

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED MAY 14, 1912.

1,069,985.

Patented Aug. 12, 1913.

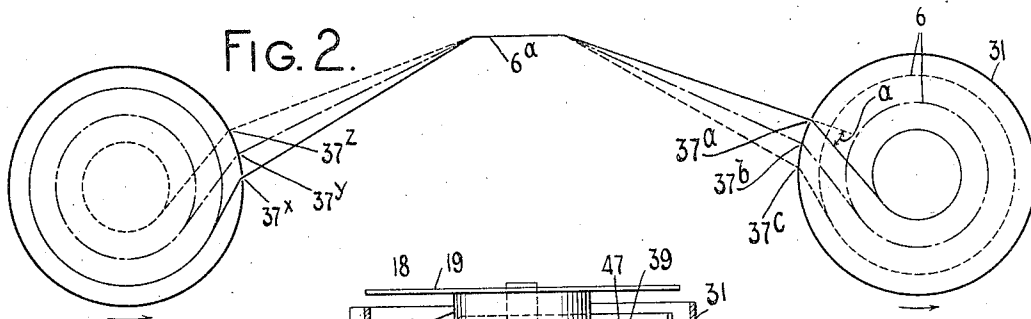
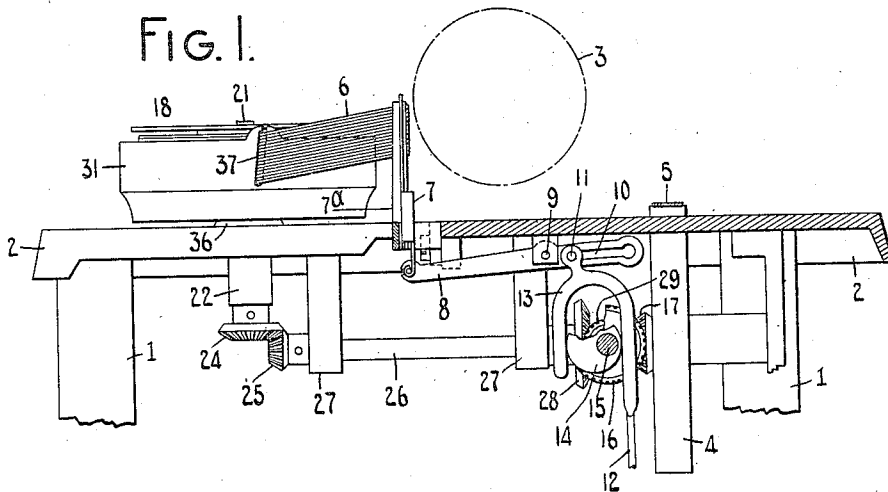


FIG. 5.

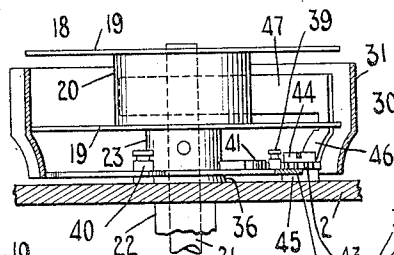
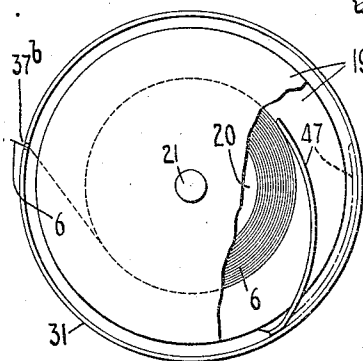
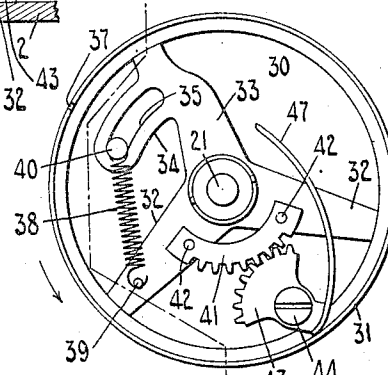


FIG. 4.

FIG. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,069,985.

Specification of Letters Patent.

Patented Aug. 12, 1913.

