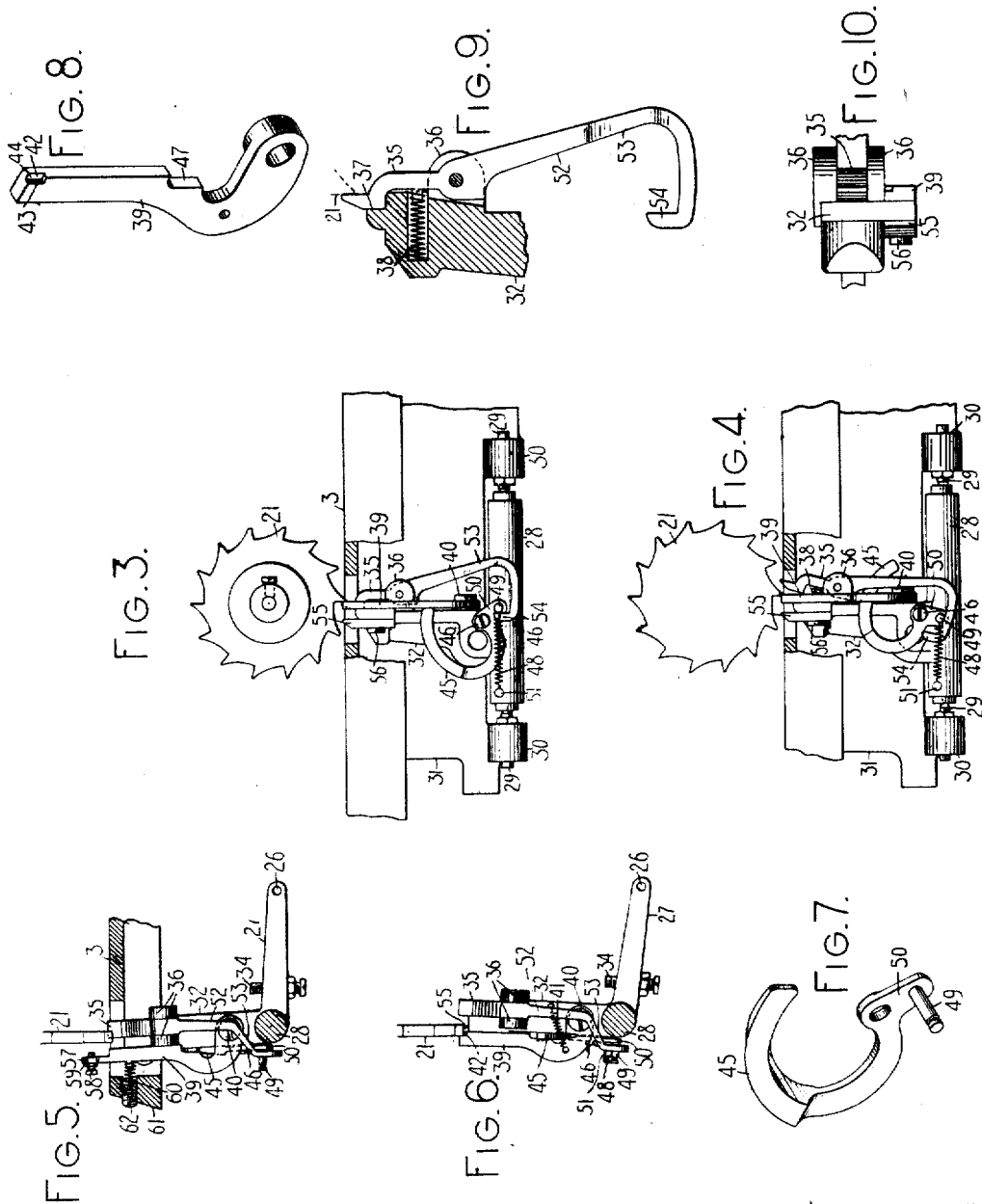


953,440.

C. H. SHEPARD.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 19, 1904.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 2.



WITNESSES:
R. H. Strother
E. M. Wells

INVENTOR:
Charles H. Shepard
By *James F. Felt*
HIS ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES H. SHEPARD, OF NEW YORK, N. Y., ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

953,440.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed September 19, 1904. Serial No. 224,962.

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 Brooklyn, city of New York, in the county of Kings 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.

