 3 and 4 as viewed from the inside to the back of the machine, in its operative position, that is, with the detent disengaged;

Fig. 6 is a view similar to Fig. 1, but showing a fork-like end of the lever for guiding the carriage traction cable, and

Fig. 7 is a view similar to Fig. 4 and showing the carriage traction cable guided by the fork-like end of the lever.

In the form of construction shown in Figs. 1 and 2 the detent cooperating with a rack is embodied in a flat pawl 2 situated within the plane determined by the position of the rack 1. The said pawl 2, fulcrumed at 3, carries a short arm 4 projecting at right angles thereto for the attachment of the free end of a tension spring 5 secured to a fixed pin 6. The spring 5 urges the ratchet tooth 7 of the pawl 2 into engagement with the teeth 8 of the rack 1. The ratchet tooth 7 has a beveled flank 9 so that the motion in the direction of the arrow 10 of the rack 1 which is affixed to the paper carriage (not shown) causes the pawl 2 to be displaced from its position shown in Fig. 1 into the position shown in Fig. 2.

To prevent the ratchet tooth immediately re-engaging the next following tooth 8 of the rack the pawl 2 is retained by a double-armed lever 11 one arm 12 of which is hooked over the carriage draw-cord 13. The length of this lever arm 12 is such that it tends slightly to pull the draw-cord out of its linear path so that a certain though small amount of friction is produced between the draw-cord and the hooked end of the arm. The carriage draw-cord is attached at one end to a lug 14 of the rack 1 and the other end is wound on to the drum of the mainspring 15.

When the rack moves in the direction of arrow 10 the other arm 16 of the double-armed lever 11 swings in the opposite direction and its angled foot 17 engages a ramp 18 located on a projection 19 which forms part of the flat pawl 2, the said ramp having an arched surface to the effect that the swing of the double-armed lever 11 forces a slight additional deflection upon the pawl 2 and a suitable clearance for the prevention of noise is established between the ratchet tooth 7 and the teeth 8 of the rack. The double-armed lever is pivotally mounted on a base plate 20 which is so located that the said lever forms approximately a right angle with the pawl 2 when it engages the same and thereby creates a positive and reliable lock.

Since the contact friction between the hooked end of the arm 12 and the draw-cord 13 is only slight—as has been hereinbefore stated—practically no resistance is offered to the manual return of the paper carriage. To ensure that the load of the double-armed lever 11 on the

carriage draw-cord 13 remains approximately uniform, and the deflection of the cord 13 is always approximately the same, the angular movement of the lever 11 is limited. To this end the form of construction shown in the drawings provides two stops 21 on the base plate 20 but these may be replaced by any other suitable limiting means. Alternatively, instead of having a hooked end the arm 12 might be provided with a forked end 12', as shown in Figs. 6 and 7, which would then deflect the return cord 13 in the opposite direction to that produced by the hook.

22 denotes a small catch which momentarily keeps the pawl disengaged from the rack 1 when a key is depressed.

It should be noted that the entire mechanism is arranged to lie substantially parallel with the base of the machine so that the height of the latter may be kept low, a factor of the greatest importance, more particularly in the construction of a portable typewriting machine.

It will be readily understood that it is not absolutely necessary to provide the ratchet tooth 7 with a beveled flank 9 as it would be quite sufficient for the flanks of the teeth 8 of the rack 1 to have appropriately inclined engaging surfaces. However, it is of the essence that the de-coupling action when the paper carriage is manually retracted should be automatic and due to the wedge effect of inclined surfaces.

In the forms of construction shown in Figs. 3 to 5 the detent for the rack 1 is embodied in a ratchet tooth 23 capable of being deflected against the action of a spring and arranged transversely to the direction of movement of the paper carriage (not shown), the said tooth being provided on that flank which is opposite to its arresting surface 24 (see Figs. 3 and 5) with a slanting surface 25 at such an angle that during the manual return of the paper carriage in the direction indicated by the arrow 10 a lateral force acts upon the detent 23 which thrusts it out of engagement and urges it out of the position shown in Figs. 3 and 4 into the position shown in Fig. 5. It will be understood, however, that the clearance between the detent 23 and the rack 1 shown in Fig. 5 is not produced by the action of the slanting surface but by means yet to be hereinafter described.

The ratchet tooth 23 actualy forms the end of a projecting arm 27 integral with a forked member 26 with a further arm 28 projecting in the opposite direction to which further reference will be made hereunder. The fork 26 is fulcrumed on a fixed spindle 29 and secured against axial displacement by bushes 30, 31. However, the bushes are so adjusted as to give the fork 26 a certain amount of axial play. This is important to allow the ratchet tooth 23, upon being disengaged by the depression of a key, to re-engage the next following tooth of the rack 1 automatically. The ratchet tooth 23 is urged into re-engagement by a spring 32 which surrounds the spindle 29. To this end the said spring is attached, on the one hand, to the bush 31 and, on the other hand, to the fork 26. The fork 26 also carries a member 33 which serves a similar purpose to that served by the catch 22 in Figs. 1 and 2.

