N. L. ANDERSON.

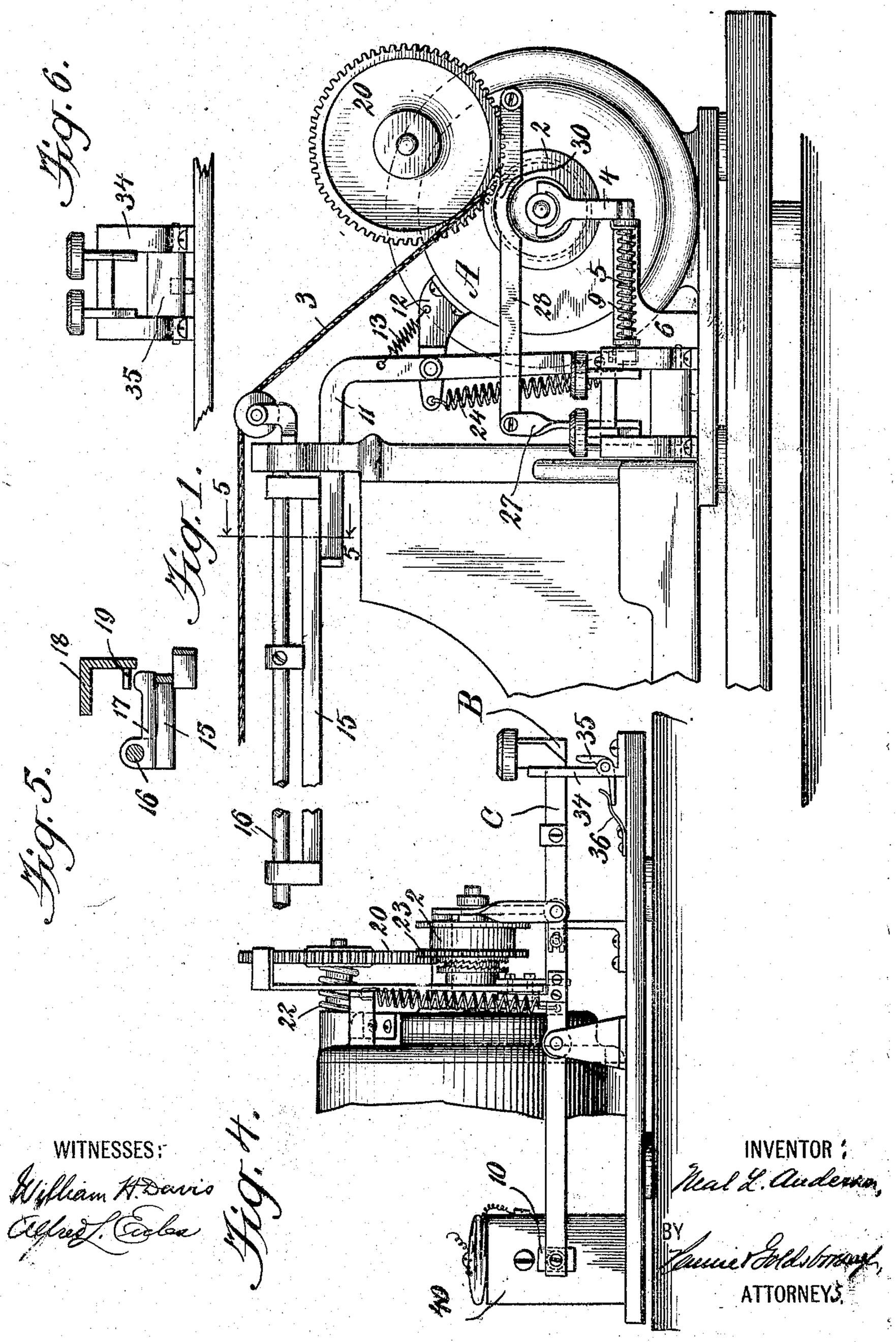
TYPE WRITER CARRIAGE RETURN MECHANISM.

APPLICATION FILED JAN. 29, 1908.

900,642.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.



WITNESSES:

William H. Davis

Alfred L. Cobb

INVENTOR:

Neal L. Anderson,

BY

Lawrence Goldsborough,

ATTORNEYS.

N. L. ANDERSON.

TYPE WRITER CARRIAGE RETURN MECHANISM.

APPLICATION FILED JAN. 29, 1908.

900,642.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 2.

Fig. 1.

