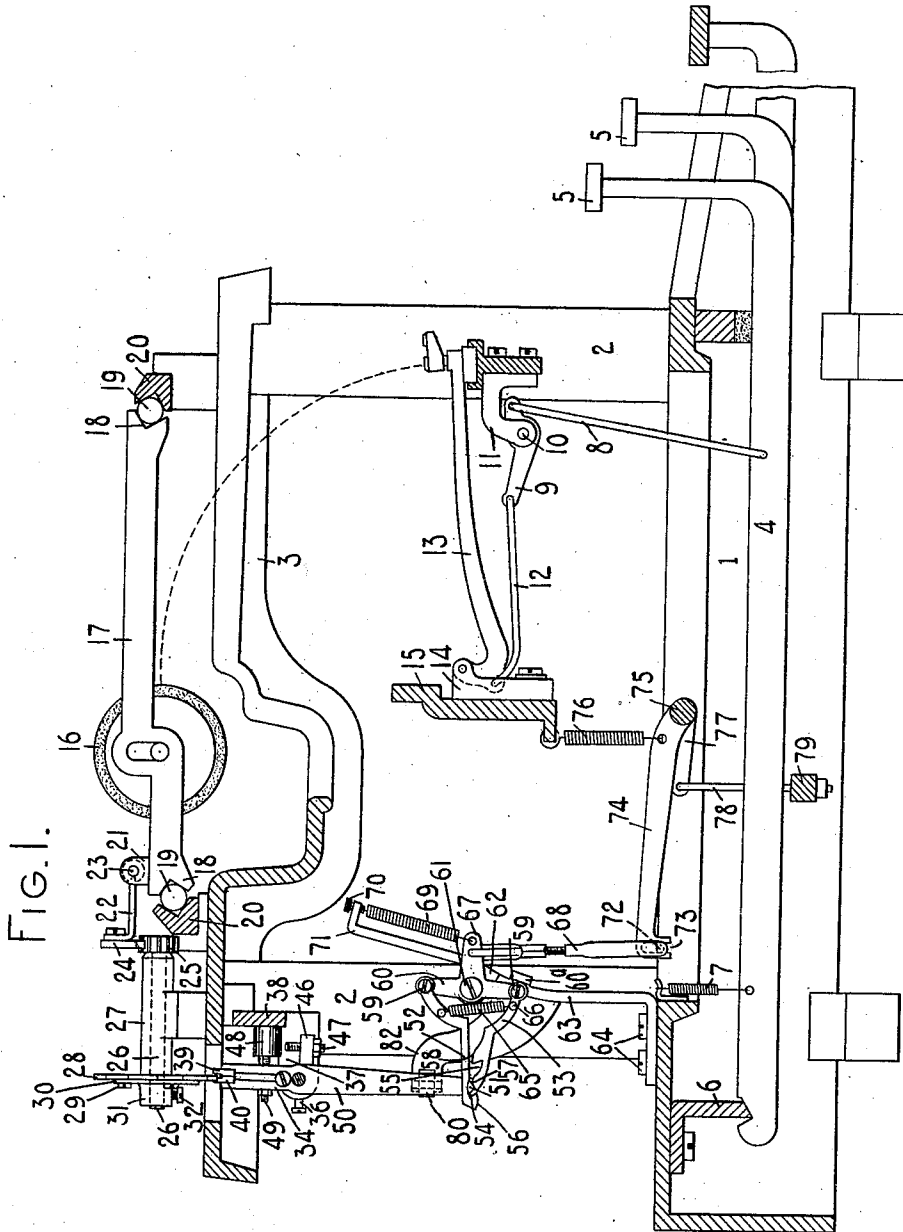


1,012,924.

C. H. SHEPARD.
TYPE WRITING MACHINE.
APPLICATION FILED NOV. 10, 1910.

Patented Dec. 26, 1911.

4 SHEETS—SHEET 1.



WITNESSES:

Wm. Smith
E. M. Wells

INVENTOR

Charles H. Shepard
By Jacob F. Bell

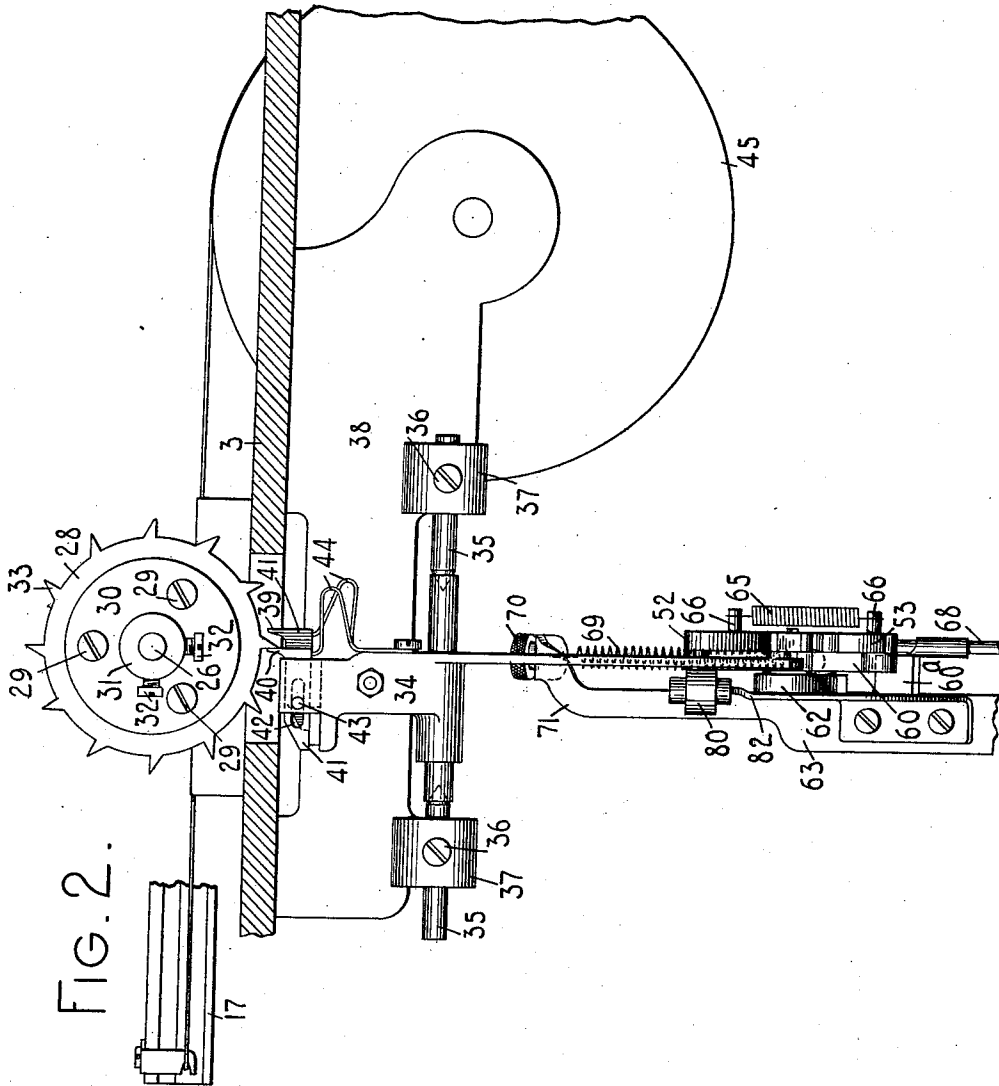
HIS ATTORNEY

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4 SHEETS—SHEET 2.