Application filed May 14, 1912. Serial No. 697,307.

To all whom it may concern:

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to ribbon mechanism for typewriting machines and has for its chief object to provide novel ribbon guiding and controlling devices.

More specifically the object of the invention is to minimize the strain and consequent wear on the ribbon arising from the varying angle and changing speed at which the ribbon passes over the side guides located between the central guide, which is usually a vibrator, and the ribbon spools or carriers. For example, in the Monarch front-strike typewriting machine the ribbon passing from the central ribbon carrier or vibrator to the winding-on spool, first engages with a guiding slot or device in the spool cup or container, and its course is thereby deflected so that within the container it follows a path which is tangent to the wound-up portion of the ribbon on the spool and is at an angle to that portion of the ribbon which extends from the guide slot to the vibrator. When the spool is empty this angle is about 30° , which experience has shown to give the minimum resistance from the drag or friction of the ribbon in passing through the slot, this drag being necessary to properly control the ribbon. If the ribbon followed a perfectly straight course from the vibrator to the spool it would crease and become stringy, owing to the fact that the vibrator is at a higher level than the spool and consequently the ribbon follows an inclined course from the vibrator down to the spool, and not a horizontal course. The intermediate guiding device or guide slot is necessary to deflect the ribbon from this straight course and keep it ironed out and flat, overcoming its tendency to crease and become stringy. In prior constructions, as the amount of ribbon wound on the spool becomes greater and the diameter consequently increases, the angle be-

tween the parts of the ribbon at opposite sides of the guide slot (or that part of the ribbon within the spool cup and that part between the spool cup and the vibrator) gradually increases so that when the ribbon is entirely wound up the angle has increased from the desirable angle of 30° to about 70° . The result is that the ribbon is subjected to a gradually increasing resistance at the guide slot which with the gradually increasing velocity with which it is fed results in injury to the ribbon fabric and increases the wear and the tendency to become raveled at the edges.

In carrying out my present invention I provide a rotatable spool cup or container which is operated by connections that are controlled by the wound-up portion of the ribbon so that the rotary movement of the cup and the consequent variation in the location of the guiding device or slot provided therein or supported thereby, corresponds with the amount of ribbon on the spool, the consequence being that the deflection or angle in the ribbon course or path is maintained substantially uniform at all times and the drag or friction at the guide will be reduced to the minimum required to control it and keep it ironed out flat.

To the above and other ends, my invention consists in the features of construction, combinations of devices and arrangements of parts hereinafter described and particularly pointed out in the claims.

While I have illustrated my invention, as applied to a monarch front-strike typewriting machine it should be understood that the principles of said invention may be embodied in other styles of writing machines.

In the accompanying drawings, Figure 1 is a fragmentary front to rear central sectional view of the upper portion of a Monarch typewriting machine embodying my invention. Fig. 2 is a diagrammatic plan view showing the courses or paths followed by the ribbon in passing from one ribbon spool or carrier to the other. Fig. 3 is a plan view of the cup or container for the ribbon spool or carrier together with the associate parts, the ribbon spool being omitted from the drawing. Fig. 4 is a vertical sectional view

taken on planes indicated by the broken dotted line $x-x$ in Fig. 3 and looking in the direction of the arrow at said line, the ribbon spool or carrier being added in Fig.

4. Fig. 5 is a plan view of the spool and its container, the upper head or flange of the spool being broken away and the spool being shown about half full.

As shown in Fig. 1, the main frame of the Monarch machine comprises uprights or posts 1 supporting a top plate 2 above which is a platen diagrammatically illustrated at 3, the platen being mounted in a reciprocatory carriage which is adapted to be drawn leftward by a motor or spring drum 4 acting through a strap 5. The types (not shown) are adapted to cooperate with the front face of the platen through a ribbon 6 which is wound upon spools hereinafter described. About centrally or midway between the spools but in a plane behind the spools, the ribbon is threaded through a ribbon guide which maintains the printing portion of the ribbon in the vicinity of the printing point. In the present instance the ribbon guide, designated as 7, is vibratory, being adapted to be moved up and down on a stationary support 7^a to cover and uncover the printing point. The actuating devices for the vibrator include a lever 8 having a fixed fulcrum 9, said lever being provided with a slot 10 engaged by a pin 11 on an actuating link 12 which in turn is operative from the printing keys as is well understood. The extent of throw of the vibrator is varied by changing the location of the pin 11 in the slot 10 by means comprising a strap 13 at the upper end of the link 12 and a cooperating eccentric 14 mounted on a ribbon driving shaft 15 which is operative from the spring drum 4 by connections comprising a pinion 16 on said shaft and an intermeshing pinion 17 connected with said drum.

