

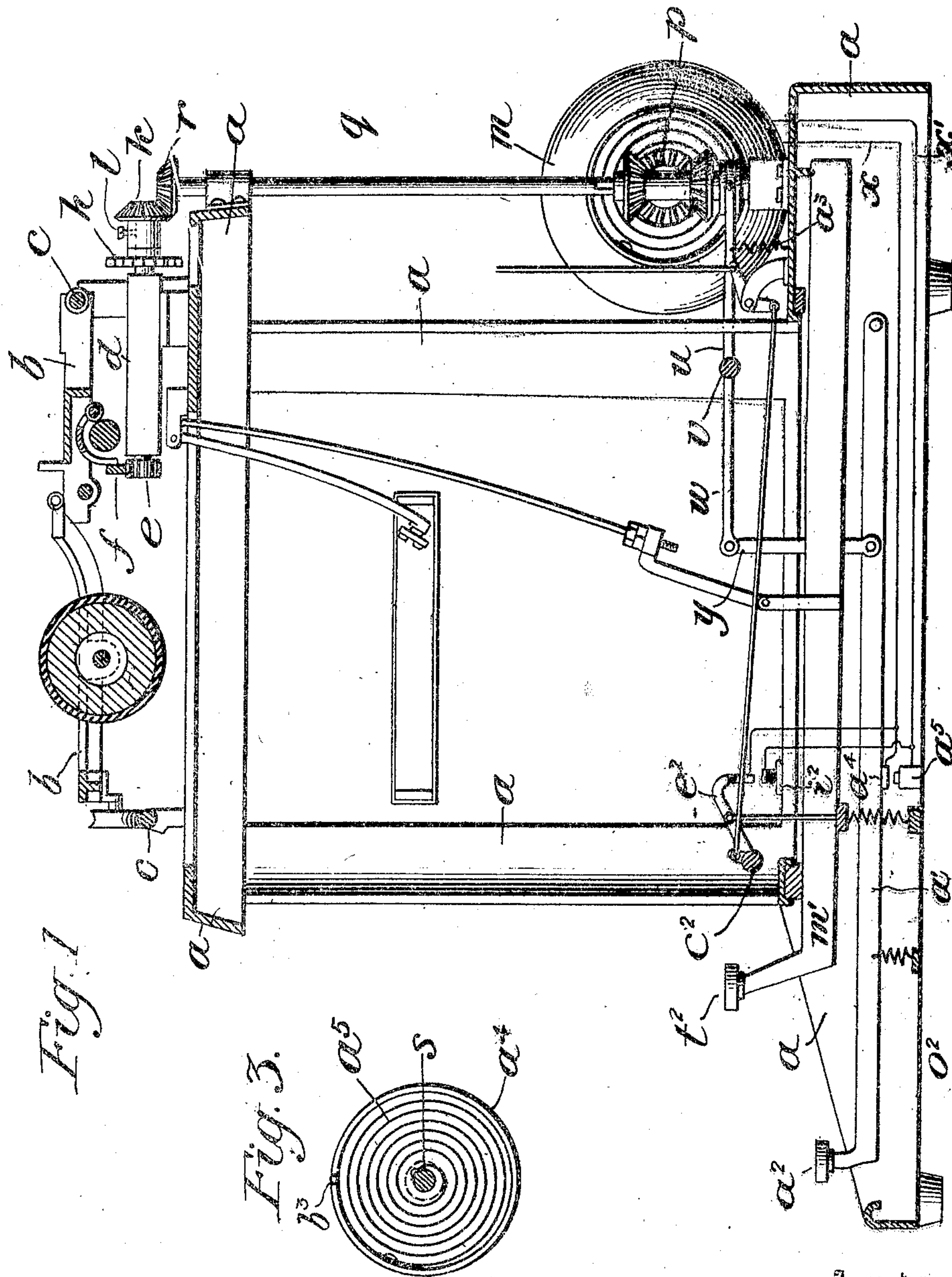
No. 859,476

PATENTED JULY 9, 1907.

N. L. ANDERSON.
TYPE WRITER.

APPLICATION FILED FEB. 8, 1907.