WITNESSES:

Wm. E. Smith
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INVENTOR:

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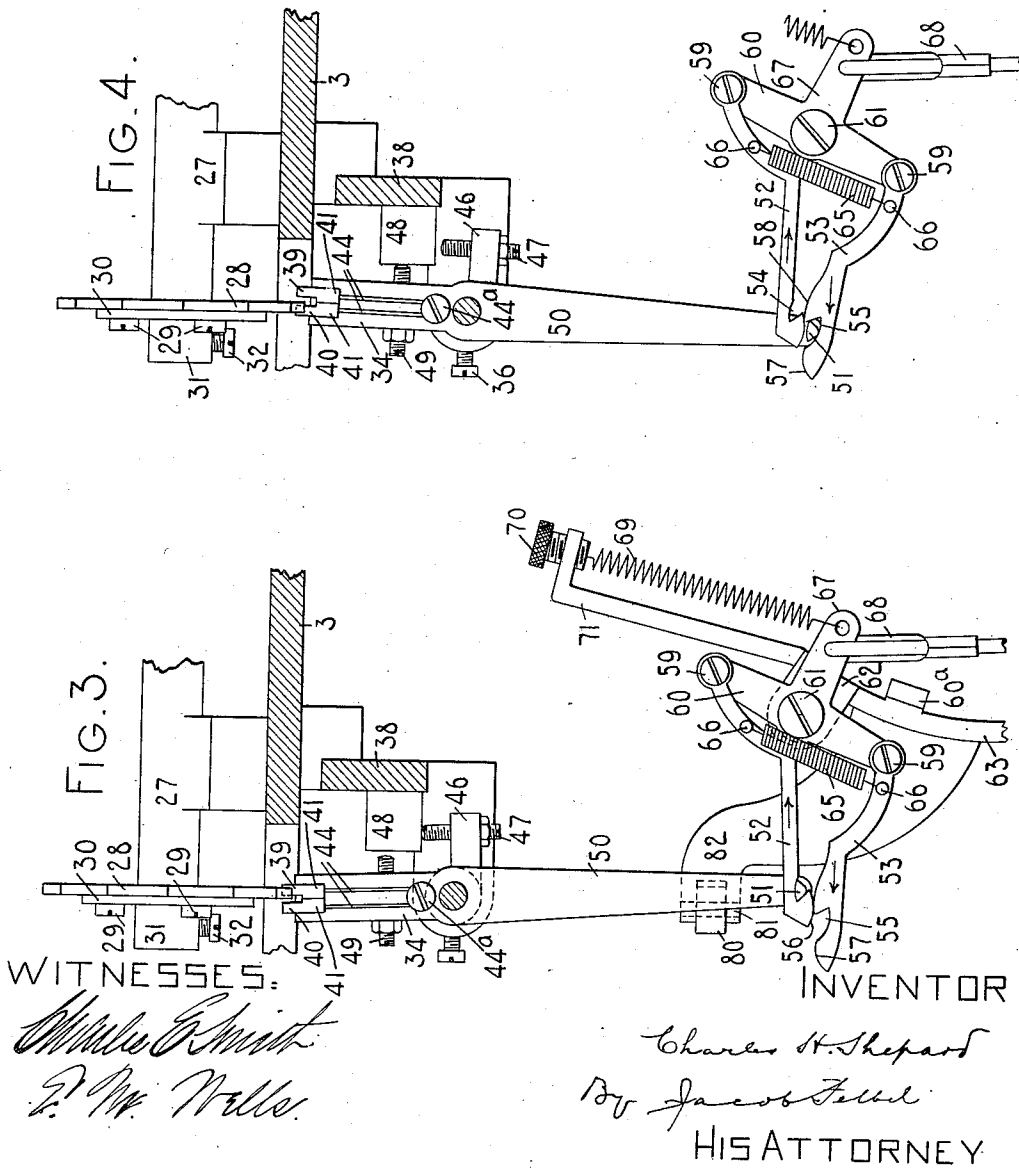
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4 SHEETS-SHEET 3

