

C. B. YAW.
TYPE WRITING MACHINE.
APPLICATION FILED FEB. 11, 1910.

995,515.

Patented June 20, 1911.

2 SHEETS—SHEET 1.

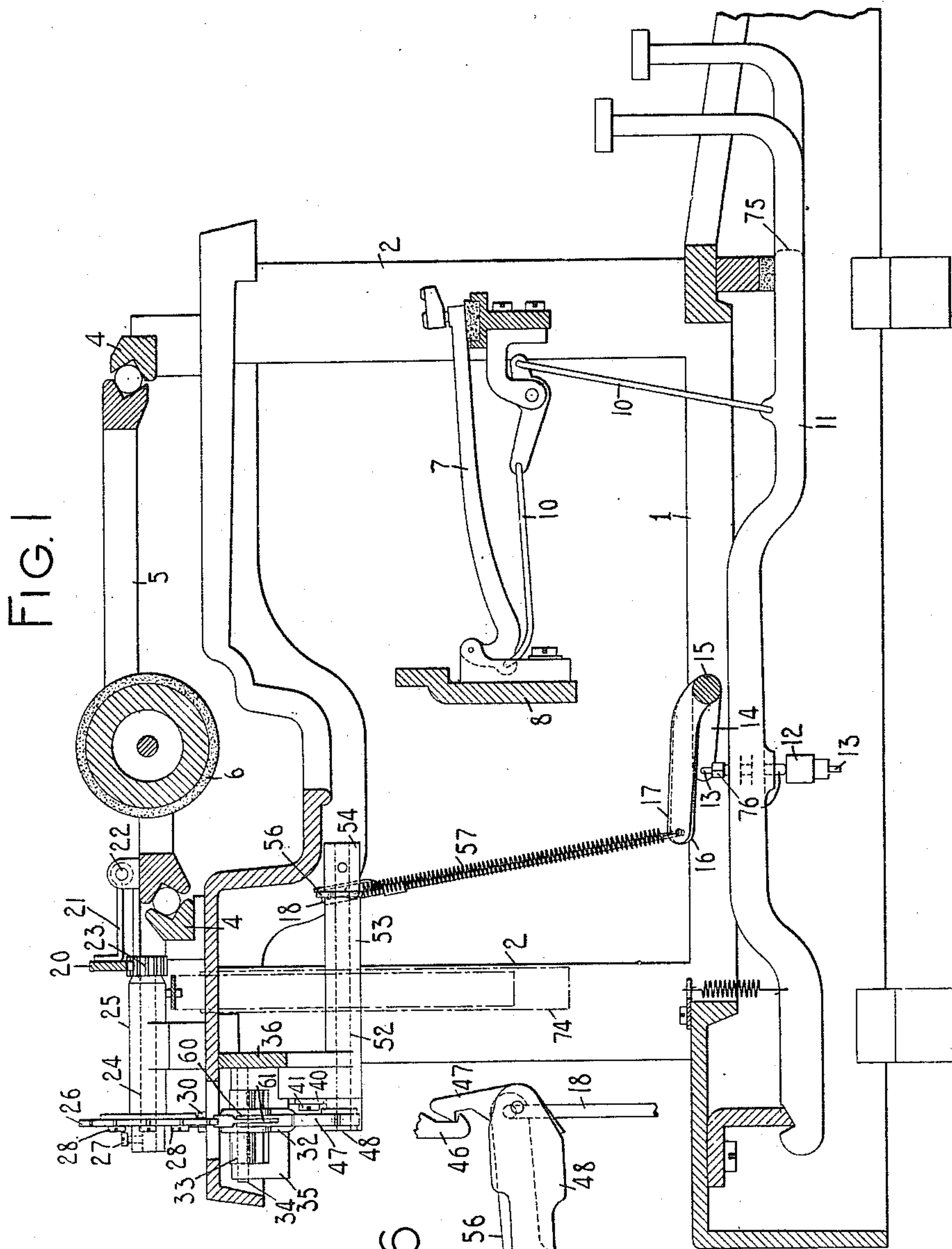
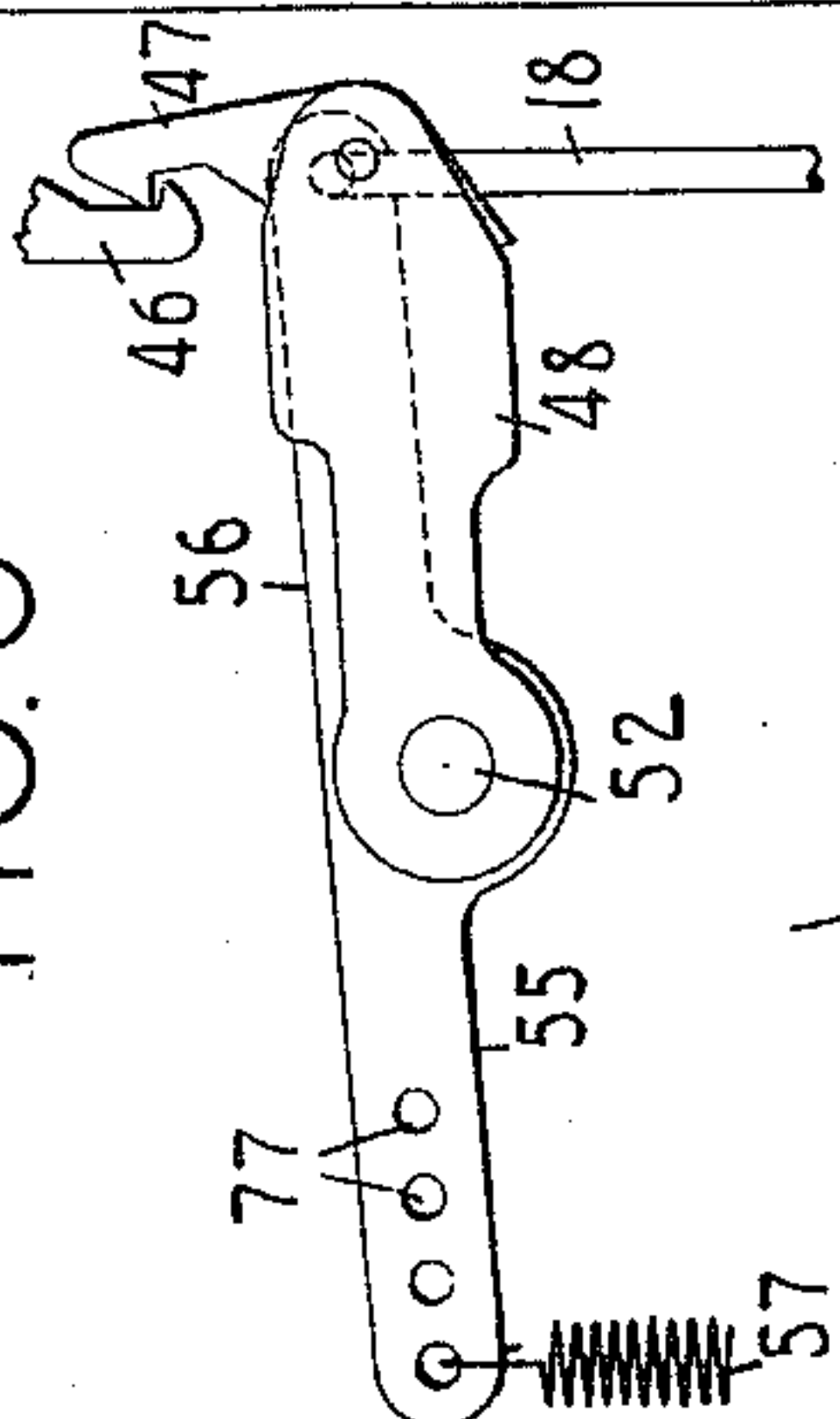


