

C. F. TAYLOR & H. P. BROWN.
TYPE WRITING MACHINE.

No. 511,373.

Patented Dec. 26, 1893.

Fig. 1.

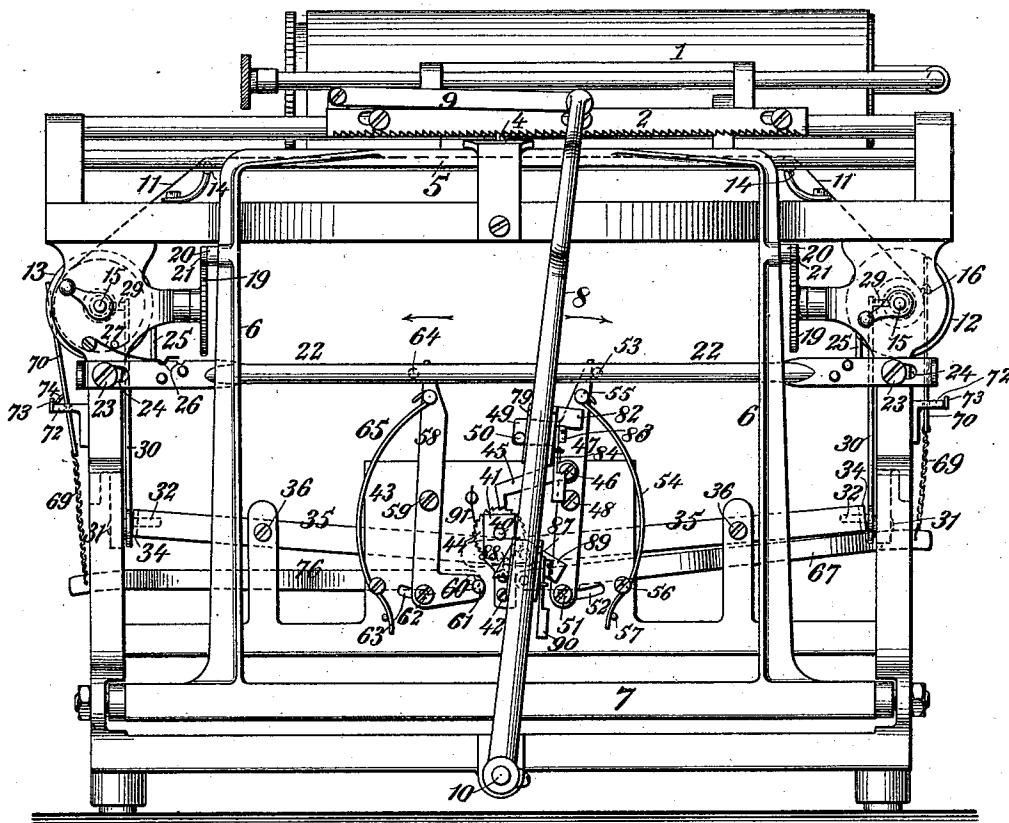
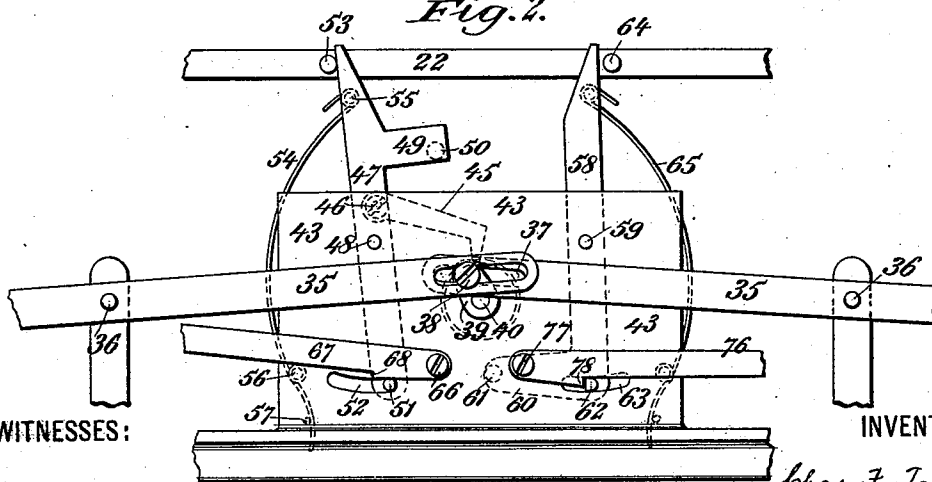


Fig. 2.