My invention also relates to escapement mechanisms and more especially to an escapement mechanism for controlling the feed of the carriage of a typewriting machine.

My invention has for its principal object to provide an improved escapement mechanism for this purpose.

In typewriting machines it is desirable that the escapement mechanism release the carriage when the type on its return stroke has moved but a short distance from the paper. To effect this result with escapement mechanisms as ordinarily constructed, it is necessary that the parts whereby the key controls said mechanism be made with a considerable degree of accuracy and that they be adjusted with nicety. Even if these parts are constructed with the requisite accuracy in the first place, they are subject to wear, and, as some of the keys are used much more than others, they do not wear uniformly. By the present invention, I have provided means whereby upon each operation of any key, the relation of that key to the escapement is automatically adjusted, so that the carriage is released at the same point in the up-stroke of every key, even though the means whereby the keys operate the escapement may not be in perfect adjustment.

My invention consists in certain features of construction and combinations and arrangements of parts which will be fully set forth hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a front to rear vertical section of a typewriting machine having my invention applied thereto; Fig. 2 is a view of the rocker and parts mounted thereon as seen from the left-hand side of the machine; Figs. 3 and 4 are rear elevations of my escapement mechanism, the parts being shown in different positions in the two figures; Fig. 5

is a side elevation showing one form of my escapement mechanism; Fig. 6 is a similar view of the form of escapement mechanism shown in Figs. 1 to 4; Fig. 7 is a perspective view of a wedge or tripper member used in my construction; Fig. 8 is a perspective view of the holding dog; Fig. 9 is a view of the loose dog; and Fig. 10 is a view of the dogs as seen from above.

My invention is applicable to typewriting machines generally, but for the sake of illustration I have here shown it applied to the Monarch typewriter. The main frame of this machine comprises a base portion 1 from which rise posts 2, which support a top plate 3, on which are mounted transverse rails or tracks 4 having raceways in their upper and lower edges respectively, which cooperate with corresponding race-ways formed in the rails of a carriage 5. Said carriage is supported by anti-friction balls or rollers 6 which run in said race ways, and it supports an overhanging platen 7. The keys 8 are mounted on the ends of key levers 9, to which are pivoted sub-levers 10 which are connected by links 11 with type bars 12 which are pivotally mounted on a segment 13. The key levers are pressed into engagement with a fulcrum plate 14 by returning springs 15 in a manner well known in the art. The carriage is drawn across the machine by a band running over a spring drum, or it may be drawn across the machine by any suitable means. A rack bar 16 is mounted on arms 17 which are pivoted at 18 to the carriage and said rack bar meshes with a pinion 19 which is fixed on the front end of a shaft which is journaled in a housing or bracket 20, and which has mounted thereon at the rear of said bracket an escapement wheel or rack 21, this mechanism being that ordinarily used in the Monarch machine. So far as my invention is concerned the escapement rack might be a straight rack mounted on the carriage or it might have any other known or suitable form.

A universal bar 22 lies beneath the system of key levers and is supported by arms 23 which are rigidly connected with a rock shaft 24, which is pivoted in the framework of the machine. A link 25 is connected at its lower end with the universal bar and at its upper end is pivoted at 26 to an arm 27 extending forward from a rock shaft 28, which is pivoted on coned pivot

pins 29 (Fig. 3) which extend through ears 30 projecting from a bracket 31, which depends from the top plate 3. This is the well known dog rocker, but so far as my invention is concerned any to and fro moving part having the feed dogs mounted thereon might be used, and the word "rocker", as used in my claims, is intended to cover any such to and fro moving part.

The rock shaft 28 has projecting upwardly therefrom, an arm 32 which is engaged by one end of a spring 33 (Fig. 1), the other end of which presses against the bracket 31. This spring holds the dog rocker in its normal position. The motion of said rocker under the impulse of said spring is adjustably limited by a stop screw 34, which is threaded through the arm 27 and the end of which engages the bracket 31. As shown in Fig. 9, the escapement wheel normally has a tooth thereof in engagement with the loose or stepping dog 35, which is pivoted between ears 36 which project from the arm 32 of the dog rocker. The tooth of the escapement wheel normally presses the loose dog against a shoulder 37 of the arm 32, against the tension of a spring 38 which is seated in a hole in the arm 32. A holding dog 39 is pivoted to the arm 32 on a shouldered and headed screw 40 (Fig. 2) so as to be free to move toward the back of the machine. The holding dog is held in its normal position with the front face thereof in engagement with a portion of the arm 32 by a spring 41 which is connected at one end with said holding dog and at its other end to the arm 32. As best shown in Fig. 8, the holding dog has near its upper end a notch 42 which receives the tooth of the escapement wheel when the rocker is moved to the position shown in Fig. 6 by the depression of a key. When the rocker is so moved, the wall 43 of the notch 42 (Fig. 8) engages the tooth of the escapement wheel and arrests the holding dog before the rocker has completed its forward motion. After the holding dog has been thus arrested the rocker continues to move until the key has reached the bottom of its stroke, the holding dog turning on its pivot and the spring 41 being stretched.

