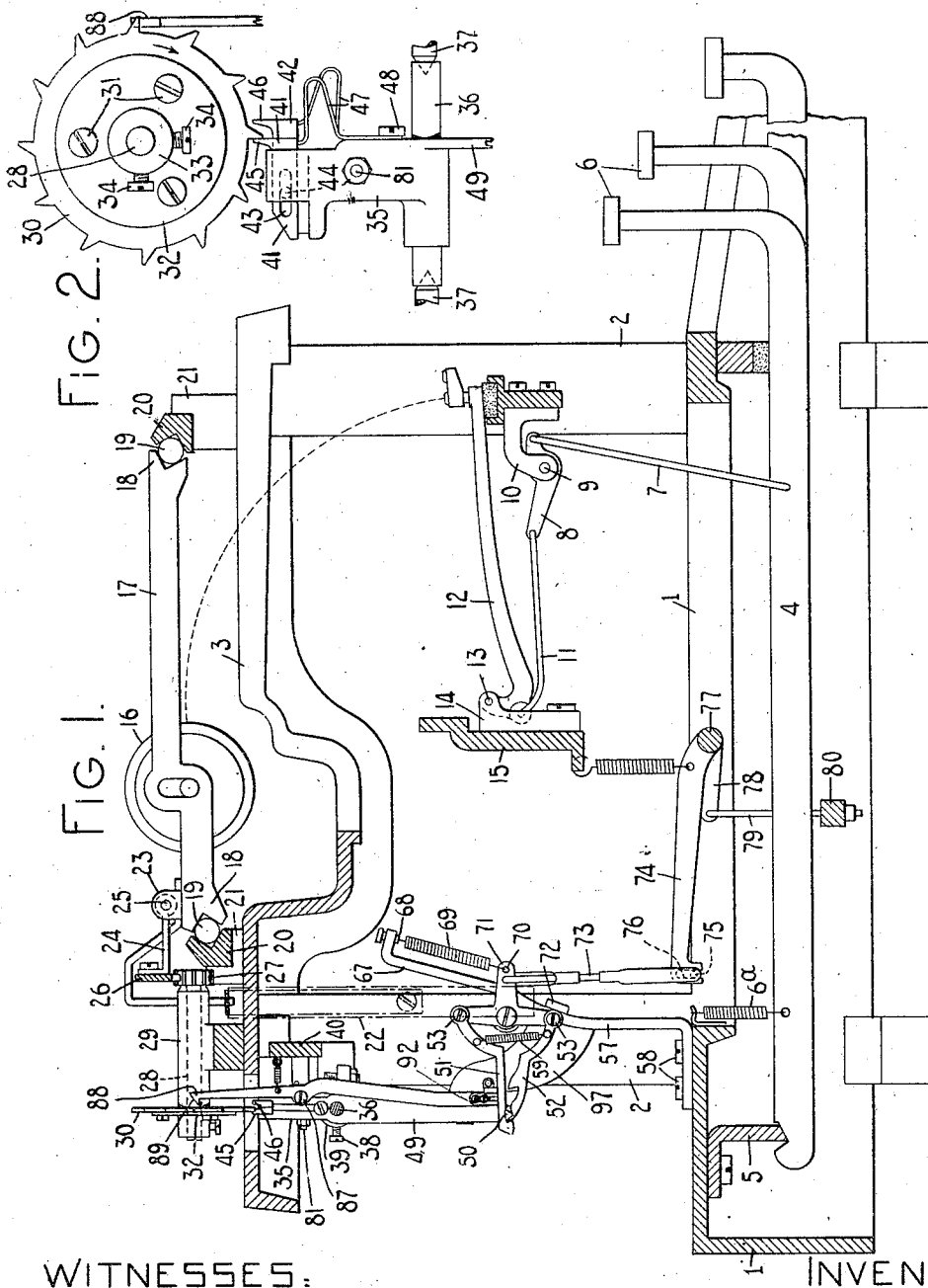


C. H. SHEPARD.
TYPE WRITING MACHINE.
APPLICATION FILED NOV. 10, 1910.

Patented Jan. 9, 1912.
2 SHEETS—SHEET 1.

1,014,336.



WITNESSES:

E. M. Wells.

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INVENTOR.