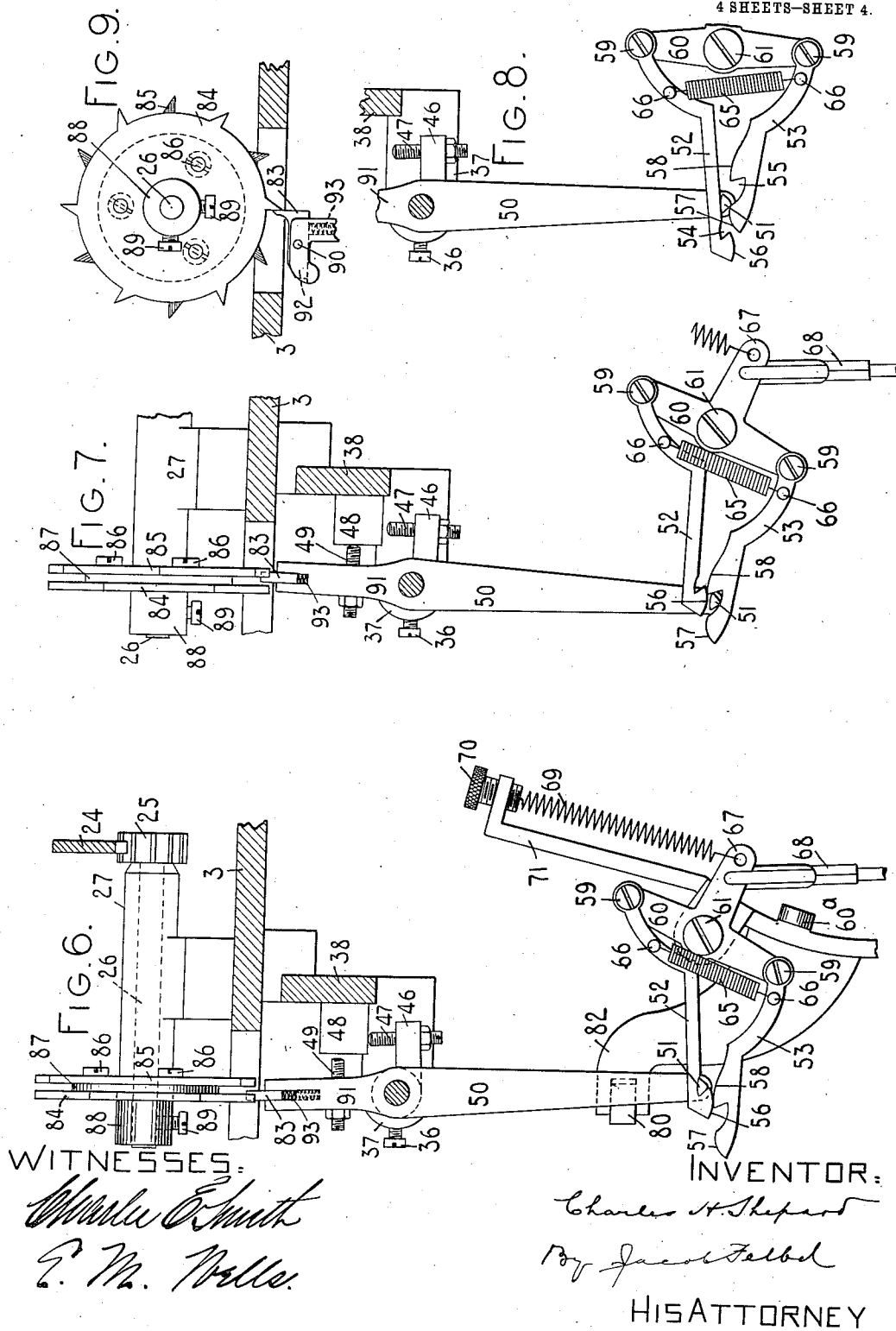


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APPLICATION FILED NOV. 10, 1910.

Patented Dec. 26, 1911.

4 SHEETS-SHEET 4.



UNITED STATES PATENT OFFICE.

CHARLES H. SHEPARD, OF NEW YORK, N. Y., ASSIGNOR TO UNION TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,012,924.

Specification of Letters Patent.

Patented Dec. 26, 1911.

Application filed November 10, 1910. Serial No. 591,679.

To all whom it may concern:

Be it known that I, CHARLES H. SHEPARD, a citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, 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 feed or escapement mechanism.

The main object of the invention, generally stated, is to provide an easily operated, efficient and reliable carriage feed or escapement mechanism and to provide one in which the wear on the coöperative escapement devices is greatly reduced.

A further object of the invention, regarded from a more specific aspect, is to provide an escapement construction in which the escapement device or devices, which are actuated by the finger keys, are maintained free from pressure of the returning spring, such as is ordinarily employed to return such device or devices to normal position.

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 to be hereinafter described 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 fragmentary vertical fore and aft sectional view of one form of typewriting machine embodying my invention. Fig. 2 is a fragmentary rear elevation with parts in section of a portion of the escapement mechanism and some of the associated parts. Figs. 3, 4 and 5 each shows a side elevation of the same with parts in section; different of these views representing different dispositions of the parts. Figs. 6, 7 and 8 are fragmentary side elevations, with parts in section, of a modified form of escapement mechanism embodying my invention; the different views representing different dispositions of the parts. Fig. 9 is a fragmentary rear elevation representing the double escapement wheel shown in Figs. 6 to 8 and the feed dog which coöperates therewith.

I have shown my invention embodied in

the present instance in a No. 10 Remington machine, although only a conventional representation of the carriage appears in the drawings. It should be understood, however, that the invention may be embodied in various styles of typewriting machines.

The frame of the machine comprises a base 1, corner posts 2 and a top plate 3. Key levers 4 are provided with the usual finger keys 5 and are fulcrumed on a fulcrum bar 6. Each key lever is connected to a returning spring 7 by which the associated key lever and the parts connected therewith are returned to normal position. A connecting link 8 extends upwardly from each key lever to a sub-lever 9 pivoted at 10 in a hanger 11. The rear end of each sub-lever is connected to a link 12 which in turn is pivotally connected with the heel of a type bar 13. The type bars are pivoted in hangers 14 secured to the front face of a segment 15; the type bars being segmentally arranged to move upwardly and rearwardly and to strike against the front face of a cylindrical platen 16.

The platen 16 is mounted in a carriage 17, provided with oppositely grooved guide rails 18 at the front and rear thereof for coöperation with anti-friction balls or rollers 19, which are also received in fixed oppositely grooved guide rails 20 secured to the top plate of the machine. Upwardly extending lugs 21 project from the carriage near the ends thereof and rearwardly extending arms 22 are pivoted at 23 to said lugs. The rear ends of the arms 22 have attached thereto a feed rack 24, which meshes with a feed pinion 25, secured to the forward end of a shaft 26 mounted to turn in a bearing 27 secured to the top plate of the machine. The rear end of the shaft 26 carries an escapement rack or wheel 28 which is preferably secured thereto by means of screws 29 which connect the escapement wheel to a disk 30 provided with a hub 31. This hub is tapped to receive set screws 32 by which the hub and escapement wheel are fixed to the shaft 26. The teeth 33 of the escapement wheel are preferably spaced apart so as to afford a full letter space movement of the carriage in the movement of the wheel from one tooth thereof to the next. While I prefer to employ a single escapement wheel of the general character specified, the construction of

the escapement wheel and of the cooperating escapement devices may be materially modified, as will be understood from a consideration of the construction disclosed in Figs. 6 to 9 inclusive, in which a double escapement wheel and single dog are shown, and as will hereinafter more clearly appear. In the construction shown in Figs. 1 to 5 inclusive, a rocker 34 is mounted to turn on cone pivots 35, secured by screws 36 in bearing openings in lugs 37, which project rearwardly from a bracket plate 38, which projects downwardly from the top plate of the machine. The rocker 34 constitutes a carrier for one member of the escapement mechanism which, as shown in Figs. 1 to 5, comprises two feed dogs 39 and 40. As shown in the present instance these dogs are loose dogs; each being mounted on a carrier or slide 41 slotted at 42 for the reception of a pin 43 which limits the movements of the dogs and their sliding carriers 41 in one direction. The carriers 41 are arranged side by side in slots in the dog rocker 34, and are adapted to slide in parallel planes transversely of the machine and in the same plane as, or in a plane substantially parallel with, the plane of the escapement wheel. The body portions of the dogs 39 and 40, where they join the slides 41, constitute abutments to limit the movements of the dogs toward the dog rocker and under the action of the escapement wheel thereon. Two connected wire springs 44 act on the dog carriers 41, one spring being connected to each dog carrier and the pressure of the springs being exerted to press the dogs and their carriers 41 to the right, as the parts are represented in Fig. 2. The looped end of the double spring is secured to the dog rocker by a screw 44^a. It will be understood that the pressure of the springs 44 is merely sufficient to advance the dogs when they are released from the escapement wheel, and that the pressure of the spring drum 45, by which the carriage is propelled, overcomes the pressure of the springs 44 when the dogs are successively engaged by the escapement wheel, as will hereinafter more clearly appear. An arm 46 projects forwardly from the dog rocker and is tapped to receive a screw stop 47 which is adapted to engage with an abutment 48 to limit the movement of the dog rocker in one direction. A like screw stop 49 is received in a tapped opening in the upper arm of the dog rocker and extends at right angles to the stop 47. The stop 49 also cooperates with the abutment 48 to limit the movement of the dog rocker in the opposite direction.