FIG. 1

FIG. 6



WITNESSES:

E. M. Wells.

R. H. Strother

INVENTOR:

C. B. Yaw

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2 SHEETS—SHEET 2.

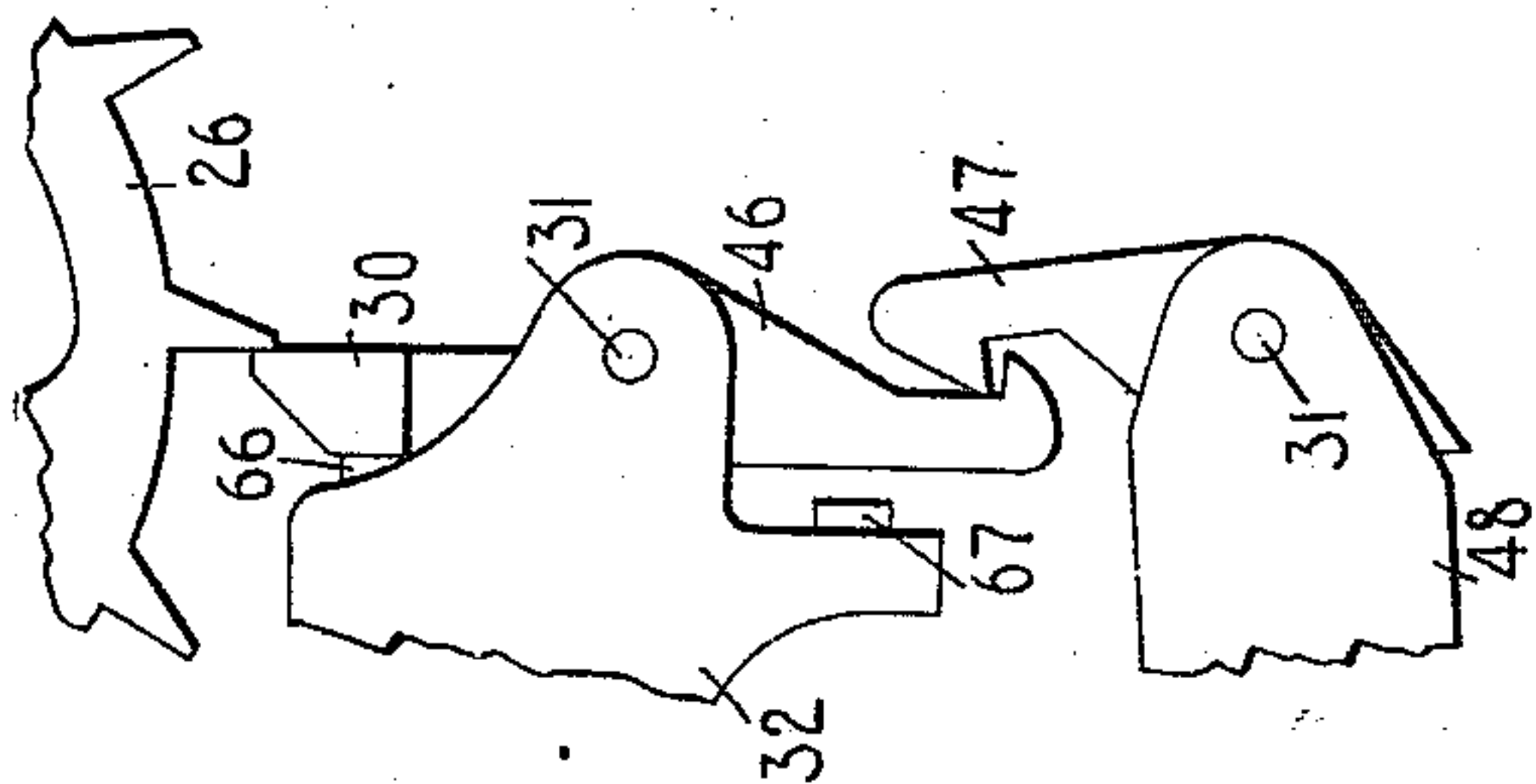


FIG. 3.

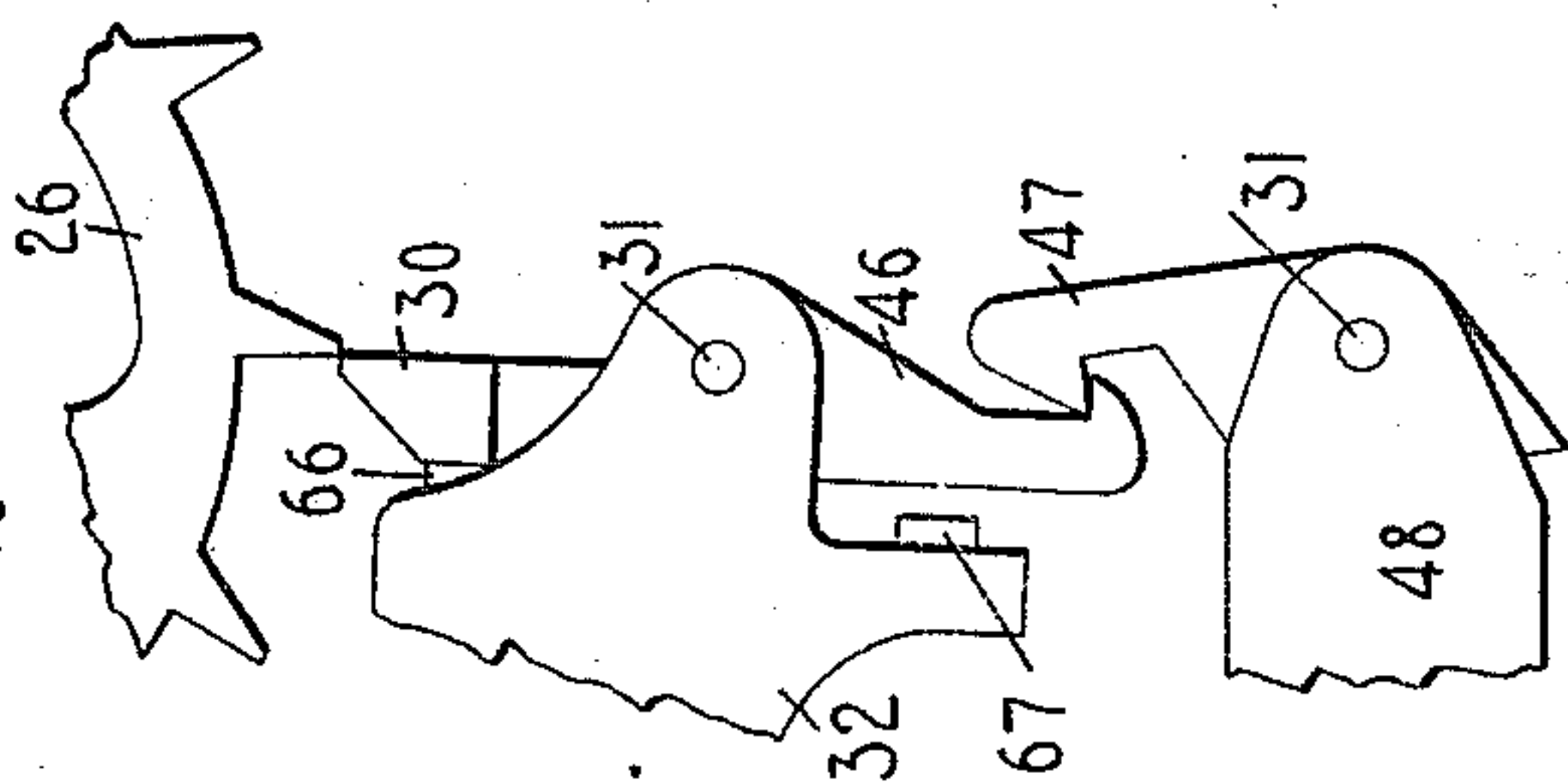


FIG. 4.

