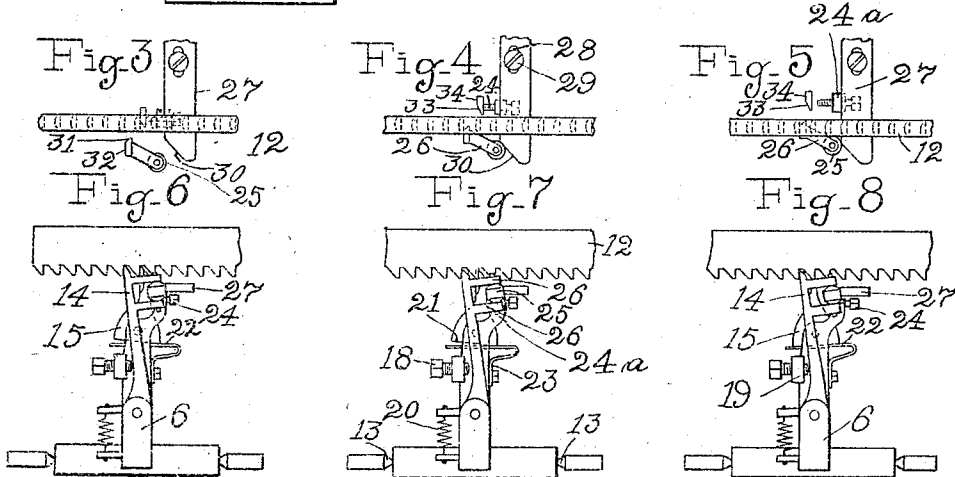
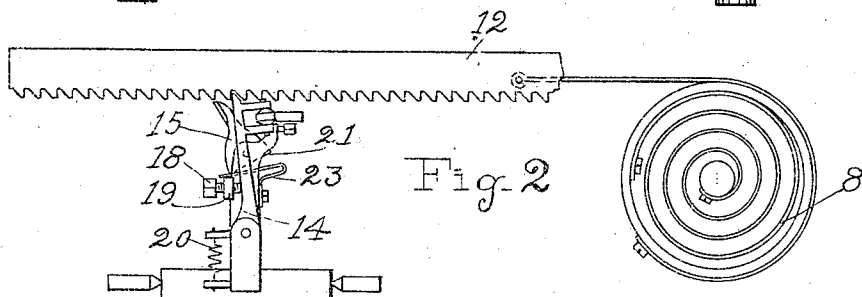
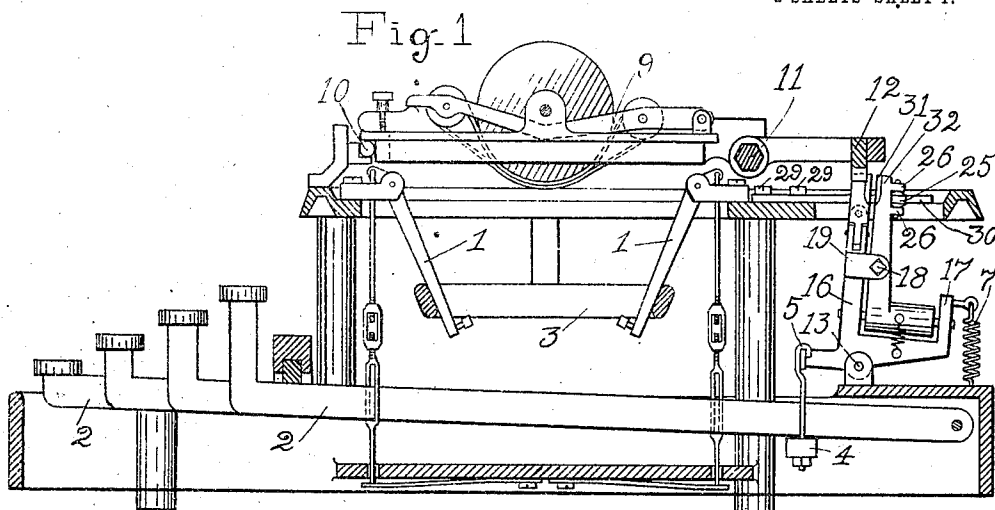


1,026,642.