The dog rocker is also provided with a depending arm 50, provided at its lower end portion with an engaging device 51 which is preferably in the nature of a projection, pin or stud which extends laterally from the

depending arm 50 at substantially right angles to the length of the arm, and which is preferably substantially triangular in cross section. Two engaging or actuating devices or pawls 52 and 53 cooperate with the engaging projection 51, to alternately engage the member 51 to actuate the dog rocker. The pawls 52 and 53 are preferably formed with recesses 54 and 55 respectively, in the end portions thereof to form oppositely disposed hook-like engaging portions. The pawl 52 has a contact face 56 thereon, for cooperation with contact faces 57 and 58 on the pawl 53, for purposes which will presently appear. The pawls 52 and 53 are pivoted at 59 to an oscillatory actuating device 60, which is preferably in the nature of a lever of the first order, pivoted intermediate its ends on a shouldered screw pivot 61. This screw is received at its threaded end in an ear 62, on a supporting bracket 63, which latter is fixed to the base of the machine by screws 64. A contractile spring 65 is connected at its opposite ends to pins 66, carried by the pawls 52 and 53, in order to draw the pawls with a slight pressure toward each other and into engagement with the engaging device 51. The lever 60 also has an arm 67 which projects therefrom, and to which an upright actuating link 68 is connected at its upper end. The arm 67 also has one end of a contractile returning spring 69 connected thereto; the opposite end of said spring being connected to a screw 70 which is received in a tapped opening in an arm 71, projecting upwardly from the bracket 63. An adjustment of the screw 70 affords a variation of the force of the spring exerted upon the lever 60; and the power of the spring is exerted to normally maintain the lever 60 and the parts connected therewith in the positions represented in Fig. 1. The movement of the lever 60 to this position is limited by a stop 60^a, which projects from the bracket 63, and with which the lower end of the lever 60 contacts when the lever is in normal position as shown in Fig. 1.

The lower end of the actuating link 68, hereinbefore referred to, is bifurcated and a pin 72 extends across the opening between the arms formed by the bifurcation of the link. This pin 72 is received in a slot 73 in a rearwardly projecting crank arm 74 which extends from a rock shaft 75. From an inspection of Fig. 1 it will be observed that the depth of the slot 73, and the normal relation of the parts, is such that a lost motion connection is formed between the crank arm 74 and the actuating link 68. In other words, the crank arm 74 may move down a considerable distance before the bottom wall of the slot 73 reaches the pin 72, to take up the actuating link 68 and thus transmit movement to the lever 60 and the pawls carried

thereby. A contractile returning spring 76 is connected at one end to the crank arm 74, and at its opposite end to the type bar segment, to return the crank arm and the parts connected therewith to normal position. Rearwardly extending crank arms 77 project from the rock shaft 75 near the ends thereof, and each arm 77 carries a depending link 78 connected at its lower end to a universal bar 79 which extends beneath the key levers 4. It will be understood therefore that the universal bar, the rock shaft 75 and the crank arm 74, are returned to normal position by the power of the spring 76. The depression of a printing key 5 is effective to actuate the associated type bar for a considerable distance before the escapement mechanism is taken up, due in part to the lost motion connection between the crank arm 74 and the actuating link 68. It will also be understood that even after the actuating link 68 is taken up by the crank arm 74, and the parts are moved from the normal position shown in Fig. 1, no movement will be immediately transmitted to the dog rocker. It will be seen that the dog rocker itself is free from the pressure of a returning spring; that it is likewise normally disconnected from the pawls 52 and 53, and that said dog rocker is free to remain in either of the backward and forward positions to which it may be moved under control of the printing keys. If necessary suitable means may be employed in order to prevent an accidental displacement of the dog rocker from either of such positions. For this purpose I preferably provide a bearing roller 80, which is mounted to turn on a vertical pivot 81, on a bracket arm 82 which projects rearwardly from the bracket 63. This roller bears against a flat contact face on one side of the depending arm 50, during the backward and forward movement of the dog rocker around its pivot. The roller 80, being mounted on a vertical pivot, a movement of the dog rocker will cause the roller to turn by reason of the contact between the depending arm 50 and the periphery of the roller. This contact between the roller 80 and the arm 50 of the dog rocker, is sufficient to prevent an accidental displacement of the dog rocker from the position to which it is moved without materially resisting the movement of the dog rocker under the control of the keys. It may be found in some instances that there is sufficient frictional contact between the dog rocker and the bearings which support it to dispense with the use of the bearing roller 80.

As hereinbefore indicated the power of the spring 76 is preferably just sufficient to restore the crank arm 74 and the universal bar connected therewith to normal position, and the power of the spring 69 is preferably

just sufficient to restore the lever 60 and the parts connected therewith to normal position, whereas the power of the spring 65 is preferably only sufficient to bring about a proper engagement between the pawls 52 and 53 and the engaging device 51 with which they coöperate, so that none of these springs offer material resistance to the depression of a finger key.

In the operation of the devices it may be assumed that the parts are in the positions shown in Fig. 1; although either of the loose dogs 39 or 40 may be normally engaged by the escapement wheel. As the parts are disposed in Fig. 1, the loose dog 40 is engaged by the wheel; the upper arm of the dog rocker being shown moved to the forward position. A depression of a finger key at this time is effective to depress the universal bar, which in turn moves the crank arm 74 downwardly through the interposed rock shaft 75. The downward movement of the crank arm 74 is transmitted to the actuating link 68, and the lever 60 is moved from the position shown in Fig. 1 to that represented in Fig. 3. This movement of the lever 60 transmits a movement to both of the pawls 52 and 53 in opposite directions, as indicated by the arrows in Fig. 3. The position of the parts in Fig. 1 indicates that the engaging hook of the pawl 52 will be brought into engagement with the pin 51 before the engaging portion of the pawl 53 reaches said pin, and at the first part of the down stroke of the key. The engagement between the pawl 52 and the pin 51 at this time, prevents an upward movement of the pawl 52 around its pivot 59 by the bill of the hook engaging beneath the pin. As the pawls 52 and 53 move in opposite directions, from the position shown in Fig. 1 to that indicated in Fig. 3, the curved contact face 56 of the pawl 52 will be presented in such position as to engage the contact faces 57 and 58 on the pawl 53, thus preventing this last mentioned pawl from engaging the pin 51; the pawl 53 at this time being moved freely past the pin to the position represented in Fig. 3. As the pawl 52 moves forwardly, the engagement of said pawl with the pin 51 causes the dog rocker to be moved from the position shown in Fig. 1 to that indicated in Fig. 3, thereby carrying the dog 40 out of engagement with a tooth of the escapement wheel and bringing the dog 39 into the path of the next oncoming tooth of the wheel. When this oncoming tooth reaches the dog 39 it will move said dog against the pressure of its spring 44 until the dog is arrested by contact with the dog rocker. This affords a letter space movement of the carriage. As soon as the dog 40 has been disengaged from a tooth of the escapement wheel in the manner described, said dog will be forced by its

