G. J. BARRETT.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 11, 1911.

1,011,721.

Patented Dec. 12, 1911.

3 SHEETS—SHEET 1.

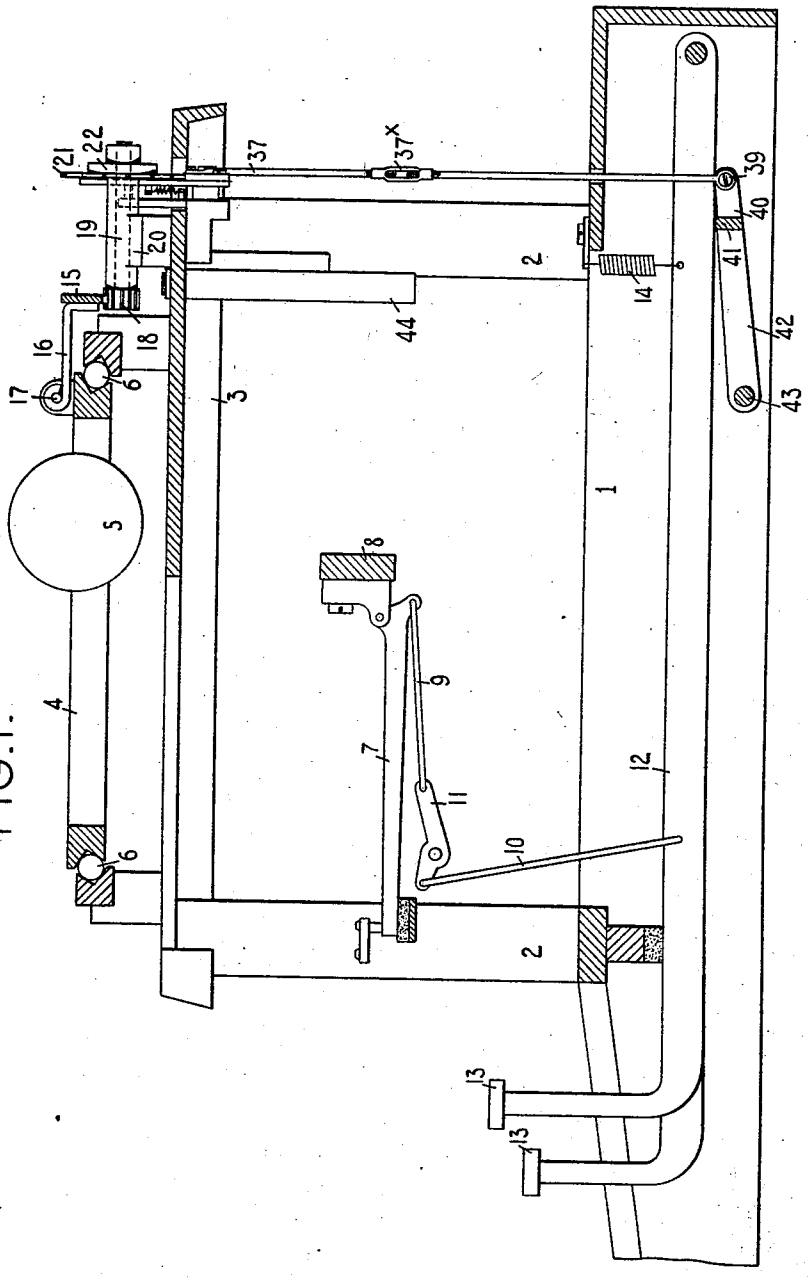

FIG. 1.

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3 SHEETS—SHEET 2.

FIG. 3.

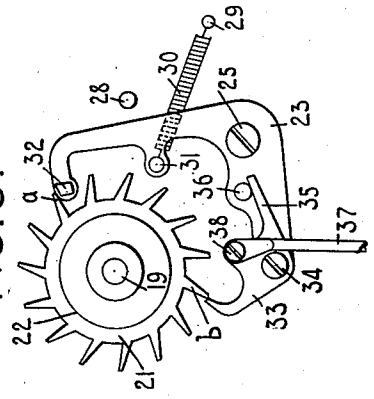


FIG. 5.