2 SHEETS—SHEET 1.



Inventor

N. L. Anderson.

Witnesses
N. P. Leonard

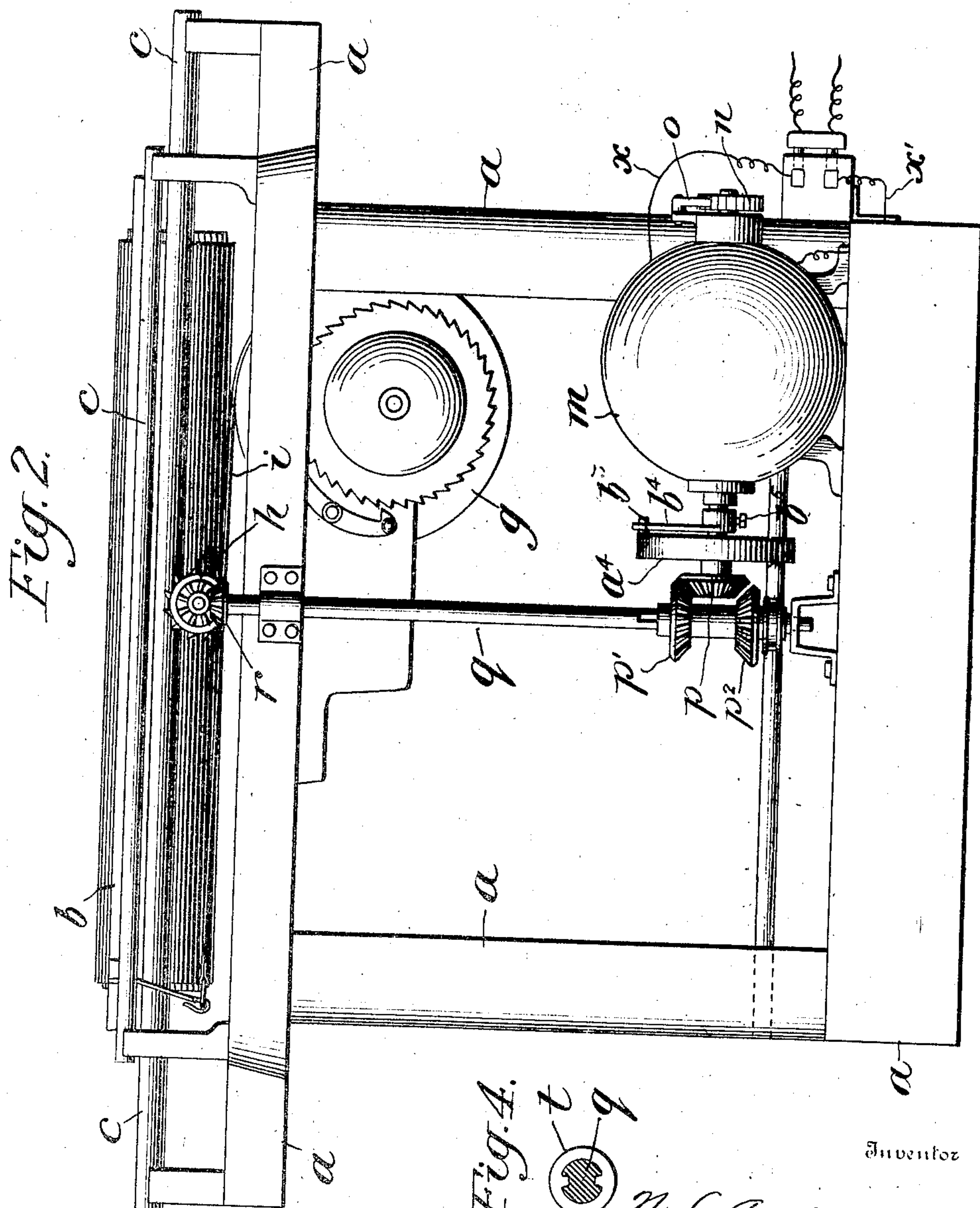
By Lemmie Goldborough
Attorney

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Inventor

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UNITED STATES PATENT OFFICE.

NEAL LARKIN ANDERSON, OF MONTGOMERY, ALABAMA.

TYPE-WRITER.

No. 859,476.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed February 8, 1907. Serial No. 356,395.

To all whom it may concern:

Be it known that I, NEAL LARKIN ANDERSON, a citizen of the United States, residing at Montgomery, county of Montgomery, State of Alabama, have invented certain new and useful Improvements in Type-Writers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention has to do with carriage-operating mechanisms for typewriters, and relates particularly to the means employed for reversing the forward travel of the carriage.