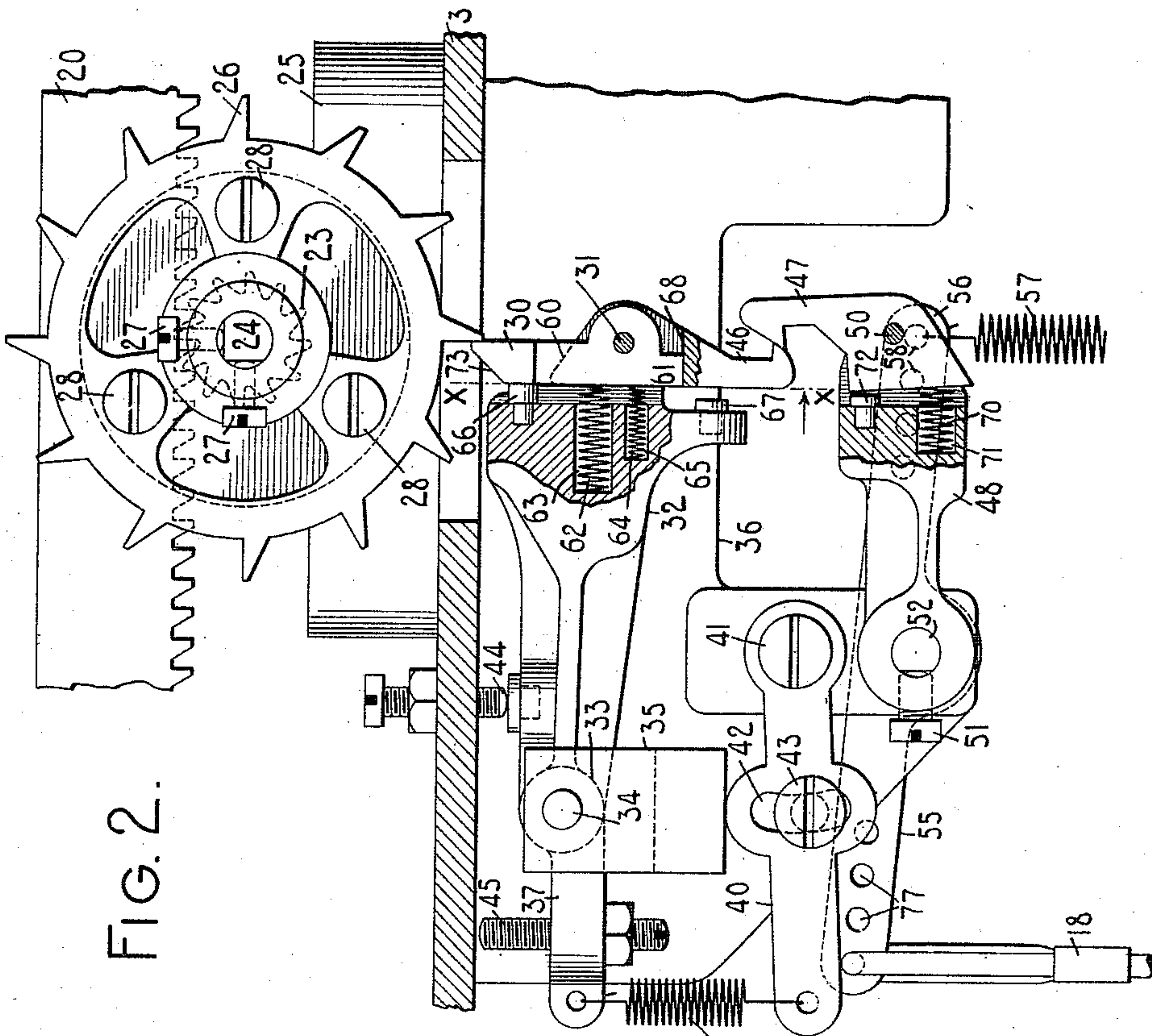


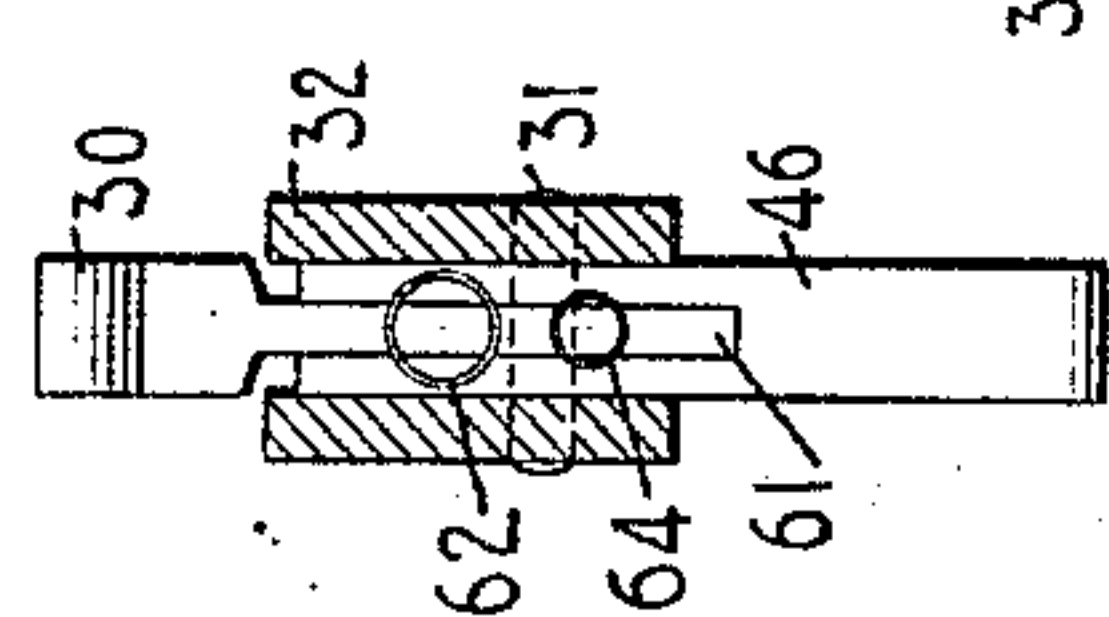
FIG. 2.

WITNESSES:

E. M. Wells.

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FIG. 5.



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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.

995,515.

Specification of Letters Patent. Patented June 20, 1911.

Application filed February 11, 1910. Serial No. 543,253.

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 the carriage escapements of such machines.

The principal object of my invention is to increase the speed of the escapement by causing the carriage to make its entire step from one letter-space position to the next in a single continuous movement.

Another object is to provide an improved means for changing the escapement from "ordinary" to "reverse" or vice versa.

Another object is to provide an escapement the action of which is always the same irrespective of the manner in which the key is operated; that is to say, an escapement in which the motion of the key does not of itself move the carriage and in which the escapement operates exactly the same whether the key be struck a sharp staccato blow, or whether the stroke is a more hesitating one in which the key is either operated slowly, or is momentarily held down, or is allowed to return slowly to normal position.

Another object is to provide an escapement in which, when the key reaches the point in its stroke at which the let-off occurs, the remainder of the operation of the escapement is entirely automatic and independent of the operation of the key.

Other objects will appear hereinafter.

In all prior escapements of which I am aware, and certainly in all escapements in common use, the stepping of the carriage from one letter-space position to the next is always made in two distinct movements. For example, there is one style of escapement which is said to have a fifty per-cent. drop. By this is meant that the carriage is released on the down stroke of the key and it makes one-half of its letter-space step due to this release. The carriage is then arrested and is again released on the up stroke of the key when it completes its letter-space movement. Even in those escapements in which the "drop" is reduced to the minimum there is still always a certain amount of drop. If

