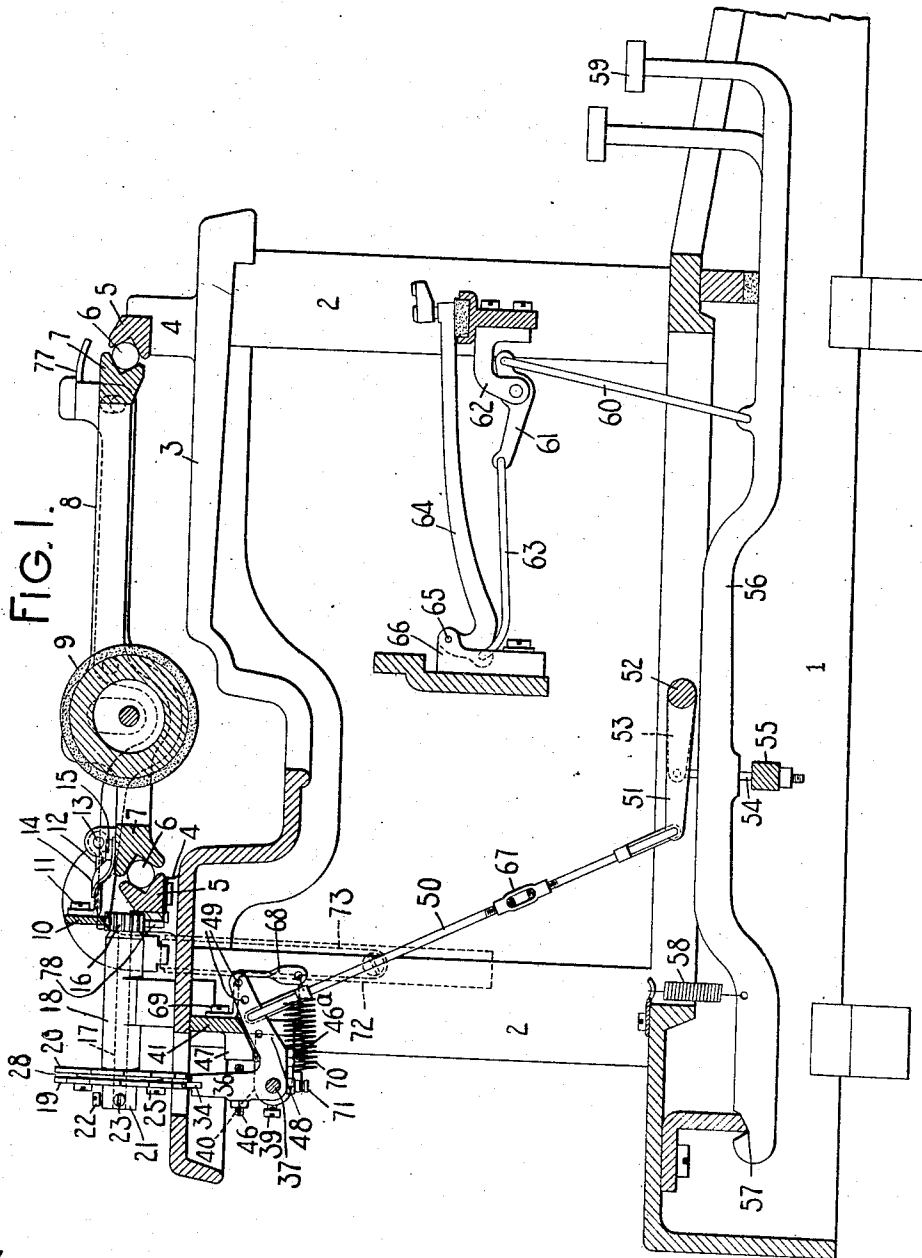


C. B. YAW.
TYPE WRITING MACHINE.
APPLICATION FILED OCT. 13, 1908.

944,303.

Patented Dec. 28, 1909.
4 SHEETS—SHEET 1.