The ribbon spools or carriers, of which there are two, each designated as a whole by 18, are horizontally arranged above the top plate, one at each side of the machine and forward of the platen, they being somewhat lower than the vibrator 7 normally is, as appears from Fig. 1. Each ribbon spool comprises a pair of parallel flanges 19 and a core 20 and is mounted at the upper end of a vertically arranged shaft 21 which is journaled in a bearing 22 depending from the top plate. The spool is supported on a collar 23 fixed to the shaft and through said collar is connected to turn with the shaft in the usual way. Fixed to the lower end of each shaft 21 is a small beveled gear or pinion 24 which intermeshes with a pinion 25 at the forward end of a horizontal shaft 26 journaled in lugs 27 depending from the top plate and provided at its rear end with a beveled pinion 28. Said pinion

28 is adapted to mesh with a driving pinion 29 secured to the driving shaft 15. There are two pinions 29 and as is well understood, these are spaced apart so that only one at a time can mesh with its cooperating pinion 28. By shifting the shaft 15 to and fro endwise the pinions 28 may be rendered alternately operative to turn their associate spools 18 to wind the ribbon thereon, causing it to move or feed longitudinally back and forth from onespool to the other. The means for shifting the driving shaft 15 endwise to reverse or change the direction of the ribbon feed is or may be of the usual construction found in the Monarch machine.

In carrying out my invention in the present instance, I replace the usual fixed cups for the ribbon spools or carriers with cups or containers novel in construction and mode of operation. My improved ribbon containers or cups, designated as a whole by the numeral 30, each comprises an annular body portion or ring 31 which surrounds and houses the associate ribbon spool. At the bottom the cup is provided with three radial arms 32 equally spaced apart and extending inward from the lower part of the ring 31 to a common center. Two of the arms are alike and are designated each by the numeral 32; while the third arm 33 is provided with an extension 34 formed with an arcuate slot 35 struck from the spool axis as a center. The junction of the radial arms is provided with a hole or bearing opening which enables the cup to fit over the associate shaft 21, said cup being adapted to turn loosely on said shaft co-axially with the associate ribbon spool. The bottom of the cup comprising the radial arms 32 and 33 is arranged between the bottom of the associate collar 23 and the usual boss 36 integral with the top plate 2. If found desirable to avoid unnecessary friction, the shaft 21 may be supported so that it will not bear directly on the radial arms. At its inner face the annular body 31 of each cup or container is provided with a guiding device or slot 37 which preferably is slightly inclined rearward from the vertical, as shown in Fig. 1, so as to counteract the tendency of the ribbon to ride upward and out of the slot. When the ribbon has been completely unwound from the spool so that the core 20 is bare, as is the case with the right-hand spool in Fig. 2, the slot or guiding device 37 is at the position indicated at 37^a. Said device is maintained in this position by controlling devices comprising a coiled draw spring 38 (Fig. 3) which extends fore and aft of the machine between the spool axis and the middle of the machine, and is hooked at its forward end to a pin 39 on one of the arms 32; while at its rear end said spring is hooked over a pin or stud 40 fixed to and rising from the top plate 2 and engaging in the

slot 35. The spring 38 tends constantly to turn the inner side of the spool cup rearward and to move the guide slot 37 toward the rear but this movement is limited by the engagement of the forward end of the slot 35 with the stud or stop 40 under or below the spring.