F. W. HILLARD.
TYPE WRITING MACHINE.
APPLICATION FILED AUG. 15, 1899.

Patented May 14, 1912.

2 SHEETS-SHEET 1.



WITNESSES

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1,026,642.

Patented May 14, 1912.

2 SHEETS—SHEET 2.

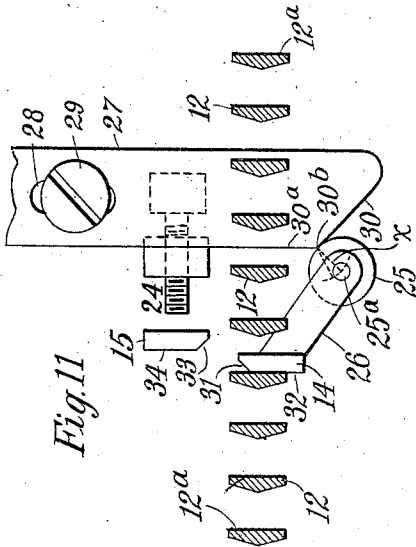


Fig. 11

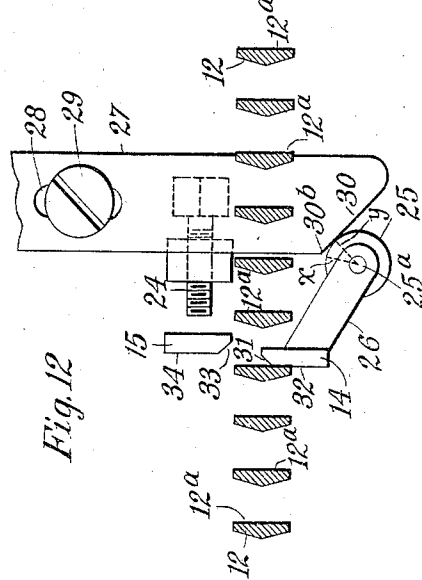


Fig. 12

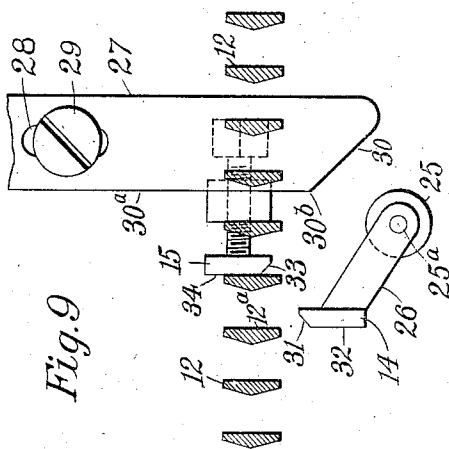


Fig. 9

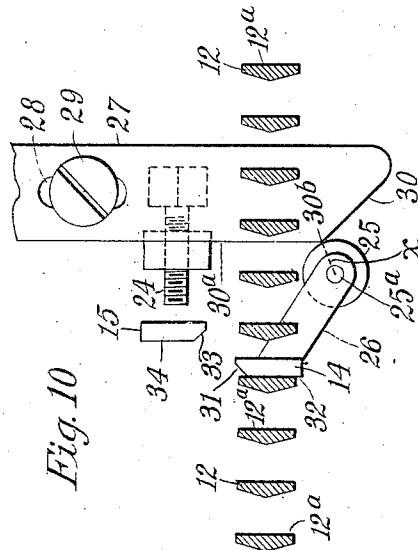


Fig. 10

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UNITED STATES PATENT OFFICE.

FREDERIC W. HILLARD, OF TOTTENVILLE, NEW YORK.

TYPE-WRITING MACHINE.

1,026,642.

Specification of Letters Patent.

Patented May 14, 1912.

Original application filed August 25, 1896, Serial No. 603,845. Divided and this application filed August 15, 1899. Serial No. 727,275.

To all whom it may concern:

Be it known that I, FREDERIC W. HILLARD, a resident of Tottenville, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My present application is a division of my application filed in the United States Patent Office on the 25th day of August, 1896, which has been serially numbered 603,845.