WITNESSES:

E. M. Wells

Charles E. Smith

INVENTOR:

Clio B. Yaw

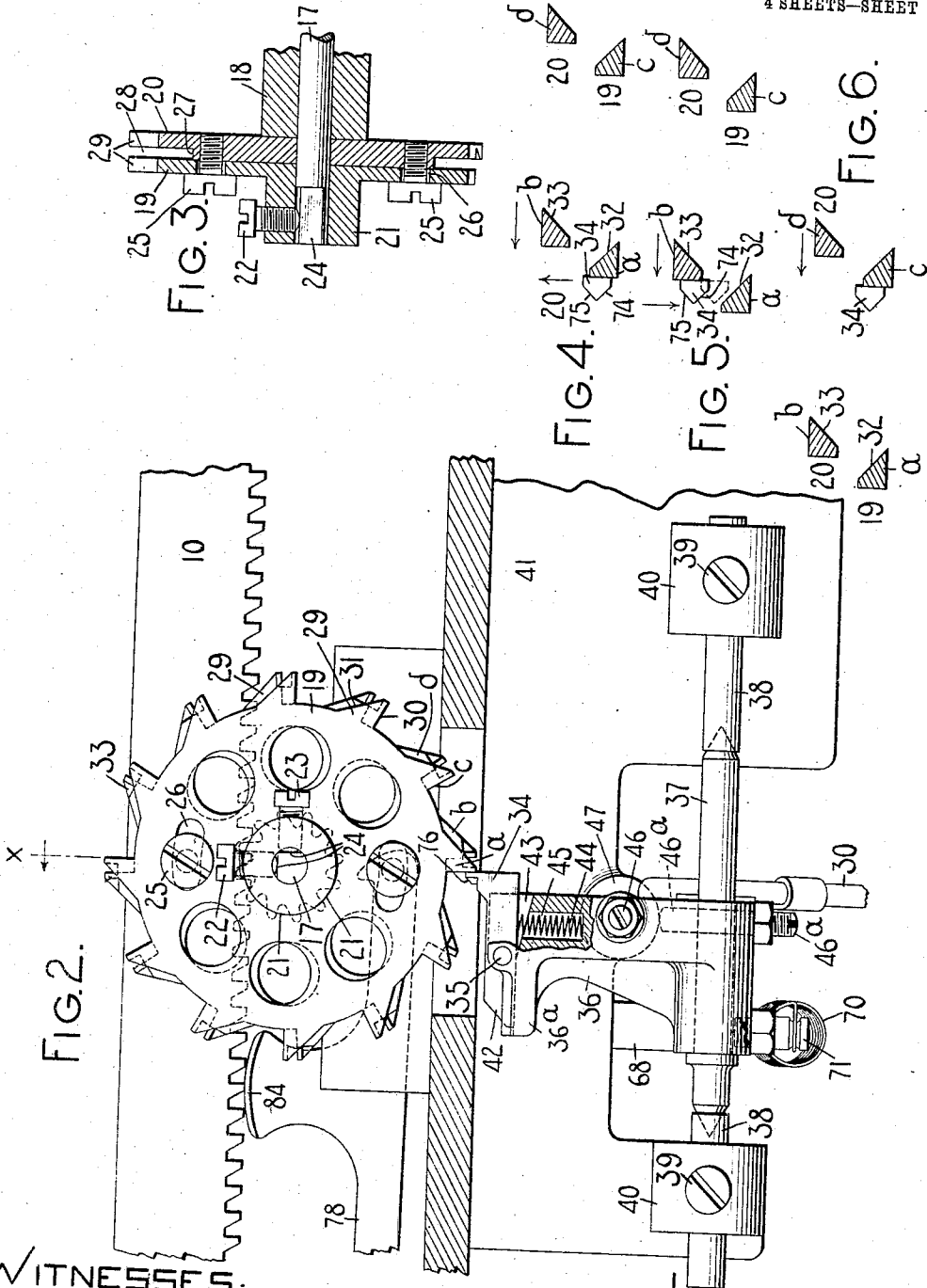
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944,303.

Patented Dec. 28, 1909.

4 SHEETS—SHEET 2.



WITNESSES:

