

W. R. FOX.
 RIBBON MECHANISM FOR TYPE WRITING MACHINES.
 APPLICATION FILED DEC. 6, 1910.

1,015,384.

Patented Jan. 23, 1912.

4 SHEETS—SHEET 1.

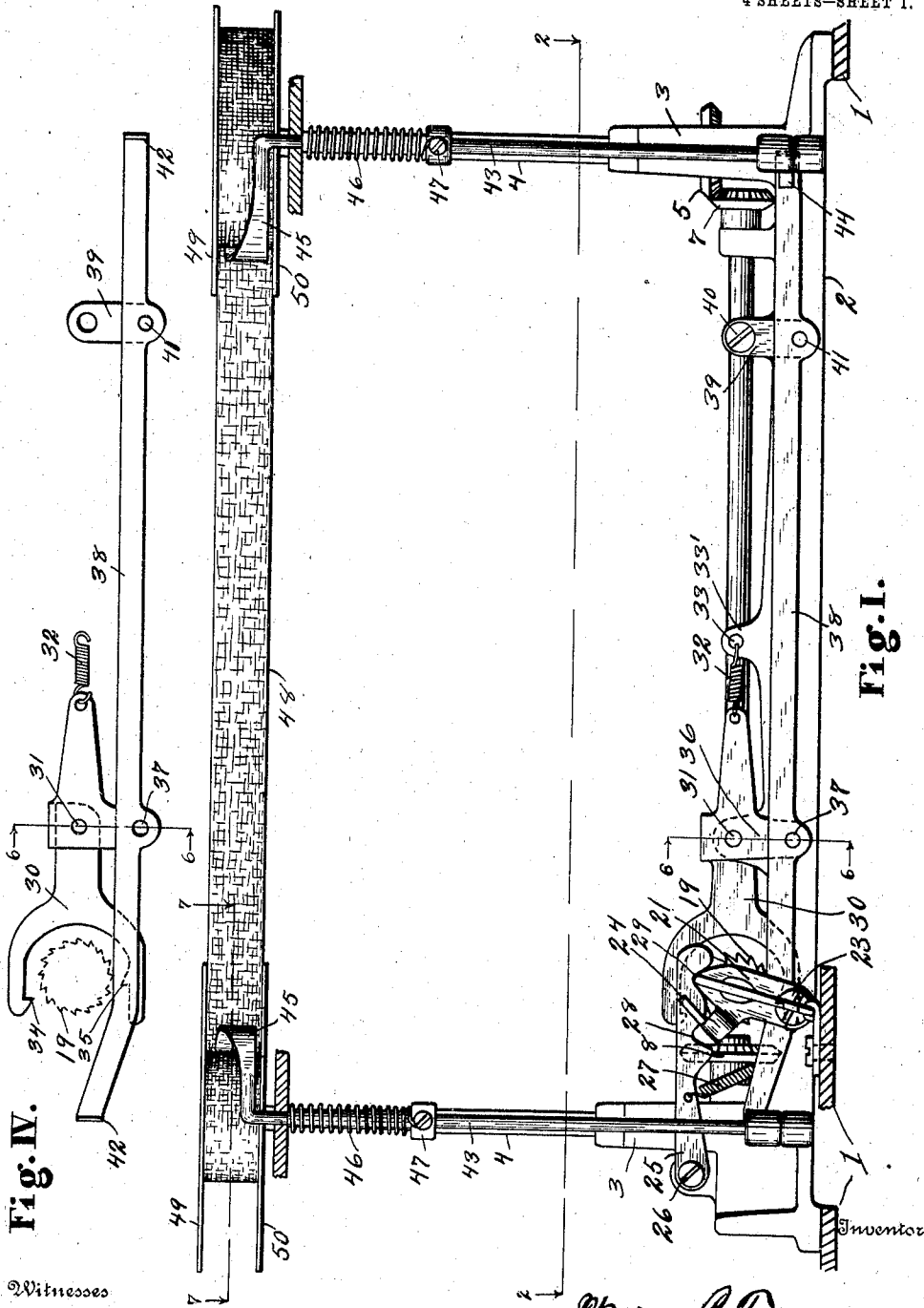


Fig. IV.