The invention described in this application relates to an improved escapement for the spaced member of typewriting machines, and has for its object to provide such a construction thereof as will result in a quick, but steady feed of the spaced member, and which will provide for such an adjustment of the parts as to permit the key levers to be worked with a light finger pressure.

The escapement herein described has many advantages in common with the escapements described in my prior patents, viz: No. 554,874, dated February 18, 1896; No. 577,982, dated March 2, 1897, and No. 580,281, dated April 6, 1897, and No. 616,840, dated December 27th, 1898, to which patents reference is hereby made for the disclosure of the general principles involved in the actions of the present escapement. I will in the accompanying specification and claims particularly point out and claim the several features particular to this invention and which I desire to protect by Letters Patent of the United States.

Referring to the accompanying drawings in which corresponding parts are designated by similar marks of reference: Figure 1 is a transverse section through a typewriting machine having my improved escapement mounted thereon, the plane of section being adjacent to the escapement. Fig. 2 is an elevation showing the escapement mechanism, and the power spring for the spaced member detached from the machine frame. Figs. 3, 4, and 5, are detailed views of the escapement, showing diagrammatically the parts thereof in the positions corresponding to different positions of the key levers. Figs. 6, 7, and 8, are elevations of the escapement mechanism detached from the machine frame, the positions of the parts

therein shown corresponding to the positions shown in Figs. 3, 4, and 5, respectively. Figs. 9, 10, 11, and 12, are enlarged detail views of the dogs and rack of Figs. 3 to 5, showing more fully the cycle of movement of the dogs and rack during the movement of the keys.

In Fig. 1 of the drawings I have shown my improved escapement as applied to a machine of the general Remington type, although it is obvious that my improved escapement is adapted for use with other types of machines. In this machine the type bars 1 are actuated from corresponding key levers 2, as well known, the type bars when in their normal position resting in a buffer or basket 3. A universal bar 4 extends beneath all the key levers, and through the connecting wires 5 transmits motion to the rocker frame 6, to rock the latter toward the front of the machine upon the depression of a key; the rocker frame being moved toward the back of the machine upon the release of the key by a rocker frame returning spring 7 and carriage main spring 8. The spaced member comprises a paper carriage 9, running on suitable guides 10 and 11 at the front and back, and a rack or toothed member 12 connected therewith; the spaced member being drawn forwardly in the line of printing by a carriage propelling power in the form of main spring 8, all of which is well known. The escapement proper comprises two members, the rack and detent, the latter composed of the rocker frame and parts thereon.

The rocker frame or detent 6 is pivoted at 13 to the base of the machine, and carries two reciprocating elements or spacing dogs 14 and 15, the latter of which is normally engaged with the rack and the former normally disengaged but adapted to be brought into engagement therewith when the dog 15 is disengaged. The dog 14 will be hereinafter designated as the roller dog because of its peculiar roller construction and to distinguish it from dog 15 which has no roller.

The rocker frame has two upwardly extending parallel arms 16 and 17, between which is pivoted the lower portion of the normally disengaged dog 14, while the normally engaged dog 15 is pivoted upon the

upper end of the arm 16; both dogs being pivoted to vibrate or reciprocate in the line of the carriage feed. The roller dog 14 is mounted on the rocker frame toward the back of the machine, and is limited in its rearward motion in the line of the feed on the rocker frame by an adjustable stop 18 carried on the projecting part 19 of the arm 16, and is normally held against this stop by a spring 20 secured to it and to the rocker frame. The normally engaged dog 15 is provided with a flattened base 21 which is adapted to bear at each end upon the leaf 22 of an impulse spring 23 secured to the rocker frame, the leaf being so depressed by the dog as to be under constant tension. This spring determines the normal position of dog 15 when the latter is disengaged from the rack, and holds it in what I term a central or intermediate position (see Fig. 8), but permits it to be moved forwardly in the line of the feed with the rack against a stop 24 carried by a nose 24^a projecting from the upper part of the arm 16 of the rocker frame; and the spring also permits the dog to move upon its pivot rearwardly in respect to the line of feed of the spaced member, so that the dog may trip out of the rack in moving the carriage back (see Fig. 2). The unequal bearing exerted by the spring on the corners of the dog in either of its extreme positions returns the dog when released to its intermediate position, and automatically stops it, in substantially the same manner that the spring shown in my said prior Patent No. 616,840 stops and holds the normally engaged dog thereof, the two dogs and centering springs acting in the same manner, but by different mechanism.