spring 44 to an advanced position corresponding with that formerly occupied by the dog 39 which is now maintained under the pressure of the escapement wheel. It will thus be understood that the parts from the finger key to the dog rocker are moved positively at this first depression or down stroke of the key to effect a full letter space movement of the carriage to provide a "reverse" feed. As hereinbefore indicated, the parts, as they appear in Fig. 3, indicate said parts as they are disposed at the end of the first down stroke of the key, assuming the parts to be normally disposed as represented in Fig. 1 before the down stroke has taken place. When the depressed key is released the dog rocker remains in the position shown in Fig. 3, but the lever 60 and the pawls 52 and 53 are moved to the positions indicated in Fig. 5, the pawls moving in the directions of the arrows in this figure. The parts remain in the positions shown in Fig. 5 until the next depression of a key. The second depression of a key is effective to move the parts from the positions shown in Fig. 5 to those represented in Fig. 4, which show the parts disposed as they appear at the end of the second down stroke of a key. It will be seen that as the pawls move in the directions of the arrows in Fig. 4, from the positions shown in Fig. 5 to those represented in Fig. 4, the pawl 53 will be engaged with the pin 51 before the pawl 52 reaches said pin and an engagement of the hook-like portion of the pawl 53 over the top of the pin 51 prevents a downward movement of the pawl 53 around its pivot 59. The effect of this movement of the pawl 53 into engagement with the pin 51, is such that the contact faces 57 and 58 will be presented for coöperation with the contact face 56 on the pawl 52, to prevent an engagement of the last mentioned pawl with the pin 51, so that the pawl 52, during the movements of the parts to the positions represented in Fig. 4, passes freely over the engaging pin 51. This second depression of a key to move the parts from the positions shown in Fig. 5 to those represented in Fig. 4, is effective to bring about a movement of the dog rocker from the position shown in Fig. 3 to that represented in Fig. 4. During this movement the loose dog 39 will be disengaged from the escapement wheel and the dogs 40 will be interposed in the path of the oncoming tooth of the released escapement wheel to afford a full letter space movement of the carriage at the second down stroke of the key. When pressure is released from the key at the end of the second down stroke, the parts are restored to the positions shown in Fig. 1, ready to move the upper end of the dog rocker rearwardly at the next down stroke of a key. It will be seen that the second down stroke

as well as the first down stroke of a key is effective to positively move the dog rocker, to effect a letter space movement of the carriage, and that this is true of every key depression. It will likewise be seen that although the dog rocker is moved back and forth transversely of the plane of the escapement rack or wheel, it receives a movement in but one direction at each complete operation of a finger key. In short, the dog rocker is alternately moved back and forth at successive key operations, and each up stroke of a key is ineffective to move the dog rocker or to afford a movement thereof. It will therefore be understood that the dog rocker receives only one-half the movement which it ordinarily received when a returning spring is employed to move the rocker back to normal position at each up stroke of a key, as in escapement mechanisms ordinarily employed. Moreover, it will be understood that there is but one-half of the wear on the escapement devices since the feed dogs receive a movement in but one direction transversely of the plane of the escapement wheel at each complete operation of a finger key instead of being moved back and forth at each operation of a key as in the escapement mechanisms ordinarily employed. Furthermore, by employing a construction, such as that shown and described, in which the dog rocker is alternately moved back and forth at successive key operations, I am enabled to dispense with the employment of a returning spring for the dog rocker, and therefore am enabled to provide a construction in which less power is necessary to effect a movement of the dog rocker at each down stroke of a key. It will be understood that where restoring springs are employed for the dog rocker, the springs must be of sufficient power to move the dog rocker against the resistance offered by the contact between the feed dogs and the escapement wheel or rack; with the pressure of the power driven carriage exerted through the wheel against the feed dogs, and that this resistance is considerable. The escapement mechanism of my present invention can therefore be actuated with the exertion of less power to depress the finger keys than formerly.

It will also be understood that each of the pawls 52 and 53 exerts a positive pressure in but one direction to move the dog rocker, and that each of said pawls is ineffective to move the dog rocker in the opposite direction. Therefore there is no liability of the escapement skipping at the termination of a down stroke of the key, due to any vibration or trembling of the key under the pressure of the operator's finger at this time, no matter what the character of the operator's stroke, be it ever so uncertain and hesitating or trembling at the

end of the stroke. This is due to the fact that any upward movement of the key is ineffective to move or afford a movement of the dog rocker, so that any vibration of the key cannot be transmitted to the dog rocker after it is once moved from one of its back and forth positions to the other. This is particularly advantageous in "reverse" escapements where a "let-off" is effected at the down stroke of the key and usually just before the type bar reaches the platen. In the ordinary "reverse" feed construction any material vibration of the type bar, and the parts which control it, at this time is liable to effect an actuation of the escapement mechanism, when such actuation is not intended, and a consequent skipping of the carriage results. This is often due to a hesitating, uncertain stroke by the operator. Then again, the construction is such as to provide an escapement which is more silent in its operation than those formerly employed and in which the dog rocker receives a return movement under the impulse of a spring at each up stroke of a key. This return of the dog rocker produces a noise in the ordinary machine which is entirely avoided in the present construction. It will therefore be understood that I have provided by my present construction, an efficient escapement mechanism which can be easily actuated; one in which the wear on the cooperating escapement devices is materially reduced; one which is not liable to afford a skipping of the carriage during the operation thereof; and which is less noisy in its operation than certain escapement devices heretofore employed.