In the machines patented by me February 11, 1896, No. 554,567 and January 5, 1904, No. 748,831, the carriage-operating mechanism comprised two motors, one of which was a prime or storage motor for moving the carriage in both directions, and the other of which was an auxiliary or replenishing motor which was operated once for the writing of each line to store up sufficient power in the prime motor for a subsequent actuation of the carriage in both directions.

The present invention is a departure from those of the above patents in that the storage motor is dispensed with and a single motor is employed and geared up to the carriage so as to actuate the same in both directions, the connections between the motor shaft and the carriage comprising shiftable gears that are controlled by a reverse key, so that the simple depression of this key reverses the gearing and causes the motor to move the carriage back to the beginning of a new line. Preferably this is an electric motor of relatively low, uniform torque that is connected up in a circuit which is normally open and is closed intermittently at periods corresponding to the actuation of the key levers, so that the current in the motor is intermittent and the motor is in circuit only while the writing is being done.

It has heretofore been proposed to employ an electric motor for the purpose of moving a typewriter carriage in both directions, but the motor was reversible, and the arrangement, among other objections, required the use of pole changing devices, and the passage of a constant current through the motor while the machine was in operation.

In the present invention, the motor is normally out of circuit, and is never reversed. No switches nor pole changing devices are required. The motor is energized progressively as the writing proceeds by a series of impulses that correspond to and are preferably directly due to the actuation of the key levers, and when it is desired to reverse the carriage the motor continues its direction of travel with whatever momentum it may have acquired during the writing of the line.

The invention is illustrated in the accompanying drawings as applied to a Remington machine of latest pattern, which has the carriage-operating escapement

shaft conveniently located for the purpose, and wherein the carriage has a gear rack with which a pinion on the escapement shaft meshes. The invention is equally applicable, however, to the Underwood or other makes of machines without the exercise of anything more than ordinary mechanical skill.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of a typewriter with the invention applied; Fig. 2 is a rear elevation of the same; Fig. 3 is a detail showing the elastic connection between the motor shaft and its gear; and, Fig. 4 is a detail showing the connection of the sliding gears with the shaft which transmit motion from the motor shaft to the carriage.

Referring to these views, *a* denotes the frame of the machine, and *b* indicates the carriage, traveling upon transverse rods *c*, as will be readily understood by those familiar with the Remington machine. About midway of the width of the frame is mounted the shaft *d* of the carriage-operating escapement, and on the front end of this shaft is a pinion *e* which meshes with a gear rack *f* on the carriage, this rack being connected to the carriage so as to be disconnectible at will from the pinion *e*.

One of the features of the present invention being the interchangeability of the electric motor drive herein described with the usual carriage-operating mechanism, I have shown at *h* in Figs. 1 and 2 the usual escapement ratchet for advancing the carriage by the manipulation of the keys and at *g* and *i* in Fig. 2 the ordinary spring drum and tape for returning the carriage, and I provide the rear end of the escapement shaft *d* with a pinion *k* which is releasably secured to the shaft by means of a set-screw *l*. The electric motor driving arrangement to be presently described is geared up to this pinion, and, as will be readily understood, the attachability of the pinion to the shaft and its detachability therefrom provide for operating the carriage to and fro either by the electric motor mechanism of the present invention, or by the usual mechanism with which the machine is or may be provided.

When the electric motor drive is being used, the spring tension in the usual carriage-returning drum will be relaxed until the drum will work back and forth as a sort of idler, and when the operator desires to change from the electric drive to the ordinary means for operating the carriage, it is only necessary to disconnect the pinion *k* from the escapement shaft and wind up the main spring until there is sufficient tension in the drum *g* to return the carriage as usual.

Proceeding now to describe the arrangement which more particularly forms the subject of the present invention, *m* denotes an electric motor mounted preferably at the back of the machine on a rear extension of the frame. This motor may be of any suitable construction, but is preferably wound so as to have a rela-