When the limit of rearward movement of the slot 37 is reached, as indicated in Fig. 3, and in the right-hand spool in Fig. 2, it will be observed from the latter figure that the slot 37 deflects the course or path of the ribbon from a straight line between the vibrator and the spool core. In other words, the portion of the ribbon between the guide 37 and the printing portion of the ribbon (which printing portion in Fig. 2 is indicated at 6^a) is at an angle to the portion of the ribbon within the cup and which extends from the guide 37 tangentially of the spool core. This angle is designated in Fig. 2 by the reference character α , and as shown is about 30°, experience having demonstrated that this is the most favorable angle for maintaining the friction of the ribbon over the guiding device at a minimum and at the same time giving a sufficient angle or diversion between the parts of the ribbon inside and outside the spool cup to keep said ribbon flat and unwrinkled, or "ironed out", as the expression is. In prior constructions where the spool cup was fixed, this favorable angle would begin to increase as soon as the ribbon would start to wind on the spool, thereby increasing the friction and consequent wear of the ribbon over the edge of the guide slot 37 in the spool cup, this trouble being aggravated by the increasing speed of the ribbon due to the enlarging diameter of the ribbon on the spool. I have provided controlling means for moving the guiding device or slot 37 or the working face thereof, with its support or spool-cup, progressively forward to extents corresponding with the amount of the ribbon wound on the spool core, with the result that the angle α is maintained substantially constant. Said controlling means in the present instance comprises a gear segment 41 arranged concentrically with the associate spool and spool cup and secured to the arms 32 of the latter, as by rivets 42 (Figs. 3 and 4). Constantly meshing with the segment 41 is a gear sector 43 pivoted at 44 to a boss 45 on the top plate. At the side of its pivot opposite from the toothed portion, the sector 43 is provided with an upstanding arm 46 from which extends horizontally inward between the spool flanges 19 a follower, tongue or finger 47. When the parts are maintained in the Fig. 3 position by the spring 38 the end or tip of the tongue 47 is in position to contact with the spool core 20 when the spool is in place. It is obvious from Fig. 3 that if the tip

of the tongue or finger 47 be swung outward toward the periphery of the spool cup it will cause the intermeshing gear members 43 and 41 to co-act to turn the spool cup on its axis and move forward the slot 37 at the inner side of said cup, overcoming the spring 38. This tongue 47 is adapted to coöperate with the folds or plies of the ribbon as it winds on the spool core, and as this wound-up portion increases in diameter the tongue will be forced farther outward and the spool cup will be turned to move the slot 37 forward progressively, the forward movement corresponding with the amount of ribbon wound on the spool core. The parts are so proportioned and arranged that this progressive movement of the slot or guiding device 37 is of such an extent as to maintain substantially constant the angle between the unwound portions of the ribbon at opposite sides of the guiding device, said angle as stated being that indicated by the reference α in Fig. 2. This will be clear from a consideration of the right-hand spool and the ribbon co-operating therewith, as diagrammed in Fig. 2. The position of the slot 37, before the ribbon begins to wind on the spool, is designated at 37^a; the position occupied by the slot when the ribbon is half wound on the spool is indicated at 37^b; and its position when the ribbon is completely wound on and the spool is full is indicated at 37^c. The position of the parts shown in Fig. 5 corresponds to the "37^b" position in Fig. 2. The unwound portion of the ribbon inside the cup at all three stages is tangential with the portion wound on the spool core; and it will be observed that the unwound section within the cup makes an angle with the section at the opposite side of the slot or device and extending therefrom to the vibrator, which angle is substantially the same in all three positions of the guide 37.

It will be understood that both ribbon spools are provided with controlling means for moving the spool cup in the manner described and further it will be understood that when the right-hand spool is empty the left-hand spool will be full so that when the right-hand guiding device or slot 37 occupies the rearmost or a position in Fig. 2, the left-hand guiding device 37 will occupy the foremost position indicated at 37^c (Fig. 2), by reason of the fact that its tongue piece 47 will be maintained in its outermost position by the full ribbon spool. The b and c positions of the right-hand guiding device 37 also corresponds with the positions of the left-hand guiding device indicated at 37^a and 37^b respectively. In other words, as the right-hand guiding device moves forward transversely of the course or path of the ribbon between the vibrator and the right-hand spool, the left-hand guiding de-

