

G. B. BRAND.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 15, 1909.

960,804.

Patented June 7, 1910.

28 SHEETS—SHEET 1.

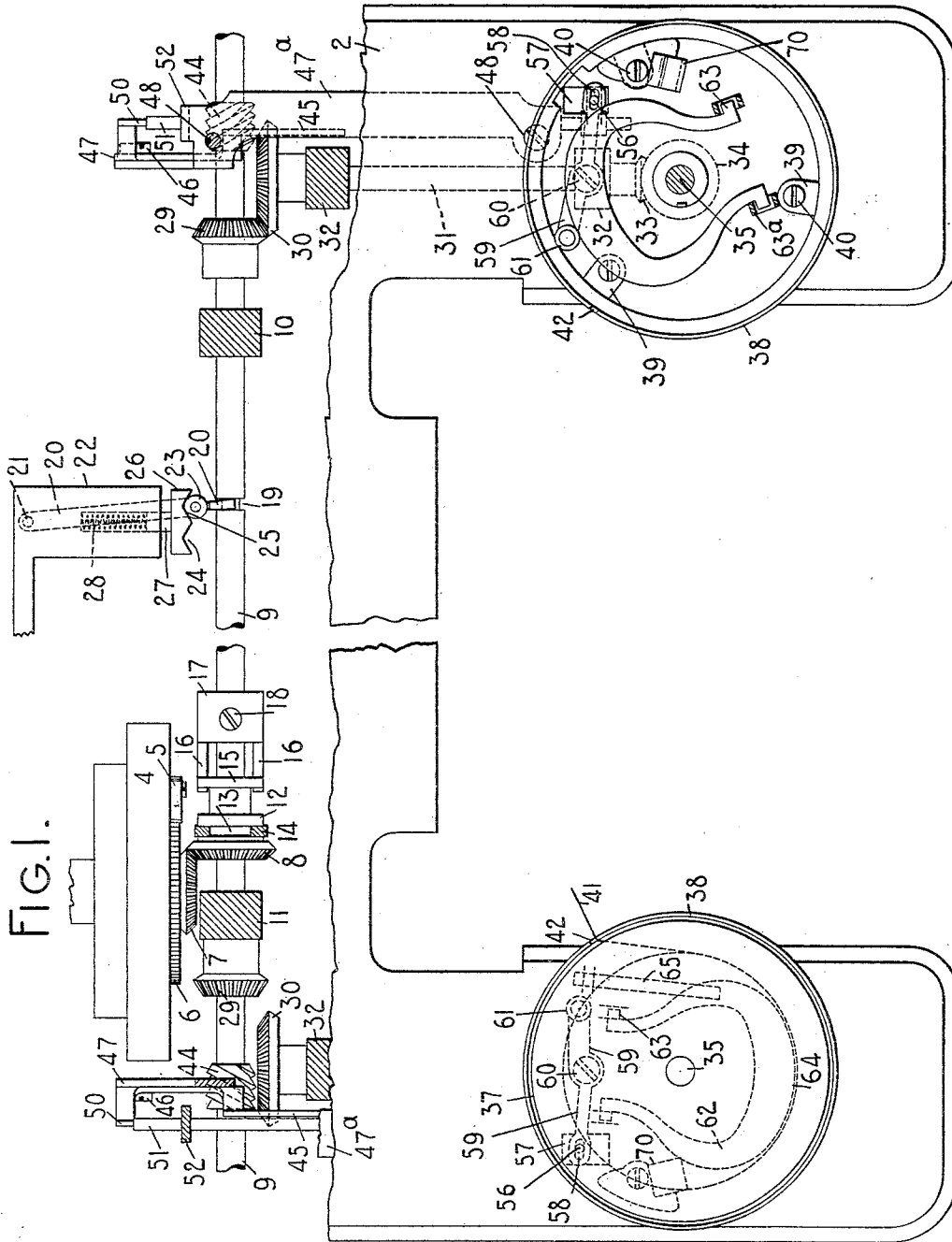


FIG. 1.

WITNESSES:

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2 SHEETS—SHEET 2.