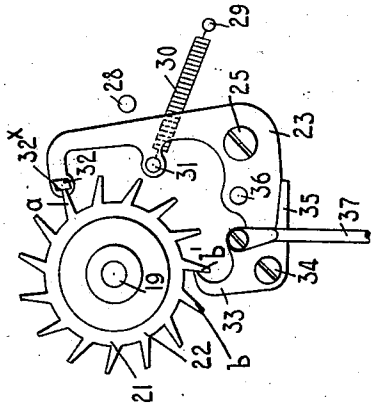


FIG. 2.

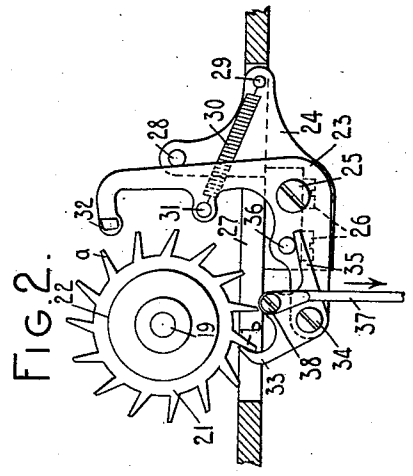
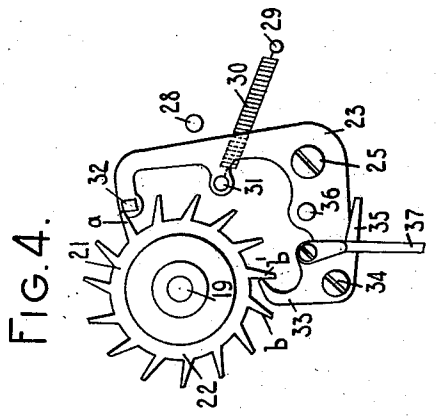


FIG. 4.



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3 SHEETS—SHEET 3.

FIG. 7.

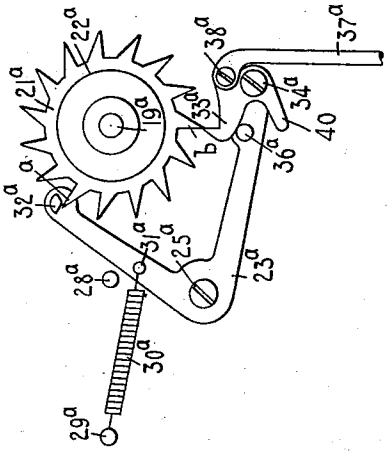


FIG. 9.

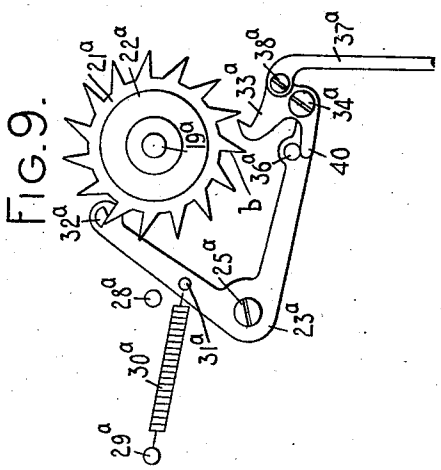


FIG. 6.