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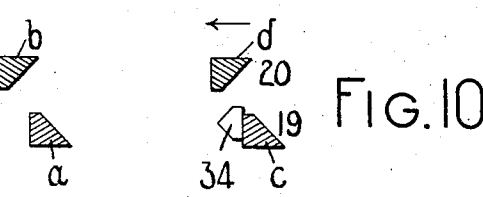
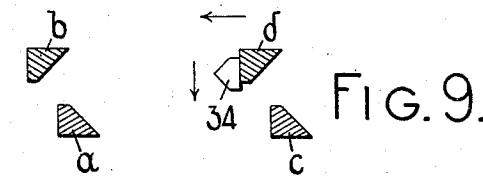
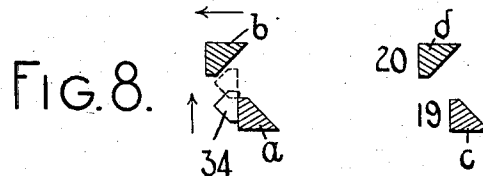
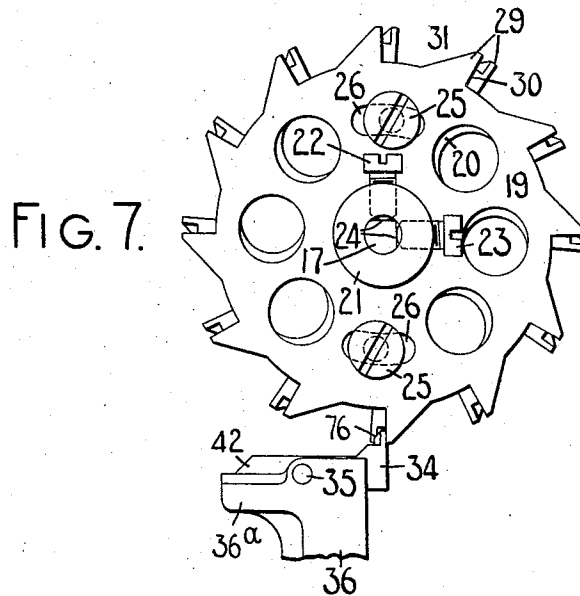
Chas. B. Yaw
By Jacob Felder
HIS ATTORNEY

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4 SHEETS—SHEET 3.



WITNESSES:

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INVENTOR:

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4 SHEETS—SHEET 4.

FIG. 11.

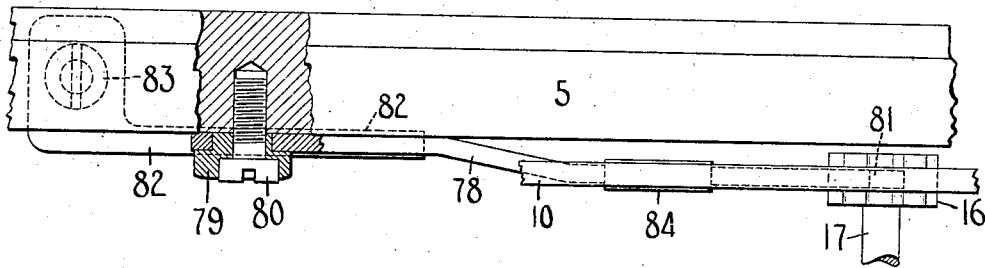
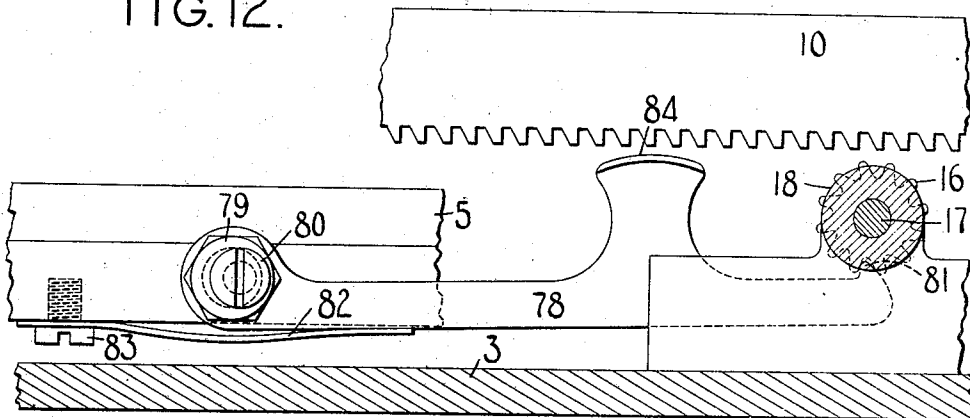


FIG. 12.



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UNITED STATES PATENT OFFICE.

CLIO B. YAW, OF ARLINGTON, NEW JERSEY, ASSIGNOR TO REMINGTON TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

944,303.

Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed October 13, 1908. Serial No. 457,498.

To all whom it may concern:

Be it known that I, CLIO B. YAW, citizen of the United States, and resident of Arlington, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more particularly to carriage escapement mechanism and the main object of said invention is to provide an efficient and comparatively simple escapement mechanism which may be regulated to accommodate itself to different operators and different speeds at which the machine may be operated.

A further object of my invention is to provide escapement mechanism which can, at will, be readily converted from "ordinary" to "reverse" feed or vice versa.

A still further object is to provide a locking device for holding the escapement wheel when the carriage is released.

