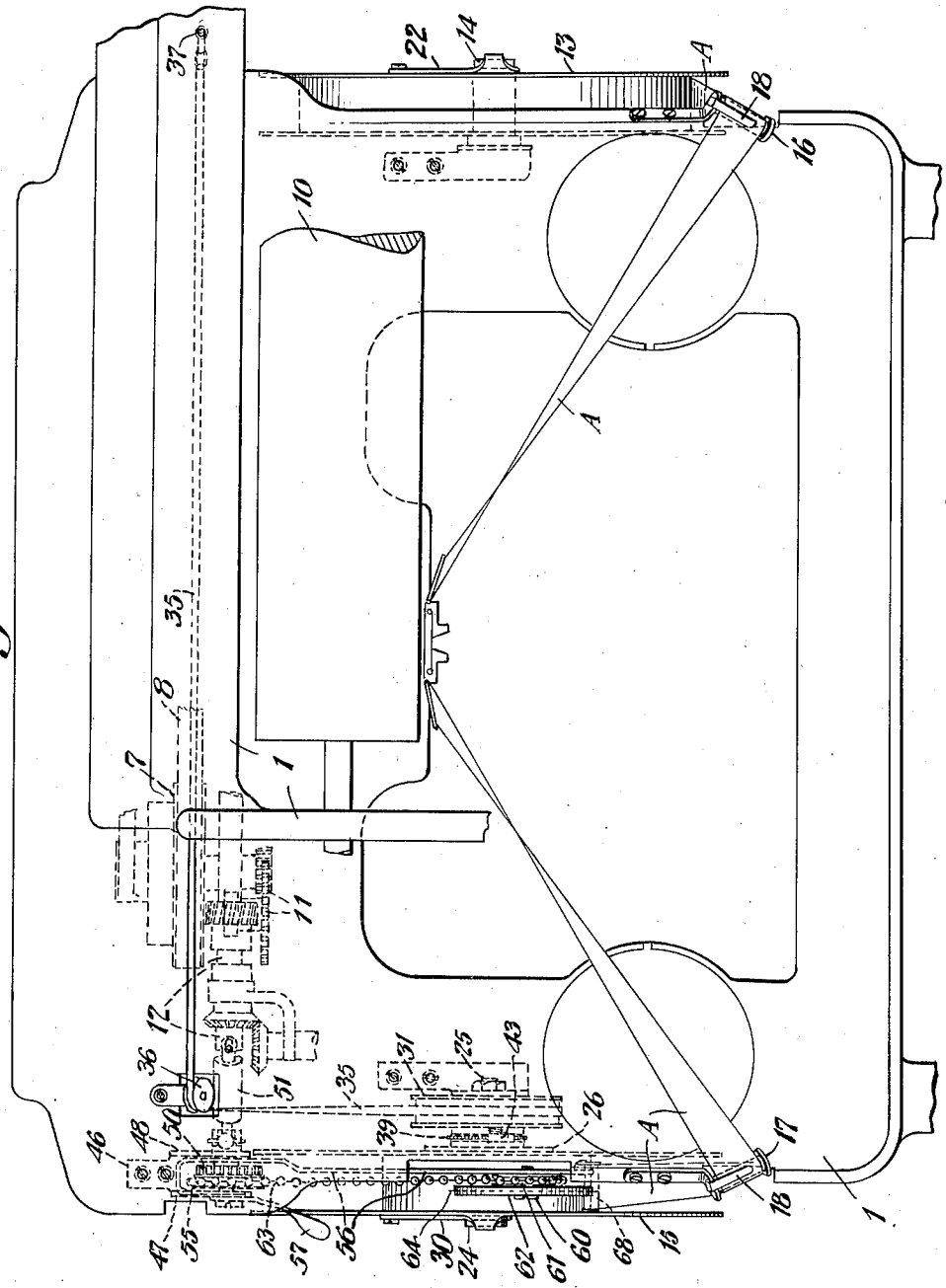
Aug. 23, 1938. W. A. GABRIELSON 2,127,812

TYPEWRITING MACHINE

Filed Dec. 11, 1936 3 Sheets-Sheet 1

Fig. 1.