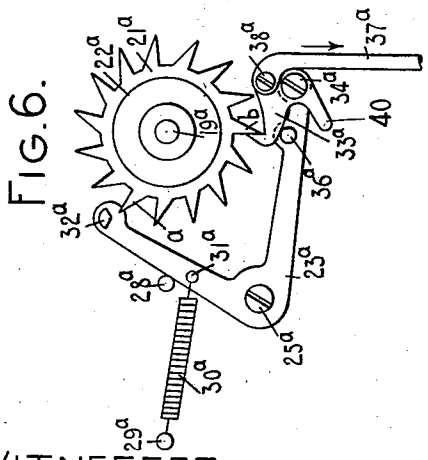
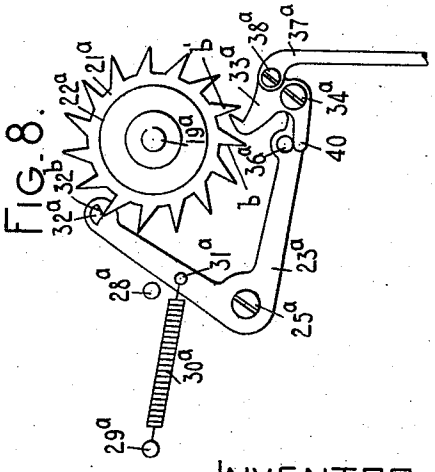


FIG. 8.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GLENN J. BARRETT, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,011,721. Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed March 11, 1911. Serial No. 613,780.

To all whom it may concern:

Be it known that I, GLENN J. BARRETT, citizen of the United States, and resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to carriage escapement mechanism.

The main object of my invention, generally stated, is to provide a comparatively simple, rapid and efficient carriage escapement.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following specification and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a vertical, central, fore and aft sectional view of one form of typewriting machine embodying my invention, only a sufficient number of parts of said typewriting machine being shown to illustrate my invention in its embodiment therein. Figs. 2, 3, 4 and 5 are detail rear elevations showing portions of the escapement mechanism, the different views illustrating the parts disposed in different positions. Figs. 6, 7, 8 and 9 are views which correspond to Figs. 2, 3, 4 and 5, respectively, but show a modified form of the construction.

I have shown my invention embodied in the present instance in a No. 10 Remington machine, although some of the parts of said machine are represented in a conventional manner. It should be understood, however, that so far as my present invention is concerned, it is immaterial what character of typewriting machine the invention is embodied in or what character of type action is employed.

The frame of the machine comprises a base 1, corner posts 2 and a top plate 3. A carriage 4 carries a cylindrical platen 5 and is mounted to move on anti-friction balls or rollers 6 across the top plate of the machine. Upwardly and rearwardly striking type bars 7 are mounted on a type bar segment 8 and each type bar is connected by links 9 and 10 and a sub-lever 11 with a key lever 12, each key lever being provided with the usual finger key 13. The key levers are restored to normal position by returning springs 14. A feed rack 15 is fixed to rearwardly extending arms 16 pivoted to the carriage at 17. The feed rack coöperates with a feed pinion 18 fixed to the forward end of a shaft 19 mounted to turn in a bearing 20 fixed to the top plate of the machine. The rear end portion of the shaft 19 extends beyond its bearing and is operatively connected to an escapement wheel 21, by means of the usual pawl and ratchet mechanism contained within a drum 22. By this connection the carriage is free to be moved from left to right independently of the escapement wheel but is operatively connected to turn the escapement wheel in its forward letter space movement from right to left under power of the usual spring drum.

The escapement of my present invention is illustrated in the present instance as an anchor escapement which affords a "let-off" of the carriage at the upstroke of the printing key and therefore belongs to that class of escapements which is known as "ordinary" as distinguished from "reverse" escapements. The anchor escapement which cooperates with the escapement wheel in the construction shown in Figs. 1 to 5, inclusive, comprises a dog rocker or carrier 23 which is in the nature of an angular lever pivoted to a bracket-plate or block 24 by means of a shouldered pivot screw 25 so that the dog rocker turns on an axis parallel with the axis of the escapement wheel. The bracket-plate 24 is secured by screws 26 to the top plate of the machine and extends upwardly through an opening 27 in the top plate and is provided near its upper end with a laterally extending stop pin 28. The bracket is also provided with a pin 29 to which one end of a contractile spring 30 is connected, the opposite end of said spring being connected to a laterally projecting pin 31 on the dog rocker. The upwardly projecting arm of the angular lever which constitutes the dog rocker, is provided with a holding dog or pallet 32 fixed to the arm and projecting laterally therefrom and crossing the plane of the escapement wheel. The lower substantially horizontally disposed arm of the dog rocker has a stepping dog or pallet 33 pivoted thereon by a shouldered