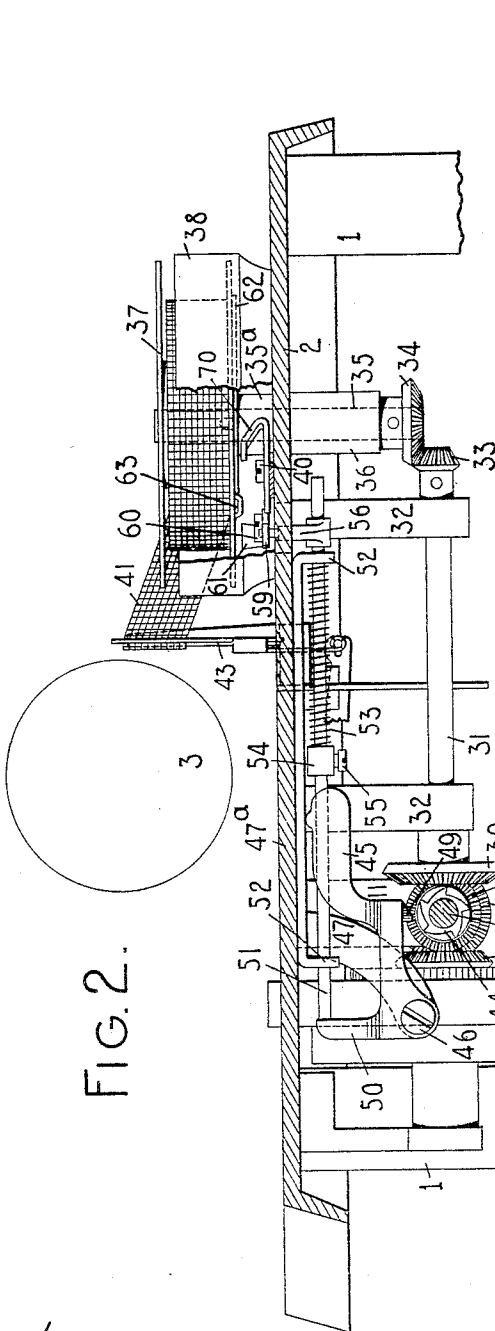


FIG. 2.

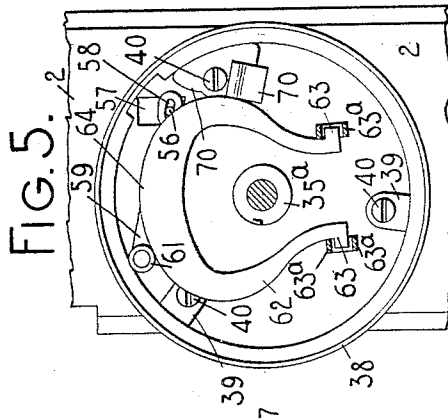


FIG. 5.

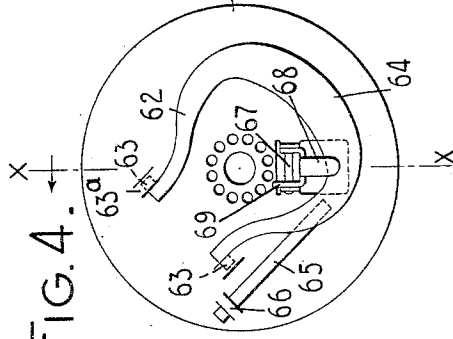


FIG. 4.

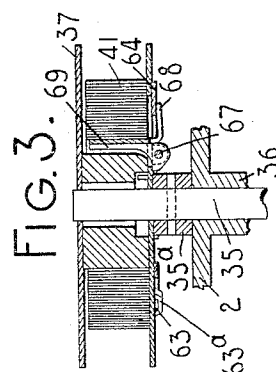


FIG. 3.

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UNITED STATES PATENT OFFICE.

GEORGE B. BRAND, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

960,804.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed March 15, 1909. Serial No. 483,416.

To all whom it may concern:

Be it known that I, GEORGE B. BRAND, citizen of the United States, and resident of Syracuse, 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 typewriting machines and more particularly to automatically actuated mechanism for effecting a reversal in the direction of the feed of the ribbon.