INVENTOR

William A. Gabrielson

BY Davis & Davis

ATTORNEYS

Aug. 23, 1938. W. A. GABRIELSON 2,127,812

TYPEWRITING MACHINE

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Fig. 2.

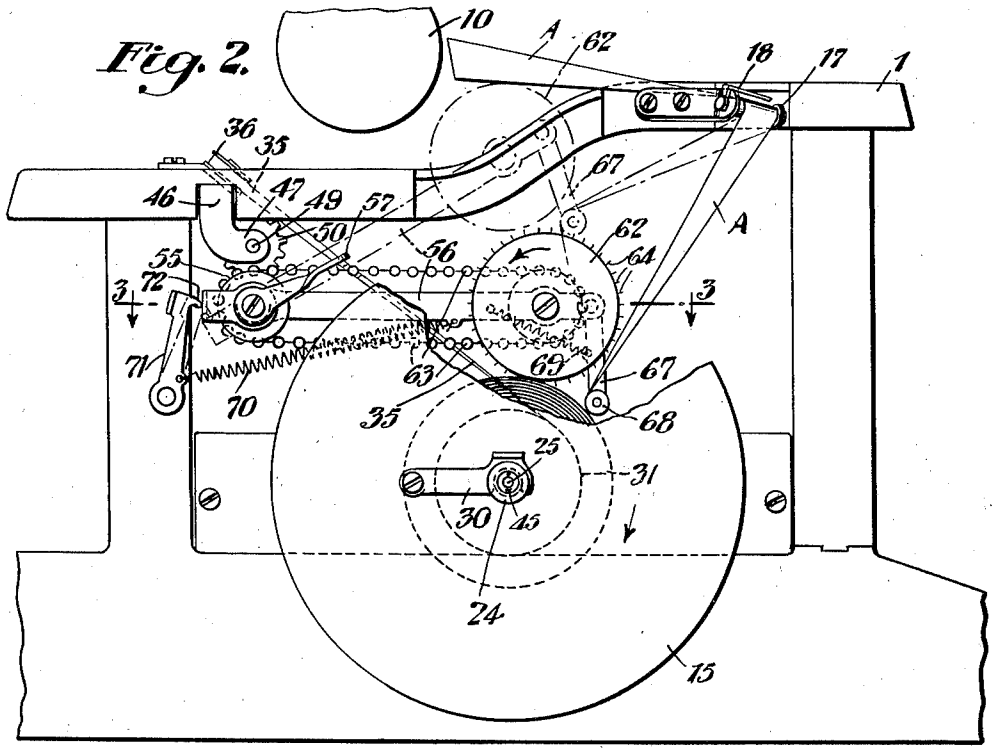


Fig. 3.



Fig. 4.

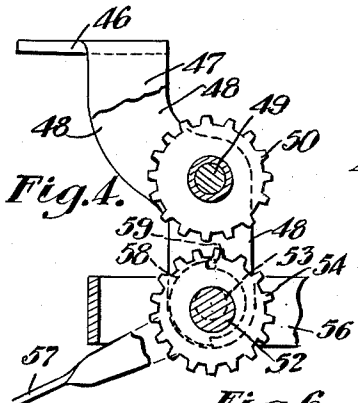


Fig. 5.

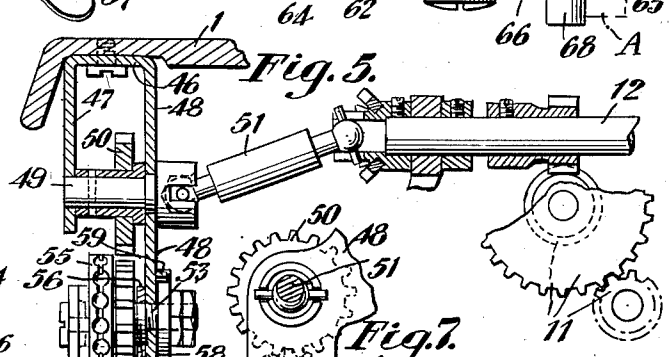


Fig. 6.