WITNESSES:

R. H. Hayward

Ida C. Macdonald

INVENTORS

BY

Chas. F. Taylor
Harold P. Brown

Donnelly & Feltel
ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

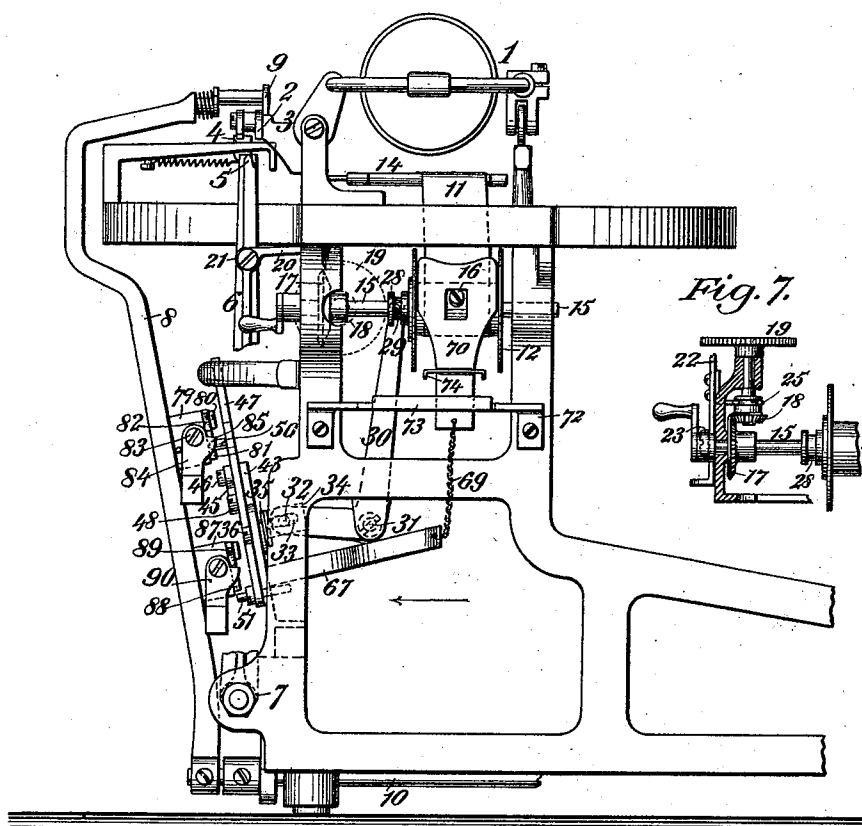


Fig. 7.

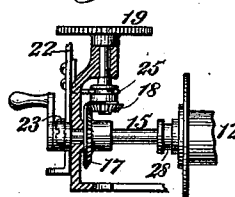


Fig. 5.

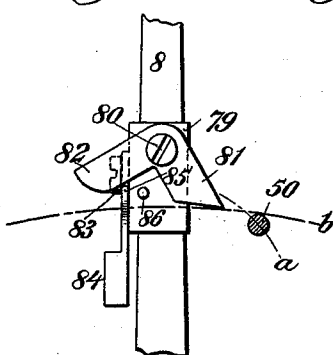


Fig. 4.

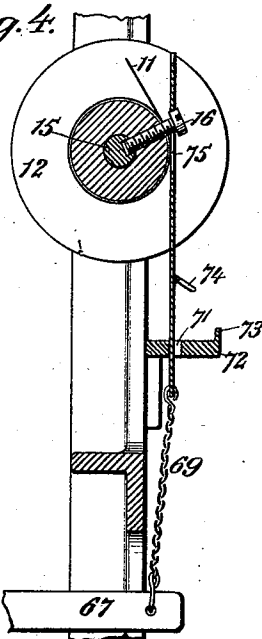
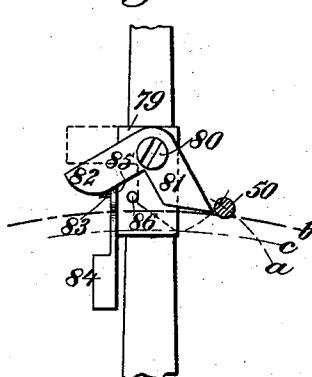


Fig. 6.



WITNESSES:

O. H. Hayworth

Ira C. McDonald

INVENTORS

Chas. F. Taylor

Harold J. Brown

BY

Sonnelly & Fitch

ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES FAYETTE TAYLOR AND HAROLD P. BROWN, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 511,373, dated December 26, 1893.

Application filed May 27, 1893. Serial No. 475,767. (No model.)

To all whom it may concern:

Be it known that we, CHARLES FAYETTE TAYLOR and HAROLD P. BROWN, citizens of the United States, and residents of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

10 Our invention relates to that class of type writing machines employing an inking ribbon, and has for its main object to provide means for automatically moving the ribbon widthwise, and also means for automatically reversing the longitudinal direction of movement of the ribbon, whereby in the first place practically the entire surface of the ribbon may be utilized, and in the second place the attention of the operator is not required when the ribbon has completed its travel in one direction or entirely unwound from one spool and needs reversing. Since the longitudinal and transverse movements of the ribbon, as well as the reversing actions thereof all take place automatically, the operator is entirely relieved of the care of the usual hand switching devices and the machine may continue in operation indefinitely or until the ribbon has been worn out or exhausted.

30 Our invention consists in certain features of construction and combinations of devices which will hereinafter be more fully described and particularly pointed out in the appended claims.