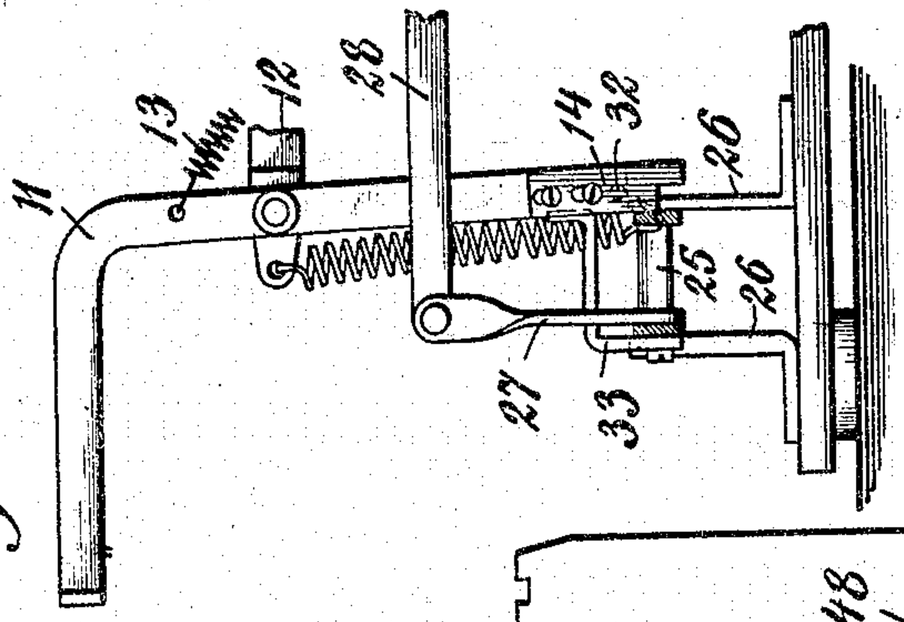


Fig. 2.

Fig. 3.

WITNESSES:

William H. Davis

Alfred L. Edgerton

INVENTOR;

Neal L. Anderson,

BY

Laurie & Goldsborough,

ATTORNEYS

N. L. ANDERSON.

TYPE WRITER CARRIAGE RETURN MECHANISM.

APPLICATION FILED JAN. 29, 1908.

900,642.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 3.

Fig. 3.