The main object of my invention is to provide, in mechanism of the character specified, safety devices or means which will insure the proper actuation of the reversing mechanism.

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

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a fragmentary top plan view, with parts in section and parts broken away, of so much of a Monarch typewriting machine as is necessary to illustrate my invention in its embodiment therein. Fig. 2 is an end view of the upper portion of the machine, looking in the direction of the arrow in Fig. 1 and with parts broken away and parts in section. Fig. 3 is a detail vertical sectional view of one of the ribbon spools and some of the associated mechanism, the section being taken on a line $x-x$ of Fig. 4 and looking in the direction of the arrow at said line. Fig. 4 is a detail bottom view of one of the ribbon spools. Fig. 5 is a detail top plan view showing a portion of the ribbon reversing mechanism associated with the right-hand ribbon spool and illustrating one of the safety stops in action.

While my invention is intended primarily as an improvement on the ribbon mechanism shown in the patent to George A. Seib, No. 908,703, dated January 5th, 1909, it should be understood that from certain aspects of the invention it may be embodied in an entirely different form of ribbon mechanism and that while I have shown the invention employed in a Monarch machine it may be

embodied in other styles of typewriting machines.

The frame of the machine comprises corner posts 1 surmounted by a top plate 2 on which the usual carriage (not shown) is mounted to travel from side to side of the machine, the carriage carrying the usual operative platen 3 diagrammatically illustrated in Fig. 2. The carriage is propelled by the usual spring drum 4 connected to the carriage by a band in the usual manner. A spring-pressed pawl 5 connects the drum to a ratchet wheel 6 mounted coincident with the axis of the spring drum. By this construction the ratchet wheel 6 is turned to move with the spring drum during the letter spacing movements of the carriage. A bevel gear 7 is connected to the ratchet wheel 6 and meshes with a companion bevel gear 8 which loosely surrounds a shaft 9. The shaft 9 extends transversely of the machine and is adapted to move longitudinally in bearings in depending studs 10 and 11 on the top plate as well as to rotate freely therein. The bevel pinion 8 has a hub 12 provided with a circumferential groove 13 therein for the reception of fingers 14 of a depending forked member which is secured to the top plate of the machine. By this arrangement the bevel pinions 7 and 8 are constantly maintained in mesh irrespective of the longitudinal movement or longitudinal position of the shaft 9. The hub 12 is also provided with an annular flange 15 with oppositely disposed notches therein for the reception of fingers 16 which project parallel with the shaft 9 from a collar 17 that surrounds the shaft 9 and is secured thereto by a screw 18. This construction provides what corresponds to a splined connection between the shaft 9 and the bevel pinion 8, so that while the shaft 9 is free to be moved longitudinally independently of the bevel pinion 8 it is at all times connected to the bevel pinion to be rotated thereby. The shaft 9 has a circumferential groove 19 therein in which the free end of a lever 20 is received, the lever being pivoted at 21 to a fixed support 22. The lever carries an anti-friction roller 23 which is adapted to be received in either of the depressions 24 or 25 in a controlling member 26. This controlling member has a stem 27 that is received and works in an opening in the fixed support 22 and is pressed forwardly by an expansion

spring 28 which bears at one end against the bottom wall of the opening in the fixed support 22 and at its opposite end against the rear end of the stem 27, thus tending to
 5 press the controlling member 26 forward. This controlling device performs its usual function of assuring a complete longitudinal movement of the shaft 9 in either direction and of retaining it against accidental displacement in either of its shifted positions.
 10 The shaft 9 is or may be provided with the usual cranks at the ends thereof by which the shaft may be turned by hand.