for example the escapement is of the "ordinary" sort and the drop is only 1/100 of an inch, still the carriage moves this 1/100 of an inch and is arrested and it makes the remaining 9/100 of an inch as a separate and distinct movement. The same is true of a reverse escapement in which the carriage steps first, say 9/100 of an inch, when it is arrested and afterward it steps the remaining 1/100. By far the greater part of the time consumed in the stepping movement of the carriage is the time spent in getting it started. When the carriage has to be started from a position of rest the driving spring has the inertia of the entire carriage to overcome and this setting of the carriage in motion is the slow part of the operation of letter-space stepping. In the prior escapements referred to, it has been necessary to set the carriage in motion from a state of rest twice for each letter-space movement thereof. The entire time spent by the carriage, therefore, in passing from one letter-space position to the next, has been greater by reason of this fact than it would be if the carriage could move from the first letter-space position to the second by one continuous, uninterrupted movement. To provide for this mode of operation constitutes one of the principal purposes of the present invention. The escapement set forth herein can be readily changed to operate either as an "ordinary" or as a "reverse" escapement and it has, under both conditions, the mode of operation above set forth.

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

In the accompanying drawings:—Figure 1 is a front to rear vertical sectional view of so much of a typewriting machine as is necessary to illustrate the application of my invention thereto, and showing my invention embodied therein. Fig. 2 is a rear elevation, partly in section and with parts broken away, and showing the escapement mechanism in normal position. Figs. 3 and 4 are fragmentary rear views, the first showing the parts when a key is fully depressed, and the second showing the parts as they are at a certain point on the upstroke of the key. Fig. 5 is a sectional view substantially on

the line $x-x$ of Fig. 2 and looking in the direction of the arrow at said line. Fig. 6 is a fragmentary rear view, showing the parts arranged as a reverse escapement. Fig. 1 is on a reduced scale and Figs. 2-5 are on an enlarged scale.