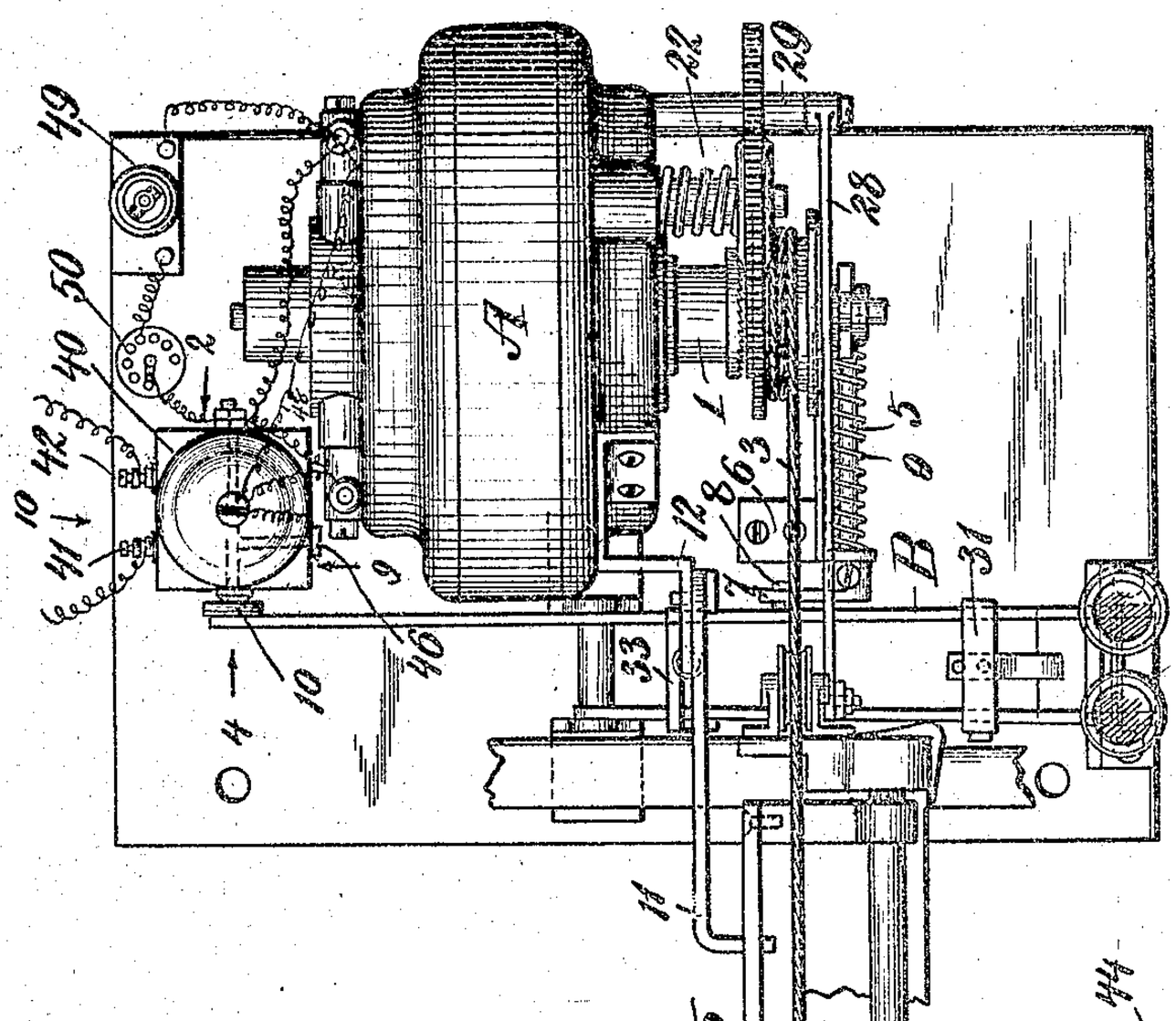


Fig. 10

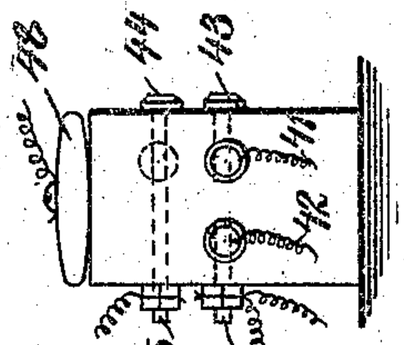


Fig. 9.

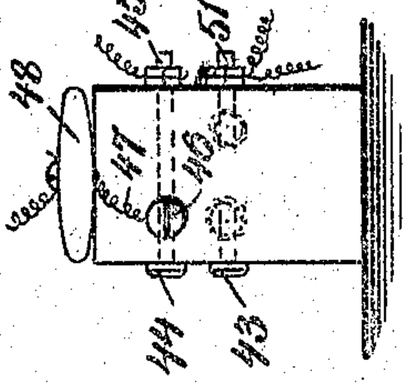


Fig. 12.

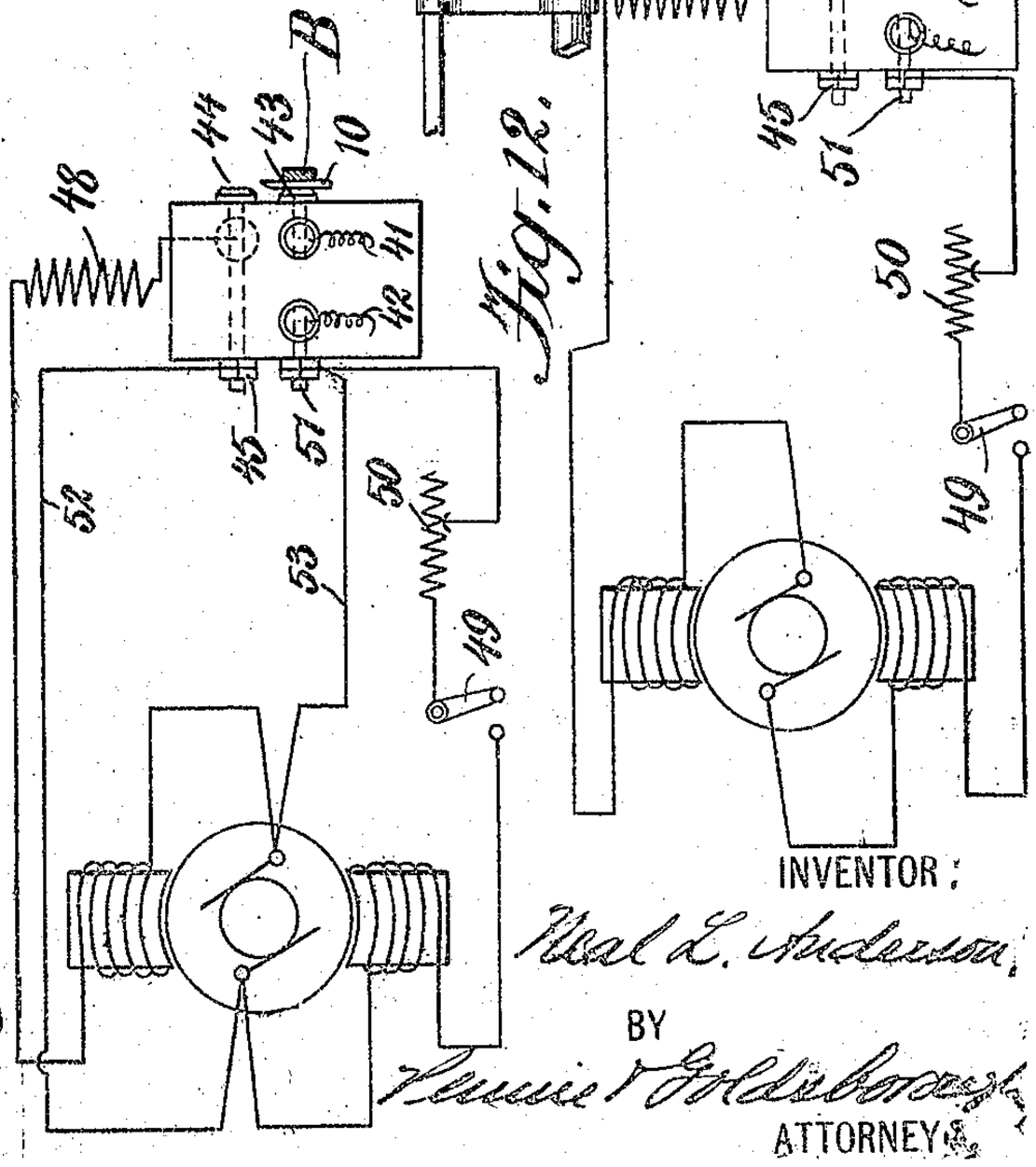


Fig. 11

WITNESSES:

William H. Davis

Chas. L. Cole

INVENTOR:

Neal L. Anderson,

BY

Louis Goldsborough

ATTORNEY.