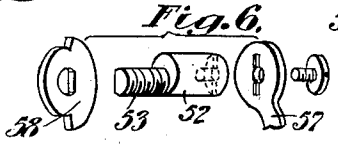


Fig. 7.

INVENTOR
William A. Gabrielson
BY Davis & Davis
ATTORNEYS

Aug. 23, 1938. W. A. GABRIELSON 2,127,812

TYPEWRITING MACHINE

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Fig. 8.

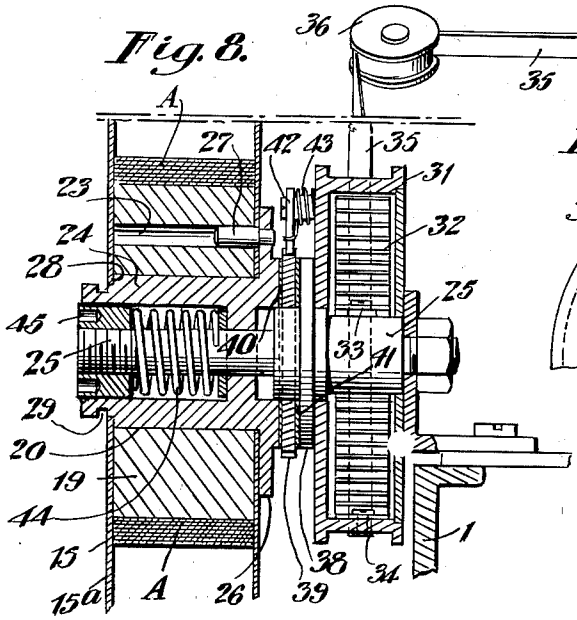


Fig. 9.

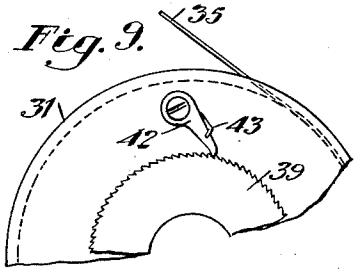


Fig. 11.

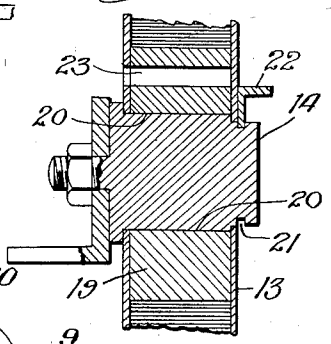
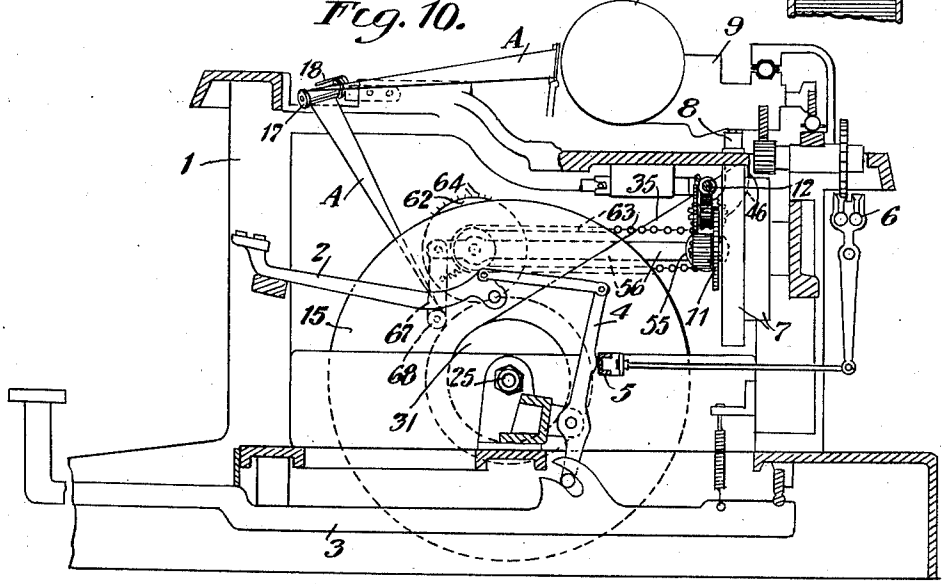


Fig. 10.