vice 37 will move correspondingly opposite or rearward transversely of the course of the ribbon between the left-hand spool and the vibrator. It will be understood that the rearward movement of the left-hand guide slot 37 will be caused by the spring 38, the gradual winding off of the ribbon from the left-hand spool permitting the tongue or follower 47 to move in toward the core under the pull of said spring. Further it will be noted that both spool cups or containers turn in the same direction, as indicated by the arrows in Fig. 2, this being the same direction as that in which the associate ribbon spools turn; but that by reason of the fact that the guiding devices are on the inner or opposite faces of their associate spools, said guiding devices will move simultaneously in opposite directions one forward and one backward. When the ribbon has been completely wound on the right-hand spool and wound off the left-hand spool the direction of longitudinal feed will be reversed, and then the guiding devices will act oppositely from the manner above described, that is, the left-hand device 37 will move forward and the right-hand device simultaneously rearward in correspondence with the winding on and winding off of the ribbon from their associate spools.

Besides maintaining a uniform angle at the guiding devices or slots in the spool cups, my invention has the further advantage of providing a safety device which prevents the ribbon from undergoing undue tension. At times when the ribbon reversing mechanism is in the course of operation, there is a short interval that no movement of the ribbon takes place due to lost motion and looseness in the parts and usually the unwound portion of the ribbon between the spools is thereby put under considerable tension. The result is that the types will frequently puncture the ribbon at this time. In my present construction it will be observed that the intermediate guiding devices 37 between the spools and the ribbon vibrator are under spring pressure so that when an excess pull or tension is applied to the ribbon, causing it to stretch and tend to straighten between the spools and the vibrator, the guides 37 will yield to permit the ribbon to follow a shorter course or path and will thus automatically lessen the tension or stress to which the ribbon would be subjected under a slow operation of the ribbon reversing mechanism or for any other cause. After the tension is relieved the guiding devices will immediately readjust themselves.

As shown in Fig. 3 when the ribbon spool is not in its cup the tongue or follower 47 will swing inward to its limit so that if it should be attempted to place the ribbon spool in position in the cup, the tongue 47 would prevent such an operation. It is nec-

essary then, prior to inserting the spool, to turn the spool cup by hand in the direction of the arrow in Fig. 3, thus causing the tongue under the action of the gear members 41 and 43 to swing to its outermost position against the inner wall of the spool cup, thus affording a clear passage for the spool. This outermost position of the tongue is indicated by dotted lines in Fig. 5. As soon as the spool is in place the operator releases the spool cup and the spring 38 will then operate to swing the tongue 47 inward into engagement with the core of the spool or with the wound portion of the ribbon thereon. When a spool is to be removed the operation just described is reversed.

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

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

1. In a typewriting machine, the combination of a ribbon, a ribbon guide, and means operative constantly by the ribbon for controlling the location of said ribbon guide.

2. In a typewriting machine, the combination of a ribbon, means for feeding the ribbon longitudinally, means for controlling the course followed by the ribbon, and means operative constantly by the ribbon itself for varying the location of said controlling means.

3. In a typewriting machine, the combination of a ribbon, means for feeding the ribbon longitudinally, means for controlling the course of the ribbon, and means operative constantly by the ribbon itself for moving said controlling means transversely of the course followed by the ribbon.

4. In a typewriting machine, the combination of a ribbon carrier on which a ribbon is adapted to be wound, and compensating means for insuring that the angle at which the ribbon winds on the carrier is always substantially the same whatever the diameter of the portion of the ribbon wound on the carrier.

5. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, and compensating means for insuring that the angle formed by the portions of the ribbon at opposite sides of said device shall be always substantially the same whatever the diameter of the wound up portion of the ribbon on the carrier.

6. In a typewriting machine, the combination of a ribbon, a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, and means for automatically moving said device to vary its location correspondingly with the amount of ribbon on the carrier.

7. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from

said carrier, a support for said guiding device, and means for automatically moving said support to correspond with the amount of ribbon wound on the carrier.

5 8. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, a progressively movable support for said device, and means coöperative with the ribbon for automatically controlling the
10 progressive position of said support and said device.