In the normal position of the parts, shown in Figs. 1, 3, and 6, the rack is in engagement with the dog 15 and impelled by the main spring 8 carries the latter forwardly against the stop 24. Upon the depression of a key the rocker frame is swung toward the front of the machine, the first effect of this movement being to disengage the rack from the normally engaged dog 15, and before their complete disengagement to engage the rack and roller dog 14. The dog 15, as soon as disengaged from the rack, is thrown rearwardly by its spring 23 to its central or intermediate position; while the movement of the rocker frame toward the front of the machine, together with the forward spacing movement of dog 14, under the pull of the rack, brings an anti-friction bearing, in the form of a roller 25, carried in lugs 26, 26 on the forward face of dog 14, into contact with a tooth 27; the tooth being adjustably mounted on the machine frame through the medium of slots 28, 28 and screws 29, 29 as shown. The back end of the tooth has a beveled face 30 thereon against which the roller 25 bears and an unbeveled face 30^a,

the two faces forming a point 30^b on the tooth where they meet. With a staccato blow upon the keys the type will strike the paper immediately at or sometimes before the engagement between the roller 25 and the beveled face 30 of the tooth 27, while if a legato blow is struck, the type will strike the paper sometime after the engagements of said parts, and after the carriage has spaced forward a corresponding greater distance, and has been cammed back by the roller running up the beveled face 30 of the tooth 27, this being due to the continued movement of the rocker frame. The function of the camming back of the carriage in preserving proper spacing with different blows, and in preventing blurring, if the key should be held down, has been explained in my prior patents to which reference is hereby made. Upon the release of the key the rocker frame is swung toward the back of the machine by the rocker frame returning spring 7, and by the main spring 8 pulling the rack 12 forward against tooth 27, so that dog 14 is disengaged from the rack and dog 15 reengaged therewith; the rack spacing forward during such disengagement and carrying each dog forward in turn while in engagement. The dog 15 enters the rack in front of the rack tooth which was engaged with dog 14 and spaces forwardly therewith against the stop 24 as before described.

The pull of the main spring 8 upon dog 14 when the latter is in engagement with the rack, tends to draw the latter forwardly, and as the roller 25 and beveled face 30 are in engagement at such time, also tends to force the roller to run down the bevel, thus throwing the rocker frame toward the back of the machine, and so assisting the rocker frame returning spring 7 to restore the rocker frame 6 to its normal position. The pull of the main spring 8 thus exerted on the rocker frame 6 results therefore in assisting to a greater or less extent, in the reengagement of the normally engaged elements of the escapement; and, as the key levers are connected with rocker frame by the connecting wires and universal bar 4, it also assists in returning the depressed key lever to normal position. This action of the main spring upon the key levers I have heretofore designated as a repulser and have described it, as well as the reengagement of the parts by the pull of the main spring in detail in my prior patents before referred to. The dogs 14 and 15 are each provided with unbeveled holding faces and beveled working edges comprising a beveled face 31 and an unbeveled face 32 on roller dog 14, and corresponding faces 33 and 34 on the normally engaged dog 15, the junction of the two faces on the dog 15 being so located that in the normal position of the parts the rack engages the unbeveled face 34 of the