INVENTOR

William A. Gabrielson

BY Davis Davis

ATTORNEYS

Patented Aug. 23, 1938

2,127,812

UNITED STATES PATENT OFFICE

2,127,812

TYPEWRITING MACHINE

William Alfred Gabrielson, Syracuse, N. Y., assignor to L. C. Smith & Corona Typewriters, Inc., Syracuse, N. Y., a corporation of New York

Application December 11, 1936, Serial No. 115,335

12 Claims. (Cl. 197—151)

The present invention relates to improvements in typewriting machines, and more particularly to the means for controlling the longitudinal movement of the ribbon from one winding spool to the other.

It is desirable to, as nearly as possible, subject all portions of a typewriter ribbon to uniform wear. With the usual form of ribbon feed mechanism the ribbon is advanced by the turning of the receiving ribbon spool, which spool is revolved through connections with the carriage power. The result is that the rate at which the ribbon is fed varies for the reason that when the amount of ribbon wound on the receiving spool is small the longitudinal advance of the ribbon is slow and as the amount on the spool, or what may be termed the coil, increases in diameter, the longitudinal advance of the ribbon increases in extent with respect to the advance of the carriage. Consequently, for a unit's distance of travel of the carriage the corresponding travel of the ribbon will continuously increase until the receiving spool is full. This mode of feeding has disadvantages when employed in connection with a paper ribbon where a single impact of the type-face drives practically all the carbon or inking material beneath the type face from the paper ribbon on to the work sheet. It is consequently highly desirable to provide a longitudinal feed which shall be constant or uniform for the carbon paper and also a feed that at each letter space movement shall be of sufficient extent to enable the vertical portions or bars or successive character impressions to clear each other.

The object of the present invention is to provide means by which the ribbon will be constantly and uniformly fed at each letter space movement of the carriage.

A further object of the invention is to provide feeding devices which, while they may be employed with the usual ink ribbon, are particularly adapted for use with a ribbon or strip of carbon paper, or the like.

In carrying out this invention in the present instance it is shown applied to an L. C. Smith typewriting machine, but the nature of the invention is such that it may be easily applied to other forms of typewriting machines.

In the accompanying drawings:

Fig. 1 is a partial plan view of a typewriting machine with the invention applied thereto, parts of the machine being shown diagrammatically;

Fig. 2 a partial side elevation of a typewriting machine showing the invention applied thereto;

Fig. 3 a longitudinal, horizontal sectional view of the feed control means taken on the line 3—3 of Fig. 2;

Fig. 4 a detail vertical sectional view of the feed control driving means with the operating gears disconnected to render the control inoperative;

Fig. 5 a detail vertical sectional view showing the driving connection from the main ribbon shaft to the receiving spool control mechanism;

Fig. 6 a detail view of the eccentric stud and shouldered stop for throwing the control operating gears into and out of mesh;

Fig. 7 a detail side elevation of the feed control driving gears in position to operate the control means;

Fig. 8 a vertical sectional view of the means for rotating the ribbon receiving spool;

Fig. 9 a detail view of the ratchet means connecting the ribbon receiving spool to its operating spring drum;

Fig. 10 a diagrammatic vertical sectional view of a typewriting machine showing the invention applied thereto; and

Fig. 11 is a detail sectional view of the supply spool and its support.

Referring to the parts illustrated in the drawings, 1 designates the machine frame; 2 a type bar; 3 a key lever; and 4 the linkage between the key lever and the type bar. 5 designates the universal bar; 6 the escapement which is connected by suitable linkage to the universal bar, said bar being operated by the type bar linkage. 7 designates the spring drum; 8 the band connecting the spring drum to the carriage 9 and by means of which power is imparted to the carriage to move it in letter-spacing direction. The carriage carries the usual platen 10. The spring drum shaft is connected by gearing 11 to the ribbon main shaft 12. From this ribbon main shaft the ribbon spools are driven by any suitable means, not shown.