Fig. I.

Witnesses

M. Phineas Woodruff.
 L. G. Greenfield

Fig. 3

William R. Fox
 Chappell & Earl

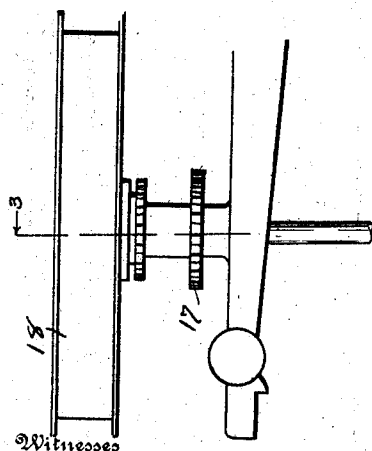
Attorneys

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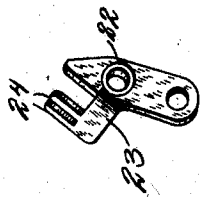


Fig. XII.

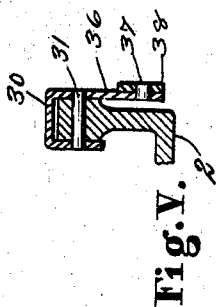


Fig. V.

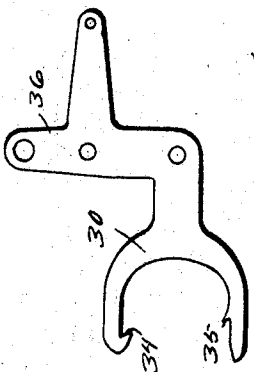


Fig. VI.

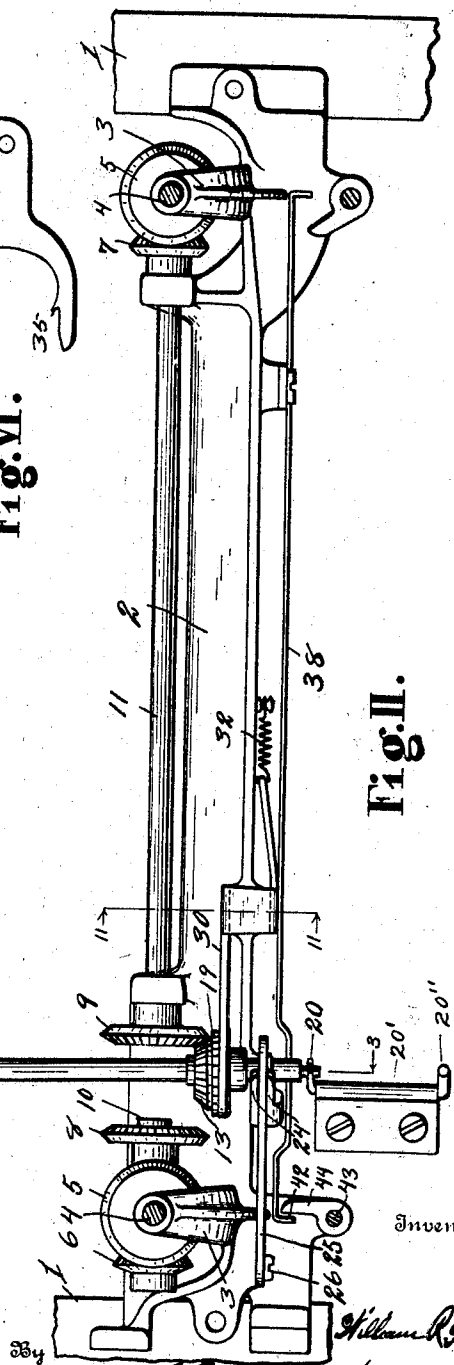


Fig. II.