To ensure that the ratchet tooth 23 is prevented from reengaging the rack 1 when the paper carriage and the rack 1 affixed thereto are manually retracted, the double-armed lever, in this form of construction, takes the form of a bell crank lever 35 which with one of its arms 36 hooks over the drawcord 13 whereas the other arm 37 moves behind the above mentioned arm 28 of the forked member 26 so that the ratchet tooth 23 cannot return into engagement with the rack 1 once it has been disengaged therefrom by the manual retraction of the paper carriage.

The manner in which the arm 37 operates, which is incidentally provided with an obliquely cut end 38, will be readily understood by reference to Figs. 3 to 5. When the rack 1 is moved in the direction of the arrow 10 the obliquely slanting edge 25 of the ratchet tooth forces the latter out of engagement with the rack 1 and the arm

37 moves behind the arm 28, the wedging action of the slanting edge 38 on the arm 28 forcing the ratchet tooth to tilt a little further away from the rack 1 whereby a clearance is established between the rack 1 and the ratchet tooth 23 (see Fig. 5). This clearance ensures that the manual retraction of the paper carriage can be noiselessly performed. The bell crank lever 35 which is fulcrumed on a pivot pin 39 affixed to the rail 34 is also provided with a slot 40 engaged by a pin 41 which is riveted to the rail 34 and limits the angular motion of the bell crank lever 35 in the same way as the angular deflection of the double-armed lever 11 shown in Figs. 1 and 2 is limited by two stops.

The form of construction illustrated by Figs. 3 to 5 is likewise adapted to a shallow type of construction so that it is particularly suitable for incorporation in portable typewriting machines.

What is claimed is:

1. An escapement mechanism for typewriting and like machines, comprising: a machine frame, a paper carriage slidably mounted on the machine frame, means for impelling the paper carriage from one end of its travel to the other, a toothed ratchet member connected with the paper carriage, a pawl rockably mounted on the machine frame and adapted to engage between the teeth of the ratchet member, the inclination of the teeth of the ratchet member being such as to urge the pawl out of engagement with the ratchet teeth during the return movement of the paper carriage, and a two-armed lever pivotally mounted on the machine frame and adapted to be rocked by frictional contact with the carriage-impelling means so as to lock the pawl against re-engagement with the ratchet member during the return movement of the carriage.

2. An escapement mechanism as claimed in claim 1, the pawl being a spring-loaded flat pawl shaped with a ramp for engagement by the two-armed lever.

3. An escapement mechanism as claimed in claim 1, further comprising: a projection on the pawl within the plane of movement of the pawl, a ramp on the said projection, the surface of the said ramp being perpendicular to the said plane of movement, and a catch adapted to come into contact with the said ramp and thereby momentarily disengage the pawl from the ratchet member when a key is depressed.

4. An escapement mechanism as claimed in claim 2, the two-armed lever being approximately perpendicular to the surface of the ramp when the lever engages the ramp.

5. An escapement mechanism as claimed in claim 1, further comprising: a base-plate mounted on the machine frame, the two-armed lever being pivotally mounted on this base-plate, and stops also mounted on the base-plate to limit the amplitude of oscillation of the two-armed lever.

6. An escapement mechanism as claimed in claim 2, the two-armed lever comprising an angled foot at the end that engages the ramp on the pawl.

7. An escapement mechanism as claimed in claim 1, the carriage-impelling means including a tensile member, and the two-armed lever being formed with a hook a tone end to engage under the said tensile member.

8. An escapement mechanism as claimed in claim 1, the carriage-impelling means including a tensile member, and the two-armed lever being formed with a fork atone end to engage under the said tensile member.

9. An escapement mechanism as claimed in claim 1, the pawl being rockable transversely to the direction of motion of the paper carriage, and the mechanism further comprising a spring urging the pawl into engagement with the ratchet member.

10. An escapement mechanism as claimed in claim 9, further comprising: a forked member pivotally mounted on the machine frame, an arm integral with the forked member, the pawl being in the form of a ratchet tooth provided at the end of this arm, and a second arm pro-

jecting from the forked member on the side opposite to the first-mentioned arm, this second arm co-operating with the two-armed lever that locks the pawl against re-engagement when the ratchet tooth is disengaged from the ratchet member.

11. An escapement mechanism as claimed in claim 10, further comprising a spindle parallel to the toothed ratchet member, the forked member equipped with the two arms being pivotally mounted on the said spindle in such a way as to be capable of limited axial displacement.

12. An escapement mechanism as claimed in claim 11, the spring that urges the pawl into engagement with the ratchet member being a helical spring surrounding the said spindle, one end of the spring being fixed and the other end acting upon the forked member.

13. An escapement mechanism as claimed in claim 10, the carriage-impelling means including a tensile member, and the two-armed lever being in the form of a bell-crank lever, one arm of which engages the said tensile member with a slight amount of frictional contact, whereas the other arm of the two-armed lever, when in the tilted position, contacts the second arm of the forked member, and in this way locks the ratchet tooth against re-engagement with the toothed ratchet member.

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