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 vertical, central, front to rear sectional view of one form of typewriting machines embodying my invention. Fig. 2 is an enlarged, fragmentary, detail, rear elevation partly in section showing portions of the escapement mechanism, the parts being shown in normal position and adjusted for "ordinary" feed. Fig. 3 is an enlarged, detail, fragmentary, sectional view taken on a line *x* of Fig. 2 and looking in the direction of the arrow at said line. Fig. 4 is a diagrammatic view of the escapement teeth, the view showing the normal positions of the teeth when the parts are adjusted as indicated in Fig. 2. Fig. 5 is a like diagrammatic view showing the positions the teeth assume at the depression of a key. Fig. 6 is a like diagrammatic view illustrating the disposition of the teeth shown in Figs. 4 and 5 after a letter space feed movement has taken place on the release of a key. Fig. 7 is an en-

larged, detail, rear elevation of portions of the escapement mechanism, the parts being adjusted for "reverse" feed. Fig. 8 is a diagrammatic view showing the normal disposition of the teeth when the parts are adjusted as indicated in Fig. 7. Fig. 9 is a like diagrammatic view illustrating the positions the teeth assume at the depression of a key. Fig. 10 is a like diagrammatic view illustrating the disposition of the teeth at the return of a key to normal position. Fig. 11 is an enlarged, detail, fragmentary, top plan view partly in section of the locking pawl and some of the associated parts. Fig. 12 is an enlarged, detail, fragmentary, rear elevation of the same with parts in section and showing the feed rack raised to release the carriage.

I have shown my invention embodied in a front-strike typewriting machine similar to that disclosed in the application of Oscar Woodward Serial No. 274,288, filed August 15th, 1905, but it should be understood that the invention may be embodied in various styles of typewriting machines and that the devices of my invention may be changed in order to accommodate them to the particular machine in which they are employed.

The frame of the machine comprises a base 1, corner posts 2 and a top plate 3. Upwardly projecting risers or lugs 4 support fixed guide rails 5 grooved to receive anti-friction balls or rollers 6 which are likewise received in oppositely grooved guide rails 7 united at their ends by bars 8 which with the rails 7 form a rectangular carriage or truck. A cylindrical platen 9 is suitably supported in the carriage for movement therewith from side to side of the machine. A feed rack 10 is secured by screws 11 to forwardly extending arms 12 pivoted at 13 to the carriage. A leaf spring 14 is secured at one end to the rear carriage rail 7 by a screw 15 and the free end of the spring extends over and bears down on one of the arms 12. If desired, one of these springs may be employed to coöperate with each of the arms 12. A feed pinion 16 is secured to the forward end of a shaft 17 which turns in a fixed bearing 18 secured to the top plate of the machine. The rear end of the shaft 17 extends beyond the bearing and receives a plurality of escapement wheels 19 and 20. The escapement wheel 19 has a hub 21

tapped to receive screws 22 and 23. These screws bear upon companion flattened portions 24 on the rear end of the shaft 17 in order to rigidly connect the escapement wheel 19 to the shaft 17. The escapement wheel 20 is tapped to receive the stems of headed screws 25 which stems extend through elongated openings 26 in the escapement wheel 19. The escapement wheel 20 is reduced for some distance from the periphery thereof so as to provide a shouldered portion 27 against which the escapement wheel 19 bears in order that the escapement wheels may be spaced apart at the outer portions thereof as indicated at 28 in Fig. 3. The heads of the screws 25 bear against the rear faces of the escapement wheel 19 and exert a binding pressure to connect the escapement wheel 20 to the escapement wheel 19. The escapement wheels 19 and 20 are of like diameter and are provided with the same number of teeth, the teeth on both wheels being formed in a like manner. Thus, each wheel has teeth 29 with a straight working face 30, a rear beveled face 31 and an inwardly directed re-entrant bevel.

The reentrant bevels on the teeth of the escapement wheel 19 are indicated at 32, whereas those on the escapement wheel 20 are indicated at 33. These bevels, as will be seen from an inspection of Figs. 4 and 5, for instance, are inclined in opposite directions for purposes which will hereinafter more clearly appear. A feed dog 34 is pivoted at 35 to a dog rocker 36 supported on a shaft 37, pivoted in bearing spindles 38 secured by set screws 39 in lugs 40 which project rearwardly from a depending bracket 41 secured to the top plate of the machine. The feed dog 34 has a portion 42 which projects beyond its pivot 35 and coöperates with a projection 36^a on the dog rocker to limit the movement of the dog around its pivot in one direction. A cut-out 43 in the dog rocker enables the dog to receive a limited movement around its pivot 35, the dog being normally maintained in the position shown in Fig. 2 by a coiled expansion spring 44 received in a pocket or opening 45 formed in the dog rocker. The spring bears at its lower end against the bottom of the opening and at its upper end against the bottom of the feed dog to normally maintain it in the operative position shown in Fig. 2. A screw stop 46 is received in a threaded opening in the upright arm of the dog rocker and extends therethrough for coöperation with a rearwardly extending lug 47 on the bracket 41 to limit the movement of the dog rocker in one direction. The movement of the dog rocker in the opposite direction is limited by a screw stop 46^a which likewise coöperates with the lug 47. A forwardly projecting arm 48 on the dog rocker has a series of