35 In the accompanying drawings, Figure 1 is a rear elevation of as much of a type writing machine as is necessary to illustrate our several improvements. Fig. 2 is an enlarged detail view of parts of the mechanism for moving the ribbon laterally, and also for reversing its lengthwise movements, the view being taken from the front side of the machine, or looking in the direction of the arrow at Fig. 3, and the carriage driving arm and its attachments being omitted. Fig. 3 is a side elevation looking at the left hand side of the machine, considered from the front thereof. Fig. 4 is an enlarged vertical section to illustrate the construction and operation of part of the means employed in connection with the reversal of the ribbon. Fig. 5 is an enlarged detail view (looking from the front, or in the

direction of the arrow at Fig. 3) of the carriage driving arm and one set of the devices thereon employed to actuate the ribbon shifting levers, the pin or projection on one of said levers being also shown. Fig. 6 is a view similar to Fig. 5, but with some of the parts in different positions, and Fig. 7 is a detail view of the gears and fork.

In the several views the same parts will be found designated by the same numerals of reference.

As we have applied our improvements in practice to that type of machines known as the "Caligraph," we have herein shown the same in connection with such style of machine, but we of course do not wish to limit ourselves thereto.

1 designates the paper-carriage as an entirety, which is supported at its front by a wheel, which travels upon a track or way, and at its back by a yoke which travels upon a guide-rail.

2 designates a compound feed-rack mounted on a hinged frame 3 connected to the yoke, and 4 is a feed-pawl mounted centrally at the upper end of a horizontal bar 5, which by vertical arms 6 is connected to a rocking frame 7 pivoted near the base of the machine, and carrying as usual a universal-bar, over which extend the key-levers (not shown), all as usual in the "Caligraph."

8 designates the carriage driving arm which is connected at its upper end by a link 9 to the paper-carriage through the hinged frame and yoke, said arm being connected at its lowermost end to the usual spring-actuated horizontally-arranged driving shaft 10, beneath the key-levers.

11 designates the inking ribbon, which is connected at one end to the left hand spool, as 12, (considered from the front of the machine,) and at its other end to the right hand spool 13, the ribbon in passing from the spool 12 extending inwardly and upwardly over a supporting roller 14, thence horizontally across the machine beneath the vertical axis of the platen, and thence over another supporting roller 14 and downwardly and outwardly to the ribbon-spool 13. Each ribbon spool is mounted to slide on a shaft 15, and also to turn therewith, the shaft being grooved longitudinally, and a screw 16 passing

through the spool about centrally and entering a groove in the shaft. By this construction the spool is compelled to turn with the shaft, while at the same time it may be moved or slid longitudinally thereon. Each spool shaft is provided with a small beveled toothed wheel 17, which is adapted to be engaged at certain times by another beveled toothed wheel 18 adapted to slide to and from the wheel 17 on a short shaft, which at its inner end is provided with a ratchet wheel 19 adapted to be moved step-by-step by a driving pawl 20, pivoted at 21 upon the arm at each vibration of the rocker-frame, or at each depression of a finger-key or spacing key. The arrangement is such that when one set of the gears 17 and 18 is in engagement to positively turn its associated ribbon-spool, the other set on the opposite side of the machine is out of engagement, although at all times the driving pawls 20 when moved turn both ratchet wheels 19. The two sets of bevel gears 17 and 18 are drawn alternately into and out of engagement by a shifter 22, which extends across the machine at the back and is supported at its ends by screws 23, portions of the shifter or switch being slotted at 24 to provide for endwise movements thereof. Near each end of the shifter is provided a vertical arm or fork 25 which engages the hub of the sliding beveled wheel 18, and hence is adapted to move the same on its short shaft when the shifter is moved, the arrangement being such that one of the gears 18 is moved out of engagement with its associated gear 17 when the shifter is moved in one direction and simultaneously the other one of the gears 18 is moved into engagement with its associated gear 17. The shifter is provided with two notches 26 along its upper edge at one end to receive the bent end of a spring 27 which holds the shifter and its connections against casual displacement in either of its shifted positions. When the gears 17 and 18 associated with the spool 12, are in mesh, said spool is positively driven by said gearing through the step-by-step movements of its ratchet wheel 19, and the ribbon is wound upon said spool, the gears of the spool 13 being at this time out of engagement, and leaving said spool free to turn in the opposite direction and pay off its ribbon in accordance with the winding action of the spool 12. This means for winding the ribbon first upon one spool and then upon the other, after manipulation of the shifter, will be found more fully shown and described in the Letters Patent granted to Fairfield and Francis February 4, 1890, No. 420,870, and need not be herein more specifically set forth.