All of the parts just described may be of ordinary or standard construction and as shown in the drawings are substantially as illustrated in the Gabrielson Patent No. 929,933, dated August 3, 1909 and Gabrielson Patent No. 1,221,720, dated April 3, 1917. It will, of course, be understood that these parts are only more or less diagrammatically illustrated in the drawings, and also that they may be of any suitable or desired construction.

The ordinary ribbon spools are removed from the machine. The carbon paper ribbon A is wound on a supply spool 13, which is freely rotatable on a horizontal stud 14 secured in the ma-

chine frame at the right hand side thereof. The receiving or take-up spool 15 for the carbon paper ribbon is mounted on a horizontal rotatable sleeve and said sleeve is mounted on a stud on the left hand side of the machine frame, as will be more fully hereinafter described. The paper ribbon is threaded from the supply spool over a guide roller 16 mounted on the machine frame, near the forward edge thereof adjacent the usual mounting for the ordinary ribbon spool. From this guide roller the ribbon is threaded through the usual ribbon guides at the printing point and is then carried over a guide roller 17 at the left hand side of the machine frame and thence to the receiving spool at the left hand side of the machine frame. Retaining clips 18 hold the ribbon on the guide rollers 16 and 17.

The supply spool 13 and the receiving or take-up spool 15 are of like construction and are interchangeable. Each spool consists of side flanges and a central core 19 of wood or other suitable material formed with a central bore 20. The central bores in the two spools are of equal diameter. The bore 20 of the supply spool receives a stud 14 which is secured to the machine frame. The end of the stud 14 is formed with an annular groove 21 in which a pivoted latch 22, carried by the spool, is adapted to fit, to lock the spool to the stud while at the same time permitting free rotation of the spool on the stud. Each spool is formed with a transverse aperture 23, the purpose of which will hereinafter appear.

The receiving or take-up spool 15 is removably mounted upon a sleeve 24 of the same external diameter as the stud 14, and fitting the central bore 20 of the spool. Sleeve 24 is rotatably mounted on a stud 25 which is rigidly secured to the machine frame. The sleeve 24, at its inner end, is provided with an annular flange 26 which carries an outwardly extending horizontal pin 27. This pin enters the aperture 23 to lock the receiving spool to the sleeve to cause it to turn therewith. The sleeve 24 near its outer end is formed with an annular recess 28 in which the inner margin of the outer spool flange fits. This sleeve, near its outer end, is also formed with an annular groove 29 in which a pivoted latch 30 carried by the spool engages to lock the spool on the sleeve. By releasing the latch from the groove 29 the ribbon spool may be removed from the sleeve 24. Latch 22 of the supply spool and latch 30 of the take-up spool are of like construction.

On the stud 25 is rotatably mounted a ribbon take-up spring drum 31. In this drum is arranged a spring 32 whose inner end 33 is attached to the stud and whose outer end 34 is attached to the inner surface of the spring drum. Wound on the spring drum is an operating strap 35 which passes over a roller 36 and is connected to the platen carriage, as indicated at 37. When the carriage is moved to its right hand position, spring 32 will be wound up within the spring drum and as the carriage is stepped toward the left hand under the control of the escapement in the typing operation the spring 32 will rotate the drum 31 in a clockwise direction, as viewed in Fig. 2 of the drawings.

The stud 25 is provided with an annular flange 38 and between said flange 38 and the flange 26 of the sleeve 24 is arranged a ratchet wheel 39 which is freely rotatable upon the stud 25. Between the ratchet wheel and the flange 26 of the sleeve 24 is a friction washer 40, and between the ratchet wheel and the flange 38 of the stud is a friction washer 41. On the outer side of the drum 31 is pivoted a pawl 42 which is yieldingly pressed into engagement with the ratchet wheel 39 by spring 43. The ratchet and pawl are so arranged that when the drum 31 is rotated by the spring 32 the pawl will engage the ratchet and rotate it on the stud 25. When, however, the drum is rotated through the movement of the carriage to its right hand position the pawl will slip over the ratchet without rotating it.