pivot screw 34, the stepping dog extending upwardly from its pivot. The stepping dog is pivoted on an axis parallel with the axis of the escapement wheel and is adapted to move in the plane of the escapement wheel in the movement of the dog on its pivot 34 and in its movement with the dog rocker. A stop arm or projection 35 extends from the stepping dog and is adapted to coöperate with a stop pin 36 which projects laterally from the dog rocker or carrier 23. When the stops 35 and 36 are in contact, as shown in Fig. 2, the stepping dog is adapted to move with the dog rocker as one part around the pivot 25, as will hereinafter more clearly appear. A depending link 37 is pivoted at 38 directly to the stepping dog and above the pivot 34 which connects the stepping dog to the dog rocker. The link 37 is in the nature of a two-part link, the two members of which are united by a turn buckle 37^x, the lower end of the link being pivoted at 39 to an arm 40 which projects rearwardly from a universal bar 41 which extends transversely beneath the series of key levers. The universal bar is carried by arms 42 which project rearwardly from a rock shaft 43 pivoted at its ends in the base of the machine.

The parts are normally disposed as indicated in Fig. 2 with the stepping dog, which moves in the plane of the escapement wheel, normally engaging a tooth of the wheel and holding the carriage against the pressure of a spring drum 44 connected in the usual manner with the carriage to move it from right to left. At this time the stop arm 35 engages the stop 36 and resists a turning action of the dog 33 on its pivot 34, by the power exerted on it by the escapement wheel. Moreover, it will be seen that at this time the pressure of the wheel is exerted in substantially a straight line between the engaged tooth of the wheel and the pivot 25 of the dog rocker, so that the power exerted from the wheel at this time does not tend to turn the dog rocker, which is held by the spring 30, against the stop 28. A depression of a finger key 13 is effective to move the associated type bar to the printing point, and as the key moves downwardly the universal bar 41 is depressed, thereby pulling down on the link 37.

From a comparison of Figs. 2 and 4 it will be understood that the link 37, considered in its relation to the pivot 34 of the stepping dog, is more nearly in a dead centered position in Fig. 2 than it is in Fig. 4; although a downward pressure on the link 37 is at all times exerted on the stepping dog to one side or to the right of its pivot 34 as viewed in Figs. 2–5. It will likewise be understood from an inspection of Fig. 2 that a turning movement of the stepping dog on its pivot 34 at the first part of the key depression is resisted by the escapement wheel which bears against the stepping dog and holds the stop arm 35 thereof in contact with the stop pin 36 on the dog rocker during the time the stepping dog is being disengaged from the wheel; it being understood that the power of the carriage spring exerted on the wheel at this time is sufficient to overcome the power of the spring 30. The first part of the key depression is effective therefore to turn the dog rocker and the stepping dog together as one part, carrying the holding dog 32 into the path of the next oncoming tooth *a* of the escapement wheel, as shown in Fig. 3, before the stepping dog is disengaged from the wheel. Before the completion of the downward stroke, the parts assume the positions shown in Fig. 3 which represents the parts as they appear just before the stepping dog snaps off the tooth *b* of the escapement wheel engaged by it and is moved forward into engagement with the next advancing tooth *b'* of the wheel as shown in Fig. 4.