UNITED STATES PATENT OFFICE.

NEAL LARKIN ANDERSON, OF WINSTON SALEM, NORTH CAROLINA.

TYPE-WRITER CARRIAGE-RETURN MECHANISM.

No. 900,642. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed January 29, 1908. Serial No. 413,264.

To all whom it may concern:

Be it known that I, NEAL LARKIN ANDERSON, a citizen of the United States, residing at Winston Salem, in the county of Forsyth, in the State of North Carolina, have invented certain new and useful Improvements in Type-Writer Carriage-Return Mechanism; 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 object of my invention is to produce a satisfactory electrically operated carriage return mechanism for typewriters and similar machines, and particularly one in which the electric motor may be used on either a direct-current circuit or an alternating-current circuit at will.

The particular nature of the means which I employ for accomplishing this object will be understood from a consideration of the following description and the accompanying drawings, in which my improvements are illustrated as applied to the "Underwood" typewriter by way of example.

In the drawings, Figure 1 is a front elevation of my improved mechanism applied to a typewriter, of which the adjacent parts are shown. Fig. 2 is a side elevation of the same parts; Fig. 3 is a plan view of the same parts; Fig. 4 is a side elevation of Fig. 3 looking in the direction of the arrows; Fig. 5 is a cross-section on line 5—5 of Fig. 1, looking in the direction of the arrows; Fig. 6 is a front elevation of the carriage-return and braking keys; Fig. 7 is a detail of the mechanism for holding down the carriage-return key; Fig. 8 is a detail of the clutch mechanism for the motor; Figs. 9 and 10 are elevations of the terminal stand looking in the directions indicated by the arrows on Fig. 3; Fig. 11 is a diagram of the circuit connections when the machine is operating on an alternating current circuit, and Fig. 12 is a similar diagram when the machine is operating on a direct current circuit.

The electric motor A has keyed to its shaft a drum 1 forming one part of a ratchet clutch mechanism.

Mounted on the motor shaft and capable of sliding thereon is the winding drum 2 which carries the other part of the ratchet clutch mechanism and on which the band or rope 3, which is connected to the carriage of the typewriter, is wound.

For the purpose of shifting the winding drum 2 toward the drum 1 against the action of the spring 60 coiled on the shaft of the motor between the parts of the clutch, so that the two portions of the clutch mechanism engage one another and the winding drum is rotated by the electric motor, there is provided a pivoted arm 4 having a yoke at its upper end which spans the hub of the winding drum 2. This arm 4 is fixed to the end of a rod 5 journaled in a standard 6 supported on the baseboard of the machine. To the other end of the rod 5 is secured the lever arm 7 which is slotted at its end to straddle a pin 8 on the carriage return key B. About the rod 5 is coiled a spring 9 which together with spring 60 acts to return the arm 4 to the position indicated in the drawings, that is, the clutch releasing position, after that arm has been brought into the clutch-engaging position by the depression of the carriage-return key. At the rear end of the carriage-return key B is a contact piece 10 which serves to close the circuit of the electric motor; so that when the carriage-return key is depressed the electric motor is started and at the same time the two portions of the clutch are brought into engagement with one another and the drum 2 is actuated by the motor to wind up the cord 3 and return the carriage.

For the purpose of holding down the carriage-return key after it has been depressed and until the carriage reaches its full return position, or nearly that, the bent lever 11 (see Fig. 7) is pivoted to a bracket 12 secured to the frame of the motor, and connected between this lever and the bracket is a spring 13 which tends to turn the lever in such a direction as to swing its lower end, carrying the adjustable notched plate 14, over the carriage-return key when that key is depressed.

For the purpose of releasing the key to break the circuit of the motor and disengage the members of the clutch at any desired point before the end of the return movement, I provide the mechanism illustrated in Figs. 1, 3 and 5, from which it will be seen that the end of the lever 11 extends beneath a frame 15, the lateral arms of which have hubs surrounding the margin-stop rod 16 so that the frame may swing on that rod. Adjustably secured to the margin-stop rod is a tripping cam-piece 17 the end of which lies above the longitudinally extending bar

of the frame 15. The abutment 18 carrying the pin 19 is secured to, or adjacent to, the ordinary scale-pointer on the carriage, so that this abutment moves with the carriage. When the carriage-return key has been depressed and the lever 11 swung into its holding position by the spring 13 the end of that lever raises the frame 15 and with it the cam-piece 17, so that as the carriage returns the pin 19 engages the cam and depresses the frame 15 and the end of the lever 11 to release the carriage-return key. By adjusting the position of the cam-piece 17 the circuit of the motor may be broken and the clutch disengaged at any desired point before the end of the return movement, and thereby the carriage may be brought to rest without objectionable jar.