When the loose dog moves out of engagement with the escapement wheel, the tooth of said wheel is arrested by the wall 44 (Fig. 8) of the notch 42. It will be perceived that in the operation which has been described the engaging surface of the arm 32 and the holding dog will become separated, so that when the key begins its upstroke there will be lost motion between these parts. This lost motion is automatically taken up by a tripper 45, comprising a segmental wedge (Fig. 7); said wedge consisting of the free end of a curved arm which is pivoted to the rear side of the dog

rocker on a shouldered and headed screw 46 (Fig. 3). The free end of the tripper arm 45 is approximately in the form of a segment having the pivot 46 as a center, the end of this segment being comparatively thin, and said segment increasing in thickness after the manner of a wedge, as shown in the drawing. The forward part of the tripper arm rests against the rear face of the arm 32 of the dog rocker and the free end of said tripper arm stands normally in such position that if the arm be rocked about its pivot said wedge shaped free end thereof will pass between the arm 32 and the holding dog, which is formed with a notch 47 (Fig. 8) for this purpose. When a key is depressed the tripper is thus thrown in behind the holding dog by a spring 48 (Fig. 3), which is connected at one end to a pin 49 which projects from a depending arm 50 of said tripper, the other end of said spring being connected to a pin 51 which projects from the rock shaft 28.

The tripper is withdrawn from behind the holding dog and is normally held in the position shown in Fig. 3 by the loose dog 35, which is formed with a tail 52 for the purpose. This tail extends downward from the pivot of the loose dog, as shown in Fig. 3, and, as shown at 53 in Fig. 6, it is bent toward the back of the machine and the lower end of said tail is formed with a hook 54 which normally engages the pin 49, as shown in Fig. 3. The construction is such that when the loose dog is held in its normal position shown in Fig. 3 by the pressure of a tooth of the ratchet wheel against the upper end of said dog, the hook 54 holds the pin 49 and the tripper 45 in its normal position against the tension of the spring 48; but when the rocker is rocked toward the front of the machine by the depression of a key, the loose dog being freed from the escapement wheel, is moved to the position shown in Fig. 4 under the impulse of the spring 38, and the hook 54 is thus moved away from the pin 49 and the tripper is thrown by its spring 48 in front of the holding dog, as shown in Fig. 4. Said spring moves said tripper until the latter reaches a point where its thickness is equal to the distance between the notch 47 and the arm 32, when said tripper is arrested by these parts, but if the key is further depressed and the rocker further moved toward the front of the machine, the wedge end of the tripper follows up the rocker, so that when the key reaches the bottom of its stroke said wedge end completely fills the gap between the arm of the dog rocker and the holding dog. When the key is released therefore, the holding dog begins immediately to move out of engagement with the escapement wheel. Said dog is moved out of engagement with the escapement wheel during the

first part of the upstroke of the key. As soon as the loose dog is struck by a tooth of the escapement wheel, it is restored to the position shown in Fig. 3 and the hook 54 withdraws the wedge end of the tripper from in front of the holding dog.

It will be perceived that upon the depression of a key after the holding dog is arrested, the loose dog continues to move away from said holding dog and it may move so far away that the space between the two is greater than the thickness of the escapement wheel. In this case when the key is released, the holding dog will release the escapement wheel before the loose dog has been moved into the path of a tooth of said wheel. In order to prevent the escapement wheel from moving more than one tooth under these circumstances, I have provided a safety dog or stop 55. This safety dog is rigidly secured to the arm 32 by a screw 56 and it stands in such position that after a tooth has been released by the holding dog it may move through approximately half of the distance from one tooth to the next, when it will be arrested by said safety dog. The relation of the safety dog to the loose dog is such that a tooth of the escapement wheel is not released from the safety dog until the loose dog is in position to arrest the next tooth.