perforations 49 at different points in the length thereof for coöperation with a link 50 connected at its lower end to a rearwardly extending crank arm 51 projecting from a rock shaft 52 pivoted at its ends to the frame of the machine. This rock shaft is likewise provided near its ends with rearwardly projecting crank arms 53 to which depending links 54 are connected. These links 54 in turn are connected to a universal bar 55 which extends beneath key levers 56 pivoted at 57 in the base of the machine and each provided with a restoring spring 58 and a finger key 59. The lower end of a connecting link 60 is connected to each key lever; the upper end of the link being connected to a sub-lever 61 pivoted to a hanger 62. A link 63 is connected at its forward end to a sub-lever and at its rear end to a type bar 64. The type bars are pivoted at 65 to hangers 66 and are segmentally arranged to strike upwardly and rearwardly against the front face of the cylindrical platen 9. The connecting link 50 is in the form of a two-part link, the separate parts of which are united by a turn buckle 67 in order that a variation of the length of the link may be effected. The upper end of the link 50 is detachably connected to the arm 48 of the dog rocker and may be secured in any of the openings 49 therein. A bracket 68 is secured by a screw 69 to the bracket plate 41 and is connected to one end of a coiled contractile spring 70, the opposite end of said spring being connected to a pin 71 which projects downwardly from the dog rocker. The spring 70 constitutes a restoring spring for the dog rocker and the parts connected therewith.

The carriage is a power driven carriage, pressure being applied thereto by the usual spring drum 72 connected to the carriage by a hand 73.

The feed or escapement racks 19 and 20 in the present instance are circular racks or escapement wheels, and the relative adjustment of the wheels around their axis by the screw and slot connection 25—26 determines the extent of "drop" that may be provided and enables the escapement to be readily converted from an "ordinary" to a "reverse" escapement or vice versa at will. In other words, any degree of "drop" on the down stroke of the key may be provided up to a full letter space feed as provided for by a reverse escapement. Thus, for instance, when the escapement wheels are relatively adjusted as indicated in Fig. 2 a depression of a finger key will effect a forward movement of the upright arm of the dog rocker so as to move the feed dog transversely of the planes of the escapement wheel and carry the feed dog forwardly out of engagement with the tooth *a* of the escapement wheel 19 to the position shown in Fig. 5, the initial

position of the parts being indicated in Fig. 4. At the key depression the feed dog is moved forward into the path of the tooth *b* of the escapement wheel 20 as shown in Fig. 5, thus affording a slight "drop" which enables the connected escapement wheels to advance slightly under the impulse of the pressure applied to the carriage through the spring drum 72. The printing operation having been effected at the depression of a key, a release of pressure on the key enables the feed dog to move rearwardly as indicated in dotted lines in Fig. 5. This movement of the feed dog disengages the tooth *b* on the escapement wheel 20 and brings the dog into the path of the tooth *c* on the escapement wheel 19. As soon as the tooth *b* is disengaged the connected escapement wheels turn together until arrested by the engagement of the tooth *c* with the feed dog as shown in Fig. 6, thus affording a letter space movement of the carriage on the up-stroke of a key.

It will be seen that the feed dog 34 has a front flat or non-beveled working face, whereas the rear side of the dog is beveled on opposite sides as indicated at 74 and 75. These bevels are merely reentrant bevels which, with the reentrant bevels 32 and 33 on the escapement wheels, enable the feed dog to pass through the space between adjacent teeth on the escapement wheels, as indicated in dotted lines in Fig. 5, so that, although the space 28 between the escapement wheels is narrower than the thickness of the feed dog, nevertheless the feed dog may pass between adjacent teeth of the escapement wheels even when they are closely arranged as in Fig. 2 to afford but a slight "drop". The pressure exerted by the escapement wheels on the feed dog in the operation of the escapement mechanism is resisted by the part 42 of the dog engaging the projection 36^a on the dog rocker and no relative movement takes place between the feed dog and the rocker which carries it. The rear face of the feed dog in the present instance is shown provided with an additional bevel 76 which cooperates with the rear beveled faces 31 on the normally engaged escapement wheel 19 when the escapement wheels receive a reverse rotation, thereby turning the feed dog on its pivot 35 away from the axis of the escapement wheels. From what has been said it will be understood that both of the escapement wheels are rigidly connected to the feed pinion and that therefore the escapement wheels will be given a reverse rotation during the backward movement of the carriage in the event that the feed rack 10 is not released. This reverse rotation of the escapement wheels merely results in vibrating the feed dog 34 around the pivot 35 and against the tension of the spring 44 of the feed dog. If, how-