In the Fairfield and Francis machine, the shifter 22 is constructed and arranged for movements by hand to reverse the direction of movement of the ribbon, but we have devised means for effecting such movements automatically, as will presently appear. In said Fairfield and Francis patent a pair of ribbon car-

riers is also provided for automatically moving the ribbon widthwise, the ribbon spools remaining stationary during such widthwise movements of the ribbon. In our machine we move the ribbon widthwise by moving the spools back and forth upon their shafts and by the mechanism and in the manner which will now be explained together with the means for reversing the longitudinal movements of the ribbon. The rear end of each spool is provided with a grooved collar 28, with which engages a pin 29 at the upper end of a bell crank or bent lever 30, pivoted at 31 in an extension of the frame work. The rear shorter arm of the lever 30 is provided with a pin 32, which extends inwardly and through a slot 33 formed in the outer bent end 34 of a lever 35 pivoted at 36 in an upwardly extending arm of the frame work. Each bent lever 30 vibrates in a plane parallel with the ribbon spool shaft, while its associated actuating lever 35 vibrates in a plane at right angles thereto. The levers 35 are arranged transversely of the machine, but their outer ends are bent to project forward longitudinally of the machine, as at 34, and are slotted, as at 33, to receive the inwardly extending pin 32 from the bent lever and permit the latter to be vibrated. The levers 35, provided one for each bent lever and ribbon spool, extend inwardly to about the center of the machine widthwise and overlap. At their overlapping portions each is provided with a slot 37, and through both these slots passes the crank or wrist pin 38, of a crank or eccentric 39, fixed on a short shaft or arbor 40, having a bearing in a bracket or plate 41, secured by screws 42 to a comparatively large supporting plate 43, preferably formed integral with the frame work. Upon said arbor 40 is mounted a ratchet wheel 44, which is adapted to be driven intermittently by a pawl 45, pivoted at 46 upon a vertically arranged lever 47, which itself is pivoted at 48 upon the plate 43. The lever 47 is formed near its upper end with an inwardly extending arm 49, which is provided with a rearwardly projecting pin 50, and said lever at its lowermost end is provided with a pin 51, which projects forwardly through an arc shaped slot 52 in the plate 43. The uppermost end of said lever 47 is adapted to engage with a forwardly projecting pin 53 on the switch or shifter 22. A wire spring 54 is provided to actuate the lever 47 in one direction and to move the shifter to the left, as will hereinafter be more fully explained. This spring is hooked at its upper end upon a stud 55, and after passing around a screw 56 on the plate 43 its lower end bears against a pin 57 on said plate. The tension of said spring serves to vibrate the upper end of the lever in the direction of the arrow at Fig. 3.

58 designates another vertically arranged lever, which is pivoted at 59 on the plate 43, and which at its lower end is formed with an inwardly-projecting arm 60, provided with a rearwardly projecting pin 61. The said le-

ver is also provided at its lower end with a forwardly projecting pin 62, which travels in an arc-shaped slot 63 formed in the plate or bracket 43. The uppermost end of the lever 58 is adapted to engage at certain times with a pin or projection 64 on the shifter 22, and is provided with a spring 65 similar to that marked 54, and having a tendency to vibrate the upper end of the lever in the direction of the arrow shown at Fig. 1.

Pivoted at 66 on the plate 43 is an arm or lever 67 which is provided with a hook or shoulder 68, near the pivot and which is curved or bent (to embrace the connecting rods of the type-bars not shown), and is extended outwardly and terminates at the left hand side of the machine beneath the ribbon spool 12. To the free end of this lever 67 is connected the lower end of a chain or flexible connection 69, whose upper end is attached to an upright plate 70, the lower portion of which extends down through a slot 71 in a horizontal bracket 72, which is provided with a vertical ledge 73. The plate 70 which is preferably made of thin, light sheet-metal, is provided with a rest 74 which is preferably made of a piece of wire soldered to the plate and bent at its ends downwardly and outwardly. Normally the ends of the wire rest bear against the ledge 73. The upper portion of the plate 70 is provided with an opening 75 preferably square or oblong in outline, which when the ribbon has been unwound from the spool 12 is adapted to be engaged by the head of the screw 16 during its turning movement with the spool, and to be lifted thereby, as shown at Fig. 4. When the plate is thus lifted the chain and the outer end of the lever 67 are also lifted and the hook 68 is caused to release the pin 51 of the lever 47, as will presently be more fully described. Another lever 76 pivoted at 77 and having a hook or catch 78 for the pin 62 of the lever 58, extends around to the right hand side of the machine beneath the ribbon spool 13, and is connected at its free end by a chain 69 to a plate 70, similar in construction to that used in connection with the spool 12, and the spool 13 is provided with a screw 16 to work in conjunction with said plate in the manner above described with reference to the spool 12. When the plate 70 associated with the spool 13 is lifted, the lever 76 is lifted and the pin 62 released from the catch or hook 78. When the pin 62 is thus released the spring 65 on the lever 58 will throw the upper end of the lever in the direction of the arrow at Fig. 1, and by reason of its contact with the pin 64 the shifter 22 will be moved toward the right, thus disengaging the beveled gears 17 and 18, which drive the ribbon spool 12, and engaging the similar gears which drive the ribbon spool 13; and when the hook 68 is in engagement with the pin 51 and the lever 67 is raised, the spring 54 of the lever 47 will throw the upper end of said lever in the direction of the arrow at Fig. 1,

and by reason of its contact with the pin 53 move the shifter in the opposite direction, and change or reverse the engagement of the driving gears 17 and 18.

Means are provided for automatically resetting or re-latching the shifter levers 47 and 58, and said means are preferably arranged upon or carried by the driving arm 8, as will now be described.