In Figs. 6 to 9 inclusive, I have shown a modified form of construction embodying my invention, and one in which a single feed dog 83 is employed to cooperate with a double escapement rack or wheel comprising two wheels 84 and 85 connected by screws 86 to rotate together. These wheels are maintained spaced apart by an intermediate disk 87 between them. The escapement wheel 84 is provided with a hub 88 tapped to receive set screws 89 by which the double escapement wheel may be fixed to the escapement wheel shaft 26. The spacing between the teeth of the escapement wheels 84 and 85 is such that a movement of the double wheel from a tooth on one of the wheels 84 to the next tooth on the other wheel 85, affords a complete letter space movement of the carriage. The dog 83 is pivoted at 90 to an upright arm of a dog rocker 91. The tail end 92 of the dog 83 abuts a portion of the dog rocker and limits the upward movement of the dog under the pressure of an expansion spring 93 contained in a socket in the dog rocker, and bearing at its upper end against the dog 83 to the right of the pivot 90, as the parts appear in Fig. 9. The spring 93 is therefore

effective to normally maintain the dog 83 up into the path of teeth on the double escapement wheel. When, however, the carriage is moved from left to right, the inclined rear sides of the teeth cooperate with the dog 83 to move it downwardly against the pressure of the spring 93 out of the path of the teeth, so as to permit a reverse rotation of the escapement wheel during the movement of the carriage from left to right. The dog rocker 93 is like the dog rocker 34, in the previously described construction, and corresponding reference numerals will be applied to the different parts thereof. The means for actuating the dog rocker are also the same as in the previously described construction and the same reference characters will be employed to designate the different parts.

In the operation of the construction illustrated in Figs. 6 to 9 inclusive, a depression of a finger key, when the parts are disposed as illustrated in Figs. 8 and 9, for instance, is effective to move the actuating pawl 53 into cooperation with the engaging device 51 and to move the dog rocker to the position shown in Fig. 7. At this time the engaging surfaces 57 and 58 of the actuating pawl 53 are effective to cooperate with the contact face 56 of the pawl 52 to prevent this last mentioned pawl from engaging the pin 51, so that the pawl 52 at this time is free to pass the pin 51 without engaging it. The first depression of the key just described, and the forward movement of the upper end of the dog rocker is effective to move the feed dog 83 from engagement with a tooth of the escapement wheel 84 and into the path of the next oncoming tooth of the escapement wheel 85, thus affording a letter space movement of the carriage. The parts are shown in Fig. 7 as they appear at the termination of, say, the first down stroke of the key. When pressure on the depressed finger key is released the lever 60 and the actuating pawls 52 and 53 will be restored to normal position. At the next depression of a finger key the pawl 52 is effective to engage the projection 51 and to prevent an engagement of the pawl 53 with said projection, by the cooperation of the contact faces 57 and 58 with the contact face 56 on the pawl 52. This second down stroke of the key is therefore effective to move the dog rocker to the position shown in Fig. 6, which illustrates the positions the parts assume at the termination of the second down stroke of a key. This last mentioned movement of the dog rocker carries the dog 83 out of engagement with a tooth on the escapement wheel 85 and moves it into the path of the next oncoming tooth of the other escapement wheel 84, thus affording a second letter space movement of the carriage at the second down stroke of the key.

It will be observed that the effect is the same in both of the constructions illustrated, and that it is immaterial whether a double dog or two dogs, such as those shown in Figs. 1 to 5, are employed to cooperate with a single escapement wheel or a single dog is employed to cooperate with a double rack or two racks or wheels as indicated in Figs. 6 to 9. In both of the described constructions a "reverse" feed is effected at each down stroke of a key; and all of the advantages attributed to the construction shown in Figs. 1 to 5 are also embodied in the construction shown in Figs. 6 to 9.

I am aware that various modifications may be made without departing from the spirit of the invention, and in two companion applications filed of even date herewith, Serial Nos. 591,680 and 591,681, I have disclosed constructions embodying certain of the advantages of the present structure as well as other features not included herein and while I prefer to embody the features of the present invention in a "reverse" escapement the modified structures disclosed in said companion applications indicate how the mechanism may be employed to effect "ordinary" feed of the carriage.

When I refer herein to the back and forth movements of the dog rocker or the dogs, and employ like terms to designate the movements of different parts, it should be understood that these terms are not intended to designate the exact direction of movement of the parts but are merely intended to indicate that such parts have a movement first in one direction and then in the opposite direction. It will be observed, moreover, that the escapement wheel, whether regarded as a single or a double wheel, constitutes a circular feed rack and is referred to herein as a feed rack or rack member. I have also referred herein to the cooperating feed member or element as a dog member, whether a single or double dog be employed.

When I refer herein to the complete operation of a finger key it should be understood that this includes the down stroke and return or up stroke of a key.

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

1. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising two cooperative escapement members, one movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and movable member and controlled wholly by power derived from pressure exerted on said finger keys for moving the said movable escapement member alternately back and forth at successive printing operations, each complete operation of a finger key moving said movable member either back or forth.

2. In a typewriting machine, the combina-

tion of a carriage; escapement mechanism therefor comprising a dog member and a rack member, one of said members being movable relatively to the other transversely of the plane of the rack member; printing keys; and means intermediate the printing keys and said movable member and controlled wholly by power derived from pressure exerted on said printing keys for moving said movable member back and forth in the direction specified at successive printing operations, each complete operation of a printing key moving said movable member either back or forth.

3. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising two cooperative escapement members, one movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and movable member and controlled wholly by power derived from pressure exerted on said finger keys for positively moving the said movable escapement member alternately back and forth at successive printing operations, one key depression positively moving the movable member in one direction and the next key depression positively moving the movable escapement member in the opposite direction.

4. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising an escapement wheel and a feed dog member movable back and forth, a single movement of the feed dog in either direction affording a complete letter space movement of the carriage; finger keys; and means intermediate said finger keys and dog for effecting a movement of said feed dog alternately in one direction and then in the other at successive operations of the keys, each complete operation of a key effecting a movement of the dog in but one direction and by power derived wholly from pressure exerted on said key.

5. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising a feed rack and a dog, one of said feed rack and dog members being movable relatively to the other; finger keys; and means intermediate said keys and said movable member for effecting a movement of said movable member in one direction only at each complete actuation of a key, successive operations of the keys effecting a movement of said movable member first in one direction and then in the opposite direction and by power derived wholly from pressure exerted on said keys.

6. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising two cooperative escapement members and a rocker which carries one of said escapement members; finger keys; and means intermediate said finger

keys and rocker for moving the rocker alternately first in one direction and then in the other at successive operations of said finger keys, a complete operation of each finger key effecting only a single movement of the rocker in one direction and by power derived wholly from pressure exerted on said key.

7. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising two coöperative escapement members and a rocker which carries one of said escapement members; finger keys; and means intermediate said finger keys and rocker for moving the rocker first in one direction at the depression of a key and then in the opposite direction at the next key depression and by power derived wholly from pressure exerted on said keys.

8. In a typewriting machine, the combination of a carriage; escapement mechanism comprising two coöperating members; finger keys; and means controlled thereby for controlling one of said escapement members, said controlling means comprising actuating devices movable in opposite directions, and means whereby one of said escapement members is actuated first by one and then by the other of said actuating devices at successive key operations.