dog. As the rocker frame swings toward the front of the machine, the beveled face 33 engages the rack, and running down the edge of the latter enables the dog 15 to commence its rearward movement under the influence of its impulse spring 23 before the dog has wholly escaped from the rack. This insures a quick proper positioning of the dog 15 to reënter the rack upon the return of the parts to normal engagement. But before the unbeveled face 34 of dog 15 is disengaged from the rack (which takes place at about the half depression of a key) the unbeveled face 32 of dog 14 is brought into engagement with the rack, the distance between the junction of the beveled and unbeveled faces on the two dogs not being greater than the width of the rack. During the latter half of the down stroke on the key the unbeveled face 32 of dog 14 passes well into the rack (see Fig. 5) and holds the carriage until after the printing. As soon as the finger pressure on the key is released dog 14 begins to be disengaged from the rack, partly under the action of the retractile spring 7 and partly under the pull of the main spring 8. The roller 25 attached to the dog moves along the beveled face 30 of the carriage controlling tooth 27, and the carriage feeds forward. As soon as the junction of the unbeveled face 32 with the beveled face 31 of dog 14 passes out of the rack, the rack begins to slide along beveled face 31, and the speed of the carriage feed is thus accelerated, until finally dog 14 passes entirely out of the rack and the carriage finishes its feed at full speed and is stopped by the contact of the rack with the unbeveled face 34 of dog 15 and by contact of the dog with stop 24. After the printing, therefore, the carriage is controlled by the unbeveled face 32 of dog 14 until the type has been started away from the platen. This insures that there shall be no blurring in the print. After that the carriage is first moved forward gradually, as the roller 25 moves along the cam surface 30, and its feed is accelerated while the rack slides along the beveled face 31, and then the carriage is released to finish its feeding movement at full speed. The proportion of the feed that is performed with each dog is determined by the adjusting screw 24, which limits the forward spacing of dog 15, and by tooth 27 which limits the forward spacing of the dog 14. By aid of these various adjustments each dog may be caused to perform its desired proportion of the carriage feed, and any part or even all of the feed may take place after printing.

The speed and easy action of the present escapement is largely due to the co-action of the roller 25 with the tooth 27; particularly is this due to the fact that 25 rolls down the face 30 instead of sliding. In the operation

of this device the parts are so adjusted that under normal conditions the roller 25 first contacts with the tooth 27 at the point 30^b which is the junction of the faces 30 and 30^a of the tooth 27. The result of the roller 25 contacting with the point 30^b is, that during the further cycle of movement of the parts in the feeding of the carriage, the roller pivots about the point 30^b, its axis 25^a moving in the arc of a circle whose radius is equal to the radius of roller 25, until the radial line from the point 30^b becomes at right angles with the face 30. The effect of this pivotal movement of the roller 25, is to rapidly withdraw the tooth 14 from the rack and to permit the feeding movement of the carriage to be begun by a rapidly accelerated motion. After the radial line 25^a—30^b has become perpendicular to the feeding face 30, 25 simply acts as a roller in its travel down the feeding face 30 of the tooth 27. This radial line of the roller 25 through the point of contact 30^b is designated, on Figs. 10, 11, and 12, by *x*. In Fig. 12 the line designated by *y* represents a line determined by a point of contact of the roller 25 with the feeding face 30, during the travel of the roller down said feeding face of the tooth 27.

Referring more particularly to the large diagrammatic views: Fig. 9, represents the normal position of the parts (corresponding to that shown in Fig. 3); Fig. 10 is diagrammatic of the position assumed by the parts under the adjustment shown, on full depression of a key, (corresponding to that of Fig. 5); Fig. 11 represents the position of parts after the release of key and shows the roller 25 as having swung about the point 30^b as a pivot, into the position where the roller begins its function as a roller in its travel down the feeding face 30; and Fig. 12 represents a later position during the return movement of the parts to normal position, and shows the roller as having rolled part way down the feeding face of the tooth 27.

The roller 25 may be considered as having an endless revolving feeding face, since the forward feed of the parts is permitted by the pivotal action and rolling of said member 25 in its contact with the feeding face 30. The forward feed of the carriage is due to the relative motion of the roller and the tooth 27, since the unbeveled face 32 of the dog 14 is maintained in contact with the unbeveled face 12^a of the rack tooth. The roller 25 in its rolling action on the feeding face 30 presents thereto an endless revolving feeding face.

The mechanism herein shown for controlling the carriage when the key is depressed, is an escapement roller or pivotal support 25, a carriage rack 12, a controlling member 27 and operative connections between said

controlling member and the rack, shown herein as dog 14, whereby the rack 12 under the pull of the carriage spring, forces the pivotal support 25 against the controlling member 27, thus holding the carriage stationary as long as the key is depressed and enabling the carriage main spring to effect an instant partial feed of the carriage as soon as the key is released. Therefore it is obvious that my present escapement has a characteristic mode of operation due to the peculiar action of the roller 25, and to the conformation of the feeding face 30 on the tooth 27. Hence I designate the escapement shown herein as a roller escapement provided with a beveled feeding and camming, impulse face.