My invention is applicable or adaptable to typewriting machines generally and it is here shown applied to a Remington visible typewriter. The stationary framework of this machine comprises a base 1, corner posts 2, top plate 3 and stationary carriage rails 4, which last support a carriage 5 by means of ball or roller bearings, and said carriage has a platen 6 mounted therein. Front strike type bars 7 mounted on a segment 8 are adapted to strike against the front face of said platen. Said type bars are operated through linkages 10 connected with printing key levers 11. A universal bar 12 is hung by rods 13 from arms 14 projecting horizontally from a rock shaft 15 which is pivoted at its ends in the base of the machine. Said rock shaft has two other rearwardly projecting arms 16 and 17, to one of which is connected a link 18 which operates the escapement. This link may be formed with the usual turn-buckle or other device for adjusting its length.

A feed rack 20 is mounted on arms 21 which are pivoted at 22 to the carriage 5, and said feed rack meshes with a feed pinion 23 which is rigid with the forward end of a shaft 24 that is journaled in a bracket 25 mounted on the top plate 3. At its rear end said shaft has an escapement wheel 26 mounted rigidly thereon by means of set screws 27 passing through the hub of the wheel. This escapement wheel is here shown as made up of two parts fastened together by screws 28, but this construction is immaterial to the present invention.

The escapement wheel 26 is controlled wholly by a single feed dog 30 which is pivoted on a pin 31 perpendicular to the plane of the escapement wheel, said dog being mounted in a suitable slot formed in the end of a lever-arm or dog-carrier 32 which has an elongated hub 33 pivoted on a pin 34 which extends horizontally in a front and back direction and is mounted in a branch 35 of a bracket 36 secured to the underside of the top plate 3. The dog-carrier 32 is substantially horizontal so that it can be swung up about its pivot 34 to bring the dog 30 into engagement with the escapement wheel 26 and down about said pivot to move said dog out of engagement with said wheel. Said dog-carrier has an arm 37 projecting to the left therefrom, as seen from the rear in Fig. 2. Said arm has connected therewith one end of a returning spring 38, the other end of which is connected to an adjustable arm 40. Said arm 40 is pivoted to the bracket 36 at 41 and it is

formed with a slot 42 through which passes a binding screw 43 threaded into said bracket. The tension of the spring 38 can be regulated by adjusting the arm 40 up or down and securing it in adjusted position by tightening the screw 43. The motion of the dog carrier under the impulse of the spring 38 is limited by an adjustable stop screw 44 and the motion of said dog carrier in the other direction is limited by another stop screw 45. The spring 38 holds the dog carrier in normal position with the dog 30 in engagement with the wheel 26, as shown in Fig. 2.

A hook 46 is pivoted on the same pin 31 that the dog 30 is mounted on. As shown in the present instance, the hook 46 is slotted at its upper end and the dog 30 is reduced at its lower end, said dog being mounted in the slot in the hook and the hook being guided by the side walls of the slot in the carrier 32. The hook 46 is adapted to be operated by another hook 47 which is mounted in a slot in the end of an arm 48, where it is pivoted on a pin 50. The arm 48 is rigidly secured by means of a set screw 51 on the rear end of a rock shaft 52 which is pivoted in the bracket 36. Said bracket is formed with a long tubular extension 53 through which the shaft 52 passes and the forward end of said shaft has rigidly mounted thereon the hub 54 of a lever having two arms 55 and 56 to one of which is pivoted the connecting rod or link 18 which is operated by the universal bar. A restoring spring 57 is connected at its upper end to the other of said arms and at its lower end to one of the arms projecting from the rock shaft 15, so that this spring operates at both ends to restore the universal bar and the connected parts to normal position.

In Figs. 1 and 2 the link 18 connects the arm 16 with the arm 55 and the spring 57 connects the arm 17 with the arm 56. This arrangement gives an "ordinary" escapement. The mechanism becomes a "reverse" escapement by interchanging the link 18 and spring 57, as shown in Fig. 6. This will be explained in detail later on. The first part of the following description refers to the arrangement of Figs. 1 and 2. The effect of the spring 57 can be varied by hooking its upper end into any one of several holes 58 formed in the arm 56 at different distances from the shaft 52.

The hook 46 has an arm 60 that extends above the pivot 31 and the dog 30 has an arm 61 that extends below said pivot and on their left-hand faces, as viewed in Fig. 2, the dog and the hook are flush with each other. A compression spring 62, seated in a hole 63 in the dog-carrier 32, presses against both the dog and the hook and tends to rock them both about the pin 31. A lighter compression spring 64, seated in a

hole 65 in said dog carrier, presses against the parts below the pivot but this spring is both weaker than the spring 62 and it is also here shown nearer the pivot than said spring 62 so that when the parts are subjected to no other pressure than that of these two springs, the spring 62 prevails. This spring is normally overcome, however, by the carriage spring acting through the escapement wheel and pressing the dog 30 back against a stop 66, which is here shown as consisting of a plug inserted in the dog carrier. A similar stop 67 limits the motion of the hook 46 under the impulse of the spring 62. The lower arm 61 of the dog 30 bears against the bottom surface 68 of the slot in the hook 46 and limits the relative motion of the dog and hook in one direction but leaves these parts free for relative motion in the opposite direction. The hook 47 has a spring 70 bearing against it below the pivot 50, said spring being seated in a hole 71 in the arm 48. The motion of the hook under the impulse of this spring is limited by a stop 72.