On the said driving arm, about midway of its length, is soldered or otherwise secured a block or support 79 to the face of which is pivoted by a screw pin 80, a pawl or driver 81, which is formed with an extension 82, and upon the left hand side of the block 79 is pivoted at 83 a weighted bent lever 84, the inner projecting arm or portion 85, of which works against the bottom edge of the extension 82 for the purpose of maintaining the pawl or driver 81 at all times in its proper working position. We prefer to weight or make heavy the lower end of the lever 84 rather than to apply a spring to said lever, since we have found in practice that the action of a weighted lever is more positive and perfect than that of a spring-actuated one, but of course the latter may be used if desired. The pawl 81 is adapted at certain times to engage with the pin 50 on the lever 48, and in order that said pawl may be rigidly held at such times and positively actuate said lever, a stop pin 86 is arranged to project from the block 79. Upon the driving arm 8, below the block 79, is arranged another block or support 87, which is provided with a pivoted pawl 88 having an extension 89 and also provided with a pivoted weighted pawl-controlling lever 90, the pawl 88 being adapted to engage at certain periods with the pin 61 on the lever 58. The pawls or drivers 81 and 88 and their extensions 82 and 89 and the weighted levers 84 and 90 are constructed, arranged and operate in precisely the same manner, the upper set of devices working in conjunction with the spring actuated lever 47, and the lower set of devices operating in connection with the spring actuated lever 58.

At Figs. 5 and 6 the arrangement and operations of the upper set of devices are illustrated on an enlarged scale, but these views apply equally well to the lower set of devices.

In view of the foregoing the further description of the operation of the mechanisms constituting our invention will be readily understood by those skilled in the art. The drawings are intended to illustrate that the ribbon 11 has been entirely wound upon the spool 13; that the screw 16 on the spool 12 has lifted, through the plate 70 and chain 69, the latch lever 67 and released the spring actuated lever 47; and that the latter has moved the shifter 22 toward the left and engaged the gears 17 and 18 at the spool 12, so that the ribbon will now wind from the spool 13 upon the spool 12 during the further operation of the machine. In order that the lever 47 may repeat this action when in course of

time the spool 12 becomes empty again it must be re-set or again put under tension and locked, and this is accomplished by the pawl 81 in the following manner:—When the carriage is returned to the right for the beginning of a new line and the driving arm sweeps in the same direction, the pawl 81 engages with the pin 50 on the lever 47. Upon contact with said pin, the pawl is first arrested and then as the driving arm continues to move the pawl is vibrated independently about its pivot until its rear edge strikes against the stop pin 86; then owing to the rigidity of the pawl it operates to move the pin 50 to the right and downwardly in the path represented by the dotted arc *a*, which is struck from the pivot of the lever 47, and by such movement cause said lever to vibrate about its pivot, and the pin 51 on the lower end thereof to move toward the left and become engaged by the hook 68 of the latch lever 67, which rests upon said pin and falls by gravity when the pin has arrived at the hook or notch 68. This vibration of the lever is of course effected against the opposition of its spring and when said lever is engaged by the latch lever it is locked or held under tension and in condition to again move the shifter when released by the raising of the latch lever. The point of the pawl 81 travels normally in the arc *b*, which is struck from the axis of motion of the driving arm, but when momentarily arrested by the pin 50 and independently vibrated, it travels in the path represented by the arc *c*. When the pin 50 and the pawl part company upon the resetting of the lever 47 the weighted lever 84 causes the pawl to vibrate back again to normal position, and it thereafter during the winding of the ribbon upon the spool 12 moves in the path *b* and above the plane of the pin 50. It will be understood of course that when the lever 47 is unlocked the pin 50 is carried slightly upward by the vibration of the lever and hence in the path of travel of the point of the pawl, as shown at Fig. 6, and that when the said lever is vibrated in the opposite direction and locked the pin 50 is carried down below the plane of the point of the pawl and out of its path of movement, as indicated at Fig. 5. The re-setting of the lever 47 having been effected the ribbon will now wind upon the spool 12 step-by-step until wholly unwound from the spool 13. When this occurs the screw 16 of the spool 13 will engage with the opening in its associated plate 70, gradually lift the same, and at the proper moment raise the latch lever 76 and cause a releasement of the pin to permit the lever 58 to vibrate under the force of its spring and effect a movement of the shifter toward the right, thus disengaging the driving gears of the spool 12 and re-engaging the driving gears of the spool 13. Thereafter the ribbon will wind upon the spool 13. The vibration of the lever 58 causes its pin 61 to ascend slightly and take a position in the path