tively low and uniform torque, and is arranged to revolve in one direction only, such uni-directional rotation being secured in a manner well understood in the art. The motor is connected up in a normally open circuit, and the wires x , x' lead off to any suitable source of current. The shaft s of the motor is provided with a gear p that is adapted to drive either of the two gears p' , p^2 upon a vertical shaft q journaled in bearings about midway the width of the frame of the machine at the rear. At its upper end the shaft q has a miter gear r which meshes with the bevel pinion k on the rear end of the escapement shaft d . The gears p' , p^2 are carried by a sleeve t which rotates with the shaft and is adapted to slide thereon by the spline and groove arrangement shown in Fig. 4. The gears are located on opposite sides of the motor shaft gear p , and the sleeve t is slid up and down on the shaft q so as to throw either of the gears p' , p^2 into mesh with the gear p , according as the carriage is to be driven forward or reversed. The position of the gear-carrying sleeve t on the shaft q is controlled by means of a forked lever u projecting rearward from a cross shaft v which is journaled in the frame standards of the machine. At one end this shaft v has an arm w projecting forward and connected by a link y to the lever a' of a reverse key a^2 , so that on the depression of this key the gear-carrying sleeve will be raised so as to throw the gear p^2 into mesh with the motor shaft gear on its under side, thereby moving the carriage in the reverse direction. When the return key is released, the spring a^3 or a^2 restores the lever u to its normal position, releasing the gear p^2 and throwing the upper gear p' into mesh with the motor shaft gear on the upper side, by which means the carriage is moved forward. The gear p is elastically connected to the motor shaft through the intermediacy of a flanged disk a^4 rigidly secured to the hub of the gear and connected to the shaft by means of a spring a^5 the outer end of which is connected to the inside of the flange of the disk and the other end of which is connected to the motor shaft, the spring being wound helically around the shaft as best illustrated in Fig. 3 of the drawings. The spring is preferably of such strength that when very slightly wound up it will have the maximum resistance of the maximum torque of the motor when moving slowly in the writing of the line. If desired, it may be arranged so that when the maximum torque of the motor has been reached, the spring will be fully wound up and the motor will be able to wind it no further. For this purpose, there is projecting from the flanged disk on the side toward the motor casing a pin b^3 , and secured to the motor shaft adjacent to the disk is an arm b^4 which is adjustably connected to the shaft by a set-screw b^5 , thus limiting the tension which the revolution of the motor shaft will put upon the gear p and the adjustability of the arm b^4 enables the degree of tension to be regulated as desired, it being obvious that the shaft can make but one revolution before the arm b^4 will strike the pin b^3 . Thus the motor shaft revolves the pinion and drives the gearing connected therewith through the intermediacy of the spring, and the interposition of this elastic connection between the gear and its shaft equalizes the effect of the motor and transmits a practically uniform torque to the carriage.

The motor being energized intermittently, as will be more fully described later on, the reaction of the spring

between the disk a^4 and the motor shaft would turn the shaft backward when no current is passing through the motor were not some provision made to prevent such retrograde movement, and for this purpose I provide the other end of the shaft with a ratchet n and pivot a pawl o upon the motor casing, so that the backward pressure of the spring upon the arm b^4 cannot turn the shaft in the reverse direction. Normally there is no current passing through the motor and the circuit is open. As above described, however, the circuit is intermittently and automatically closed and opened as the writing proceeds, so as to give the motor a series of impulses corresponding to the actuation of the keys in writing. Preferably this making and breaking of the circuit is caused directly by the writing keys, as indicated in Fig. 1, where the usual universal bar c^2 of the machine is provided with a contact e^2 for each key, one of the wires x of the circuit being connected to the contact e^2 and the other x' being connected to a corresponding contact i^2 located in fixed position on the machine. The depression of the lever m' of the writing key i^2 , causes as usual the rocking of the universal bar c^2 , and this rocking brings the contacts e^2 and i^2 together, closing the circuit for a period corresponding to the time that the writing key is held down and thus energizing the motor. On releasing the key, it is returned to its normal position by the usual spring arrangement and the contacts e^2 and i^2 are separated, thus breaking the circuit and discontinuing the passage of the current through the motor until another key is depressed when the same operation is repeated and continued as long as the keys are manipulated in writing a line.

As will be understood, while the operation just described is going on, the gear p' of the shaft q is in mesh with the motor shaft gear p , the gear p^2 being meanwhile out of operation. When the end of the line is reached, and it is desired to reverse the travel of the carriage, the return key a^2 is depressed, whereupon the position of the gears p' and p^2 is reversed, p' being disconnected from the motor shaft gear and p^2 being thrown into mesh therewith. At the same time, the circuit is closed by the contact a^4 on the lever of the return key striking the contact a^5 on the machine frame, again sending the current through the motor in the same direction as before and continuing the revolution of the motor as long as a key is held depressed. When the carriage is returned to the beginning of the line, or whatever other point it is desired to start the writing again, the release of the return key causes the spring a^3 or a^2 to separate the contacts a^4 and a^5 and again break the circuit.