The shaft 9 is provided near each end
 15 portion thereof with a bevel pinion 29 which is fixed thereto and coöperates with a companion bevel gear 30 secured to the rear end of a shaft 31 that extends fore and aft of the machine and is mounted to turn in bearing openings in depending brackets or lugs
 20 32 on the top plate of the machine. The forward end of the shaft 31 is likewise provided with a bevel pinion 33 coöperative with a bevel gear 34 secured to a vertically
 25 disposed ribbon spool shaft 35 mounted to turn in a bearing 36 on the top plate of the machine. The ribbon spool shaft 35 extends through its bearing opening above the top plate of the machine and coöperates
 30 in the usual manner with a ribbon spool 37 which is fixed to turn with the shaft but is detachable therefrom. A collar 35^a is fixed to the ribbon spool shaft 35 above the top plate to form a support for the shaft on the
 35 top plate and for the spool on the shaft. A bottomless ribbon spool casing 38 surrounds the ribbon spool and is provided with inwardly projecting ears 39 secured to the top plate of the machine by screws 40. The
 40 ribbon 41 passes through an opening 42 in one ribbon spool casing and extends through the guide openings in a ribbon vibrator 43 and thence through the opening 42 in the other ribbon spool casing to the spool contained in said casing.

The main driving shaft 9 is provided near each end thereof with a worm 44 which is secured to the shaft. A gravity pawl 45 is pivoted on a shouldered screw 46 to a bracket
 50 arm 47 depending from a plate 47^a secured to the top plate of the machine by screws 48. There is one of these gravity pawls provided for each of the worms 44 and an engaging nose 49 on each pawl is adapted to co-act
 55 with its associated worm when the pawl is in the operative position. Each gravity pawl is provided with an upright arm 50 with which a controlling rod 51 coöperates as shown in Fig. 2 to maintain the substantially horizontally disposed arm of the pawl
 60 in the elevated position and out of engagement with its coöperative worm. Depending bracket arms 52 formed on the plate 47^a from which the bracket arm 47 projects, are
 65 perforated to form bearing openings for the

reception of the sliding rod 51 so that said rod is free to move longitudinally in its bearing openings. A coiled expansion spring 53 surrounds each controlling rod 51 and bears at one end against a collar 54 secured
 70 to its associated rod by a set screw 55, the spring bearing at its opposite end against one of the associated bracket arms 52. The forward end portion of the controlling rod, where it extends beyond the forward bracket
 75 arm 52, is provided with an upwardly projecting finger 56 which extends through an opening 57 in the top plate of the machine and into the companion ribbon spool casing where it is received in a slot 58 in one end of
 80 a lever 59 pivoted at 60 to the top plate of the machine beneath the companion ribbon spool 57 and provided at its opposite end with an anti-friction roller 61 which projects upwardly from the lever as shown in
 85 Fig. 2.

From an inspection of Figs. 3 and 4 it will be observed that each of the ribbon spools 37 has a cam or controlling device 62 pivoted to the bottom flange thereof as at 63
 90 in bearing ears 63^a so that the free end portion 64 of the cam is adapted to drop to the operative position as will hereinafter clearly appear. A leaf spring 65 is secured at one
 95 end as at 66 to the bottom flange of the ribbon spool and bears at its free end on the top of the member 62 so as to force the free end thereof down when it is free to receive a downward movement. An angular lever
 100 is pivoted to the ribbon spool at 67 and is provided with a substantially horizontally disposed arm 68 and an upright arm 69. The arm 69 extends through an opening in the lower flange of the ribbon spool and adjacent to the core of the ribbon spool so that
 105 the coils of the ribbon may surround the arm as indicated in Fig. 3 and hold the lever in its normal position. The horizontally disposed arm 68 extends beneath the controlling member or cam 62 so that when
 110 the parts are in the position shown in Fig. 3 the cam will be held in the elevated position against the bottom flange of the ribbon spool and at a greater elevation than the top of the roller 61. It should be understood, however, that when the ribbon is
 115 about exhausted from, say, the right-hand spool the arm 69 will be freed, thus allowing the cam to move down to an operative position where it is coöperative with the
 120 anti-friction roller 61 on the lever 59 during a further rotation of the ribbon spool. A turning of the cam at this time effects an actuation of the lever 59, thereby moving the companion rod 51 toward the front of the
 125 machine to release the companion gravity pawl 45, thereby enabling the pawl to drop to the operative position into engagement with the associated worm 44. A continued rotation of the shaft or driver 9 will cause
 130

the shaft to be moved longitudinally or self shifted to the right through the engagement of the worm with its associated pawl, thus engaging the right-hand bevel pinions 29 and 30 and disengaging the corresponding bevel pinions at the other side of the machine. The effect of this is to connect the right-hand ribbon spool with the main driving shaft and disconnect the left-hand ribbon spool therefrom so that the direction of the feed of the ribbon is reversed.