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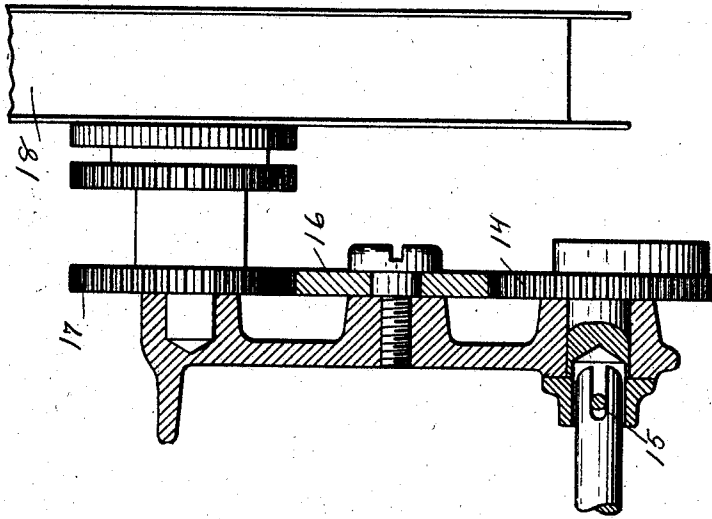
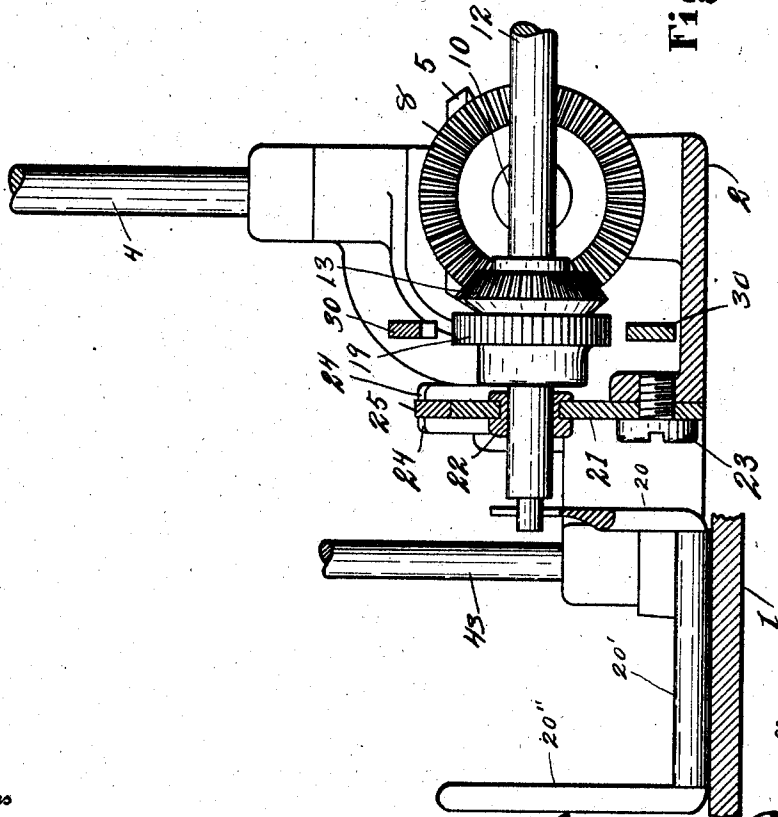


Fig. III.



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4 SHEETS—SHEET 4.

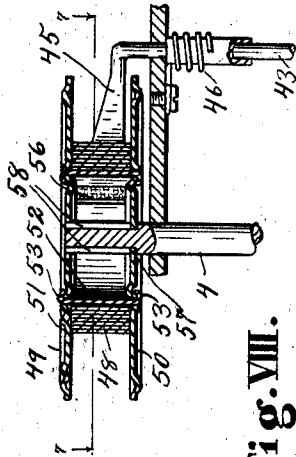


Fig. VIII.