I contemplate a construction in which the depth of the notch 42 in a direction from front to back of the machine shall be slight so that the escapement wheel will be released when the type has made but a small part of its return motion from the printing point. It will be perceived that the present device does not necessitate any fine or accurate adjustment between the dog rocker and the individual keys, such adjustment being made automatically at each stroke of the key by the tripper which takes up whatever lost motion there may be between the rocker and the holding dog in each individual stroke. It will also be perceived that my escapement mechanism does not require the use of any stop to arrest the dog rocker on the down stroke of the key. When such a stop is used, the key is sharply arrested at the bottom of the stroke, which has the effect of a blow on the finger of the operator. The omission of the stop gives the keys a much more elastic touch. By the present invention this stop is dispensed with without impairing the speed of the escapement.

I have illustrated a modification of my escapement mechanism in Fig. 5. According to this modification the notch 42 is dispensed with and the holding dog has an upwardly extending portion 57 through which is threaded a set screw 58 having a lock nut 59. In this construction the holding dog is arrested on the down stroke of the key by the engagement of the end of the screw 58

with the face of the escapement wheel. By adjusting the screw 58, the distance that the holding dog may move and the extent of its engagement with the tooth of the wheel may be regulated. In Fig. 5 I have also shown the spring 41 replaced by a spring 60 which is seated in an opening in the flange 61 of the top plate 3. This spring is compressed between the holding dog and a screw 62 which is threaded into said opening and by adjusting which the tension of said spring may be regulated. In the form of the invention shown in the other figures of the drawing, after the holding dog has been arrested, the spring 41 is stretched by the power applied to the keys, whereas in this modification this work is not thrown on the keys.

It is obvious that many other modifications might be made in the parts without departing from my invention. For example, the holding dog might be pivoted to a stationary part of the machine instead of to the dog rocker. Also it is not essential that the holding dog be arrested in its forward motion by the escapement wheel itself, as any other means might be provided for this purpose. Furthermore, the dogs might be mounted on the stationary part of the machine and the escapement wheel be moved to and fro by the keys; or the parts might be modified in other ways without departing from my invention.

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

1. The combination with an escapement rack, of a stepping dog and a holding dog, one movable toward and from the other in a direction transversely of said rack, and a safety dog adapted to arrest said rack if it escapes from both of the first mentioned dogs.

2. In an escapement mechanism, the combination with an escapement rack, of a rocker, a stepping dog mounted on said rocker, a holding dog movable relatively to said rocker in the direction of motion of said rocker, and a safety dog mounted on said rocker and adapted to arrest said rack in case a tooth thereof escapes between the first mentioned dogs.

3. In an escapement mechanism, the combination with the escapement rack, of a rocker, a holding dog that moves into engagement with the rack when the rocker is moved from normal position, and that is arrested by said rack, and a tripper for restoring said holding dog during the first part of the return motion of the rocker.

4. In an escapement mechanism, the combination with an escapement rack, of a rocker, a holding dog, means for moving said holding dog to operative position during the first part of the motion of said rocker from normal position, means for ar-

resting said holding dog in its operative position before the rocker reaches the end of its motion away from normal position, and means for moving said holding dog out of engagement with said rack during the first part of the return motion of said rocker.

5. In an escapement mechanism, the combination of an escapement rack, a rocker, a holding dog, means for moving said holding dog to and for arresting it at operative position during the first part of the motion of said rocker in one direction, and a block movable into position to take up the lost motion between said rocker and said holding dog, whereby said rocker during the first part of its return motion moves said dog out of operative position.

6. In a typewriting machine, the combination with the keys and the carriage, of an escapement mechanism for controlling the feed of the carriage comprising an escapement rack, a holding dog, means for moving said holding dog into position to cooperate with said rack during the down stroke of the key, means for arresting said holding dog before the key has reached the end of its down stroke, and means for moving the holding dog out of engagement with the rack during the first part of the up-stroke of the key.

7. In an escapement mechanism, the combination with an escapement rack, of a rocker; a loose dog mounted on said rocker; a holding dog; and means for causing said holding dog to move with said rocker during the first part of the return stroke of said rocker, and an operative connection between said means and said loose dog.

8. In an escapement mechanism, the combination with the escapement rack, of a holding dog, a rocker, a loose dog; means for moving the holding dog with the rocker in one direction, means for arresting the holding dog in its operative position, and a wedge or cam for taking up the lost motion between the holding dog and the rocker after said holding dog has been arrested.