The construction being as thus described, it will be understood that the motor is energized intermittently by a multiplicity of momentary impulses corresponding to the actuation of some or all of the keys. No current whatever passes through the motor when the machine is not in operation, nor even when in operation except when a key is depressed, the motor being immediately and automatically cut out of the circuit on the release of the key.

It is to be noted in respect to the connection between the motor shaft and its gear p that it eases the shock or jar caused by the carriage reaching the beginning of the line on its return movement by providing an elastic cushion between the carriage rack and the

shaft of the motor, thereby obviating the necessity of providing special brakes or separate buffers.

Although I have herein illustrated a simple and efficient construction for effecting the advance and return movements of the carriage by a uni-directional motor, I do not desire or intend to be limited thereto, as the invention contemplates broadly the actuation of the carriage in both directions by such a motor connected to a rack on the carriage by a train of gearing which includes reversing mechanism, so that though the motor revolves in one direction only, the carriage moves forward and back under the control of the writing and return keys above described.

Neither do I desire or intend to be limited to the described location of the elastic connection between the motor shaft and the carriage-operating gear, since substantially the same effect could be secured by locating the spring at some other point in the train of gears between the motor and the carriage rack.

Neither do I desire or intend to be limited to the manner hereinbefore described of controlling the energizing of the motor by the actuation of the writing keys, as the invention covers broadly any means for energizing a motor revolving in one direction only by means of a multiplicity of impulses that are given to the motor as the writing of the line proceeds no matter how or by what means the intermittent opening and closing of the circuit is effected.

I would also have it understood that, so far as the movement of the carriage in one direction is concerned, it is not essential that the motor should be one having a uni-directional rotation only; but, so far as the movements of the carriage in both directions are concerned, an essential feature of the invention is that the motor should be one where no reversal is required, and the provision for reversing the movement of the carriage is derived from the interposition between the one-way revolving motor and the carriage of reversing mechanism or gearing.

I would also have it understood that, though I have herein shown the reverse gearing as being operated by a return key which is to be depressed by hand, I do not intend to be limited to such manual reversal, as the lever for shifting the reverse gears may be automatically operated on the carriage reaching the end of the line.

I would also have it understood that, though I have herein shown the reverse gearing as operated by a return key which is to be depressed by hand and is held down until the carriage reaches the beginning of the new line, when said key is manually released, I do not intend to be limited to such manual release, as the return key may be mechanically held down during the return of the carriage and automatically released when the carriage reaches the beginning of a new line.

Having thus described my invention, what I claim is:—

1. In a carriage-operating mechanism for typewriters, the combination with an intermittently energized electric motor having uni-directional rotation only, of a rack on the carriage, and reversible gearing interposed between the motor shaft and the rack whereby the carriage may be operated in either direction.

2. In a carriage-operating mechanism for typewriters, the combination with an electric motor having uni-directional rotation only, of a rack on the carriage, the shaft

of the escapement mechanism and its pinion engaging the rack, and reversible gearing interposed between the motor shaft and the escapement shaft, whereby the carriage may be fed forward step by step or returned by the motor through the escapement shaft.

3. In a carriage-operating mechanism for typewriters, the combination with an electric motor having uni-directional rotation only, of a rack on the carriage, reversible gearing interposed between the motor shaft and the rack, and mechanism for disconnecting the gearing whereby the carriage may be operated by or without the motor.

4. In a carriage-operating mechanism for typewriters, the combination with a rack on the carriage, the shaft of the escapement mechanism and its pinion engaging the rack, an electric motor having uni-directional rotation only, and reversible gearing interposed between the motor shaft and the escapement shaft, said gearing being disconnectible from the escapement shaft, whereby the carriage may be operated by the motor or by the usual carriage operating mechanism as desired.

5. In a carriage-operating mechanism for typewriters, the combination with a rack on the carriage, the shaft of the escapement mechanism and its pinion engaging the rack, an electric motor having uni-directional rotation only, and a gear on the escapement shaft connected by intermediate reversible gearing with the motor shaft, said escapement shaft gear being disconnectible from its shaft, so that said shaft may be operated by or without the motor.