The operation of my invention when set as an "ordinary" escapement is as follows: The parts normally stand in the positions shown in Fig. 2 with the dog carrier 32 up against the stop 44 and the dog in engagement with the escapement wheel, the hook 47 standing too low to engage the hook 46. When a key is depressed the universal bar and parts connected therewith are operated, which moves the hook 47 up to the position shown in Fig. 3, said hook snapping into engagement with the hook 46. On the upstroke of the key the universal bar moves downward and the arm 48 is also moved downward by the restoring spring 57 and the hook 47 draws the hook 46 and dog-carrier 32 downward with it, thus drawing the dog 30 out of engagement with the escapement wheel. The parts are shown in Fig. 4 at the instant when the dog 30 is just passing out of engagement with a tooth of the escapement wheel. As soon as the dog is entirely free from the wheel it is moved to the right in Fig. 2 by the spring 62. As this spring also bears against the upper arm 60 of the hook 46, said hook is also thrown back against its stop 67 which disengages the two hooks, leaving the dog carrier 32 free to be restored instantly to normal position by its spring 38. The motion of these parts is quicker than that of the escapement wheel so that the dog is back in position to arrest the next succeeding tooth of said wheel by the time said tooth reaches the dog. It will be observed that the disconnection of the two hooks does not depend upon the rapidity with which the key itself is restored to normal position but the hook 46 is snapped out of engagement with the hook 47 by the spring 62 as soon as the dog

30 is free of the escapement wheel, irrespective of any further return motion of the part of the key and universal bar. It is thus impossible for the key to hold the dog down out of engagement with the escapement wheel. It will of course be understood that the restoring spring 57 is much stronger than the restoring spring 38. As soon as the parts reach the positions shown in Fig. 4 the rest of the action is entirely automatic, the two hooks being disconnected and the dog carrier 32 returning to normal position and the dog 30 arresting the oncoming tooth of the escapement wheel.

When the carriage is drawn to the right without lifting the feed rack 20 out of engagement with the feed pinion 23, the escapement wheel turns backward and the dog 30 and the hook 46 are turned by the spring 62 until said hook strikes the stop 67. The dog 30 is free to turn still farther but is prevented from doing so automatically by the spring 64. As the carriage moves to the right, however, each tooth of the escapement wheel striking on the beveled side 73 of the dog 30, turns said dog about its pivot 31 against the tension of the spring 64 until the tooth passes over the dog. The several teeth thus snap over the dog until the carriage is stopped and restored to the control of its spring, whereupon the parts resume their positions shown in Fig. 2 and the carriage is held by the escapement. When the dog 30 is held in the position shown in Fig. 2 by the tooth of the escapement wheel it holds the hook 46 away from its stop 67 by reason of the engagement of the lower arm 61 of said dog with the bottom 68 of the slot in the hook so that said hook is held firmly in position to be engaged by the hook 47 when the key is depressed.

The carriage is drawn across the machine by the usual spring drum 74. The universal bar can be held down by any suitable means so as to provide lost motion between said universal bar and the key levers 11. As here shown a special bar 75 is provided which lies beside the key levers 11 and said bar has a set screw 76 therein, the lower end of which contacts with the universal bar 12, and holds said universal bar down in the position shown against the tension of the spring 57. The normal position of the universal bar can be regulated by adjusting this screw. In case the universal bar is given a very low normal position and has therefore only a very short stroke the upper end of the link 18 would be set into one of the holes 77, several of which are shown in Fig. 2 in the lever arm 55, said holes being at different distances from the shaft 52. The leverage of the universal bar on said shaft can be varied by connecting the link 18 with one or another of these holes so that a short stroke of the universal bar or a link stroke may be

made to impart the desired extent of motion to the shaft 52 and hook 47.

When it is desired to use the mechanism as a reverse escapement the spring 57 is connected at its lower end with the arm 16 and at its upper end it is hooked into one of the holes 77 in the lever arm 55, as shown in Fig. 6. The link 18 is connected with the arm 17 and with one of the holes 58 in the arm 56. The tension of the spring then normally holds the hook 47 up in the position shown in Figs. 3 and 6, and the escapement is operated on the down stroke of the key instead of on the up stroke of the key. With this exception the operation is identical with that above described. It will be seen that the normal position of the dog 30 and the dog carrier 32 is the same in both settings of the mechanism, and that the operation of this dog is identical in both instances. The change from "reverse" to "ordinary" is not made in the escapement itself but is made in the connections between the escapement and the universal bar.