From a comparison of Figs. 3 and 4 it will be understood that the power applied to the finger keys to move the dog rocker is exerted through the stepping dog and that this power is likewise effective to turn the stepping dog rapidly on its pivot 34 when it is released from the tooth *b* and to carry it forward to the next tooth *b'*, usually before the wheel has an opportunity to advance. This movement of the stepping dog is a pivotal movement around the pivot 34 and relative to the dog rocker; although at the same time the dog rocker receives a slight retrograde movement under the influence of the spring 30 to elevate the pivot and enhance the rapidity of the advance movement of the stepping dog to the next tooth *b'* of the wheel. The retrograde movement of the dog rocker just referred to is also effective to carry the holding dog outwardly away from the axis of the escapement wheel in order to decrease the extent or depth of engagement between the holding dog and the escapement wheel. This will be understood by a comparison of Figs. 3 and 4 which represent the parts respectively just before and just after the stepping dog has been released from the tooth *b* of the escapement wheel.

Ordinarily in escapements the holding dog is moved into engagement with the teeth of the escapement wheel a distance corresponding to that required to move the stepping dog out of engagement with the wheel so that a "lost" pull or travel of the holding dog is effected. When a release or "let-off" is effected it is necessary to effect a retrograde movement of the dog rocker sufficient to release the holding dog from the considerable depth or distance to which it has been forced in its engagement with

the teeth of the escapement wheel, and this results in a comparatively slow "let-off" of the carriage. It will be seen, however, that in accordance with my present invention not only is the depth of engagement of the holding dog not increased by the withdrawal of the stepping dog from the position shown in Fig. 3 to effect a movement thereof to the position shown in Fig. 4, but the depth of such engagement is actually decreased, so that almost the instant a return movement of the key starts to take place a release of the escapement wheel will be effected by the holding dog. In short, in accordance with my present invention there is no "lost" travel of the holding dog into or through the wheel, and while the holding dog efficiently engages the wheel, nevertheless, it is in a position where it can instantly release the wheel on the first part of the upstroke of the key. Moreover, the power of the carriage exerted on the escapement wheel assists in the quick restoration of the parts of the escapement mechanism by bearing against the holding dog, as shown in Fig. 5, and also by bearing against the stepping dog and tending to move it and the key back to normal position. Thus for instance if the depressed key be released when the parts are in the positions shown in Fig. 4 the link 37 is free to receive a rapid upward movement and the holding dog 32 under the influence of the spring 30 is quickly moved out of the path of the tooth *a*. The pressure of the escapement wheel is at the same time exerted on the stepping dog to assist in restoring it to normal position; the wheel moving a tooth space distance and affording a letter space advance of the carriage.

The escapement will have slightly different methods of operation under different conditions of key stroke. In some instances, for example, the end of the oncoming tooth *a* of the escapement wheel may bear against the flat face 32^x of the holding dog, as shown in Fig. 5, instead of engaging the corner or the top of the holding dog. It will be seen, however, that the pressure maintained on the key, at the time when a tooth of the wheel bears against the face 32^x, is effective to press the holding dog against the escapement wheel and the wheel resists a movement of the upright arm of the dog rocker to the left, thus preventing a depression of the horizontal arm of the dog rocker. The pivot 34 is held fixed, therefore, and downward pressure exerted on the link 37 tends to turn the stepping dog 33 on its pivot 34, thus holding the escapement wheel against turning movement by the downward pressure thus exerted on the link. The instant that pressure is released on the key the dog rocker is free to return to normal position under the pull of its spring 30, and the escapement wheel bearing against the stepping dog turns it on its pivot 34 back to the normal position shown in Fig. 2; the stepping dog at this time being effective to resist further movement of the escapement wheel. If the tooth of the escapement wheel should engage the face 32^x of the holding dog, as shown in Fig. 5, and a further downward movement be given the key and pressure exerted thereon, this pressure will be exerted on the stepping dog and turn it on its pivot 34 and turn the wheel backwardly against the pressure of the carriage spring until the parts are restored to the positions shown in Fig. 4. Thus it will be understood that under the conditions mentioned the carriage will be moved back a fraction of a letter-space equal to the distance the carriage has advanced. This is indicated by the difference between the positions of the tooth *a* of the wheel in Figs. 4 and 5. The result of this backward movement of the carriage is that it will be replaced to receive the impact of the type at the proper point during the down stroke of the key and before the type reaches the platen, the release of the carriage being effected at the first part of the upstroke of the key as previously described.