9. In a typewriting machine, the combination of a carriage; escapement mechanism comprising two coöperating members; finger keys; and means controlled thereby for controlling one of said escapement members, said controlling means comprising actuating devices movable in opposite directions, and means by which operative connection is alternately and automatically effected between one of said escapement members and first one and then the other of said actuating devices at successive key operations.

10. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two coöperating escapement members one movable back and forth relatively to the other and free to remain in either of the two back and forth positions to which it may be moved; finger keys; and means intermediate said finger keys and movable member and controlled by said finger keys for positively moving said movable escapement member alternately first to one of said positions and then to the other.

11. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two coöperative escapement members one movable back and forth relatively to the other and free to remain in either of the two back and forth positions to which it may be moved, each of such movements of the movable member to either of said positions affording a full letter space movement of the

carriage; finger keys; and means intermediate said finger keys and movable member and controlled by said finger keys for positively moving said movable escapement member alternately first to one of said positions and then to the other.

12. In a typewriting machine, the combination of a carriage, escapement mechanism therefor comprising a to and fro movable rocker adapted to remain in either of the two positions to which it may be moved and carrying one of the escapement members, finger keys and means controlled wholly by the power derived from pressure exerted on said keys for moving the rocker alternately first in one direction and then in the other at successive key strokes.

13. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and means controlled by said finger keys for controlling a member of said escapement mechanism, said controlling means comprising two actuating devices which are moved in opposite directions at each movement of a key in one direction, and means by which first one and then the other of said actuating devices is rendered effective to move said controlled escapement member, the movement of said member being first in one direction and then in the opposite direction at successive down strokes of a key.

14. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and means controlled by said finger keys for controlling a member of said escapement mechanism, said controlling means comprising two actuating devices which are moved in opposite directions at each movement of a key in one direction, and means by which each of said actuating devices is effective to move a member of the escapement in one direction but is ineffective to move it in the opposite direction.

15. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor comprising two coöperative members one of which is movable back and forth relatively to the other; finger keys; and spring returned means controlled by said keys for effecting said back and forth movements of said movable escapement member, said means including means by which pressure applied to the finger keys is exerted to positively move said movable escapement member back and forth.

16. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor comprising two coöperative members one of which is movable back and forth relatively to the other; finger keys; and spring returned means controlled by said keys for effecting said back and forth movements of said movable es-

capement member, said means including means by which pressure applied to the finger keys is exerted to positively move said movable escapement member alternately
 5 back and forth to two different positions at successive key operations, each key stroke positively moving said member from one of said back and forth positions to the other.

17. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two
 10 cooperative members one of which is movable back and forth relatively to the other; finger keys; and spring returned means controlled by said keys for successively effecting
 15 said back and forth movements of said movable escapement member at successive printing operations, said means including means by which a down pressure alone on
 20 the keys is rendered effective to successively transmit said back and forth movements to the escapement member, one down stroke of a key effecting a movement of the movable member in one direction and the next successive
 25 down stroke of a key effecting a movement of the movable member in the opposite direction.

18. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor comprising two
 30 cooperative members one of which is movable back and forth relatively to the other; finger keys; and spring returned means controlled by said keys for effecting said back
 35 and forth movements of said movable escapement member; said means including two oppositely disposed hooks, means for moving said hooks in opposite directions at each movement of a key in one direction, and
 40 means whereby said hooks are rendered alternately effective to move the said movable escapement member first in one direction and then in the other in the back and forth movements thereof.

19. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two
 45 cooperative members one of which is movable back and forth relatively to the other; finger keys; and spring returned means controlled by said keys for effecting said back
 50 and forth movement of said movable escapement member, said means including two oppositely disposed hooks, means for moving said hooks in opposite directions at each
 55 movement of a key in one direction, and means by which said hooks are rendered alternately effective to move the said movable escapement member first in one direction
 60 and then in the other in the back and forth movements thereof, a single complete stroke of a key effecting a movement of said movable escapement member in but one direction.

20. In a typewriting machine, the combination

of a power driven carriage; escapement mechanism therefor comprising two cooperative members one movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and
 70 movable member and controlled wholly by power derived from pressure exerted on said finger keys for moving said movable escapement member forward at one key operation and back at the next.

21. In a typewriting machine, the combination of a power driven carriage; a feed rack; a feed dog; a dog rocker normally
 75 free from spring pressure which tends to move it; printing keys; and controlling means intermediate said printing keys and said rocker, said controlling means moving the rocker at the down strokes only of the
 80 printing keys and by power derived wholly from pressure exerted on said keys, the controlling means being ineffective to move the rocker at the up strokes of the keys.

22. In a typewriting machine, the combination of a power driven carriage; a feed rack; a feed dog; a dog rocker free to be
 90 moved back and forth in opposite directions and to remain in either position to which it may be moved; printing keys; and means intermediate said printing keys and rocker and controlled wholly by power derived
 95 from pressure exerted on said printing keys for moving the rocker back and forth at successive key operations, each complete operation of a key being effective to move the rocker in but one direction.

23. In a typewriting machine, the combination of a feed rack; two loose dogs cooperative therewith; printing keys; and
 100 means intermediate the printing keys and loose dogs and controlled wholly by power derived from pressure exerted on said printing keys for effecting relative back and forth transverse movements between said loose dogs and feed rack, said means including
 105 means by which a complete operation of a printing key is operative to effect a relative transverse movement between the dogs and rack in but one direction.

24. In a typewriting machine, the combination of a feed rack; two loose dogs cooperative therewith; a dog rocker which
 115 is free to be moved back and forth and to remain in either of the back and forth positions to which it may be moved; printing keys; and means intermediate said printing keys and dog rocker for moving the latter in but one of said back and forth directions at
 120 each complete operation of a key and by power derived wholly from pressure exerted on said key.

25. In a typewriting machine, the combination of a carriage; an escapement wheel which affords a full letter space movement
 125 of the carriage at each movement of the wheel from one tooth to the next; two loose

dogs which cooperate with said escapement wheel; a dog rocker which carries said dogs and by which they are moved back and forth transversely of the plane of said wheel, said rocker being free to remain in either of the back and forth positions to which it may be moved; printing keys; and means controlled thereby for moving the rocker back and forth and for moving the rocker to but one of said back and forth positions at each complete operation of a printing key.

26. In a typewriting machine, the combination of a power driven carriage; escapement mechanism comprising cooperative escapement members one movable back and forth transversely of the other; finger keys; and means controlled by said finger keys for moving said movable member back or forth at each complete operation of a key, such complete operation being operative with the aid of said means to move the escapement member in one direction and being inoperative to move it in the opposite direction.

27. In a typewriting machine, the combination of a power driven carriage; escapement mechanism comprising cooperative escapement members one movable back and forth transversely of the other; finger keys; and means controlled by said finger keys for moving said movable member back or forth at each complete operation of a key and to return to normal position independently of said movable escapement member after the key has moved said member to one of such back or forth positions.