9. In a typewriting machine, the combination of a ribbon, a ribbon carrier, a progressively movable guiding device over which
15 the ribbon passes to and from said carrier, and means coöperative with the ribbon for automatically controlling the progressive position of said device.

20 10. In a typewriting machine, the combination of a ribbon spool, a progressively movable guiding device over which the ribbon passes to and from said spool, and means coöperative with the portion of the ribbon wound on the spool for automatically
25 controlling the progressive position of said device.

11. In a typewriting machine, the combination of a rotatable ribbon spool, a guiding device over which the ribbon passes to and
30 from said spool, said device being movable concentrically with said spool, and connections operative to move said device whenever said spool is rotated.

35 12. In a typewriting machine, the combination of a ribbon, a ribbon spool, a guiding device over which the ribbon passes to and from said spool, and mechanical connections for automatically moving said device to constantly change its location during rotary
40 movements of said spool.

13. In a typewriting machine, the combination of a ribbon spool, a guiding device over which the ribbon passes to and from
45 said spool, a movable support for said device, and connections for automatically moving said support to change the location of said device constantly during rotary movements of said spool.

50 14. In a typewriting machine, the combination of a ribbon spool, a guiding device over which the ribbon passes to and from said spool, a support for said device, and devices for automatically and progressively
55 turning said support in the same direction in which said spool rotates.

15. In a typewriting machine, the combination of a ribbon, a rotatable ribbon spool, a guiding device over which the ribbon
60 passes to and from said spool, and mechanical devices for automatically and progressively moving said guiding device in the same direction in which said spool rotates.

16. In a typewriting machine, the combination of a ribbon spool, a guiding device

over which the ribbon passes to and from said spool, and mechanical connections operatively controlled by the ribbon to bodily move said device progressively during rotary movements of said spool.

17. In a typewriting machine, the combination of a ribbon spool, a progressively movable ribbon guiding device separate from said spool, and mechanical means movable concurrently with said spool for controlling said guiding device to move progressively.

18. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, and means operating automatically to constantly vary the position of said guides.

19. In a typewriting machine, the combination of ribbon spools, a vibratory ribbon guide, ribbon guides separate from said vibratory guide, and means for constantly varying the positions of said ribbon guides, said means operating independently of said vibratory guide.

20. In a visible typewriting machine, the combination of ribbon spools, a ribbon vibrator for controlling the ribbon in the vicinity of the printing point, side guides, and means for automatically and constantly varying the position of said guides.

21. In a visible typewriting machine, the combination of ribbon spools, a ribbon vibrator for controlling the ribbon in the vicinity of the printing point, side guides, and means for progressively varying the position of said side guides to correspond with the amount of ribbon on the ribbon spools.

22. In a front-strike typewriting machine, the combination of ribbon spools, a centrally arranged ribbon guide for controlling the ribbon in the vicinity of the printing point, the ribbon inclining upward from the ribbon spools to said ribbon guide, side guides co-operating with the ribbon to deflect it in its passage from the spools to the central guide, and means for varying the position of said side guides to compensate for the variations in the amount of ribbon wound on the spools.

23. In a front-strike typewriting machine, the combination of ribbon spools, a centrally arranged ribbon guide for controlling the ribbon in the vicinity of the printing point, the ribbon inclining upward from the ribbon spools to said ribbon guide, side guides co-operating with the ribbon to deflect it in its passage from the spools to the central guide, and means operating automatically to constantly move said side guides oppositely.

24. In a front-strike typewriting machine, the combination of ribbon spools, a centrally

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arranged ribbon guide for controlling the ribbon in the vicinity of the printing point, the ribbon extending upward from the ribbon spools to said ribbon guide, side guides cooperating with the ribbon to deflect it in its passage from the spools to the central guide, and means for maintaining said guides under constantly varying spring tension.

25. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, and means for varying the position of said side guides to compensate for variations in the amount of ribbon wound on the spools.

26. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, and means for simultaneously moving said side guides oppositely step by step.