A coil spring 44 is arranged around the stud 25 and within the sleeve 24. The inner end of this spring engages a washer which contacts with the inner end of the sleeve. In the outer end of the stud 25 is screwed an adjusting nut 45 by means of which the pressure of the spring against the inner end of the sleeve may be varied. The spring 44 forces the sleeve 24 inwardly and places the desired pressure on the washers 40 and 41 and the ratchet wheel 39.

A depending bracket 46 is secured to the under side of the top of the machine frame. This bracket is formed with two forwardly extending arms 47 and 48. In these two arms is mounted a horizontal stub shaft 49. Secured to this shaft between the arms of the bracket is a gear wheel 50. The inner end of the stub shaft 49 is connected to the adjacent end of the main ribbon shaft 12 by a shaft 51, the joints between the shafts being universal. These universal joints obviously would not be necessary if the stub shaft and the main ribbon shaft were in line.

In the lower end of the arm 48 of the bracket 46 is mounted a horizontal rotatable eccentric stud 52. The body portion of this stud is eccentric to the shank 53 and said shank extends through and is rotatably mounted in the arm 48. On the eccentric body portion of the stud is rotatably mounted a sleeve carrying a gear 54 and a sprocket wheel 55, said gear and said sprocket wheel being either integrally formed or rigidly connected together. Gear 54 is designed to mesh with gear 50 mounted on the stud shaft 49.

Mounted on the eccentric body portion of the stud 52 is a forwardly extending frame 56. Secured to the outer free end of the stud 52 is a lever 57, said lever serving as the means to hold the frame on the stud. On the shank 53 of the stud 52 is mounted a shouldered stop member 58 and on the arm 48 of the bracket is mounted a stop pin 59. The stud 52 may be rotated by means of the lever 57 to raise or lower the gear 54 and the frame 56. When the lever 57 is in the position shown in Figs. 2 and 3 the gear 50 is in mesh, but when the lever is shifted to the position indicated in Fig. 4 the gear 54 has been moved downwardly and out of mesh. This is accomplished by the rotation of the eccentric body portion of the stud 52. The shoulders on the stop member 58 engage the pin 59 and limit the movement of the lever 57.

In the forward end of the frame 56 is mounted a horizontal outwardly extending stud 60. On this stud is mounted a sprocket wheel 61 and a control wheel 62, said wheels being rigidly connected together for rotation on the stud 60. The sprocket wheel 55 is connected to the sprocket wheel 61 by sprocket chain 63. The frame 56 and the control wheel 62 are disposed to lie between the flanges of the receiving or take-up spool 15, and the control wheel is arranged to contact the cylindrical surface of the roll of ribbon on the spool. The control wheel is provided with radial pins 64 spaced a uniform distance apart around the wheel. This control wheel may be of any suitable construction. As shown it consists of two disks 65 with a thin plate 66 clamped be-

tween them, the said plate being cut out around its margin to form the fine radial pins **64**.

Pivotally mounted on the forward end of the frame **56** is a depending arm **67** at the lower end of which is mounted a freely rotatable guide roller **68** over which the ribbon A passes from the guide roller **17** to the receiving or take-up spool **15**. A spring **69** is connected to the arm **67** and to the frame **56** to draw the roller **68** to the coil of ribbon on the take-up spool and place the desired tension on the ribbon A. Whenever it is desired to relieve the ribbon A of the tension of the roller **68** the arm **67** may be swung upwardly to move the spring above the center of the pivot of the arm **67**.

The control wheel **64** is resiliently pressed into engagement with the coil of ribbon on the take-up spool by spring **70** which is connected at its forward end to the frame **56** and at its rear end to a pivoted latch **71** mounted in the machine frame. The upper end of the latch **71** is formed with a locking dog **72** which in the normal operation of the device rests against the rear end of the frame **56**. When it is desired to raise the control wheel from between the flanges of the ribbon take-up spool the forward end of the frame **56** is raised, said frame turning on the stud **52** as a pivot. The dog **72** will latch over the rear end of said frame **56** and lock the frame with its forward end raised, as indicated in dotted lines in Fig. 2.