9. In an escapement mechanism, the combination with the escapement rack, of a holding dog, a rocker, a loose dog, means for moving the holding dog with the rocker in one direction, means for arresting the holding dog in its operative position, and a wedge or cam for taking up the lost motion between the holding dog and the rocker after said holding dog has been arrested, and an operative connection between said loose dog and said wedge.

10. In a typewriting machine, the combination with the keys and the carriage, of an escapement mechanism for controlling the feed of the carriage, comprising an escapement rack, a holding dog having a limited motion under the control of a key during the down stroke of said key, and

means, operated by power independent of that applied to the key for connecting said holding dog to move with said key during the first part of the up stroke of said key.

11. In an escapement mechanism, the combination with the rack, of a dog rocker; a loose dog mounted on said dog rocker; a holding dog; means for moving said holding dog with said rocker; means for arresting said holding dog before the rocker completes its motion; a wedge or tripper for taking up the lost motion between said rocker and said holding dog, due to the continued motion of said rocker after said holding dog has been arrested; and a tail to said loose dog for restoring said tripper to normal position.

12. In an escapement mechanism, the combination with the rack, of a dog rocker; a holding dog mounted for motion relatively to said rocker; a spring tending to move said holding dog with said rocker on the forward stroke thereof; a stop on said holding dog adapted to engage said rack and to arrest said dog before the rocker completes its forward stroke; a wedge or tripper mounted on said rocker and movable to take up the lost motion between the holding dog and the rocker when said rocker moves forward after the holding dog has been arrested; a loose dog; and a tail on said loose dog for restoring said tripper to normal position.

13. In an escapement mechanism, the combination with the rack, of two dogs which alternately engage said rack, and a third dog off-set from said two dogs in the direction of travel of the active or engaging tooth of said rack for arresting said rack after one of said dogs has become disengaged therefrom and before the other has become engaged therewith.

14. In an escapement mechanism, the combination with the rack, of two dogs which alternately engage said rack; means for arresting one of said dogs before the other has completed its motion, whereby the distance between said dogs is increased; and a safety stop for arresting said rack.

15. In a typewriting machine, the combination of a key, a carriage, escapement mechanism for said carriage including a part controlled by said key, and means for automatically effecting an operative adjustment between the key and said key-controlled escapement part upon each operation of said key and for maintaining said adjustment during a portion of the key-stroke.

16. In a typewriting machine, the combination of a series of keys, a carriage, escapement mechanism for said carriage including a part controlled by said keys, and means for automatically effecting an operative adjustment between the operated key and said key-controlled part upon each op-

eration of any key and for maintaining said adjustment during a portion of the key-stroke.

17. In a typewriting machine, the combination of a series of keys, a carriage, escapement mechanism for said carriage including a part controlled by said keys, and means operated by power independent of that applied to the keys for automatically effecting an operative adjustment between the operated key and said key-controlled part upon each operation of any key and for maintaining said adjustment during a portion of the key-stroke.

18. In a typewriting machine, the combination of keys, an escapement rack, two key-controlled dogs cooperating with said rack, means for automatically effecting an operative adjustment between the key and one of said dogs upon each operation of any key and for maintaining said adjustment during a portion of the key-stroke, and an operative connection between said means and the other of said dogs.

19. In a typewriting machine, the combination with a series of keys, a carriage, and an escapement rack, of a pair of key controlled dogs cooperating with said rack, one of said dogs being movable toward and from the other in a direction transversely of said rack, and a wedge which is introduced to make up for lost play so that when a key is released the two dogs return as one.

20. In a typewriting machine, the combination of a series of keys, a carriage, a feed rack, two dogs controlled by said keys and cooperating with said feed rack, one of said dogs being movable with relation to the other, and a wedge which is introduced to make up for lost play so that when the key is released the two dogs return as one.

21. In a typewriting machine, the combination with keys, of escapement mechanism comprising an escapement rack, a key controlled dog cooperating with said rack, and means for automatically effecting an operative adjustment between the operated key and said dog upon each operation of any key and for maintaining said adjustment during a portion of the key-stroke.

22. In a typewriting machine, the combination of keys, a carriage, and escapement mechanism, said escapement mechanism comprising an escapement rack, a key controlled dog cooperating with said rack, means whereby the dog is arrested on the downstroke of the key before the key has completed its downstroke, and means for automatically taking up the lost motion between the key and the dog.