27. In a front-strike typewriting machine, the combination of a platen, a pair of ribbon spools forward of the platen, a centrally arranged ribbon guide for controlling the position of the ribbon in the vicinity of the printing point at the front of the platen, side guiding devices for the ribbon between said central guide and the ribbon spools, and oppositely acting means associated with the spools and constantly operating to move the guiding devices for the paying-off spool rearward and simultaneously to move the guiding devices for the winding-on spool forward.

28. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, spring means tending constantly to move said device in one direction, and means for controlling the action of said spring means so that said device will be moved thereby correspondingly with the amount of ribbon on said carrier.

29. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, spring means tending constantly to move said device in one direction, and means cooperative with the ribbon for automatically controlling the action of said spring means and through it constantly varying the position of said guiding device.

30. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, spring means tending constantly to move said device in one direction, a follower controlled by said spring means and cooperative with the wound-up portion

of the ribbon on said spool, and connections between said follower and said device.

31. In a typewriting machine, the combination of a ribbon carrier, a guiding device over which the ribbon passes to and from said carrier, spring means tending constantly to move said device in one direction, and connections operative to control the action of said spring means and permit said device to be constantly moved thereby during rotary movements of said carrier.

32. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, and means for maintaining said guides under constantly varying spring tension, said guides yielding bodily under an excessive pull of the ribbon.

33. In a typewriting machine, the combination of a central ribbon guide, ribbon spools, and means for preventing undue tensioning of the ribbon in its course from one spool to the other through the center guide.

34. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, said side guides deflecting the ribbon from straight paths between the central guide and the spools, and means associated with said guides for preventing excessive tensioning of the ribbon between the spools.

35. In a typewriting machine, the combination of a pair of ribbon spools, a central ribbon guide for controlling the position of the ribbon in the vicinity of the printing point, side guides for the ribbon between said central guide and the ribbon spools, and means for constantly moving said guides during the feeding of the ribbon bodily transversely of the paths followed by the ribbon between the central guide and the ribbon spools.

36. In a typewriting machine, the combination of a ribbon carrier, a carrier container provided with a passage-way for the ribbon, and means for automatically and progressively moving said container.

37. In a typewriting machine, the combination of a ribbon carrier, a carrier container provided with a passageway for the ribbon, and means cooperative with the ribbon for automatically controlling the position of said container, the position of said container constantly changing during the feeding of the ribbon.

38. In a typewriting machine, the combination of a ribbon carrier, a carrier container provided with a passageway for the ribbon, and means cooperative with the por-

tion of the ribbon wound on the carrier for automatically controlling the position of said container.

39. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, said container being movable concentrically with said spool, and connections operative to move said container whenever said spool is rotated.

40. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, and connections for automatically and progressively moving said container during rotary movements of said spool.

41. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, said container being movable concentrically with said spool, and connections for automatically and progressively turning said container in the same direction in which said spool rotates.

42. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, and means for progressively varying the position of said passageway to correspond with the amount of ribbon wound on said spool.

43. In a typewriting machine, the combination of a ribbon spool, a slotted spool container, means for turning the ribbon spool to feed the ribbon thereon, and means for simultaneously turning the spool container in the same direction but to a different extent, said container turning whenever the ribbon receives a feeding movement.

44. In a typewriting machine, the combination of a ribbon spool, a spool container

provided with a passageway for the ribbon, a spring tending constantly to turn said container in one direction, and automatic means for progressively turning said container in the opposite direction.

45. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, a spring tending constantly to turn said container in one direction, and connections operative constantly by the ribbon itself as it is fed for turning said container in opposition to said spring.

46. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, a spring tending constantly to turn said container in one direction, and connections operative by the ribbon itself for turning said container in opposition to said spring, said connections comprising co-acting gears and a tongue or finger engageable with the portion of the ribbon on the spool core.

47. In a typewriting machine, the combination of a ribbon spool, a spool container provided with a passageway for the ribbon, a draw spring connected to said container and tending to turn it constantly in one direction, a gear on said container, an intermeshing gear on the machine frame, and a tongue or finger connected to said intermeshing gear and engageable with the wound-up portion of the ribbon.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 10th day of May A. D. 1912.

HERBERT H. STEELE.

Witnesses:

HARRY BARRY,
BERNICE E. FOX.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."