ever, the feed rack is released by the usual release key 77 by lifting it against the pressure of its spring or springs 14, then the carriage may be moved independently of the escapement mechanism.

Should the operator desire to arrange the escapement for reverse feed the escapement wheels receive a relative adjustment such as shown in Fig. 7 and they are secured together in this relation by the screws 25. When the parts are disposed in the manner shown in Fig. 7 the feed dog 34 normally engages a tooth of the escapement wheel 19 as before, for example, tooth *a* of Fig. 8; but in moving to the dotted line position shown in Fig. 8 the feed dog moves to the rear of the tooth *b* on the escapement wheel 20 instead of in advance thereof as under the adjustment previously described. This enables the escapement wheel to make a full or substantially full letter space movement on the depression of a key to effect a "drop" from the tooth *a* of one wheel 19 to the tooth *d* of the other wheel 20 as shown in Fig. 9. The imprint and letter space movement of the carriage having been effected on the down-stroke of the key a release of pressure on the key enables the feed dog to move from the position shown in Fig. 9 to that indicated in Fig. 10 where a slight "drop" will take place from the tooth *d* to the tooth *c* of the escapement wheels 20 and 19 respectively, so that at the next down stroke of a key the feed dog is in a position to clear the tooth *d* and afford a letter space movement of the carriage.

In order to prevent the escapement wheels from being accidentally displaced from position or from receiving an accidental reverse rotation when the feed rack 10 is disconnected from the feed pinion, I have provided a locking pawl 78 best shown in Figs. 11 and 12. This pawl is pivoted on a headed sleeve or eccentric 79 through which an eccentrically disposed screw 80 passes to engage a tapped opening in the rear fixed carriage rail 5. The pawl 78 is retained upon its pivot by the head of the sleeve or eccentric 79 and the latter is secured in the position to which it is adjusted by the screw 80. The purpose of this eccentric is to provide for an adjustment of the pawl 78 in order that the engaging nose 81 thereof may properly engage the teeth of the feed pinion 16 when the locking pawl is in the operative position. A leaf spring 82 is secured by a screw 83 to the bottom of the rear carriage rail 5 and bears at its free end upwardly against the locking pawl 78. A contact shoe 84 is in the nature of a projection which extends upwardly from the pawl 78 and beneath the feed rack 10. The parts are so disposed that when the feed rack is in the normal position in mesh with the feed pinion 16 as shown in Fig. 2, said feed rack

will bear down upon the contact shoe 84 and, overcoming the pressure of the spring 82, will force and maintain the locking pawl out of engagement with the feed pinion. When, however, the release key 77 is depressed to effect an elevation of the feed rack 10, the spring 82 will force the locking pawl up into engagement with the teeth of the feed pinion 16, thus locking the feed pinion, the rock shaft 17 and the escapement wheels in the position they were left in upon the disengagement of the feed rack. As soon as the feed rack is released it is effective to automatically release the locking pawl and the carriage is in the position to resume control of the feed mechanism without the escapement wheels having been displaced from the positions they were left in prior to the disengagement of the rack.

The extent of each concentrically arranged slot 26 is preferably such that a relative adjustment between the escapement wheels may be effected for a distance corresponding substantially to the distance between two teeth of an escapement wheel. This affords a relative adjustment of wheels which should meet all requirements, giving as it does practically any extent of "drop" up to a full drop on the down stroke of a key or a "reverse" feed. The wheels may be adjusted to give a half letter space "let-off" on the down stroke and half a letter space let-off on the up stroke of the key, or to give essentially a full letter space let-off on the down stroke of the key as in a "reverse" feed or to give practically a full letter space let-off on the up stroke of the key as in "ordinary" feed or any extent of drop between these may be provided without changing the parts and by a mere relative adjustment between the escapement wheels. It will be seen that the two escapement wheels travel together as one part at all times irrespective of the character of feed being effected; that the relative adjustment of the wheels may be quickly effected; that the escapement is simple in construction, strong and durable, efficient in use and is not liable to become deranged or broken.