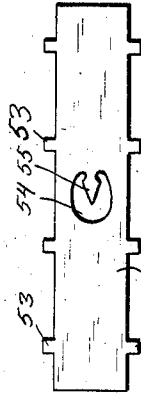


Fig. XI.

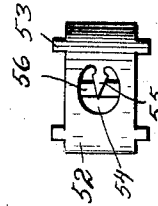


Fig. X.

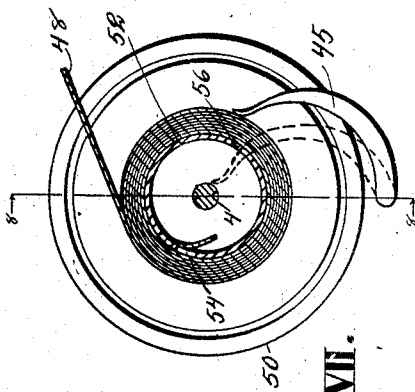


Fig. VII.

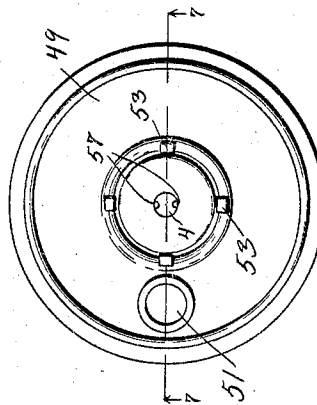


Fig. IX.

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By

Inventor
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UNITED STATES PATENT OFFICE.

WILLIAM R. FOX, OF GRAND RAPIDS, MICHIGAN.

RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

1,015,384.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed December 6, 1910. Ser. 595,911.

To all whom it may concern:

Be it known that I, WILLIAM R. FOX, a citizen of the United States, residing at Grand Rapids, Kent county, Michigan, have invented certain new and useful Improvements in Ribbon Mechanism for Type-Writing Machines, of which the following is a specification.

This invention relates to improvements in ribbon mechanism for typewriting machines.

The objects of the invention are: First, to simplify and improve the ribbon mechanism generally. Second, to simplify and improve the driving and reverse mechanism for ribbon mechanism generally; and, further, to organize such parts as an independent unitary structure for convenience in assembling. Third, to improve the spool construction, and incidentally, in improving the spool construction, provide means whereby the spools may be readily detached. Fourth, to improve the spool and trip mechanism or lever for tripping the reverse means.

Further objects, and objects relating to details, will definitely appear from the detailed description to follow.

The objects of the invention are accomplished by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of the invention is clearly illustrated and detailed in the accompanying drawing, only so much of a typewriting machine being illustrated as is necessary to show the relation of the ribbon mechanism.

In the drawing,—Figure I is a front elevation view of a structure embodying the features of the invention, the supporting frame of a typewriter being in section. Fig. II is a sectional plan view, taken on a line corresponding to line 2—2 of Fig. I. Fig. III is an enlarged detail sectional elevation view of the driving connections for the ribbon mechanism, taken on a line corresponding to line 3—3 of Fig. 2. Fig. IV is a detail elevation view of the reversing pawl and its actuating means detached, showing the relation of the parts. Fig. V is a detail sectional view of the pawl means, taken on a line 6—6 of Fig. IV. Fig. VI is a detail view of the developed blank from which the reversing pawl is formed. Fig. VII is a detail sectional plan view of the ribbon

spool, taken on a line corresponding to line 7—7 of Figs. I, II and VIII. Fig. VIII is a detail vertical sectional view, taken on a line corresponding to line 8—8 of Figs. VII and IX. Fig. IX is a detail plan view of the ribbon spool detached. Fig. X is a detail view of the detached barrel of the ribbon spool. Fig. XI is a detail view of the developed blank from which the barrel of the spool is formed. Fig. XII is a detail perspective view of the reverse rock shaft arm and guide.

In the drawing, all of the sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Considering the numerals of reference, as indicating the parts to which they refer, 1 is the frame of the typewriter.

2 is the base bar which carries the ribbon driving mechanism and extends laterally across the machine, resting on the typewriter frame.