In carriage escapements, as heretofore commonly constructed, there are either two dogs or else two escapement wheels or other escapement racks. In case there are two dogs coöperating with one rack, the rack is normally held by one of said dogs, which dog is drawn out of engagement with the rack on the down stroke of the key, thus drawing the other dog into engagement with the rack. The second dog has to be drawn out of engagement with the rack on the up-stroke of the key, bringing the first dog again into engagement. There is thus the friction of drawing a dog out of engagement on the down stroke of the key and also the friction of drawing another dog out of engagement on the up stroke of the key, which makes twice as much frictional resistance to be overcome by the key as in the present construction. In those escapements which have a single dog and two racks said dog is drawn out of engagement with one rack on the down stroke of the key and out of engagement with the other rack on the up stroke of the key. This form of escapement also offers twice the amount of frictional resistance that is offered by the present escapement. In the present escapement the single dog is drawn out of engagement with a rack-tooth only once at each operation. The dog is then immediately disconnected from the key and is restored to normal position free of the wheel. This escapement therefore offers a minimum of frictional resistance to be overcome by the key.

The escapement wheel is rigid on the shaft of the feed pinion which gives a more accurate positioning of the carriage than in those constructions where the escapement wheel is loose on the shaft and is connected with the shaft by a pawl and ratchet.

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

1. In a typewriting machine, the combination of a carriage, an escapement rack, a dog carrier, a dog pivoted in said carrier and engaging said rack, a hook pivoted co-axially with said dog, a spring engaging both said dog and said hook on one side of their common pivot, said spring tending to oppose the carriage spring, and a second spring engaging said dog on the opposite side of said pivot, whereby said dog and hook normally turn together but said dog can turn independently of said hook during the return movement of the carriage.

2. In a typewriting machine, the combination of printing keys, a carriage, a single escapement rack, a single dog controlling said rack, and means for moving said dog out of and into engagement with said rack once only at each operation of a printing key, said means including changeable devices for causing said dog to be operated either on the down stroke of the key or on the up stroke of the key, depending on the setting of said changeable devices.

3. In a typewriting machine, the combination of printing keys, a universal bar, carriage escapement mechanism, a link operated by said universal bar, a two-armed lever operated by said link, and a snapping-off connection between said two-armed lever and said escapement mechanism, said link being connectible with either arm of said lever whereby said escapement can be changed from reverse to ordinary and vice versa.

4. In a typewriting machine, the combination of a carriage, printing keys, a universal bar, an escapement controlling said carriage and comprising a rack and a dog normally in engagement with said rack, and changeable connections between said universal bar and said escapement whereby said dog can be withdrawn from engagement with said rack either on the downstroke of a key or on the up stroke of a key depending on the setting of said changeable connections.

5. In a typewriting machine, the combination of a carriage, printing keys, a single escapement rack, a single dog controlling said rack, and means operated by said keys for moving said dog out of and into engagement with said rack once only at each operation of a key, said moving means comprising changeable devices for moving said dog out of engagement with said rack either on the up stroke or on the down stroke of said key depending upon the setting of said changeable devices, and said moving means comprising also a snapping-off connection between said changeable devices and said dog.

6. In a typewriting machine, the combination of printing keys, a universal bar operated by said keys, a carriage, escapement

mechanism for controlling said carriage, and a changeable connection between said universal bar and said escapement mechanism, said changeable connection including
 5 a link, a two-armed lever and a spring, said link connected to one arm of said lever and said spring to the other, and the construction being such that the link and spring can be interchanged whereby the escapement can
 10 be changed from reverse to ordinary and vice versa.

7. In a typewriting machine, the combination of printing keys, a universal bar, a carriage, escapement mechanism, and a connection between said universal bar and escape-
 15 ment mechanism comprising a link and a two-armed lever, said link being connectible with either arm of said lever whereby said escapement can be changed from reverse to
 20 ordinary and vice versa.

8. In a typewriting machine, the combination of printing keys, a universal bar, an oscillatory frame to which said universal bar is connected, said frame having two arms
 25 projecting therefrom on the same side of the axis of said frame, escapement mechanism, and a connection between said universal bar and escapement mechanism including a link and a two-armed lever, said lever being connectible
 30 with one arm of said lever and with one arm of said universal bar frame or with the other arm of said lever and the other arm of said universal bar frame whereby the escapement can be changed from reverse to
 35 ordinary and vice versa.

9. In a typewriting machine and in escapement mechanism, the combination of an

escapement rack, a dog carrier mounted to move toward and from said rack, a single
 dog pivoted on said dog carrier for engage- 40
 ment with said rack, and so as to move at its engaging end in a direction substantially parallel with the direction of the engaged rack tooth, a spring connecting said dog and
 45 carrier and tending to move the dog in opposition to the movement of the rack, a hook controlled by the movement of said dog relative to its carrier, and a cooperating hook for operating said carrier, the first
 50 mentioned hook being moved out of connection with the last mentioned hook when the dog is moved by its spring upon its release from the rack.

10. In a typewriting machine and in escapement mechanism, the combination of an
 55 escapement rack, a dog carrier, a dog pivoted to said carrier for engagement with said rack, a hook separately pivoted to said carrier, a cooperating hook for operating said carrier through the first mentioned
 60 hook, a spring tending to move said dog in opposition to the motion of said rack and connections between said dog and the first mentioned hook for releasing the latter from the operating hook when the dog is free
 65 from the rack.

Signed at the borough of Manhattan, city of New York, in the county of New York and State of New York this 10th day of February, A. D. 1910.

CLIO B. YAW.

Witnesses:

CHARLES E. SMITH,
 E. M. WELLS.