Charles H. Shepard

By Isaac F. Felt

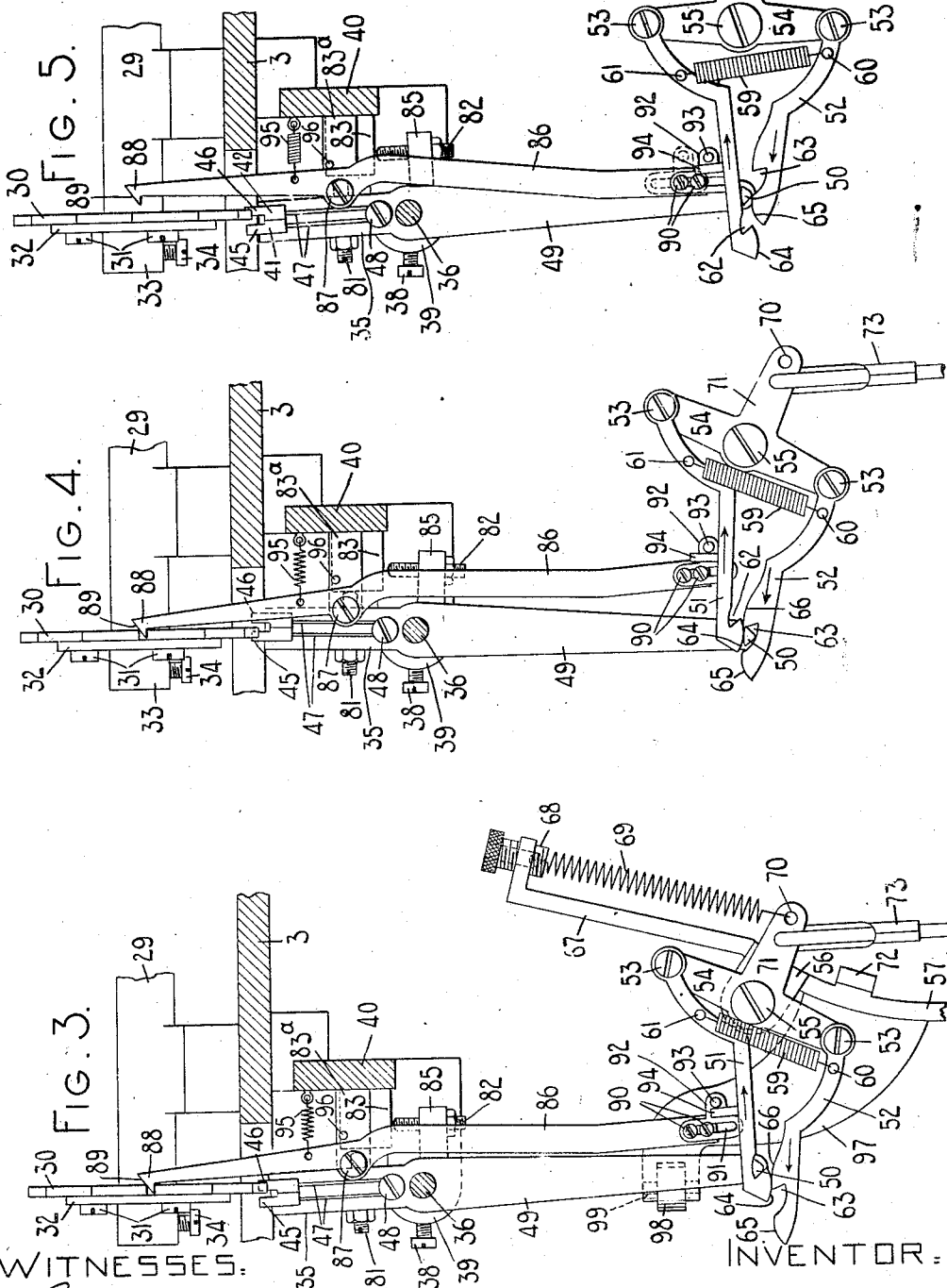
HIS ATTORNEY

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E. M. Wells
Charles H. Shepard

INVENTOR:

Charles H. Shepard
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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.

1,014,336.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed November 10, 1910. Serial No. 591,681.

To all whom it may concern:

Be it known that I, CHARLES H. SHEPARD, 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 present invention is in the nature of an improvement on the constructions disclosed in my two companion applications Serial Nos. 591,679 and 591,680 filed of even date herewith.

The present invention has some of the same general objects in view as the constructions disclosed in said companion applications, namely, to provide an easily operated, efficient and reliable carriage feed or escapement mechanism and one in which the wear on the escapement devices is greatly reduced, and also to provide means which enable the parts to be regulated at will to effect either "ordinary" or "reverse" feed at will.

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, central, fore and aft sectional view of one form of typewriting machine embodying my invention. Fig. 2 is a fragmentary rear elevation showing a portion of the escapement devices. Figs. 3, 4 and 5 are detail fragmentary side elevations with parts in sections of the escapement mechanism, the different views showing the parts disposed in different positions.

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 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 fulcrumed on a fulcrum plate 5 and each key lever is provided with a key 6 and with a returning spring 6^a. Each key lever is connected with an upwardly extending link 7 connected at its upper end to a sub-lever 8, pivoted at 9 to a hanger 10. A rearwardly extending link 11 is connected to each sub-lever 8 at its forward end, and to a type bar 12 at its rear end. The type bars are each pivoted at 13 to a hanger 14, secured to a type bar segment 15. The type bars are segmentally arranged to strike upwardly and rearwardly against the front face of a cylindrical platen 16 mounted in a carriage 17 having front and rear oppositely grooved guide rails 18 in which anti-friction balls or rollers 19 are received. Oppositely fixed guide rails 20 are secured to lugs 21 which project upwardly from the top plate of the machine. The carriage is thus mounted for movement over the top plate from side to side of the machine and may be propelled in the direction of its feed from right to left by the usual spring drum 22. This drum is shown in dotted lines in the present instance as it is situated at this side of the plane on which the section in Fig. 1 is taken. The carriage has upwardly extending lugs 23 to which arms 24 are pivoted at 25, the arms being situated near the opposite ends of the carriage and carrying a feed rack 26 at the rear ends thereof. The feed rack engages a feed pinion 27 fixed to the forward end of a shaft 28 mounted in a bearing 29 secured to the top plate of the machine. The rear end of the shaft 28 extends beyond the bearing 29 and carries a circular feed rack or escapement wheel 30 which in the present instance, is a single wheel having teeth so spaced that a movement of the wheel from one tooth to the next affords a full letter space movement of the carriage. This escapement wheel is secured by screws 31 to a disk 32, provided with a hub 33 tapped to receive screws 34 by which the escapement wheel is fixed to the shaft 28. A dog rocker 35 has a rock shaft 36 mounted on cone bearings 37, secured by screws 38 in bearing lugs 39, on a bracket plate 40, which latter is secured to the bottom of the top plate 3. The upwardly projecting arm of the dog rocker 35 is slotted to receive two sliding carriers 41 and 42 which move in the direction of the axis of the rock shaft 36 of the dog rocker.