of the pawl 88, so that when the driving arm is next swept to the right, on the return of the carriage, said pawl may contact with said pin in the manner above explained with reference to the pawl 81 and re-set or re-latch the lever 58, for renewed action at the proper time. During the feed of the ribbon from one spool to the other, both of the levers 47 and 58 are in a latched condition and hence neither of the pawls 81 or 88 contacts with the pins 50 or 61. It will thus be seen that the ribbon is adapted to be wound first upon one spool and then upon the other and that the reversal is effected automatically, the gear shifter being moved first in one direction by one shifter lever, and then in the other direction by another shifter lever. The means for re-setting said levers being connected to the carriage driving power and operating during the return of the carriage under the push or pull thereon by the operator, no resistance is felt at the finger-keys, during the time of writing, and the re-setting devices are relatively so arranged that no extra power is required to move the levers during the return of the carriage. The rest 74 on the latch-lifting plate 70 not only prevents the plate from falling through the slot 71, but it is so arranged that the tendency of the upper end of the plate is toward the ribbon-spool, and hence such portion of the plate always rests lightly against the ribbon, whether the spool be wholly or partially filled, excepting at the time the reversing action is to take place and when the screw is in engagement with the opening in said plate. This tendency of the upper portion of the plate toward the ribbon-spool is assisted by the weight of the outer end of the latch lever and the chain connection therefrom to the plate. As the spool grows larger in diameter by taking on ribbon the upper portion of the plate moves outward accordingly, and as the spool grows smaller in diameter the upper portion of the plate moves inwardly, and hence is always in the proper position to be engaged by the screw 16 when the latter has been uncovered and its protruding end comes around to catch said plate, thus making the action positive and reliable.

We will now describe more fully the operation of moving the ribbon-spools and the ribbon laterally or widthwise.

When the lever 47 has been unlatched and permitted to throw the shifter 22 toward the left the pawl 45 on said lever moves back one tooth on the ratchet wheel 44, and when said lever is again re-set or vibrated back to its normal, latched position the said pawl is caused to turn the ratchet wheel the distance of one tooth and accordingly to move the crank or wrist pin around one step or part of a revolution. The crank pin working in the slots of the levers 35 operates to vibrate them slightly for each movement given it, and by the vibration of said levers the bell-crank levers 30 connected thereto are actuated and caused to move the ribbon spools in unison

along their shafts. During a half revolution of the crank the ribbon spools and the ribbon are moved in one direction and during the other half revolution of said crank the ribbon spool and ribbon are moved in the opposite direction. In the arrangement shown, when the crank descends the ribbon spools and the ribbon are moved forward, and during the ascent of the crank these parts move backward.

A detent 91 is provided to prevent any accidental return movement of the ratchet wheel 44. Since the lever 47 is moved for re-setting once only during two reversals of the ribbon longitudinally, the ribbon will be moved laterally only one step while the ribbon moves from one spool to the other and then returns. For this reason, the types will print twice along the same line longitudinally of the ribbon, but of course if desired another driving pawl may be mounted upon the lever 58 to turn the ratchet wheel 44 during each resetting of said lever, and thus provide a new line or surface for the types at each reversal of the ribbon longitudinally.

It will be understood of course that it is a great disadvantage to make the paper-carriage in its movement toward the left, or during the depression of the key levers, perform the additional work of reversing the ribbon, or of moving it widthwise, because this not only puts more work on the fingers in writing but checks the speed of writing, and causes frequent errors by checking the speed of the carriage during its spacing movement.

In moving the carriage to the right there is an abundance of surplus power, as the motion is made by the entire arm, and not by a single finger. Therefore, the additional work of reversing the ribbon movement, of resetting the latches, and of moving the ribbon-spools and ribbon widthwise is not perceptible in our machine, and the fingers are consequently greatly relieved.

Numerous changes in detail construction and arrangement may be made without departing from the gist of our several improvements, and as far as some of the same are concerned, different means from those herein shown may be employed for rotating the spools to move the ribbon longitudinally. For instance, our improved mechanism for moving the ribbon widthwise may be used with any means for moving the ribbon lengthwise, and our improvements for reversing the longitudinal movements of the ribbon may be also used with any means for moving the ribbon lengthwise alternately from one spool to another; and again, our improved means for reversing the lengthwise movement of the ribbon may be used without any means for moving the ribbon laterally, and the means for moving the ribbon laterally may be used without any means for automatically reversing the ribbon. We do not, therefore, wish to be limited entirely to the use of all of the mechanism shown, as some may be used without others.

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

1. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected each to one of said bell-cranks, and a crank or eccentric arranged to vibrate said levers and move the ribbon widthwise.
2. In a typewriting machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected to said bell-cranks, a crank or eccentric for vibrating said levers, and a pawl and ratchet mechanism for turning said crank or eccentric step-by-step.
3. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected to said bell-cranks, a crank or eccentric for vibrating said levers, a pawl and ratchet mechanism for turning said crank or eccentric step-by-step and operated periodically by connections to the carriage driving mechanism.
4. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected to said bell-cranks, a crank or eccentric for vibrating said levers, a pawl and ratchet mechanism for turning said crank or eccentric step-by-step, a lever carrying said pawl, a carriage driving arm, and a pawl thereon for vibrating the pawl-carrying lever during the return of the carriage to the right.
5. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected to said bell-cranks, a crank or eccentric for vibrating said levers, a ratchet wheel mounted on the crank arbor, a pawl for turning said ratchet wheel, a lever carrying said pawl, a spring for throwing said lever in one direction, a latch for holding the said lever in one position against the tension of said spring, means for unlatching said lever, and means for re-latching said lever and simultaneously effecting a partial rotation of said ratchet wheel.
6. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools or carriers, a pair of bell-cranks connected thereto, a pair of levers connected to said bell cranks, a crank or eccentric for vibrating said levers, a ratchet wheel mounted on the crank arbor, a pawl for turning said ratchet wheel, a lever carrying said pawl, a spring for throwing said lever in one direction, a latch for holding said lever in one position against the tension of said spring, means for unlatching said lever, a carriage driving arm, and a pivoted pawl on said arm for re-latching said lever and simultaneously actu-

ating said ratchet wheel during a movement of said driving arm and carriage toward the right.