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

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

1. In a typewriting machine, the combination of a power driven carriage, a plurality of relatively adjustable feed racks which move together as one rack at all times during the operation of the machine and under all possible adjustments, means for securing said feed racks together in their adjusted relation, and a feed dog cooperative with said feed racks.

2. In a typewriting machine, the combination of a power driven carriage, a plurality

of escapement wheels which move together as one wheel at all times during the operation of the machine and under all possible adjustments, said wheels being relatively adjustable around their axes to determine the amount of "drop" to be afforded, means for securing said wheels together in their adjusted relation, and a feed dog cooperative with said escapement wheels.

3. In a typewriting machine, the combination of a power driven carriage, a plurality of escapement wheels which are at all times secured together to move as one part during the operation of the machine and under all possible adjustments, a feed dog cooperative therewith, and means for effecting a relative adjustment between certain of the above mentioned parts and for maintaining them in their adjusted relation to afford an "ordinary" or "reverse" feed at will.

4. In a typewriting machine, the combination of a power driven carriage, escapement wheels arranged side by side and spaced apart, said escapement wheels being at all times when in operation secured together to turn as one part and having reentrant bevels on non-working faces of the teeth thereof, means for affording a relative adjustment between said wheels to determine the amount of "drop," and a feed dog having a thickness which is greater than the space between said wheels, said feed dog having a reentrant bevel on a non-working face thereof.

5. In a typewriting machine, the combination of a power driven carriage, escapement wheels at all times when in operation secured together to move as one part, means for affording relative rotative adjustments between said wheels up to an amount substantially equal to the distance between two teeth of one of said wheels to regulate the extent of "drop," and a feed dog cooperative with said escapement wheels.

6. In a typewriting machine, the combination of a power driven carriage, escapement wheels at all times when in operation secured together to move as one part, means for affording a relative rotative adjustment between said wheels to regulate the extent of "drop," and a feed dog cooperative with said escapement wheels, said feed dog being mounted for movement transversely of the planes of said escapement wheels and toward and away from the axis of said wheels.

7. In a typewriting machine, the combination of a power driven carriage, escapement wheels at all times when in operation secured together to move as one part, means for affording a relative rotative adjustment between said wheels to regulate the extent of "drop," a feed dog cooperative with said escapement wheels, and a dog rocker to which said feed dog is pivoted to vibrate toward and away from the axis of said escapement wheels, the dog rocker being piv-

oted to afford a movement of the feed dog transversely of the planes of the escapement wheels.

8. In a typewriting machine, the combination of a power driven carriage, escapement wheels at all times when in operation secured together to move as one part, means for affording a relative rotative adjustment between said wheels to regulate the extent of "drop", a feed dog cooperative with said escapement wheels, said feed dog being mounted for movement transversely of the planes of said escapement wheels and toward and away from the axis of said wheels, bevels between the rear faces of the teeth of the escapement wheels and the rear face of the feed dog, and a spring for normally maintaining a fixed relation between said feed dog and the dog rocker, whereby a backward movement of the escapement wheels will cause the feed dog to be vibrated out of the path of the teeth of the engaged escapement wheel.

9. In a typewriting machine, the combination of a power driven carriage, escapement wheels arranged side by side and spaced apart, said escapement wheels being at all times when in operation secured together to turn as one part and having reentrant bevels on non-working faces of the teeth thereof, means for affording a relative adjustment between said wheels to determine the amount of "drop", and a feed dog having a thickness which is greater than the space between said wheels, said feed dog having a reentrant bevel on a non-working face thereof, said feed dog being mounted for movement transversely of the planes of said escapement wheels and toward and away from the axis of said wheels.

10. In a typewriting machine, the combination of a power driven carriage, escapement wheels arranged side by side and spaced apart, said escapement wheels being at all times when in operation secured together to turn as one part and having reentrant bevels on non-working faces of the teeth thereof, means for affording a relative adjustment between said wheels to determine the amount of "drop", a feed dog having a thickness which is greater than the space between said wheels, said feed dog being mounted for movement transversely of the planes of said escapement wheels and toward and away from the axis of said wheels, bevels between the rear faces of the teeth of the escapement wheels and the rear face of the feed dog, and a spring for normally maintaining a fixed relation between said feed dog and the dog rocker, whereby a backward movement of the escapement wheels will cause the feed dog to be vibrated out of the path of the teeth of the engaged escapement wheel.