Each of these carriers or slides is slotted at 43 to receive a pin 44 carried by the dog rocker to limit the movements of the slides 41 and 42. The slide 41 carries a feed dog 45 and a corresponding feed dog 46 is carried by the slide or carrier 42.

Two wire spring arms 47 are secured to the dog rocker by a screw 48 which is received in the loop of the double spring, and each arm of the spring is connected with one of the slides 41, 42 and exerts a pressure thereon to move the slide to the right, as the parts are indicated in Fig. 2. The construction and arrangement of the parts are such that one or the other of the loose dogs 45 or 46 will be engaged by a tooth of the escapement wheel 30. As the dog rocker is moved to effect a movement of the feed dogs transversely of the plane of the escapement wheel, one of the loose dogs which is engaged by a tooth of the escapement wheel is moved out of the path of said tooth. At the same time the other or advanced dog is moved into the path of the next oncoming tooth of the escapement wheel, which under the power of the spring drum engages said advanced dog and moves it against the pressure of its spring 47 until it is arrested by cooperation with the dog rocker; or until one end of the slot reaches the pin 44. The movement just described of the dog rocker, to carry the previously engaged feed dog out of the path of the engaged tooth of the escapement wheel, releases said dog from pressure and it moves to the advanced position as the other dog is being moved by the escapement wheel against the pressure of its spring 47. In this manner the dogs are alternately engaged and released at successive movements of the dog rocker in opposite directions and the dogs are alternately moved to the advanced positions by their springs 47 and are alternately moved, by the escapement wheel cooperating therewith, to the retracted positions. This construction, whereby the loose dogs are alternately advanced and retracted relatively to each other, enables the dogs to clear the teeth of the escapement wheel and to avoid liability of contact between the dogs and the teeth of the wheel in the back and forth movements of the dog rocker. It will also be observed that each back or forth movement of the dog rocker affords a full letter space movement of the carriage, so far as the cooperation between the feed dogs 45 and 46 and the escapement wheel 30 is concerned. The dog rocker 35 is also provided with a depending arm 49 which has a laterally projecting engaging device, pin, or stud 50 at the lower end portion thereof. This stud 50 is preferably substantially triangular in cross section, and is arranged for cooperation with two actuating devices or pawls 51 and 52 arranged above and below

the same. Each pawl is pivoted at 53 to an oscillatory device 54, which is in the nature of a lever of the first order fulcrumed intermediate its ends on a shouldered pivot screw 55. This screw is received at its threaded end in a projection 56 and the latter extends from the bracket 57 secured, by screws 58, to the base of the frame. A light contractile spring 59 is connected at one end to a pin 60 which projects laterally from the pawl 52, and is connected at its opposite end to a pin 61 which projects laterally from the pawl 51. The power of this spring is exerted to draw the pawls 51 and 52 toward each other and into cooperation with the engaging device or stud 50. A turning movement of the lever 54 in either direction is effective to move the pawls 51 and 52 in opposite directions, as indicated by the arrows in Figs. 3, 4 and 5. Each of the pawls 51 and 52 is provided with oppositely disposed hook-like engaging ends, so that each of the pawls is cooperative with the engaging pin 50 during the movement of each pawl in but one direction, each pawl being adapted to move independently of the engaging pin, during the movement of the pawl in the opposite direction. Thus the pawl 51 is provided with a recess 62 shaped to conform substantially to two sides of the pin 50, whereas the pawl 52 is provided with a recess 63 in which the pin is adapted to be seated. The pawl 51 likewise has a contact face 64 which is cooperative with contact faces 65 and 66 on the pawl 52, as will hereinafter more clearly appear. An upwardly extending bracket arm 67 projects from the bracket 57, and is tapped to receive a screw 68 to which one end of a contractile spring 69 is swiveled; the opposite end of said spring being connected at 70 to an arm 71 which projects from the lever or oscillatory device 54. The pressure of the spring 69 is exerted to move the lever 54 and the parts connected therewith to the positions indicated in Fig. 1. In this position the lower end of the lever 54 is adapted to bear against a stop 72 which projects from the bracket 57 to limit the movement of the lever 54 in one direction, or back to normal position. An actuating link 73 is connected at its upper end to the arm 71, and the lower end of said link is bifurcated to receive the rear end of a crank arm 74 between the side arms formed by the bifurcation. A pin 75 extends between the two arms formed by the bifurcated end of the link 73, and is received in an upright slot 76 in the crank arm 74, so that a lost motion connection is formed between the crank arm 74 and the link 73. This affords a downward movement of the crank arm independently of the link until the bottom wall of the slot 76 engages the pin 75. The

crank arm 74 extends rearwardly from a rock shaft 77 which turns at its ends in bearings in the frame of the machine. Crank arms 78 extend rearwardly from the rock shaft 77 near the ends thereof and each of the crank arms 78 is connected to a depending link 79, the lower end of which is connected to a universal bar 80.

The operation of the parts thus far described will be more readily comprehended when it is understood at the outset that in the "reverse" feed of the parts, which will first be set forth, the auxiliary dog 88 (to be hereinafter described) does not cooperate with the escapement wheel, said auxiliary dog being rendered inoperative by adjusting the slide 92 to the dotted line position shown in Fig. 5. For the present therefore the auxiliary feed dog may be entirely disregarded.