As many changes could be made in the above structure 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 corresponding drawings shall be interpreted as illustrative, and not in a limiting sense. I desire it also to be understood that the language used in the claims is intended to cover all generic and specific features of this invention herein described and all statements of the scope of the invention which as matter of language might be said to fall therebetween.

Having thus described my invention what I claim and desire to secure by Letters Patent is:—

1. In a typewriter escapement, the combination with a carriage-rack, of a pivoted dog having a beveled face on its side opposing the forward movement of said rack and a carriage controlling tooth determining the position of the dog when it is in engagement therewith, substantially as described.

2. In a typewriter escapement, the combination of a spaced member having unbeveled engaging faces thereon, of a pair of dogs alternately engaging with the spaced member, each of the dogs having an unbeveled engaging face, and a beveled face thereon, the beveled engaging face of each dog engaging the spaced member prior to the total disengagement of the dog from the spaced member.

3. In a typewriter escapement, the combination with a spaced member having unbeveled engaging faces thereon, of a normally engaged dog having an unbeveled face normally engaging the spaced member, and a beveled face engaging the spaced member as soon as the normally engaged face is disengaged therefrom, a normally disengaged dog having an unbeveled engaging face and a beveled engaging face, and a key connected to the said dogs to disengage the normally engaged dog and to

engage the unbeveled face of the normally disengaged dog with the said spaced member, substantially as described.

4. The combination in a typewriter escapement, with a power propelled carriage, of a rack and a dog member, comprising two dogs which alternately engage with the rack, one of which is engaged with and the other disengaged from the rack in the normal position of the escapement, a key and connections for disengaging the normally engaged dog from the rack and for engaging the normally disengaged dog therewith, and a controlling member rigidly mounted on the machine and brought into engagement with the normally disengaged dog when that dog is engaged with the rack, and which is acted on by the carriage propelling power to disengage the normally disengaged dog from the rack, substantially as described.

5. The combination in a typewriter escapement, with a power propelled carriage, of a rack and a dog member, comprising two dogs which alternately engage with the rack, one of which dogs is engaged with and the other disengaged from the rack in the normal position of the escapement, a key and connections for disengaging the normally engaged dog from the rack and for engaging the normally disengaged dog therewith, and a controlling member rigidly mounted on the machine and having thereon a beveled face which is engaged by one of said dogs.

6. The combination in a typewriter escapement, with the keys, of a rack and a dog member, comprising two dogs adapted to alternately engage with the rack, one of which dogs is engaged with and the other disengaged from the rack in the normal position of the machine, the said normally engaging dog being provided with an unbeveled holding face which engages the rack in said normal position and with a beveled feeding face down which the rack runs during the depression of the keys and prior to the total disengagement of said normally engaging dog from the rack, substantially as described.

7. In a typewriting machine, the combination with a printing mechanism, a series of keys for operating said mechanism, and a carriage carrying a rack, of a dog moved by said keys and engaging the rack for controlling the movement of the carriage, a pivoted frame carrying said dog, a stop carried by the frame for limiting the movement of the dog and a spring carried by the frame bearing against said dog at its under side, whereby said dog may rotate in either direction against the action of the spring.

8. In a typewriter escapement, the combination with a rack adapted to be secured to a power driven carriage and a detent

having teeth adapted to engage those of the rack, one of said teeth having an inclined face arranged and adapted to permit the rack to commence its feeding movement during the disengaging movement of the parts, and suitable means for varying the rack controlling position of the inclined face, so that it will retract the carriage or not according to its adjustment, substantially as described.

10. 9. In a combination in a typewriter escapement with a power propelled carriage, of a rack and a dog member, comprising two dogs which alternately engage with the rack, one of which dogs is engaged with and the other disengaged from the rack in the normal position of the escapement, a key and connections for disengaging the normally engaged dog from the rack and for engaging the normally disengaged dog therewith, an escapement retracting spring to disengage the normally disengaged dog from the rack, and a controlling member having a beveled face which is brought into engagement with the normally disengaged dog when that dog is engaged with the rack, and which is acted on by the carriage propelling power to aid the escapement retracting spring in disengaging said normally disengaged dog from the rack, substantially as described.