It should be understood that the reversing devices and ribbon spool rotating mechanism between the shaft 9 and the ribbon spool at one side of the machine is the same as that employed at the other side and the same reference numerals therefore have been employed to designate the corresponding parts of such mechanism at both sides of the machine.

It might sometimes occur in an unusually rapid movement of the carriage from right to left, as in a tabulating operation for instance, that a cam 62 would turn so rapidly past the anti-friction roller 61 that the cam would be brought out of coöperation with the anti-friction roller 61 before the released gravity pawl has properly engaged its worm and before the reversing mechanism has had an opportunity to complete its operation. This would be particularly liable to happen, for instance, if the gravity pawl should, in its downward movement, rest on the crown of the thread of the worm at the instant when it drops downward; and the rapid rotation of the worm may not enable the pawl to seat itself in a groove in the worm and thus effect a longitudinal shifting of the shaft 9. One of the main objects of my present invention is to provide means to overcome this difficulty and to assure a proper coöperation between each of the gravity pawls and its associated worms and to insure the proper actuation of the parts to effect a reversal in the direction of the feed of the ribbon. To this end I have provided a sheet metal safety device or stop 70 within each of the ribbon spool casings. This stop 70 is substantially V-shaped in cross section as shown in Fig. 2 and is fixed in place by one of the screws 40 which secures the companion ribbon spool casing to the top plate. In the normal operation of the reversing mechanism a reversal in the direction of the feed of the ribbon should be effected just before the cam 62 on, say, the right-hand ribbon spool reaches the position it is shown in Fig. 1. In short, the parts shown in Fig. 1 at the right-hand side of the machine are in the positions which they assume just after the gravity pawl has been released and a longitudinal shifting movement of the shaft 9 to the right has been effected. This brings the right-hand bevel pinions 29 and 30 into coöperation to wind

the ribbon on the right-hand ribbon spool instead of winding it on the left-hand ribbon spool. Should the right-hand cam 62 pass to the right beyond the position shown in Fig. 1, (where ordinarily the reversal in the direction of the feed should be effected) without a shift of the shaft 9 being effected, the cam 62 will be arrested by the stop 70 in the position shown in Fig. 5 where the high portion or dwell on the cam 62 still coöperates with the anti-friction roller 61 to hold the releasing rod in its forward position and allow the gravity pawl to still maintain its engagement with its associated worm or be in a position to engage the worm. The stop 70 at this time likewise arrests the right-hand ribbon spool against further rotation from left to right and insures a longitudinal shifting movement of the shaft 9 to the right to bring about an engagement between the right-hand bevel pinions 29 and 30 and thus effect a reversal in the direction of the feed of the ribbon. It will be seen therefore that the two safety stops or devices insure a proper actuation of the parts to effect a reversal in the direction of the feed of the ribbon in the event of the reversing mechanism for either spool, which is ordinarily sufficient without the aid of the stops, failing to work properly. From an inspection of Fig. 2 it will be seen that the safety devices or stops 70 are out of the paths of the cam 62 when the latter are in the normal or inoperative positions, so as not to obstruct the rotation of the spools. When, however, either of the cams 62 drops to its operative position it will be brought into the path of the companion stop and will co-act therewith in the event of the cam passing beyond the rotative position which it ordinarily assumes when the parts are shifted to reverse the feed.

From the foregoing description it will be understood that each worm 44 constitutes a shiftable reversing device; that each gravity pawl 45 is in the nature of an angle lever, trip or tripping lever and constitutes a companion reversing device which yieldingly engages its coöperative reversing device or worm 44; that each of the cams 62 constitutes a controlling device which is moved or is rotated as the ribbon is fed; that each gravity pawl 45 or reversing device is under control of one of the controlling devices 62 through an intermediate lever 59 beneath the associated ribbon spool and the associated spring-pressed slidable rod 51 and that each of said levers 59 and its rod 51 are positively connected.