6. In a carriage-operating mechanism for typewriters, the combination with an intermittently energized electric motor having uni-directional rotation only and adapted to drive the carriage in both directions, of a rack on the carriage, reverse gearing interposed between the motor shaft and the rack, and a return key the lever of which is connected to the reverse gearing.

7. In a carriage-operating mechanism for typewriters, the combination with an electric motor, of a gear loose on the motor shaft and elastically connected therewith, and gearing interposed between the motor shaft gear and the carriage.

8. In a carriage-operating mechanism for typewriters, the combination with an electric motor, and gearing interposed between the motor shaft and the carriage whereby the carriage may be operated in the reverse direction, said gearing including a gear which is elastically connected to its shaft, so as to act as a buffer for the return movement of the carriage.

9. In a carriage-operating mechanism for typewriters, the combination with an electric motor, of a gear loose on the motor shaft and elastically connected therewith, gearing interposed between the motor shaft gear and the carriage, and means for preventing the reaction of the spring between the gear and motor shaft from reversing the motor.

10. In a carriage-operating mechanism for typewriters, the combination with an electric motor having uni-directional rotation only, of a rack on the carriage, the shaft of the escapement mechanism and its pinion engaging the rack, a shaft intermediate between the motor shaft and the escapement shaft, sliding gears on the intermediate shaft on opposite sides of the motor shaft gear, and mechanism for throwing either of said sliding gears into mesh with the motor shaft gear to operate the carriage forward or back.

11. In a carriage-operating mechanism for typewriters, the combination with an electric motor, of a gear loose on the motor shaft, gearing interposed between said gear and the carriage, a spring wound helically around the shaft and connected at one end to the gear and at the other end to the shaft, whereby the gear is normally elastically driven by the shaft, and means interposed between the shaft and gear whereby the tension of the spring due to the revolution of the shaft may be determined and adjusted.

12. In a carriage-operating mechanism for typewriters, the combination with an electric motor, of a gear loose on the motor shaft, gearing interposed between said gear and the carriage, a spring wound helically around the shaft and connected at one end thereto and at the other end to a disk integral with the gear, a pin on the disk, and an

arm adjustably secured to the motor shaft to strike the pin and limit the tension of the spring.

13. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor in a normally open circuit, and means whereby the rotation of the motor is effected by a series of current impulses as the writing progresses.

14. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor in a normally open circuit, and means whereby the actuation of the keys effects the rotation of the motor by giving it a series of current impulses as the writing progresses.

15. In a carriage-operating mechanism for typewriters, the combination with an electric motor having uni-directional rotation only and included in a normally open circuit, of gearing, including reversing mechanism, interposed between the motor shaft and the carriage, means controlled by the keys for periodically and momentarily making and breaking the circuit and energizing the motor by a series of impulses corresponding to said keys as the writing proceeds, and a return key for closing the circuit and further energizing the motor when it is desired to return the carriage.

16. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor in a normally open circuit, and means whereby the actuation of the keys periodically makes and breaks the circuit and effects the rotation of the motor by giving it a series of current impulses corresponding to the operation of said keys as the writing proceeds.

17. In a carriage-operating mechanism for typewriters, the combination with an electric motor, of a gear loose on the motor shaft, gearing interposed between said gear and the carriage, a spring connecting the loose gear and the motor shaft, whereby said gear is normally elastically

driven by the shaft, and means for maintaining a substantially uniform tension of the spring.

18. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor, and means whereby the rotation of the motor is effected intermittently by a series of current impulses as the writing proceeds.

19. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor, and means whereby the actuation of the keys effects the intermittent rotation of the motor by giving it a series of current impulses as the writing proceeds.

20. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor, and means whereby the actuation of the keys periodically makes and breaks the circuit and effects the intermittent rotation of the motor by giving it a series of current impulses corresponding to the operation of said keys.

21. In a carriage-operating mechanism for typewriters, the combination of a rotary electric motor, writing keys, a return-carriage key, means whereby the actuation of the writing keys effects the intermittent rotation of the motor by giving it a series of current impulses as the writing proceeds, and means whereby the actuation of the return key effects the further rotation of the motor in the same direction for operating the carriage for the return movement.

In testimony whereof I affix my signature, in presence of two witnesses.

NEAL LARKIN ANDERSON.

Witnesses:

W. R. McDADE,
J. B. GASTON, Jr.