28. In a typewriting machine, the combination of a power driven carriage; escapement mechanism comprising cooperative escapement members one movable back and forth transversely of the other and free to remain in either of the back and forth positions to which it may be moved; finger keys; and means controlled by said finger keys for moving said movable member back or forth in but one direction at each complete operation of a key, the said key and certain of the key controlled means returning to normal position independently of said movable escapement member after the member has been moved from one to the other of said back and forth positions.

29. In a typewriting machine, the combination of a power driven carriage; an escapement wheel therefor; a dog rocker free to remain in either of the back and forth positions to which it may be moved; two loose feed dogs carried by said dog rocker and affording a full letter space movement of the carriage at each back or forth movement of the dog rocker; finger keys; and means controlled by said finger keys for moving said dog rocker, said means including means by which the dog rocker is moved by the movement of a finger key in only one direction.

30. In a typewriting machine, the combination of a carriage; feed devices therefor; finger keys; and means intermediate said finger keys and certain of said feed devices for effecting a back and forth movement thereof and by power derived wholly from pressure exerted on said keys, said means including means by which the movable feed device or devices are moved back or forth at the down stroke only of a finger key.

31. In a typewriting machine, the combination of a power driven carriage; cooperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising two pawls which operate alternately at successive key operations to move said movable escapement member back and forth.

32. In a typewriting machine, the combination of a power driven carriage; cooperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising an oscillatory member, and pawls operative alternately at successive key operations to move said escapement member back and forth, one of said pawls being effective at one key operation and the other pawl being effective at the next key operation.

33. In a typewriting machine, the combination of a power driven carriage; cooperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising a key controlled lever, pawls carried by said lever, and means for rendering said pawls operative to move said movable escapement member back and forth at successive key operations, each key operation moving said movable escapement member in but one direction.

34. In a typewriting machine, the combination of a carriage; cooperating escapement members; a rocker for one of said members; finger keys; and intermediate controlling means between said finger keys and rocker for moving the latter back and forth, said intermediate means comprising pawls that are operative alternately on the rocker at successive key operations to move it back and forth.

35. In a typewriting machine, the combination of a power driven carriage; cooperating escapement members therefor, one

of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising a lever of the first order, and pawls carried by said lever on opposite sides of the fulcrum thereof and operative alternately at successive key operations.

36. In a typewriting machine, the combination of a power driven carriage; co-operating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising a lever of the first order controlled by said finger keys, pawls carried by said lever at opposite sides of the fulcrum thereof and which are moved in opposite directions at each movement of a key in one direction, and means which are engaged alternately by said pawls at successive operations of a key and move said movable escapement back and forth.

37. In a typewriting machine, the combination of a carriage; co-operating escapement members; a rocker for one of said members; finger keys; and intermediate controlling means between said finger keys and rocker for moving the latter back and forth, said intermediate means comprising a lever of the first order controlled by said finger keys, pawls carried by said lever at opposite sides of its fulcrum, and means connected with said rocker and which is engaged by each of said pawls in its movement in but one direction.

38. In a typewriting machine, the combination of a power driven carriage; co-operating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; and means intermediate said finger keys and the said movable escapement member to control its back and forth movements, said means comprising two pawls, an engaging member which constitutes a part of said intermediate means, means for alternately effecting an engagement between first one and then the other of said pawls and said engaging member at successive key operations, and means for preventing one of said pawls from engaging said member when the other of said pawls is in engagement therewith.

39. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and actuating connections between said finger keys and escapement mechanism; said connections comprising an engaging member, two pawls, means for alternately engaging

first one and then the other of said pawls with said engaging member at successive key operations, and means for preventing the engagement of one pawl with said engaging member when the other pawl is in engagement therewith.

40. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and actuating connections between said finger keys and escapement mechanism; said connections comprising an engaging member, two pawls, means for alternately engaging first one and then the other of said pawls with said engaging member at successive key operations, and means carried by each of said pawls and with which the other pawl is co-operative to prevent the engagement of one pawl with said engaging member when the other pawl is in engagement therewith.

41. In a typewriting machine, the combination of a power driven carriage; an escapement rack; two loose dogs co-operative therewith and movable back and forth transversely of the escapement rack; finger keys; and intermediate actuating connections between said finger keys and said dogs, said connections including means whereby the dogs are moved back and forth transversely of the rack at successive key depressions, each key depression moving the dogs transversely in but one direction.

42. In a typewriting machine, the combination of a carriage; finger keys; and carriage feed mechanism, said carriage feed mechanism including a rocker normally free from spring pressure to move it, and means under control of and operative by power derived wholly from pressure exerted on said finger keys for moving said rocker first in one direction and then in the opposite direction at successive complete key operations.

43. In a typewriting machine, the combination of a carriage; finger keys; and carriage feed mechanism, said carriage feed mechanism including a rocker free from spring pressure to move it; and means under control of the said finger keys and disconnected from but operative on said rocker for positively moving it first in one direction and then in the opposite direction, the said movements of the rocker being effected wholly by the keys and only at the down strokes thereof.

44. In a typewriting machine, the combination of a power driven carriage; finger keys; and carriage escapement mechanism including co-operative escapement members, one of which moves transversely of the other; an oscillatory actuating member controlled by the finger key; and actuating means controlled by said oscillatory member and normally disconnected from said transversely movable escapement member but op-

erative thereon to positively move it first in one direction and then in the opposite direction.

45. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and means controlled by said finger keys for controlling said escapement mechanism, said means comprising two pawls that are moved in opposite directions at each movement of a finger key in one direction.

46. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and means controlled by said finger keys for controlling said escapement mechanism, said means comprising two pawls, and automatically operating means for rendering said pawls alternately operative.

47. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; and means controlled by said finger keys for controlling said escapement mechanism, said means comprising an oscillatory actuating device, and means whereby said oscillatory actuating device is rendered effective to move a member of the escapement mechanism during the movement of the oscillatory device in one direction and is free to return independently of said member during the movement of the oscillatory device in the opposite direction.

48. In a typewriting machine, the combination of a power driven carriage; escape-

ment mechanism therefor including a feed dog; finger keys; and means intermediate the finger keys and escapement mechanism and controlled by the finger keys for moving said feed dog in one direction at one operation of a key and for moving the feed dog in the opposite direction at the next operation of a key, the said movements of the feed dog being effected by power derived wholly from pressure exerted on said keys.

49. In a typewriting machine, the combination of a power driven carriage; two loose dogs each spring pressed to an advanced position; an escapement wheel co-operative therewith and adapted to move each of said dogs against the pressure of its spring at letter space movement of the carriage; finger keys; and means controlled by said finger keys for moving said feed dogs alternately first in one direction and then in the opposite direction transversely of the escapement wheel at successive operations of the finger keys.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 9th day of Nov. A. D. 1910.

CHARLES H. SHEPARD.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."