10. The combination in a typewriter escapement, with a power propelled carriage, of a rack and a dog member, comprising two dogs which alternately engage with the rack, one of which dogs is engaged with and the other disengaged from the rack in the normal position of the escapement, a key and connections for disengaging the normally engaged dog from the rack and for engaging the normally disengaged dog therewith, an escapement retracting spring to reengage the normally engaged dog with the rack, and a fixed member having a beveled face which is brought into engagement with the normally disengaged dog when that dog is engaged with the rack, and which is acted on by the carriage propelling power to aid the escapement retracting spring in reengaging said normally engaged dog with the rack, substantially as described.

11. In a typewriting machine, the combination with a carriage rack and a detent, of an escapement roller on said detent, and a carriage controlling tooth adapted to engage said roller to control the movement of the carriage.

12. In a typewriting machine, the combination of a carriage rack and a detent, a normally engaged dog having an unbeveled face which normally engages the rack, an escapement roller on the detent and a carriage controlling tooth adapted to engage said roller to release the rack and enable it to commence its forward feeding movement.

13. In a typewriting machine, the combination of a carriage rack and a detent, a normally engaged dog and a normally disengaged escapement roller on the detent, a carriage controlling tooth, and an adjustment for varying the portions of the carriage feed which are performed under control of the escapement roller and under control of the normally engaged dog, substantially.

14. In combination with the carriage and rack, a detent having two dogs with their edges adjacent to each other beveled on the sides opposing the forward movement of the carriage and staggered with respect to each other, a key and connections for disengaging one dog from the rack and permitting a partial feed of the carriage down one beveled edge, and means for disengaging the other dog from the rack and permitting an additional feed of the carriage down the other beveled edge.

15. In a typewriter escapement, the combination of two elements in one member which alternately engage with the other member, both elements having their edges adjacent to each other provided with inclined faces on the sides opposing the forward movement of the carriage, the two said inclined faces being staggered with respect to each other, and successively disengaged from the said other member, the one during a depression of a key and the other after the release thereof, whereby successive limited feeds of the carriage will occur prior to and after the release of the key.

16. In a typewriting machine, the combination of a key, carriage propelling power, an escapement, operative connections between the key and said escapement, the escapement having a roller dog and means cooperating therewith for bringing the propelling power into action to lift the key when the key is depressed.

17. In a typewriting machine, the combination of a key, a carriage, a carriage propelling power, an escapement, operative connections between the key and the escapement, a controlling member; and a pivotal member having an endless feeding face adapted to cooperate with said controlling member to control the movement of said carriage.

18. In a typewriting machine, the combination of a carriage, carriage propelling power, an escapement, a controlling member having two faces thereon and a member adapted to roll on one of said faces and to pivotally swing from said face, the juncture formed by the junction of said faces being the fulcrum for this pivotal action.

19. In a typewriting machine, the combination of a carriage, carriage propelling power, a key, an escapement controlled by said key, a controlling member having faces

intersecting at an angle, one of said faces being a feeding face, and a pivotal member having an endless feeding face adapted to cooperate with said controlling member, substantially as described.

20. In a typewriter escapement, the combination with a dog and carriage controlling tooth of a rack, which can be spaced step by step with respect to and under the control of the dog, and a roller on said dog adapted to engage said tooth and to thereby space the rack backward, substantially as described.

21. In a typewriter escapement, the combination of two engaging members which can be disengaged and reengaged, means operated by the keys for disengaging the members, and a roller dog which is operated

on by the carriage propelling power for re-engaging the members, substantially as described.

22. In a typewriting machine, in combination, a carriage, a carriage propelling power, a rack, a controlling member having a feeding face thereon and a roller adapted to cooperate with said controlling member, said roller being adapted to maintain a portion of its periphery in stationary relationship with said controlling member during a portion of the feeding movement.

Signed by me in New York city, this 9th day of August, 1899.

FREDERIC W. HILLARD.

Witnesses:

ABRAM COLE,

M. C. EIGENRAUCH.