23. In a typewriting machine, the combination of keys, a carriage, an escapement mechanism, said escapement mechanism comprising an escapement rack, a key controlled dog cooperating with said rack,

means whereby said dog is arrested on the downstroke of the key before the key has completed its downstroke, and means including a wedge for automatically taking up the lost motion between the key and the dog.

24. In a typewriting machine, the combination of keys, a carriage, and escapement mechanism, said escapement mechanism comprising an escapement rack, of a dog rocker controlled by said keys, a holding dog that is spring pressed toward said rack but is normally held out of engagement with said rack by said dog rocker, means for arresting said holding dog when it moves into engagement with said rack without arresting said rocker, and a wedge that is automatically interposed between said dog rocker and said holding dog to take up lost motion consequent upon the arrest of the holding dog.

25. In a typewriting machine, the combination of keys, a carriage, and escapement mechanism, said escapement mechanism comprising an escapement rack, of a key controlled dog rocker, a holding dog that is spring pressed toward said rack but is normally held out of engagement with said rack by said dog rocker, means for arresting said holding dog when it moves into engagement with said rack without arresting said rocker, and means for taking up the lost motion between said holding dog and said dog rocker consequent upon the arrest of said holding dog so that said holding dog begins to move out of engagement with said rack as soon as the dog rocker begins its return motion.

26. In a typewriting machine, the combination with a carriage and a series of keys, of step-by-step feed mechanism for said carriage controlled by said keys, connections between said keys and a part of said step-by-step feed mechanism, and means operating automatically at each stroke of a key to effect an operative adjustment between the operated key and said part and to maintain said adjustment during a portion of the key-stroke.

27. In a typewriting machine, the combination with a power-driven carriage and a series of keys, of an escapement device for said carriage controlled by said keys, said escapement device including a feed dog element and a feed rack element, connections between said keys and one of said escapement elements, and means for automatically effecting an operative adjustment at each stroke of a key between the operated key and the connected escapement element and for maintaining said adjustment during a portion of the key-stroke.

28. In a typewriting machine, the combination with printing keys and a carriage, of escapement mechanism, said escapement

mechanism comprising an escapement member connected with the carriage, a cooperative escapement member moved by said keys, and automatically operating means controlled by an actuation of each of said keys for regulating the time of the taking up of said cooperative member with reference to the stroke of said keys.

29. In a typewriting machine, the combination of a carriage, printing keys, and escapement mechanism, said escapement mechanism comprising escapement members, means whereby said escapement members are movable relatively to each other and into and out of engagement with each other at each actuation of a key, means for limiting the extent of engagement between said members irrespective of the extent of key depression, and means for taking up the lost motion due to the further depression of the key after the escapement member has reached the limit of its engagement and for effecting a disengagement between said members at the first portion of the return movement of the key irrespective of the position to which the key has been depressed.

30. In a typewriting machine, the combination of a key, a carriage, escapement mechanism for said carriage including a member controlled by said key, and means for automatically effecting an operative adjustment between the key and said key-controlled escapement member, upon each operation of said key, said means including a part movable into position to maintain said adjustment positively during a portion of the stroke of the key.

31. In a typewriting machine, the combination of a series of keys, a carriage, escapement mechanism for said carriage including

a member controlled by said keys, and means for automatically effecting an operative adjustment between the operated key and said key-controlled member upon each operation of any key, said means including a part movable into position to maintain said adjustment positively during a portion of the stroke of the key.

32. In a typewriting machine, the combination of a series of keys, a carriage, escapement mechanism for said carriage including a member controlled by said keys, and means operated by power independent of that applied to the keys for automatically effecting an operative adjustment between the operated key and said key-controlled member upon each operation of any key, said means including a part movable into position to maintain said adjustment positively during a portion of the stroke of the key.

33. In a typewriting machine, the combination of keys, an escapement rack, two key-controlled dogs cooperating with said rack, and means controlled by one of said dogs for automatically effecting an operative adjustment between the key and the other of said dogs upon each operation of any key, said means including a part movable into position to maintain said adjustment positively during a portion of the stroke of the key.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 14th day of Sept. A. D. 1904.

CHARLES H. SHEPARD.

Witnesses:

E. M. WELLS,

M. F. HANNWEBER.