7. In a type writing machine, the combination of an inking ribbon, a ribbon spool, a vertically-arranged bell-crank connected thereto, a horizontally-arranged lever connected to said bell-crank at right angles thereto, and a crank or eccentric connected to said horizontally-arranged lever for vibrating the same and causing it to vibrate the bell-crank, and the latter to move the ribbon spool back and forth.

8. In a type writing machine, the combination of an inking ribbon, a ribbon-spool, a vertically-arranged bell-crank connected thereto, a horizontally-arranged lever connected to said bell crank, a crank or eccentric for vibrating said levers, a pawl and ratchet mechanism, a carriage driving arm, and intermediate means for actuating the pawl and ratchet mechanism through the movements of said driving arm.

9. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for laterally moving said spools, a shifter connected to said spool-turning means, for changing the direction of movement of the ribbon, a spring actuated lever connected to said shifter, a latch for holding said lever against the tension of its spring, and means for releasing said lever to effect a movement of said shifter and of the means for driving the ribbon spools, whereby the direction of movement of the ribbon is reversed.

10. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for alternately moving said spools, a shifter connected to said spool-turning means, for changing the direction of movement of the ribbon, a spring-actuated lever connected to said shifter, a latch for holding said lever against the tension of its spring and connected to one of the ribbon spools and adapted to release said lever when said spool becomes empty.

11. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for alternately moving said spools, a shifter connected to said spool-turning means, for changing the direction of movement of the ribbon, a spring-actuated lever connected to said shifter, a latch for holding said lever against the tension of its spring, a latch-lifter arranged in proximity to one of said spools, and means on said spool for raising said latch-lifter when said spool becomes empty, or the ribbon is to be reversed.

12. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for alternately moving said spools, a shifter connected to said spool-turning means, for changing the direction of movement of the ribbon, a spring-actuated lever connected to said shifter, a latch for holding said lever against the tension of its

spring, a latch-lifter arranged in proximity to one of said spools, a flexible connection between said latch-lifter and the said latch, and a projection on said spool adapted to engage with said latch-lifter when the spool becomes empty and effect the releasement of the shifter lever to enable it to move said shifter and reverse the means for driving the ribbon longitudinally.

13. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for alternately moving said spools, a shifter connected to said spool-turning means, for changing the direction of movement of the ribbon, a spring-actuated lever connected to said shifter, a latch-lever for holding said lever in one position against the tension of its spring, a latch-lifter having a perforation and a rest and flexibly connecting the said latch lever, a stand or bracket for said rest, and a screw or projection on said ribbon spool for raising the said latch lifter when the spool becomes empty or the ribbon is to be reversed.

14. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, gears for alternately rotating said spools, a shifter connected to said gears, a spring-actuated lever adapted to move said shifter, a latch-lever, a lifter therefor adapted to move in a slot in a stand or bracket, and having a rest and a perforation, and a screw or projection on one of the spools to raise said lifter when the spool becomes empty or the ribbon is to be reversed.

15. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for alternately rotating said spools, a shifter connected to said spool turning means and provided with a pin, a spring-actuated lever adapted to engage therewith at its upper end and provided at its lower end with a pin, a latch-lever adapted to engage the last mentioned pin and extended out beneath one of the ribbon-spools, a lifting plate flexibly connected to said latch lever and guided and supported in a manner to fall always toward said ribbon-spool, and means upon said spool to engage and raise said lifter.

16. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for moving said ribbon lengthwise, and a suitable shifting mechanism, of a spring actuated driving mechanism connected to one of the ribbon spools and to the shifting mechanism adapted and arranged to throw the shifting mechanism into action, when the ribbon spool becomes empty, by and through the continued rotation of said spool.

17. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for moving said ribbon lengthwise, a shifter connected thereto, a spring acting mechanism normally under tension and adapted to drive said shifter when released, and means connected to said spring acting

mechanism and one of said spools, for releasing said spring acting mechanism, and put into motion by said ribbon spool at or about the time the ribbon is unwound therefrom.

18. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for moving the ribbon lengthwise, a shifter for said mechanism, a spring acting mechanism for moving said shifter connected to and controlled by one of said spools, and means for re-setting said mechanism after the shifter has acted and reversed the direction of movement of the ribbon.

19. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for moving the ribbon lengthwise, a shifter for said mechanism, a spring acting mechanism for moving said shifter, a latch mechanism connected to one of the ribbon spools, for holding said spring acting mechanism normally under tension, devices connected with said ribbon spool for actuating said latch mechanism when the spool becomes empty and thus unlocking said spring acting mechanism to permit it to drive said shifter, and means for re-setting the said spring-acting mechanism, connected to the carriage driving arm and operating upon a return movement of the paper-carriage.

20. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for turning the same, a shifter connected thereto, a spring acting mechanism for moving said shifter, a latch mechanism connected thereto and operated by one of the ribbon spools, a carriage driving arm and a pawl thereon adapted to engage the spring acting mechanism and re-set the same after releasement by the latch mechanism and on a movement of the carriage driving arm toward the right.

21. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for turning the same, a shifter connected thereto, a spring actuated lever provided with a pin, a latch-lever adapted to normally hold said spring actuated lever against the tension of its spring, connections between said latch lever and one of the ribbon spools whereby the spring actuated lever may be released when said spool becomes empty, a carriage driving arm, and a pivoted pawl thereon for engaging said pin and resetting or re-latching said spring actuated lever.

22. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for turning the same, a shifter connected thereto, a spring actuated lever provided with a pin, a latch lever adapted to normally hold said spring actuated lever against the tension of its spring, connections between said latch lever and one of the ribbon spools, whereby the spring actuated lever may be released when said spool becomes empty, a carriage driving arm, a pivoted pawl thereon, a stop for said pawl, and means for normally holding the point of said pawl, in a

position to positively engage the pin on said spring actuated lever after its releasement by the latch mechanism.

23. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for turning the same, a shifter connected thereto, a spring actuated lever provided with a pin, a latch lever adapted to normally hold said spring actuated lever against the tension of its spring, connections between said latch lever and one of the ribbon spools, whereby the spring actuated lever may be released when said spool becomes empty, a carriage driving arm, a pawl pivoted thereon, a stop for said pawl, an extension on said pawl, and a weighted lever for holding said pawl positively in a position such that it will engage the pin of the spring actuated lever after the latter has been released by the latch lever.

24. In a type writing machine, the combination with an inking ribbon, a pair of ribbon spools, means for turning the same, a shifter connected thereto, a lever pivoted between its ends and adapted to move said shifter and provided with a spring, two pins on said lever, a catch lever adapted to engage one of said pins and connected to one of the ribbon spools, substantially as described, and a pivoted pawl connected to the carriage driving arm and adapted to engage the other one of said pins on said lever after releasement thereof by the latch lever and for the purpose of re-setting said spring actuated shifter lever.

25. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for rotating the same, a shifter connected thereto, a pair of spring actuated levers adapted to move said shifter in opposite directions, and a latch mechanism connected to each of spring actuated levers and also to one of said ribbon spools.

26. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for rotating the same, a shifter connected thereto, a pair of spring actuated levers, a latch mechanism connected to each of said spring actuated shifter levers and to one of said spools, and a means for re-setting each of said spring-actuated shifter levers after releasement by the action of the latch mechanism.

27. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for rotating the same, a shifter connected thereto, a pair of spring actuated levers, a latch mechanism connected to each of said spring actuated shifter levers and to one of said spools, a carriage driving arm, and a pair of driving pawls connected thereto to re-set said spring actuated shifter levers during the return movements of the carriage.

28. In a type writing machine, the combination of an inking ribbon, a pair of ribbon spools, means for rotating the same and moving the ribbon longitudinally, a shifter con-

needed thereto, means for moving said spools
endwise and moving the ribbon laterally, a
shifter connected to the means for moving the
ribbon longitudinally, a pair of spring actu-
5 ated levers connected to said shifter, one of
said levers carrying means to actuate the
mechanism for moving the ribbon laterally,
and a latch mechanism connected to each of
said spring actuated shifter levers and to one
10 of said spools, whereby the ribbon is moved
laterally at the same time that the mechanism
is shifted for reversing its longitudinal
movement.

29. In a type writing machine, the combination of an inking ribbon, a pair of ribbon
15 spools, gears for rotating the same, a pair of
bell cranks, a pair of actuating levers there-
for, a crank or eccentric connected to the last
mentioned levers, a ratchet wheel, a shifter,
20 a pair of spring actuated levers, one of which
carries a pawl for said ratchet wheel, a pair
of latch levers, a pair of lifters therefor flexi-
bly connected thereto and arranged to be al-
ternately raised by the rotative actions of said
25 spools, and a carriage driving arm provided
with means for resetting said spring actuated
shifter levers.

30. In a type writing machine having an

inking ribbon wound on two spools, a paper-
carriage, and means of moving the ribbon lon- 30
gitudinally, the combination of means for
storing power exerted while moving said car-
riage to the right, and a latch or trigger for
releasing said power and thereby reversing
the movement of the ribbon whenever the lat- 35
ter reaches the end of its travel.

31. In a type writing machine having an
inking ribbon, wound on two spools, and means
for moving the ribbon longitudinally, the combination of means of storing power exerted 40
while moving said carriage to the right, a latch
or trigger for releasing said power and there-
by reversing the movement of the ribbon
whenever it reaches the end of its travel, and
means for moving said spools and ribbon lat- 45
erally by the motion of the paper-carriage to
the right.

Signed at New York city, in the county of
New York and State of New York, this 15th
day of May, A. D. 1893.

CHARLES FAYETTE TAYLOR.
HAROLD P. BROWN.

Witnesses:

PHILLIPS ABBOTT,
IDA C. MACDONALD.