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

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

1. In a typewriting machine, the combi-

nation of a ribbon spool, ribbon feed and reversing mechanism comprising two coöperative devices one of which turns at all times with the ribbon spool and the coöperation between which devices ordinarily brings about a reversal in the direction of the feed of the ribbon at a predetermined point in the feed thereof, and a safety device for arresting one of said devices if it should pass beyond the position it ordinarily attains when the reversal is effected, in order to insure an operation of the reversing mechanism.

2. In a typewriting machine, the combination of a ribbon spool, ribbon feed and reversing mechanism comprising two coöperative devices one of which is a cam that turns at all times with the ribbon spool and ordinarily brings about a reversal in the direction of the feed of the ribbon at a predetermined point in the feed thereof, and means for arresting said cam if it should pass beyond the position it ordinarily attains when the reversal is effected, in order to insure an operation of the reversing mechanism.

3. In a typewriting machine, the combination with ribbon feed and reversing mechanism which ordinarily effects a reversal in the direction of the feed of the ribbon at a predetermined point in the feed thereof, said reversing means comprising a controlling device, means whereby said controlling device is moved as the ribbon is fed, and means controlled by the ribbon for maintaining said controlling device in the inoperative position until just before an end of the ribbon is reached and for then affording a movement of said controlling device to the operative position, of a safety device normally out of the path of said controlling device but in the path thereof when the controlling device is in the operative position and adapted to coöperate therewith to arrest said controlling device.

4. In a typewriting machine, the combination with ribbon feed and reversing mechanism which ordinarily effects a reversal in the direction of the feed of the ribbon at a predetermined point in the feed thereof, said reversing means comprising a controlling cam, means whereby said controlling cam is moved as the ribbon is fed, means controlled by the ribbon for maintaining said controlling cam in the inoperative position until just before an end of the ribbon is reached and for then affording a movement of said controlling cam to the operative position, of a safety device normally out of the path of said controlling cam but in the path thereof when the controlling cam is in the operative position and adapted to coöperate therewith to arrest said controlling cam if it should pass when in the operative position beyond the point where

the reversing operation ordinarily takes place.

5. In a typewriting machine, the combination of step-by-step ribbon feed mechanism and ribbon reversing mechanism which ordinarily effects a reversal in the direction of the feed of the ribbon at a predetermined point in the feed thereof, said reversing mechanism comprising a controlling device; means whereby said controlling device is moved at each step-by-step feed of the ribbon; two parts which by their coöperation effect the reverse, one of said parts being under control of said controlling device; means whereby one of said parts may yieldingly engage the other; and a safety device adapted to arrest the movement of said controlling device.

6. In a typewriting machine, ribbon feed and reversing mechanism including a controlling device that moves at each step-by-step feed movement of the ribbon, a shiftable part, coöperative means to produce a change in the direction of the feed of the ribbon when said shiftable part is shifted, a coöperating part, means for causing said coöperating part to yieldingly engage said shiftable part, said coöperating part being under control of said controlling device, and a safety device coöperative with said controlling device when the latter is in the operative position to arrest it if it should pass beyond the position where the reversal is ordinarily effected.

7. In a typewriting machine, the combination of a pair of ribbon spools; a rotary and endwise movable driving shaft common to both spools and having two worms thereon; two trips adapted to fall by gravity into engagement with said worms to shift said shaft endwise to connect it with one or another of said spools; two spring-pressed rods for normally holding said trips away from said worms; devices on said ribbon spools brought into operation when the ribbon is nearly exhausted from a spool to move one of the spring-pressed rods to allow its trip to drop into engagement with its worm; and stops which are adapted to coöperate with said devices on the ribbon spools.

8. In a typewriting machine, the combination of a pair of ribbon spools; a rotary and endwise movable driving shaft common to both spools and having two worms thereon; two trips adapted to fall by gravity into engagement with said worms to shift said shaft endwise to connect it with one or another of said spools; two spring-pressed rods for normally holding said trips away from said worms; devices on said ribbon spools brought into operation when the ribbon is nearly exhausted from a spool to move one of the spring-pressed rods to allow its trip to drop into engagement with its worm; and fixed stops, said stops being out of the paths

of said devices on the ribbon spools when the devices are in the inoperative positions but in the paths of said devices when the latter are in the operative positions.