The operation of the parts for "reverse" feed is as follows:—Assuming that the parts are normally in the positions shown in Fig. 1, it will be understood that a depression of a finger or printing key 6 is effective to depress the universal bar, thereby rocking the shaft 67 and moving the crank arm 74 downwardly. This movement is transmitted, through the link 73, to the lever 54 to turn it from the position shown in Fig. 1 to that indicated in Fig. 3. This movement of the lever 54 against the pressure of the spring 69 is effective to move the pawls 51 and 52 in the directions of the arrows in Fig. 3. At the first part of the movement the hook-like end of the pawl 51 will be brought into engagement with the stud 50 on the depending arm 49 of the dog rocker, and the bill of the hook-like portion of the pawl engaging beneath the stud 50 will prevent the pawl from being lifted. This initial movement of the pawl 51 is adapted to bring the contact face 64 thereon to a position where it will co-act with the contact faces 65 and 66 on the pawl 52 as the latter moves in the direction of the arrow in Fig. 3, thus preventing an engagement of the pawl 52 with the stud 50. Fig. 3 represents the positions of the parts at the end of the first down stroke or depression of a key. It will be seen that this movement has been effective to turn the dog rocker on its pivot from the position shown in Fig. 1 to that indicated in Fig. 3 and that this movement carries the loose dog 45 out of engagement with the escapement wheel and interposes the dog 46 in the path of the oncoming tooth of the escapement wheel, thus affording a full letter space movement of the carriage. When pressure on the depressed finger key is released, the spring 69 is effective to return the parts of the actuating devices to the normal position as represented in Fig. 5. Both of the pawls 51 and 52 are ineffective during these return move-

ments of the parts to effect a movement of the dog rocker, so that the dog rocker remains in the position to which it was moved on the first down stroke of the key. The next depression of a finger key is effective to move the parts from the positions represented in Fig. 5 to those indicated in Fig. 4. At this time the pawls 51 and 52 move in opposite directions, as indicated by the arrows in Fig. 5, and the first part of the movement is effective to seat the engaging pin 50 in the recess 63 of the pawl 52. This same movement of the pawl 52 into engagement with the pin 50 is effective to bring the contact faces 65 and 66 to a position where the contact face 64 on the pawl 51 will cooperate therewith, so that the movement of the pawl 51 in the direction indicated by the arrow in Fig. 5, may take place without the pawl 51 engaging the projection 50; the pawl 51 at this time passing freely over the pin. The movements just described, at the second depression of a finger key, is effective to move the dog rocker from the position shown in Fig. 5 to that indicated in Fig. 4. This movement carries the feed dog 46 out of engagement with the escapement wheel and interposes the dog 45 in the path of the oncoming tooth of the wheel, thus affording a full letter space movement of the carriage at the second down stroke or depression of a key. At the third stroke of a key the operation of the parts described at the first key depression will be repeated. So on successive key depressions are operative to positively move the dog rocker alternately first in one direction and then in the opposite direction, and a full letter space movement of the carriage is effected at each back or forth movement of the dog rocker and in this manner a "reverse" feed is afforded.

The back and forth movements of the dog rocker are limited by two screw stops 81 and 82 which extend at right angles to each other and both of which cooperate with a projection 83 which projects forwardly from the bracket plate 40. The screw stop 82 is received in a tapped opening in an arm 85 which projects forwardly from the dog rocker 35. The screw stop 82 is adapted to contact with the bottom of the projecting abutment 83 to limit the rearward movement of the feed dogs, whereas the stop 81 is received in a threaded opening in the upper dog carrying arm of the dog rocker and co-acts with the rear end of the abutment 83 to limit the forward movement of the dogs.

As has been hereinbefore intimated, I have provided, in accordance with my present invention, means which may be regulated at will to effect either "ordinary" or "reverse" feed as may be desired. In order to effect this result I provide a carrier 86 which is in the

nature of a lever of the first order fulcrumed on a shouldered pivot screw 87 to a projection 83^a on the bracket plate 40. It will thus be seen that this lever or carrier 86 is mounted independently of the dog rocker. The upper end of this lever is provided with a holding dog 88 which is preferably provided with an inclined or beveled working face 89. The lower end of the lever or carrier 86 is tapped to receive the threaded ends of two headed screws 90. The stems of these screws extend through a slot 91 in an adjustable device 92, which carries a laterally projecting pin 93. The heads of the screws 90 are adapted to bear against the face of the slide or adjustable device 92 to hold it in the position to which it may be adjusted longitudinally of the lever 86, whereas the stems of the screws 90 guide the slide in its adjustment longitudinally of the lever. When the slide 92 is adjusted to the lowermost position, shown in Figs. 3, 4 and 5, the pin 93 extends into the path of an upwardly extending pin 94 on the pawl or actuating device 51. A contractile spring 95 is connected at one end to the bracket plate 40 and at its opposite end to the carrier 86 above the pivot of the latter. The power of this spring is exerted to withdraw the holding dog from the path of the teeth of the escapement wheel as shown in Fig. 5, whereas a movement of the pawl 51 in the direction of the arrow thereon in Fig. 3, is effective to move the carrier 86 against the pressure of the spring 95 and to move the holding dog into the path of the teeth on the escapement wheel, as shown in Fig. 3. I preferably provide a stop pin 96 on the abutment 83 in order to limit the movement of the carrier 86 in one direction, and in that direction in which it is moved by the spring 95 to carry the holding dog out of the path of the teeth of the escapement wheel.