It will be noted that in the Fig. 5 position the wheel and carriage are held by the tooth *b'* acting on the dog 33 and the pressure of the carriage spring comes on the link 37, tending to elevate said link and to force the key and other parts of the type action back to normal position. It will also be noted that the tension of the carriage spring does not come on the link 37 and through it on the key, until the parts reach the Fig. 5 position.

In another form of the construction shown in Figs. 6, 7, 8 and 9 the parts are slightly modified and they operate in some respects in substantially the same manner as in the previously described construction and in some respects they operate differently. In the modified form of construction, the link 37^a is pivoted at 38^a to the stepping dog 33^a outside of the pivot 34^a, which connects the stepping dog to the carrier or dog rocker 23^a, instead of the link being pivoted to the stepping dog intermediate its pivot and the pivot of the dog rocker, as in the previously described construction. The retrograde movement of the dog rocker at the instant that the stepping dog passes forward to the oncoming tooth of the escapement wheel in this modified construction, will be understood by a comparison of Figs. 7 and 8, which show the parts in the positions in which they are disposed as they appear respectively just before and just after the disengagement of the stepping dog from the wheel. It is believed that a detail description of the construction and operation of this modified form of the invention is unnec-

essary, it being sufficient, it is believed, to indicate the corresponding parts by the same reference numerals that appear in the previously described construction with the addition thereto of the exponent *a*.

The most important difference between the modification shown in Figs. 6–9 and the form of the invention shown in Figs. 1–5, resides in the fact that in said modification the stop pin 36^a is adapted positively to limit the motion of the dog 33^a in both directions whereas in the form shown in Figs. 1–5 the stop pin 36 limits the motion of the dog 33 in only one direction. It will be noted that in Fig. 2 the dog 33 is held by the pin 36 which arrests the arm 35 of said dog and that in Fig. 6, which shows the normal position of the modification, it is the wheel engaging arm of the dog 33^a that is pressed by force of the carriage spring against the pin 36^a. This difference is due to the fact that in the modification as shown the dog rocker has been moved to the left hand side of the wheel instead of being on the right hand side as in the other form. This change in the location of the dog rocker is an immaterial one except in one respect that will be pointed out presently. The dog 33^a is provided with an arm 40 that lies beneath the pin 36^a and is normally out of engagement with said pin. When the parts move to the Fig. 8 position this arm 40 striking the pin 36^a positively limits the turning movement about the pivot 34^a and prevents the dog 33^a from pressing against the tooth of the escapement wheel as it does in the Fig. 4 position of the other form of the invention. In the position shown in Figs. 8 and 9, the wheel is held by the abrupt face of the tooth or dog 32^a and as said face is substantially coincident with an arc about the pivot 25^a as a center, the pressure of the carriage spring is not felt on the link 37^a and on the key. As here shown the dog 32^a is formed with an inclined face 32^b across which the point of the tooth of the wheel rubs as said tooth is escaping from the dog on the upstroke of the key. This inclined or beveled face has a camming action, therefore tending to assist in the restoration of the dog rocker and of the key to the normal position. From a study of Fig. 8 it will be seen that when the link 37^a has moved upward slightly from the position shown in that figure and when the wheel has begun to turn, the tooth *b'* of said wheel will engage the dog 33^a and force said dog to turn about its pivot 34^a until the dog is restored to the position shown in Fig. 6.