5 9. In a typewriting machine, the combination of a pair of ribbon spools; a rotary driving shaft common to both spools and having two worms thereon; two trips adapted to fall by gravity into engagement with
10 said worms to shift said shaft endwise to connect it with one or another of said spools; two spring-pressed rods for normally holding said trips away from said worms; devices on said ribbon spools brought into operation when the ribbon is nearly exhausted
15 from the spools, each of said devices being operative to move one of the spring-pressed rods to allow its trip to drop into engagement with its worm; and fixed stops, said
20 stops being out of the paths of said devices on the ribbon spools when the devices are in the inoperative positions but in the paths of said devices when the latter are in the operative positions, said stops being so located
25 that they do not cooperate with said devices until after said devices have passed the positions where they ordinarily co-act operatively with said spring-pressed rods.

30 10. In a typewriting machine, the combination of a pair of ribbon spools; a rotary driving shaft adapted to be shifted endwise to gear it to one or the other of said spools; a shifting worm on said driving shaft; a trip adapted to fall by gravity into engagement with said worm; a spring-pressed rod
35 for normally holding said trip in inoperative position; means on a ribbon spool brought into operation when the ribbon is nearly exhausted from a spool, for positively moving said rod in the direction of its
40 length against the tension of its spring to allow said trip to drop into engagement with said worm; and a stop adapted to engage the said positive moving means on the associated ribbon spool if the positive moving means should move beyond the position where it is ordinarily located at the time when the reversal in the direction of the feed of the ribbon is effected by said means.

50 11. In a typewriting machine, the combination of a pair of ribbon spools; a rotary driving shaft adapted to be shifted endwise to gear it to one or the other of said spools; a shifting worm on said driving shaft; a trip adapted to fall by gravity into engagement with said worm; a spring-pressed rod for normally holding said trip in inoperative position, a shifting device on a ribbon spool brought into operation when the ribbon on a spool is nearly exhausted from the spool for positively moving said rod in the direction of its length against the tension of its spring to allow the trip to drop by gravity into engagement with said worm, a
65 safety stop normally out of the path of said

shifting device when it is in the inoperative position but in the path of said shifting device when the latter is in the operative position.

70 12. In a typewriting machine, the combination of two ribbon spools mounted to turn on vertical axes; a driving shaft adapted to be shifted endwise to gear it to one or the other of said spools; two worms on said driving shaft; trips adapted to fall by
75 gravity into engagement with said worms; spring pressed slidable rods for normally gravity into engagement with said worms; levers pivoted under the ribbon spools and positively connected with said rods; cams on said ribbon spools, normally held in inoperative position by the ribbon but each adapted, when the ribbon is nearly exhausted from a spool, to drop into position to operate one of said levers to move its
85 sliding rod against the tension of its spring to allow its trip to drop into engagement with its worm; and means adapted to cooperate with said cams when they are in the operative positions to limit the movements thereof with the ribbon spools.

90 13. In a typewriting machine, the combination of two ribbon spools mounted to turn on vertical axes; a driving shaft adapted to be shifted endwise to gear it to one or the other of said spools; two worms on said driving shaft; trips adapted to fall by gravity into engagement with said worms; spring pressed slidable rods for normally holding said trips away from said worms;
95 levers pivoted under the ribbon spools and positively connected with said rods; cams on said ribbon spools, normally held in inoperative position by the ribbon but each adapted, when the ribbon is nearly exhausted from a spool, to drop into position to operate one of said levers to move its sliding rod against the tension of its spring to allow its trip to drop into engagement with its worm; and fixed stops each out of the
105 path of its associated cam when the latter is in the operative position but in the path of the cam when the latter is in the operative position.