It will be understood that although the dog rocker is only moved in one direction at each complete operation of a key, the lever 54 is, nevertheless, moved or turned first in one direction and then in the opposite direction at each complete operation of a key. The pawl 51 is likewise moved first in one direction and then in the opposite direction at each complete operation of a key. It follows therefore that the carrier 86, for the holding dog, is turned first in one direction and then in the opposite direction by each complete key operation. When the holding dog 88 is to be employed in order to effect an "ordinary" instead of a "reverse" feed, a depression of a finger key, when the parts are in the position shown in Fig. 1, is effective to move them to the position shown in Fig. 3 which represents the parts as they are disposed at the end of the first key depression. It will be seen that this movement is effective to carry the holding dog

into the path of a tooth of the escapement wheel so that the let-off of the wheel, afforded by the movement of the dog rocker, is ineffective to produce a letter space movement of the carriage since at this time the holding dog locks the wheel against rotation. The movement of the holding dog into operative position is effected by the movement of the pawl 51 in the direction of the arrow thereon; this movement being transmitted through the pins 94 and 93 to the carrier 86 of the holding dog. When pressure on the finger key is released the springs 69 and 95 restore the parts to normal position, withdrawing the holding dog from the engaged tooth of the escapement wheel and allowing it a full letter space movement of the wheel. The wheel is finally arrested by the dog 46 which has been interposed in the path thereof at the depression of a key. It will be understood therefore that a "let-off" of the escapement wheel is effected at the up stroke of the key instead of at the down stroke thereof, so as to afford an "ordinary" instead of a "reverse" feed of the escapement mechanism. As the holding dog 88 is withdrawn from engagement with the escapement wheel, the beveled working face of the holding dog affords a forward movement of the escapement wheel to enhance the rapidity of the feed movement of the carriage and to afford an advance of the carriage while the holding dog is being disengaged. The pressure of a tooth of the escapement wheel against the beveled working face 89 of the holding dog also tends to force the holding dog out of the path of the escapement wheel when pressure of the finger is released on the depressed finger key. In some instances it may be that this pressure of the escapement wheel will be found sufficient, without using the light spring 95 to move the holding dog out of cooperation with the escapement wheel. I prefer as a matter of precaution, however, to employ the spring 95 to assure a proper actuation of the parts. When the finger key has been released after its first depression the parts will be in the positions shown in Fig. 5. The next depression of a key will operate the dog rocker in the manner hereinbefore described, and at the same time will move the holding dog into the path of a tooth of the escapement wheel to lock it against movement until the depressed key has been released. Fig. 4 shows the positions of the parts as they appear at the second depression of a key. As soon as the second depressed key has been released, the holding dog will be withdrawn in the manner previously described and a letter space movement of the carriage will be effected.

It will be understood that an upward adjustment of the slide 92 is effective to carry the pin 93 out of the path of the pin 94 and

that the holding dog and its carrier will be rendered inoperative by such adjustment and at such time a "reverse" feed of the escapement will then be effected at each depression of a key. When the slide is moved or adjusted downwardly to bring the pins 93 and 94 into coöperation, the holding dog is rendered effective or operative and the parts are then regulated for "ordinary" instead of "reverse" feed.

If it should be found that insufficient friction is produced at the bearings of the dog rocker to maintain it against accidental displacement in either the forward or back position to which it may be shifted, suitable means may be employed to coöperate with the dog rocker to hold it against accidental displacement. In the present instance I have shown a rearwardly extending bracket arm 97 provided with a bearing roller 98, mounted on a vertical pivot 99, and adapted to bear at its periphery against a flat side of the depending arm 49 of the dog rocker. This pressure of the bearing roller on the depending arm 49 of the dog rocker is effective to maintain it against accidental displacement in either of the positions to which the dog rocker may be moved. The bearing wheel 98 is insufficient, however, to afford any material resistance to the operation of the dog rocker under control of its actuating devices.

It will be observed that the pawls 51 and 52 move in opposite directions at each up stroke and also at each down stroke of a key; that the pawls are each operative to move the dog rocker in but one direction; that the parts may be regulated so as to feed either the down stroke or the up stroke of a key to afford either "ordinary" or "reverse" feed as may be desired; that this depends, in the present instance, on the adjustment of the device 92 and whether or not the holding dog 88 is operative; that in either "reverse" or "ordinary" feed the dog rocker and feed dogs receive a movement under control of the keys in but one direction at each complete operation of a finger key; that the dog rocker is free to remain in either of the back and forth positions to which it may be moved and has no returning spring, the power of which must be overcome by the pressure exerted upon the keys; that the transverse movement of the feed dogs and rocker in but one direction at each complete operation of the key reduces the wear on the escapement devices by one-half over the ordinary construction in which it is necessary to move the dog rocker and feed dogs back and forth at each complete operation of a key; that the construction is such as to require but little power to actuate the parts, thereby providing a light touch on the finger keys; that the entire train of mechanism from the finger key to the feed dogs is actuated by a positive pressure ap-

plied to the finger key but that the actuating devices on the dog rocker are inoperative to move it during the up stroke of the key so that any trembling of the key at the last part of the down stroke cannot be transmitted to the dog rocker and there is no liability of the carriage skipping under the control of the escapement as is often the case in "reverse" feed constructions ordinarily employed; that the escapement is therefore effective and reliable irrespective of the character of the operator's touch.

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

My companion applications hereinbefore referred to contain generic claims which cover the present construction; the claims in this case being restricted to features not disclosed in said companion applications.