11. In a typewriting machine, the com-

bination of a power driven carriage, a rack carried thereby, a feed pinion with which said rack is adapted to mesh, a shaft to which said feed pinion is secured, an escapement wheel secured to said shaft against independent movement of one relatively to the other, and a second escapement wheel adjustably secured to the first mentioned escapement wheel and at all times rotative therewith, and a feed dog cooperative with said escapement wheels.

12. In a typewriting machine, the combination of a power driven carriage, a rack carried thereby, a feed pinion with which said rack is adapted to mesh, a shaft to which said feed pinion is secured, an escapement wheel secured to said shaft against independent movement of one relatively to the other, and a second escapement wheel secured to the first mentioned escapement wheel to move therewith as one part, means for affording a rotative adjustment of the second escapement wheel relatively to the first mentioned wheel to regulate the extent of "drop", a feed dog cooperative with said escapement wheels, said dog being mounted for movement transversely of the planes of the escapement wheels and toward and away from the axis of said wheels.

13. In a typewriting machine, the combination of a power driven carriage, a rack carried thereby, a feed pinion with which said rack is adapted to mesh, a shaft to which said feed pinion is secured, an escapement wheel secured to said shaft against independent movement of one relatively to the other, a second escapement wheel secured to the first mentioned escapement wheel to move therewith as one part, means for affording a rotative adjustment of the second escapement wheel relatively to the first mentioned wheel to regulate the extent of "drop", a feed dog cooperative with said escapement wheels, and a dog rocker to which said feed dog is pivoted to vibrate toward and away from the axis of said escapement wheels, the dog rocker being pivoted to afford a movement of the feed dog transversely of the planes of the escapement wheels.

14. In a typewriting machine, the combination of a power driven carriage, a rack carried thereby, a feed pinion with which said rack is adapted to mesh, a shaft to which said feed pinion is secured, an escapement wheel secured to said shaft against independent movement of one relatively to the other, a second escapement wheel secured to the first mentioned escapement wheel to move therewith as one part, means for affording a rotative adjustment of the second escapement wheel relatively to the first mentioned wheel to regulate the extent of "drop", a feed dog cooperative with said escapement wheels, said dog being mounted

for movement transversely of the planes of the escapement wheels and toward and away from the axis of said wheels, bevels between the rear faces of the teeth of the escapement wheels and the rear face of the feed dog, and a spring for normally maintaining a fixed relation between said feed dog and the dog rocker, whereby a backward movement of the escapement wheels will cause the feed dog to be vibrated out of the path of the teeth of the engaged escapement wheel.

15. In a typewriting machine, the combination of a power driven carriage, escapement mechanism including an escapement wheel and a feed rack movable into and out of operative connection with said escapement wheel, and locking means for said escapement wheel, said locking means being controlled solely by the movement of said feed rack into and out of operative connection with the escapement wheel.

16. In a typewriting machine, the combination of a power driven carriage, escapement mechanism including an escapement wheel and a feed rack movable into and out of operative connection with said escapement wheel, and locking means for said escapement wheel, said locking means comprising a locking device spring-pressed into locking position and held against its spring pressure by said feed rack.

17. In a typewriting machine, the combination of a power driven carriage, escapement mechanism including a feed rack, a pinion, a shaft to which said pinion is secured, an escapement wheel secured to said shaft, and a locking pawl spring-pressed into engagement with said pinion when said rack is released therefrom, the rack holding the pawl out of engagement with the pinion when the rack engages the feed pinion.

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

ment mechanism including an escapement wheel and a feed rack movable into and out of operative connection with said escapement wheel; a carriage release key carried by the carriage; and locking means for said escapement wheel, said locking means being controlled by said rack when moved by said carriage release key.

19. In a typewriting machine, the combination of a power driven carriage; escapement mechanism including an escapement wheel and a feed rack movable into and out of operative connection with said escapement wheel; locking means for locking said escapement wheel, said locking means comprising a locking device spring-pressed into locking position and held against its spring pressure by said feed rack; and a carriage release key carried by the carriage and co-operative with said feed rack, and the actuation of which release key renders the spring pressed locking device operative.

20. In a typewriting machine, the combination of a power driven carriage; escapement mechanism including a feed rack and a feed pinion; a locking pawl spring-pressed into locking engagement with said feed pinion and normally held out of engagement with said feed pinion; and a carriage release key carried by the carriage and the actuation of which release key is effective to render said locking pawl operative.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 12th day of October A. D. 1908.

CLIO B. YAW.

Witnesses:

CHARLES E. SMITH,

E. M. WELLS.