To prevent a back lash of the drum 2 and a consequent loosening of the cord 3 when the carriage comes to rest, the idler cog-wheel 20 is mounted to rotate on a stub shaft 21 extending from the frame of the motor and a coiled spring 22 surrounds this stub shaft and is attached at one end to the motor and at the other end to the cog-wheel. The cog-wheel 20 meshes with the cog-wheel 23 which forms one head of the drum 2. By this arrangement of parts the spring 22 tends to turn the cog-wheel 20 and through it the cog-wheel 23 in such a direction as to keep the cord 3 tight, and the cog wheel 20 is broad enough to remain in engagement with the cog-wheel 23 when the drum 2 is shifted back and forth from its unclutching to its clutching position.

It will be observed that the spring 60 and the spring 9 coiled on the shaft 5 will tend to return the carriage-return key to its upper position, but to insure the quick and positive return of this key, I provide the additional coiled spring 24 extending from the end of the bracket 12 to the carriage return key.

The mechanism thus far described provides for the return of the carriage to the end of its movement, but for the purpose of returning the carriage after it has advanced toward the left but a short distance (that is, when a short line has been written) or for returning the carriage through but a portion of its return movement, I provide the brake key C which is pivoted at its inner end to the shaft 25 supported in the brackets 26, to which shaft is also pivoted the carriage return key B. Secured to this brake key is a bar 27 which is pivoted at its upper end to the end of a pivoted brake bar 28, which is in turn pivoted to a stub shaft 29 extending from the motor frame and which carries a brake-shoe 30 engaging the upper surface of a hub on the drum 2, and capable of exerting a braking pressure thereon when the brake-key is depressed. It is desirable to provide an arrangement by which the depressing of the brake key also depresses the carriage-return key to close the motor circuit and engage the members of the clutch, and also mechanism which puts the latching lever 11 out of operation when the brake key is depressed, so that if it is desired to return the carriage through only a portion of its movement the brake key may be depressed for this purpose sufficiently to start the motor and the drum 2 and then may be further depressed to stop the motor and drum by its braking action, and at the same time withhold the latch on the lever 11 so that the carriage-return key may rise freely when the brake key is released. For the purpose of carrying down the carriage-return key a bar 31 is secured to the brake key and extends above the carriage return key, as indicated most clearly in Fig. 3. For the purpose of putting the latching lever 11 out of operation, or releasing it if it has already moved to its locking position, I attach to that lever a pin 32 (see Fig. 2), and to the brake-key I attach a bent bar 33 which, when the brake key is depressed, engages the pin 32 and holds the lever 11 in its disengaging position.

In order to apply the brake it is necessary to depress the brake key further than the circuit-closing position, and yet it is desirable that there should ordinarily be a definite stop for the carriage return key when it has reached the circuit closing position. For this purpose I pivot in the frame 34 (see Figs. 4 and 6) a bent plate 35 which is held in the position shown in the figures by spring 36. The lower surface of the end of the carriage return key is straight so that when it engages this bent plate 35 its movement is stopped. The corresponding surface of the brake key C, however, is beveled so that when that key is depressed the plate 35 is turned on its pivot, allowing the brake key and carriage return key to be further depressed to apply the brakes, and if desired this range of movement may be sufficient to open the circuit of the motor.

The operation of this mechanism then is as follows: For the purpose of fully returning the carriage the carriage-return key B is depressed closing the circuit of the motor and engaging the clutch, and at the same time the lever 11 swings over the carriage-return key to hold it in its depressed position until the pin 19 depresses the cam-piece 17, releasing the carriage-return key, and allowing it to open the circuit of the motor and disengage the clutch. If it is desired to return the carriage through only a portion of its movement the brake-key is depressed carrying down with it the carriage-return key to close the circuit of the motor and engage the clutch, but by means of the arm 33 and pin 32 the lever 11 is prevented from swinging into its holding position. The further depression of the brake key beyond

the normal range of movement of the carriage return key serves to apply the brake, so that the effective power of the motor is reduced when the motor is used to return the carriage through a portion of a line only. The brake key C is also employed for returning the carriage through a "short line," that is, when the carriage has traveled but a short distance toward the left. In such case the depression of key C carries with it the carriage return key and closes the circuit of the motor and clutches the motor to the winding drum, and at the same time, by the further depression of key C the brake is applied to the motor, thus reducing its effective power when it is used for short line work. It will be observed, furthermore, that the supplemental key C may be used to return the carriage to any desired point of the line independently of the braking mechanism. Thus if the supplemental key C is depressed it will carry down with it the carriage-return key and start the motor on its return movement, but at the same time the latch which normally holds down the carriage return key when it is depressed, is rendered ineffective by the supplemental key, so that when the supplemental key is released the carriage-return key returns at once to its initial position thereby at once opening the circuit of the motor and unclutching it from the carriage. The carriage is thus brought to rest.