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 coöperative escapement members, one movable back and forth relatively to the other; finger keys; means controlled by said finger keys for successively 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; an auxiliary holding dog; and means for moving said auxiliary dog into the path of one of said escapement members at each down stroke of a key and for moving said auxiliary dog out of the path of said escapement member at each up stroke of the key.

2. In a typewriting machine, the combination 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; means controlled by said printing keys for moving said movable member back and forth in the directions specified at successive printing operations, each complete operation of a printing key moving said movable member either back or forth; an auxiliary holding dog; and means for moving said holding dog into the path of the rack member at each down stroke of a key and for moving said auxiliary dog out of the path of said rack member at each up stroke of a key.

3. In a typewriting machine, the combination of a carriage; feed devices therefor; finger keys; means intermediate said finger keys and certain of said feed devices for effecting back and forth movements thereof and for effecting a back or forth movement thereof only at each complete operation of a key; and an auxiliary feed dog that is moved

back and forth at each complete operation of key.

4. In a typewriting machine, the combination of a carriage; feed devices therefor; finger keys; means intermediate said finger keys and certain of said feed devices for effecting back and forth movements thereof and for effecting a back or forth movement thereof only at each complete operation of a key; an auxiliary feed device in the nature of a holding dog; and means by which said holding dog is moved into the path of one of said first mentioned feed devices on the down stroke of the key and by which said holding dog is moved out of the path thereof on the up stroke of the key.

5. 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; 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; an auxiliary feed device in the nature of a holding dog; and means for moving said holding dog into the path of the escapement member with which said movable member cooperates at each down stroke of a key and for moving the holding dog out of the path of said escapement member on the up stroke of a key.

6. 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; 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 movable 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; a holding dog; and means for moving said holding dog back and forth at each operation of a key.

7. 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; 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 opera-

tion moving said movable escapement member in but one direction; a holding dog; and means for moving said holding dog back and forth at each operation of a key.

8. In a typewriting machine, the combination of a carriage; cooperating escapement members; a rocker for one of said members; finger keys; 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; a holding dog; and means for moving said holding dog back and forth at each operation of a key.

9. In a typewriting machine, the combination of a carriage; cooperating escapement members; a rocker for one of said members; finger keys; 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; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

10. 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; 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; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

11. 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; 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 key depression, and means which are engaged alternately by said pawls at successive key depressions and move said movable escapement back and forth; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

12. In a typewriting machine, the combi-

nation of a carriage; cooperating escapement members; a rocker for one of said members; finger keys; 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; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

13. 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; 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 effecting alternate engagement between 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; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

14. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; actuating connections between said finger keys and escapement mechanism; said connections comprising an engaging member, two pawls, means for alternately engaging 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; a holding dog mounted independently of said rocker; and key controlled means for controlling the movement of said holding dog.

15. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; actuating connections between said finger keys and escapement mechanism; said connections comprising an engaging member, two pawls, means for alternately engaging 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 cooperative to prevent the engagement of one pawl with said engaging member when the other pawl is in engagement therewith, an auxiliary holding dog; and means for moving said auxiliary dog

into the path of one of said escapement members at each down stroke of a key and for moving said auxiliary dog out of the path of said escapement member at each up stroke of the key.

16. In a typewriting machine, the combination of a power driven carriage; an escapement rack; two loose dogs cooperative therewith and movable back and forth transversely of the escapement rack; finger keys; 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; an auxiliary holding dog cooperative with said rack; and means for moving said auxiliary holding dog into the path of the teeth of the rack at the down stroke of a key and for moving said auxiliary dog out of the path of the teeth of said rack at each up stroke of a key.

17. 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, means under control of the said finger keys for positively moving said rocker first in one direction and then in the opposite direction, an auxiliary holding dog mounted independently of the dog rocker, and means for moving said holding dog.

18. 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, means under control of the said finger keys for positively moving said rocker first in one direction and then in the opposite direction, an auxiliary holding dog, and means under control of said keys for moving the holding dog forward and back into and out of operation at each actuation of a finger key.

19. 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, 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, an auxiliary holding dog mounted independently of the dog rocker, and key actuated means for moving said auxiliary dog back and forth in opposite directions at each complete operation of a key.

20. In a typewriting machine, the combination of a power driven carriage; finger keys; and carriage escapement mechanism including cooperative escapement members, one of which moves transversely of the

other, an oscillatory actuating member controlled by the finger key, actuating means controlled by said oscillatory member and normally disconnected from said transversely movable escapement member but operative thereon to positively move it first in one direction and then in the opposite direction, an auxiliary holding dog, and means under control of the keys for moving said auxiliary dog into operation at a down stroke of a key and for moving the auxiliary dog out of operation at the up stroke of a key.

21. In a typewriting machine, the combination of a carriage; escapement mechanism therefor comprising an escapement wheel and a feed dog, a single movement of the feed dog in one direction affording a complete letter space movement of the carriage; finger keys; 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 one direction; and a key controlled holding dog movable into the path of the teeth of the escapement wheel at the down stroke of a key and movable out of the path of said teeth at the up stroke of a key.

22. 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; 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 movement of each finger key effecting only a single movement of the rocker in one direction; a holding dog mounted independently of the dog rocker; and key controlled means for moving said holding dog into operative position at a down stroke of a key and for moving it out of operative position at the up stroke of a key.

23. In a typewriting machine, the combination of a carriage; escapement mechanism comprising two cooperating members; finger keys; 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; a holding dog; and means for moving said holding dog forward and back at each complete operation of a key.