The operation is as follows:

The movement of the platen carriage from its right hand position in letter spacing direction toward its left hand position, permits the drum **31** to rotate under the influence of its spring **32**. The pawl **42** causes the ratchet wheel **39** to rotate on the stud **25**. The friction between the ratchet wheel and the friction washer **40** causes the sleeve **24** to rotate with the ratchet wheel on the stud **25**. The receiving or take-up spool is in driving connection with the sleeve **24** through the pin **27** so that the take-up spool **15** rotates with the sleeve **24** thereby drawing the ribbon from the supply spool past the printing point and winding it on the take-up spool.

The control wheel **62** is positively driven from the ribbon main shaft and the pins **64** carried thereby are forced into the coil of ribbon on the take-up spool by the spring **70**. The gearing from the ribbon main shaft to the control wheel **62** is so proportioned and arranged that the control wheel will be rotated, on each letter spacing movement of the platen carriage, a distance corresponding substantially to the letter space movement of the carriage. The pins **64** will permit the roll or ribbon on the take-up spool to have a corresponding movement only and such movement of the roll of ribbon will, of course, move the ribbon past the printing point a space equal substantially to a letter space movement of the carriage. If the movement of the take-up spool, under the influence of the spring **32**, pawl **42** and ratchet **41**, tends to move the ribbbon past the printing point a greater distance than the letter space movement of the carriage, due to the increasing diameter of the roll of ribbon on the take-up spool, the pins **64** of the control wheel will hold the spool against such excess movement and cause the ratchet to slip. The control wheel permits the receiving spool to take up a certain uniform length of ribbon for each letter space movement of the carriage, regardless of the diameter of the coil of ribbon on the spool. When a roll of carbon is started on the machine and the take-up spool is empty, or nearly so, the control wheel and the take-up spool run at approximately the same speed. As the carbon builds up on the take-up spool the control wheel, running at a uniform speed, causes a slippage between the ratchet wheel **39** and the sleeve carrying the take-up spool. The take-up spool never runs slow enough to cause the control wheel to drive.

The spring **44** is adjusted by means of the nut **45** to place the desired pressure on the friction washers to secure the proper operation of the take-up spool.

It is manifest, therefore, that the receiving spool will take up a constant and uniform length of ribbon for each letter space movement of the carriage, regardless of the diameter of the coil of ribbon on the receiving spool.

What I claim is:

1. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a wheel carrying radial pins adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, and means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage.

2. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a pivoted frame, a wheel mounted in said frame and adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to move said ribbon uniform extents from the supply device and wind it on the receiving spool during the step by step movement of the carriage, and manually operable means to lock said frame in position to hold said wheel out of operative position.

3. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a wheel adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to move said ribbon uniform extents from the supply device and wind it on the receiving spool during the step by step movement of the carriage, and manually operable means to render the said wheel rotating means inoperative.

4. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a spring drum adapted to rotate said receiving spool, a strap connecting said spring drum to the carriage, a freely rotatable ratchet wheel, a pawl on the spring drum engaging said ratchet wheel, a sleeve forming a mounting for the receiving spool, means to detachably connect said spool to said sleeve for rotation therewith, means causing a frictional engagement between the sleeve and one face of the ratchet wheel, and means positively driven from the carriage driving means and adapted to engage the coil of ribbon on the receiving spool to positively control the rotation of the ribbon receiving spool by the spring drum to draw the ribbon from the supply device in uniform steps

equal in extent to the step by step movement of the carriage in letter spacing.

5. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a spring drum adapted to rotate said receiving spool, a strap connecting said spring drum to the carriage, a freely rotatable ratchet wheel, a pawl on the spring drum engaging said ratchet wheel, a sleeve forming a mounting for the receiving spool, means to detachably connect said spool to said sleeve for rotation therewith, means causing a frictional engagement between the sleeve and one face of the ratchet wheel, a rotary control wheel adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, and means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to positively control the rotation of the ribbon receiving spool by the spring drum to draw the ribbon from the supply device in uniform steps equal in extent to the step by step movement of the carriage in letter spacing.

6. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a spring drum adapted to rotate said receiving spool, a strap connecting said spring drum to the carriage, a freely rotatable ratchet wheel, a pawl on the spring drum engaging said ratchet wheel, a sleeve forming a mounting for the receiving spool, means to detachably connect said spool to said sleeve for rotation therewith, means causing a frictional engagement between the sleeve and one face of the ratchet wheel, a wheel carrying radial pins adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, and means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to positively control the rotation of the ribbon receiving spool by the spring drum to draw the ribbon from the supply device in uniform steps equal in extent to the step by step movement of the carriage in letter spacing.

7. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a spring drum adapted to rotate said receiving spool, a strap connecting said spring drum to the carriage, a rotatable sleeve forming a mounting for the receiving spool, means to connect said spool to said sleeve for rotation therewith, means forming a frictional coupling between the sleeve and the spring drum, a control wheel adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, and means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to positively control the rotation of the ribbon receiving spool by the spring drum to draw the ribbon from the supply device in uniform steps equal in extent to the step by step movement of the carriage in letter spacing.

8. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, a spring drum adapted to rotate said receiving spool, a strap connecting said spring drum to the carriage, a rotatable sleeve forming a mounting for the receiving spool, means to connect said spool to said sleeve for rotation therewith, means forming a frictional coupling between the sleeve and the spring drum, a wheel carrying radial pins adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, and means to positively rotate said wheel from the carriage driving means in uniform steps substantially equal in extent to the step by step movement of the carriage to positively control the rotation of the ribbon receiving spool by the spring drum to draw the ribbon from the supply device in uniform steps equal in extent to the step by step movement of the carriage in letter spacing.

9. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, means to rotate the receiving spool to draw the ribbon from said supply device during the step-by-step letter-spacing movement of the carriage, connections between said means and the carriage, control means adapted to engage the coil of ribbon on the receiving spool and positively driven from the carriage driving means to positively prevent movement of the ribbon in excess of predetermined uniform steps from the supply device to the receiving spool during the step-by-step letter-spacing movement of the carriage, and means to yieldingly maintain said control means in operative contact with the coil of ribbon as said coil varies in diameter.

10. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon-receiving spool, means constantly tending to rotate the receiving spool to draw the ribbon from said supply device, connections between said means and the carriage holding the receiving spool rotating means inactive when the carriage is stationary and releasing said rotating means for operation during the step-by-step letter-spacing movement of the carriage, control means adapted to engage the coil of ribbon on the receiving spool and positively driven from the carriage driving means to positively prevent movement of the ribbon in excess of predetermined uniform steps from the supply device to the receiving spool during the step-by-step letter-spacing movement of the carriage, means to automatically maintain said control means in operative contact with the coil of ribbon as said coil varies in diameter, and a slip connection between the receiving spool and the means to rotate the said spool.

11. The combination of a carriage that is fed step by step for letter spacing, carriage driving mechanism, a ribbon supply device, a ribbon-receiving spool, means constantly tending to rotate the receiving spool to draw the ribbon from said supply device, connections between said means and the carriage holding the receiving spool rotating means inactive when the carriage is stationary and releasing said rotating means for operation during the step-by-step letter-spacing movement of the carriage, a rotary control means adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool and positively driven from the carriage driving means to positively prevent movement of the ribbon in excess of predetermined uniform steps from the supply device to the receiving spool during the step by step letter spacing movement of the carriage, and means to yieldingly maintain said rotary control means in operative contact with the coil of ribbon as said coil varies in diameter.

12. The combination of a carriage that is fed step by step for letter spacing, a carriage driving mechanism, a ribbon supply device, a ribbon receiving spool, means operating to rotate said spool as the carriage is moved step by step in letter spacing direction, a slip connection between said spool rotating means and said spool to permit said spool to be rotated at variable speeds, a control wheel adapted to engage the cylindrical surface of the coil of ribbon on the receiving spool, means to positively rotate said wheel from the carriage driving means at a constant speed to positively prevent movement of the ribbon in excess of predetermined uniform steps substantially equal in extent to the step by step movement of the carriage to thereby maintain the surface speed of the ribbon roll equal to the surface speed of the control wheel, and means to automatically maintain said control wheel in operative contact with the coil of ribbon as said coil varies in diameter.

WILLIAM A. GABRIELSON.