In view of the fact that carriage-return mechanism of the type contemplated may be called upon for service in places where an alternating electric current alone is available, or in places where a direct current alone is available, it is highly desirable that the motor for returning the carriage should be capable of successful operation on either an alternating or a direct current. Furthermore, I have discovered that for the successful return of a typewriter carriage under all conditions of service a motor should be employed having peculiar properties, or at least one operated under peculiar and abnormal conditions. For this service it is necessary, if the thing is to be a success, that the carriage should be quickly returned, which implies the employment of considerable energy in its return, and yet the arrangement must be such that the carriage does not develop an excessive speed, and, therefore, reaches the end of the return movement without an objectionable jar or shock, which is at first sight incompatible with the employment of a considerable power. I have found that this result may be successfully accomplished by employing, on a constant-potential direct-current circuit of relatively high voltage such as the ordinary 120 volt circuit for lighting purposes, a series motor having characteristics such that the effort incident to the return of the carriage constitutes a material overload for the motor at the motor's rated speed, so that at starting a heavy flow of current passes through the motor developing a considerable torque to quickly start the motor, and yet as the motor drives the carriage toward its return position, it does not develop an excessive speed. For example, a series motor designed to drive a light load at high speed will have a comparatively weak field, which means, if the motor is properly designed, that a comparatively small current through its field-windings will saturate its field-poles; such a motor will also have a comparatively small number of turns on its armature and, therefore, a low armature resistance. If such a motor is connected to a typewriter carriage which constitutes a material overload for the motor at the motor's rated speed, then in the effort to start the carriage a heavy current will flow through the motor (field and armature) very considerably stronger than is necessary to saturate the field, and yet the excessive armature current reacting on the field at its maximum strength will give the quick starting torque. As the carriage begins to move, under the conditions assumed, the motor is still materially overloaded and consequently the current, even after it is diminished by the counter-electromotive force generated by the rotation of the armature, is in excess of that designed to saturate the field, and consequently the motor does not have the common characteristics of a series motor, namely, a weakening of its field as the speed increases. The result is that the motor does not develop an excessive speed under the load of the carriage. In view of the fact that the starting is extremely quick the whole return movement has the desired rapidity and yet the jar upon the stopping of the carriage is not objectionable. I appreciate that such a motor could not run for any great length of time under such a load without objectionable over-heating, but in my arrangement the motor is operated only intermittently and is, therefore, capable of performing its intended functions without injury.

I have found furthermore that, if the same series motor used on the direct-current circuit is connected on an alternating current circuit of substantially the same potential, it will operate successfully for the purpose, provided only that on the alternating-current the resistance of the motor circuit be materially diminished, thereby causing a relatively greater flow of current through the motor, or, as it may be otherwise expressed, under-winding the motor. I have discovered that this result may be accomplished in a very satisfactory way, and an ordinary direct-current series motor employed on the alternating-current circuit, pro-

vided the circuit connections of the motor are rearranged in the manner indicated in Figs. 11 and 12 of the drawings; that is to say, if the motor connections are so changed when it is placed on the alternating-current circuit that its field windings and armature are connected in three parallel paths, one path including one half of the field windings, the second path including the armature, and the third path including the other half of the field windings. In order that this rearrangement of connections may be readily made by one not skilled in the manipulation of electrical connections, I have devised the terminal stand and arrangement of circuit connections illustrated in the drawings.

The terminal stand 40 is mounted on the base-board carrying the motor in a convenient position adjacent to the motor and such that the contact plate 10 on a carriage-return key is in position to control the circuit of the motor. This terminal stand is provided with sockets into which the terminals 41 and 42 of the external circuit are inserted. The socket receiving the terminal 41 is connected within the stand to the contact button 43, and when the plate 10 is in circuit-closing position button 43 is connected through that plate to the button 44 which is connected within the stand to the binding screw 45 and also to the button 46 which is connected by the wire 47 to a resistance coil 48 on the top of the stand from which the circuit extends to the motor.

In Fig. 12 the circuit is a series one through one-half of the field of the motor, the armature, the other half of the field of the motor back to the switch 49 mounted on the base-board of the motor and from thence through an adjustable resistance 50 back to the binding screw 51, which is connected to the socket for the terminal 42 from which the current passes again to the line.