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

ment mechanism therefor comprising two cooperative 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; means controlled by said finger keys for moving said movable escapement member alternately first to one of said positions and then to the other; a holding dog; and key controlled means for moving said holding dog forward and back at each complete operation of a key.

25. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two cooperative 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; means controlled by said finger keys for moving said movable escapement member alternately first to one of said positions and then to the other; a holding dog; and key controlled means for moving the holding dog into operative position at the depression of a key to prevent a letter space movement of the carriage and for moving said holding dog to inoperative position at the up stroke of a key to afford a letter space movement of the carriage.

26. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two cooperative members one of which is movable back and forth relatively to the other; finger keys; spring returned means controlled by said keys for effecting said back 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 operation of a key, and 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; a holding dog; and means for moving said holding dog forward and back at each complete operation of a key, whereby the carriage is held by the holding dog against letter space movement at the down stroke of a key and said holding dog is withdrawn to afford a letter space movement of the carriage at the up stroke of a key.

27. 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; means controlled by said finger keys for moving said movable escapement member forward at one key depression and back

at the next; a holding dog; and key controlled means for moving said holding dog forward and back at each complete operation of a key.

28. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising a rack and three dogs which cooperate therewith and which are movable back and forth transversely of said rack; finger keys; means controlled by said finger keys for moving two of the dogs in but one direction transversely of the feed rack at each complete operation of a key; and means for moving the third dog forward and back transversely of the rack at each complete operation of a finger key.

29. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising a rack and three dogs which cooperate therewith; a dog rocker which carries two of said dogs; a carrier independent of the dog rocker by which a third dog is carried; finger keys; means controlled by said finger keys for moving said dog rocker in but one direction at each complete operation of a finger key; and means for moving said dog carrier back and forth in opposite directions at each complete operation of a key.

30. In a typewriting machine, the combination of a power driven carriage; an escapement wheel having teeth spaced apart to afford a full letter space movement of the carriage in the movement of the wheel from one tooth on the wheel to the next; two dogs cooperative with said wheel and movable back and forth transversely thereof and affording a full letter space movement of the wheel in the movement of the dogs back or forth in either direction; a third or holding dog movable into and out of cooperation with the escapement wheel; finger keys; means controlled by said finger keys for moving said first mentioned dogs in but one of the back and forth transverse movements thereof at each complete operation of a finger key; and means controlled by said finger keys for moving the third dog into cooperation with the escapement wheel at the down stroke of a key to prevent a movement of said escapement wheel and to withdraw the said third dog from the path of the teeth of the wheel at the up stroke of a finger key.

31. 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; means controlled by 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; an auxiliary holding dog; means for moving said auxiliary dog into the path of one of said escapement members at each down stroke of a key and for moving said auxiliary dog out of the path of said escapement member at each up stroke of a key to afford "ordinary" feed; and means for throwing said auxiliary dog out of operation at will to afford a "reverse" feed.

32. In a typewriting machine, the combination 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; means controlled by 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; an auxiliary holding dog, means for moving said holding dog into the path of the rack member at each down stroke of a key and for moving said auxiliary dog out of the path of said rack member at each up stroke of a key to afford "ordinary" feed; and means operable at will for throwing said auxiliary dog out of operation to afford a "reverse" feed.

33. In a typewriting machine, the combination of a carriage; feed devices therefor; finger keys; means intermediate said finger keys and certain of said feed devices for effecting back and forth movements thereof and for effecting a back or forth movement thereof only at each complete operation of a key; an auxiliary feed dog that is moved back and forth at each complete operation of a key, to afford "ordinary" feed; and means operable at will to render said auxiliary dog inoperative and thereby enable the parts to effect "reverse" feed.

34. In a typewriting machine, the combination of a carriage; feed devices therefor; finger keys, means intermediate said finger keys and certain of said feed devices for effecting back and forth movements thereof and for effecting a back or forth movement thereof only at each complete operation of a key; an auxiliary feed device in the nature of a holding dog; means by which said holding dog is moved into the path of one of said first mentioned feed devices on the down stroke of the key and by which said holding dog is moved out of the path thereof on the up stroke of the key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

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; 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; an auxiliary feed device in the nature of a holding dog; means for moving said holding dog into the path of the escapement member with which said movable member coöperates, at each down stroke of a key and for moving the holding dog out of the path of said escapement member on the up stroke of a key to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

36. In a typewriting machine, the combination of a power driven carriage; coöperating escapement members therefor; one of said escapement members being movable back and forth relatively to the other; finger keys; 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 movable 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; a holding dog; means for moving said holding dog back and forth at each operation of a key to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

37. In a typewriting machine, the combination of a power driven carriage; coöperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; 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; a holding dog; means for moving said holding dog back and forth at each operation of a key to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

38. In a typewriting machine, the combination of a carriage; coöperating escapement members; a rocker for one of said

members; finger keys; 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; a holding dog; means for moving said holding dog back and forth at each operation of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

39. In a typewriting machine, the combination of a carriage; coöperating escapement members; a rocker for one of said members; finger keys; 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; a holding dog mounted independently of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

40. In a typewriting machine, the combination of a power driven carriage; coöperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; 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; a holding dog mounted independently of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

41. In a typewriting machine, the combination of a power driven carriage; coöperating escapement members therefor, one of said escapement members being movable back and forth relatively to the other; finger keys; 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 key operation, and means which are engaged alternately by said pawls at successive key operations and move said movable escapement back and forth; a holding dog mounted independently

of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

42. In a typewriting machine, the combination of a carriage; cooperating escapement members; a rocker for one of said members; finger keys; 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; a holding dog mounted independently of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