115 14. In a typewriting machine, the combination of a pair of ribbon spools; an endwise movable driver common to both spools and provided with a worm; a tripping lever normally tending to engage said worm; means normally holding said tripping lever out of
120 operative position; controlling means rotative with one of said spools for moving said holding means to a position permitting said tripping lever to move into engagement with said worm; and means cooperative with said
125 controlling means to limit its rotative movement with the spool.

15. In a typewriting machine, the combination with a pair of ribbon spools, of an endwise movable driver common to both
130

spools and provided with a worm; a tripping lever normally tending to engage said worm; a device on the framework between the spool and the tripping lever normally holding said tripping lever out of operative position; controlling means operable through the longitudinal movement of the ribbon for forcing said holding device to release said tripping lever; and a fixed stop for arresting said controlling means and the ribbon spool.

16. In a typewriting machine, the combination with a pair of ribbon spools, of an endwise movable driver common to both spools and provided with a worm; a tripping lever normally tending to engage said worm; a device normally holding said tripping lever out of active position; a device mounted to rotate with one of the spools and to be held in inoperative position by the coils of ribbon; means called into action by said spool device when released by the ribbon for forcing said lever holding device to release said lever; and a fixed stop out of the path of said spool device when the latter is in the inoperative position and in the path of the spool device when the latter is in the operative position.

17. In a typewriting machine, the combination with a pair of ribbon spools, of a driving shaft common to both spools; a pair of worms upon said shaft; a pair of tripping levers tending to engage said worms; devices normally holding said tripping levers out of engagement with said worms, said holding devices being arranged on the framework and normally disconnected from the spools; means operating automatically through the longitudinal movement of the ribbon for forcing said holding devices to release said tripping levers one at a time, whereby said shaft is caused to drive the spools alternately; and safety stops coöperative with said automatically operating means to assure an operation of the mechanism to effect a reversal of the direction of the feed of the ribbon.

18. In a typewriting machine, the combination with a pair of ribbon spools, of a driving shaft common to both spools; a pair of worms on said shaft; a pair of tripping levers tending to engage said worms; devices normally holding said tripping levers out of engagement with said worms; a cam arranged at each spool; means called into action through the longitudinal movements of the ribbon for enabling said cams to force said holding devices to release said levers; and stops adapted to coöperate with said cams to arrest them and the spools on which they are arranged.

19. In a typewriting machine, the combination with a pair of ribbon spools, of a

driving shaft common to both spools; a pair of worms on said shaft; a pair of tripping levers tending to engage said worms; a sliding rod coöperative with each of said tripping levers and holding the associated lever away from its worm; means called into operation by the longitudinal movement of the ribbon for forcing either of said rods to release its lever; and a fixed stop with which said last mentioned means is adapted to be brought into coöperation to assure a reversal in the direction of the feed of the ribbon.

20. In a typewriting machine, the combination of two ribbon spools; two shafts controlling the rotation of said ribbon spools; a rotary and endwise movable driving shaft adapted to be geared to one or the other of said spools; a worm mounted on said driving shaft; an angle lever pivoted on the framework and having a horizontally extending arm adapted to move into engagement with said worm and an upright arm; a spring-pressed sliding rod normally engaging said upright arm to hold said lever out of engagement with said worm; a cam on one of the ribbon spools, said cam being controlled by the ribbon; means whereby when the ribbon is nearly exhausted from the spool said cam slides said rod against the tension of its spring and releases said angle lever; and a fixed stop out of the path of the cam in one position of the latter and in the path of the cam in another position of the latter.

21. In a typewriting machine, the combination of a pair of ribbon spools, means for driving said spools to feed the ribbon, reversing means controlled by the turning of a spool for reversing the feed, said reversing means comprising an actuating device which turns at all times with a ribbon spool, and positively acting means for preventing an over-rotation of said spool during reversing operation.

22. In a typewriting machine, the combination of a ribbon spool, means for driving said spool to feed the ribbon, means controlled by the turning of the spool for reversing the feed, stop devices for arresting said spool, and means for automatically bringing said stop devices into coöperative relation when the ribbon is exhausted from the spool to prevent an over-rotation of the spool during the reversing operation.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 11th day of March A. D. 1909.

GEORGE B. BRAND.

Witnesses:

H. H. STEELE,
C. J. BOND.