In the case of Fig. 11, which shows the connections for the alternating current, a wire 52 is led from binding screw 45 to one brush of the motor and a wire 53 from binding screw 51 to the other brush of the motor, so that now the current flows in through the terminal 41 to the button 43 through contact plate 10 to button 44 beyond which it divides one portion passing through the resistance 48 and one-half of the field to one of the motor brushes and from there through the wire 53 to the binding screw 51. The other part passes from 44 to the binding screw 45 and through wire 52 to the other brush of the motor where it again divides, one-half passing through the armature and the wire 53 to binding screw 51 and the other half through the second half of the field windings, the switch 49, the adjustable resistance 50 and to binding screw 51, from which the reunited currents pass to the socket of terminal 42 and thence to the line. It will be observed that merely by connecting the wires 52 and 53 to the binding screws 45 and 51 as shown in the drawings the motor is converted from a direct-current motor to an alternating-current motor. By this change of connections the direction of flow of the current through the armature of the motor is reversed when it is connected into the alternating-current circuit, but nevertheless, I find that the motor rotates in the same direction as when it was connected in the direct-current circuit. It will, of course, be understood that by thus connecting the circuits of the motor in parallel when it is placed in the alternating-current circuit the resistance of the motor circuit is greatly reduced which, as before described, gives the desired operating effect. In the type of motor which I have adopted for this purpose I have constructed the fields of a solid piece, rather than of laminations, since I have found that when so constructed the motor operates more satisfactorily. It is also of some advantage to make the armature core of a solid piece of metal instead of laminating it though this is not of so much importance.

It will be observed that with this arrangement of parts the motor is normally out of service and operates only intermittently to return the carriage. That is to say, the motor circuit is closed and the motor is clutched to the winding drum by the same movement of the carriage-return key and near the end of the return movement the motor is unclutched and its circuit is opened. By this arrangement the carriage is entirely relieved of the momentum of the motor at the end of its return and is, therefore, more easily brought to rest.

I claim

1. In a typewriter carriage-return mechanism, a constant-potential series-wound electric motor for returning the carriage, and means for connecting the motor to the carriage, the carriage constituting a material overload for the motor at the motor's rated speed, whereby the motor develops a high starting torque, but does not attain an excessive speed during the return of the carriage; substantially as described.

2. In a typewriter carriage-return mechanism, a constant-potential series-wound electric motor for returning the carriage, and means for intermittently closing the circuit of the motor and connecting the motor to the carriage, the carriage constituting a material overload for the motor at the motor's rated speed, whereby the motor develops a high starting torque, but does not attain an excessive speed; substantially as described.

3. In a type-writer carriage-return mechanism, a constant-potential series-wound electric motor for returning the carriage, means

for intermittently closing the circuit of the motor and connecting the motor to the carriage, and means for opening the circuit of the motor and disconnecting the motor from the carriage near the end of the return movement, the carriage constituting a material overload for the motor at the motor's rated speed, whereby the motor develops a high starting torque but does not attain an excessive speed, and objectionable jar is prevented; substantially as described.

4. In an electric-motor-driven typewriter carriage-return mechanism operative on either a direct-current circuit or an alternating current circuit, an electric-motor having armature windings and field-windings, means for connecting the armature windings and field windings in series for operating on the direct-current circuit, means for connecting the armature windings and field windings in parallel for operating on the alternating-current circuit, and mechanism for connecting the motor to the carriage; substantially as described.

5. In an electric-motor-driven typewriter carriage-return mechanism, operative on either a direct-current circuit or an alternating-current circuit, an electric motor having an armature winding and field windings, means for connecting the armature winding and field windings in series for operation on the direct-current circuit, the carriage constituting a material overload for the motor at the motor's rated speed when so connected, means for reducing the resistance of the motor circuit when it is connected on the alternating current circuit, and mechanism for connecting the motor to the carriage; substantially as described.

6. In an electric-motor-driven typewriter carriage-return mechanism for alternating current circuits, an electric motor having an armature winding and a plurality of field windings and connections for including the armature winding and the two halves of the field windings in parallel circuits, and mechanism for connecting the motor to the carriage; substantially as described.

7. In an electric-motor-driven typewriter carriage-return mechanism for alternating current circuits, a motor having an armature and two field poles, windings therefor, and connections including the armature winding and the respective field pole windings in three parallel paths, and mechanism for connecting the motor to the carriage; substantially as described.

8. In an electric-motor-driven typewriter carriage-return mechanism for alternating current circuits, an electric motor having an armature winding and field windings, and connections including the armature winding and field windings in parallel circuits; substantially as described.

9. In an electric-motor-driven typewriter carriage-return mechanism for alternating current circuits, a motor having a field frame with solid unlaminated pole pieces, windings on the pole pieces, an armature, windings on the armature, and connections including the armature windings and field windings in parallel circuits, and mechanism for connecting the motor to the carriage; substantially as described.

10. In a typewriter-carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby the depression of the said key actuates the electric motor to return the carriage, a brake for the motor, and a supplemental brake-key for applying the brake to thereby arrest the movement of the motor; substantially as described.

11. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby the depression of the said key actuates the electric motor to return the carriage, a brake for the motor, a supplemental brake-key for applying the brake to thereby arrest the movement of the motor, and connections between the brake-key and the carriage-return key, whereby when the brake key is depressed it carries with it the carriage-return key; substantially as described.

12. In a typewriter-carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key connections whereby the depression of the said key closes the circuit of the electric motor and connects the motor to the carriage, a brake for the motor, a supplemental brake-key for applying the brake to thereby arrest the movement of the motor, and connections between the brake-key and the carriage-return key, whereby when the brake-key is depressed it carries with it the carriage-return key; substantially as described.

13. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby the depression of the said key closes the circuit of the electric motor and connects the motor to the carriage, a latch for retaining the carriage return-key in its circuit-closing position, a brake for the motor, a supplemental brake-key for applying the brake to thereby arrest the movement of the motor, connections between the brake-key and the carriage-return key, whereby when the brake-key is depressed it carries with it the carriage-return key, and mechanism connected to the brake-key to render the latch inoperative when the brake-key is depressed, whereby when the brake is released the carriage-return key returns to its initial position; substantially as described.

14. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage return-key, connections

whereby when the carriage-return key is depressed the motor is actuated to return the carriage, a stop for limiting the downward movement of the carriage-return key to its actuating position, a brake for the motor, a supplement brake-key for applying the brake to thereby arrest the movement of the motor, connections whereby when the brake-key is depressed it carries with it the carriage return key, and mechanism associated with the brake-key for removing the stop which limits the movement of the carriage-return key; substantially as described.

15. In a carriage return mechanism for typewriters, a motor having a strong initial impulse, mechanism for transmitting such impulse to the carriage to impart a throw thereto, and mechanism for discontinuing the action of the motor on the carriage before the end of the return movement, whereby the carriage is brought easily to rest.

16. In a carriage return mechanism for typewriters, a motor having a strong initial impulse, transmission mechanism between the motor and carriage, mechanism for connecting the motor and transmission mechanism to return the carriage, and an adjustable stop for disconnecting the motor and transmission mechanism before the end of the return movement, whereby the carriage is brought easily to rest.

17. In a carriage return mechanism for typewriters, an electric motor having a high starting torque for returning the carriage, a carriage return key, connections whereby when the carriage return key is depressed the circuit of the motor is closed, and mechanism for automatically opening the circuit of the motor before the end of the return movement, whereby the carriage is brought easily to rest.

18. In a carriage return mechanism for typewriters, an electric motor having a high starting torque for returning the carriage, a carriage return key, connections whereby when the carriage return key is depressed the circuit of the motor is closed, and an adjustable stop for automatically opening the circuit of the motor before the end of the return movement, whereby the carriage is brought easily to rest.

19. In a carriage return mechanism for typewriters, the combination of an electric motor having a high starting torque, transmission mechanism between the motor and carriage, mechanism for connecting the motor and transmission mechanism to return the carriage, and mechanism for disconnecting the motor and transmission mechanism near the end of the return movement, whereby the carriage is relieved of the momentum of the motor.

20. In a carriage return mechanism for typewriters, the combination of an electric motor having a high starting torque, transmission mechanism between the motor and carriage, means for simultaneously connecting the motor and transmission mechanism and closing the circuit of the motor to return the carriage, and means for simultaneously disconnecting the motor and transmission mechanism and opening the circuit of the motor near the end of the return movement.

21. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby when the carriage return key is depressed the circuit of the motor is closed, a latch for automatically retaining the carriage return key in the circuit closing position, a stop in the path of movement of the carriage, which stop may be adjusted at will to different positions in which it is engaged by the carriage before the end of the return movement, and connections between the adjustable stop and the latch, whereby when the carriage engages the stop the latch is released at a predetermined point before the end of the return movement.

22. In a carriage-return mechanism for typewriters, a motor for returning the carriage, mechanism for transmitting the power of the motor to the carriage to return it from any point in its range of movement, and means for reducing the effective power of the motor when it is used to return the carriage through a short portion only of its range of movement.

23. In a carriage return mechanism for typewriters, a motor for returning the carriage, a carriage return key which when depressed renders the motor effective to return the carriage, and means for reducing the effective power of the motor when the carriage return key is depressed during the last portion of the return movement.

24. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby when the carriage-return key is depressed the circuit of the motor is closed and the motor is connected to the carriage, a latch for automatically retaining the carriage-return key in its circuit-closing position, a stop in the path of movement of the carriage, which stop may be adjusted at will to different positions in which it is engaged by the carriage before the end of the return movement, and connections between the adjustable stop and the latch, whereby when the carriage engages the stop the latch is released at a predetermined point before the end of the return movement; substantially as described.

25. In a typewriter carriage-return mechanism, an electric motor for returning the carriage, a carriage-return key, connections whereby the depression of the said key closes

the circuit of the electric motor and connects the motor to the carriage, a latch for retaining the carriage-return key in its circuit-closing position, a supplemental key, connections between the supplemental key and the carriage-return key, whereby when the supplemental key is depressed it carries with it the carriage-return key, and mechanism connected to the carriage-return key to render the latch inoperative when that key is depressed, whereby when the supplemental key is released the carriage-return key returns to its initial position; substantially as described.

26. In a typewriter carriage-return mechanism, the combination with the typewriter carriage, of a constant potential electric motor so rated with respect to the typewriter carriage as to have a strong field and heavy armature current at starting, whereby a high starting torque is developed, and in which the field is maintained substantially constant throughout the range of movement of the carriage, whereby an excessive speed is prevented, and mechanism for connecting the motor to the carriage.

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

NEAL LARKIN ANDERSON.

Witnesses:

W. C. IDOL,

J. F. BROWER, Jr.