43. 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; 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 effecting alternate engagement between 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; a holding dog mounted independently of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

44. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor; finger keys; actuating connections between said finger keys and escapement mechanism; said connections comprising an engaging member, two pawls, means for alternately engaging 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; a holding dog mounted independently of said rocker; key controlled means for controlling the movement of said holding dog, to afford "ordi-

nary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

45. In a typewriting machine, the combination of a power driven carriage; an escapement rack; two loose dogs cooperative therewith and movable back and forth transversely of the escapement rack; finger keys; intermediate actuating connections between said finger keys and said dogs, said connections including means by which 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; an auxiliary holding dog cooperative with said rack; means for moving said auxiliary holding dog into the path of the teeth of the rack at the down stroke of a key and for moving said auxiliary dog out of the path of the teeth of said rack at each up stroke of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

46. In a typewriting machine, the combination of a carriage; finger keys; carriage feed mechanism, said carriage feed mechanism including a rocker free from spring pressure to move it, means under control of the said finger keys for positively moving said rocker first in one direction and then in the opposite direction, an auxiliary holding dog, and means under control of said keys for moving the holding dog forward and back into and out of operation at each actuation of a finger key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

47. In a typewriting machine, the combination of a carriage; finger keys; carriage feed mechanism, said carriage feed mechanism including a rocker free from spring pressure to move it, 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, an auxiliary holding dog mounted independently of the dog rocker, and key actuated means for moving said auxiliary dog back and forth in opposite directions at each complete operation of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

48. In a typewriting machine, the combination of a power driven carriage; finger keys; carriage escapement mechanism including cooperative escapement members, one of which moves transversely of the other,

an oscillatory actuating member controlled by the finger keys, actuating means controlled by said oscillatory member and normally disconnected from said transversely movable escapement member but operative thereon to positively move it first in one direction and then in the opposite direction, an auxiliary holding dog, and means under control of the keys for moving said auxiliary dog into operation at a down stroke of a key and for moving the auxiliary dog out of operation at the up stroke of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

49. In a typewriting machine, the combination of a carriage; escapement mechanism therefor, comprising an escapement wheel and a feed dog, a single movement of the feed dog in one direction affording a complete letter space movement of the carriage; finger keys; 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 one direction; a key controlled holding dog movable into the path of the teeth of the escapement wheel at each down stroke of a key and movable out of the path of said teeth at each up stroke of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

50. 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; 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 movement of each finger key effecting only a single movement of the rocker in one direction; a holding dog mounted independently of the dog rocker; key controlled means for moving said holding dog into operative position at a down stroke of a key and for moving it out of operative position at the up stroke of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

51. In a typewriting machine, the combination of a carriage; escapement mechanism comprising two cooperating members; finger keys; means controlled thereby for controlling one of said escapement members, said controlling means comprising actuat-

ing 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; a holding dog; means for moving said holding dog forward and back at each complete operation of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

52. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising two cooperative 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; means controlled by said finger keys for moving said movable escapement member alternately first to one of said positions and then to the other; a holding dog; key controlled means for moving the holding dog into operative position at the depression of a key to prevent a letter space movement of the carriage and for moving said holding dog to inoperative position at the up stroke of a key to afford a letter space movement of the carriage and thereby effect "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

53. 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; means controlled by said finger keys for moving said movable escapement member forward at one key depression and back at the next; a holding dog; key controlled means for moving said holding dog forward and back at each complete operation of a key, to afford "ordinary" feed; and means operable at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

54. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor comprising a rack and three dogs which cooperate therewith and which are movable back and forth transversely of said rack; finger keys; means controlled by said finger keys for moving two of the dogs in but one direction transversely of the feed rack at each complete operation of a key; means for moving the third dog forward and back transversely of the rack at each complete operation of a finger key, to afford "ordinary" feed; and means oper-

able at will to render said holding dog inoperative and thereby enable the parts to effect a "reverse" feed.

55. In a typewriting machine, the combination of a power driven carriage; escapement mechanism therefor comprising a rack and three dogs which cooperate therewith; a dog rocker which carries two of said dogs; a carrier independent of the dog rocker by which the third dog is carried; finger keys; means controlled by said finger keys for moving said dog rocker in but one direction at each complete operation of a finger key; means for moving said dog carrier back and forth in opposite directions at each complete operation of a finger key; and means operable at will for rendering said carrier inoperative.

56. In a typewriting machine, the combination of a power driven carriage; an escapement wheel having teeth spaced apart to afford a full letter space movement of the carriage in the movement of the wheel from one tooth on the wheel to the next, two dogs cooperative with said wheel and movable back and forth transversely thereof and affording a full letter space movement of the wheel in the movement of the dog back or forth in either direction, a third or holding dog movable into and out of cooperation

with the escapement wheel; finger keys, means controlled by said finger keys for moving said first mentioned dog in but one of the back and forth transverse movements thereof at each complete operation of a finger key; means controlled by said finger keys for moving the third dog into cooperation with the escapement wheel at the down stroke of a key to prevent a movement of said escapement wheel and to withdraw the said third dog from the path of the wheel at the up stroke of a finger key; and means operable at will to render said third dog inoperative.

57. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor comprising two loose or stepping dogs, a third holding dog, and means operable at will to render said third holding dog operative or inoperative to feed "ordinary" or "reverse" as may be desired.

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:

M. F. HANNWEBER,
CHARLES E. SMITH.