It is the intention that at the bottom of the key stroke the parts shall have reached the position shown in Fig. 8 or the link 37^a may have been drawn down slightly farther than shown in said figure, drawing the tooth 32^a a little deeper into the wheel. It will be noted both in Fig. 4 and in Fig. 8 that although the dogs 32 and 32^a are barely in engagement with the teeth of the wheel, yet the stepping dogs 33 and 33^a are each well up into the path of the next oncoming tooth of the wheel.

In Fig. 6 it will be noted that the link 37^a is but slightly removed from a dead center with relation to the pivot 34^a. As the link is depressed to the position shown in Fig. 7 the turning of the parts about the pivot 25^a slightly increases the distance of the pivot 38^a from the dead center position. In the form of the invention shown in Figs. 1–5 the reverse of this action takes place, that is to say, the link 37 is slightly nearer a dead center position in Fig. 3 than it is in Fig. 2. The difference pointed out gives the arrangement of the dog rocker at the left of the wheel in Fig. 6 a slight advantage over the arrangement of said dog rocker at the right of the wheel in Fig. 2.

Fig. 9 illustrates the parts as they appear when a very long, following stroke is given the key; that is to say, when an operator depresses the key to the limit of its movement and maintains pressure thereon at the last part of the stroke. It will be seen that at this time the holding dog is forced into deeper engagement with the teeth of the escapement wheel than is ordinarily the case when a quick, sharp movement of the key is effected and the finger is not maintained on the key throughout the limit of its downward movement. This provides a slightly slower action than when a quick, short stroke is given the key and it is desirable that it should, as usually the long, following stroke is slower and more hesitating, uncertain and irregular than the short quick stroke. It will be understood that in this modified form of construction as well as in the one previously described, the pressure exerted by the carriage on the escapement wheel is utilized to restore parts of the escapement mechanism to normal position, thus enhancing the speed of the escapement. In short, the pressure of the escapement wheel whether exerted on the holding dog in the manner described or on the stepping dog has a tendency to restore the parts to normal position. It will also be understood that in both of the constructions described the approximation of the links 37 and 37^a to the dead center of the pivots 34 and 34^a respectively, in the normal positions of the parts, effects a low leverage on the stepping dog, so far as any tendency to turn the dog on its pivot (34 or 34^a) is concerned. This therefore enables the power exerted from the finger key through the stepping dog to turn the dog rocker and stepping dog together around the pivot (23 or 23^a) without any undue pressure being exerted by the stepping dog on the escapement wheel, and

which might turn the wheel backwardly against the pressure of the carriage spring.

From the foregoing description it will be seen that I have provided comparatively simple, efficient and rapid escapement mechanism in which the power employed to move the carriage is effective to restore parts of the escapement mechanism to normal position and in which the carriage may be "let-off" almost instantly when the key is released and starts its upward movement.

That feature of the present invention which relates to the automatically operating means for affording a retrograde or return movement of the dog rocker during the depression of a key, is claimed generically in another companion application of mine filed of even date herewith and having Serial No. 613,779; the claims in the present case being restricted to features not disclosed in the said companion application.

Various changes may be made without departing from the spirit and scope of my invention.

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

1. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including a dog rocker, a stepping dog carried thereby, and key controlled means for moving the dog rocker by power applied from said key controlled means directly to said stepping dog.

2. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including a dog rocker, a stepping dog carried thereby and pivoted thereto, and key controlled means for moving said dog rocker by the power applied from said key controlled means directly to said stepping dog, the power thus applied from the finger key to the stepping dog also tending to turn said dog on the rocker.

3. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker, a stepping dog carried by said dog rocker and pivoted thereto, and key controlled means for moving said dog rocker by the power applied from said key controlled means directly to said stepping dog, the power thus applied from the finger key to the stepping dog also tending to turn said dog on the rocker into the path of and toward the next oncoming tooth of the escapement wheel.

4. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including a dog rocker, a stepping dog pivoted to said rocker, a key controlled link connected directly to said stepping dog and effective to move the stepping dog on the rocker and to move the dog rocker at the depression of a key, the link in the first part of the key depression acting near the dead center of said stepping dog and moving farther from said dead center as said dog moves on the dog rocker.

5. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker, a stepping dog pivoted to said rocker, a key controlled link connected directly to said stepping dog and effective to move the stepping dog on the rocker and to move the dog rocker at the depression of a key, the link in the first part of the key depression acting near the dead center of said stepping dog and moving farther from such position as the dog moves on the dog rocker whereby the link acts with a greater leverage on the stepping dog, said link forcing the stepping dog into the path of and toward the oncoming tooth of the escapement wheel.

6. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker pivoted to turn on an axis parallel with the axis of the escapement wheel, a holding dog fixed to the dog rocker, and a stepping dog pivoted on the rocker, and key actuated means connected directly with the stepping dog and by means of which the stepping dog is advanced and the dog rocker is actuated.

7. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker having the form of an angular lever pivoted to turn on an axis parallel with the axis of the escapement wheel, a holding dog rigid with one arm of the angular lever, a stepping dog pivoted to the other arm of said angular lever on a pivot the axis of which is parallel with the axis of the escapement wheel, and a key controlled member connected directly to said stepping dog and operative to advance the stepping dog and to actuate the dog rocker.

8. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker having the form of an angular lever pivoted to turn on an axis parallel with the axis of the escapement wheel, a holding dog rigid with one arm of the angular lever, a stepping dog pivoted to the other arm of said angular lever on a pivot the axis of which is parallel with the axis of the escapement wheel, and a key controlled link connected to said stepping dog between the pivot of the stepping dog and

the pivot of the dog rocker and by means of which link the dog rocker is turned to move the holding dog into engagement with the escapement wheel and the stepping dog is moved on the dog rocker toward the advancing tooth of the escapement wheel.

9. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a holding dog, a stepping dog normally engaged by the escapement wheel, means for disengaging the stepping dog from one tooth of the escapement wheel and advancing said dog to the next tooth while the holding dog controls the wheel and for decreasing the extent of engagement of the holding dog with the wheel while the stepping dog is being thus advanced from one tooth to another of the wheel.

10. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a dog rocker, a holding dog rigid with the dog rocker, a stepping dog pivoted to the dog rocker, and automatically operating means for affording a retrograde movement of the dog rocker when the stepping dog advances from one to another tooth of the escapement wheel.

11. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, a holding dog, a stepping dog normally engaging the escapement wheel, both of said dogs being movable into and out of engagement with the escapement wheel in a plane coincident therewith, and means by which both of said dogs are compelled to move together at the first part of the depression of a key and by which the dogs may move relatively to each other before the completion of the key depression and when the stepping dog advances from one tooth of the wheel into the path of the next and while the wheel is under control of the holding dog, both of the dogs moving in the same general direction during said relative movement to decrease the extent of engagement of the holding dog and thereby afford a quick "let-off" of the wheel at the first part of the up stroke of the key.

12. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, an anchor escapement coöperating therewith, one of the pallets of the anchor escapement being pivoted to its carrier, and key controlled means connected directly with said pivoted pallet and by which the said pallet is turned on its carrier and the carrier is actuated.

13. In a typewriting machine, the combination of a power driven carriage; and escapement mechanism therefor, said escapement mechanism including an escapement wheel, an anchor escapement coöperating therewith, one of the pallets of the anchor escapement being pivoted to its carrier, stops which limit the relative movement between the pivoted pallet and its carrier in one direction, and a key actuated link connected directly to said pivoted pallet to turn it on its pivot on the down stroke of a key and to move the carrier to which the pallet is pivoted.

Signed at Grand Rapids, in the county of Kent, and State of Michigan, this sixth day of March, A. D. 1911.

GLENN J. BARRETT.

Witnesses:
HELEN M. NEWTON,
LULU B. VALENTINE.