3—3 are vertical brackets carrying the vertical spool shafts 4—4. On the lower ends of these spool shafts 4 are beveled gears 5—5. The lefthand gear is driven by a beveled gear 6, and the righthand gear is driven by the beveled gear 7. The gear 6 is on the shaft 10, which is driven by the gear 8. The shaft 10 is suitably supported in brackets on the base 2. The gear 7 is on the shaft 11 driven by the gear 9. The shaft 11 is likewise supported in suitable brackets on the base bar 2. The beveled gears 8 and 9 face each other, and are a little separated, and between them is disposed an adjustable shifting shaft 12, which carries the beveled driving gear 13, which is adapted to mesh first with one gear and then with the other, the effect being to drive first the righthand spool and then the lefthand spool. The spools are driven in opposite directions, so that the ribbon will be wound from one spool to the other, until unwound, when the shift mechanism provided shifts the shaft 12 and reverses the gear.

The shaft 12 extends into the hub of the gear 14 which it fits loosely and is driven by a cross-pin 15 through said hub. The end of the shaft 12 is slotted and is engaged by said cross pin. This leaves the shaft 12 free to oscillate from side to side at its forward end. The gear 14 is driven from the spring drum 18 by the intermediate

gears 16 and 17. As this invention does not pertain to the details of the spring drum and connected parts, it is deemed unnecessary to describe them further. A ratchet wheel 19 is fixed on the front end of the shaft 12 in proximity to the gear 13, and is, in connection with the double pawl 30, hereafter to be described, the connecting means for shifting the shaft 12 from side to side, to reverse the ribbon driving gear.

A slotted arm 20 on the rock shaft 20' is provided for manually shifting the shaft 12 from side to side by the lever arm 20'', if desired. The shaft is supported on the swinging arm 21 in the bushing 22. The arm 21 swings on the pivot 23. This arm 21 is formed of sheet metal and has a bifurcated guide 24 at its upper end and cooperates with a yielding locking means for the upper end of this lever. The pointed upper end of the arm 21 engages the yielding lock arm 25. The locking arm 25 is pivoted at 26 to a suitable bracket on the base bar 2, and is urged yieldingly downward by a spring 27. It is notched at 28 and 29 to receive the upper end of the arm 21 to hold it yieldingly in its extreme shifted position. It will thus be seen that, when the shaft 12 is shifted from side to side, the upper end of the arm 21 will be engaged and locked yieldingly in position to hold the gear 13 in mesh with either of the gears 8 or 9, as the case may be. This reverse can be done manually, as above indicated. The reverse is, however, usually done automatically. A double toothed shifting pawl 30 is provided for the purpose. This pawl is pivoted at 31 on a projection of the frame bar 2, as indicated. It is held normally in the central position by the spring 32, which is looped into perforation 33 in lug 33' on base bar 2. Oppositely-pointed teeth 34 and 35 are on the arms of the bifurcated double pawl. A downwardly-projecting arm 36 on this pawl 30 is secured to the horizontal bar 38 by suitable pivot 37. The opposite end of this bar 38 is carried by a link 39 which is parallel to the arm 36. The link 39 is pivoted at 40 on the frame 2, and is connected by pivot 41 at its lower end to the bar 38. The ends of the bar 38 are bent outwardly into engaging ears 42—42, as clearly appears in Figs. I and II. It will be clear that, whenever this bar 38 is moved to the right, it will have the effect of throwing the upper arm or finger of the bifurcated pawl 30 downwardly, so that its tooth 34 will engage the ratchet wheel 19. As the ratchet wheel is rotated by the spring drum and it is engaged by this pawl, the effect will be to shift the shaft 12 toward the righthand side of the machine, throwing the gear 13 into mesh with the gear 9 and driving the ribbon shaft at that end of the machine. When the bar

38 is moved in the opposite direction, the tooth 35 of the bifurcated pawl will engage the ratchet 19 on the under side, and, as the shaft is rotating against this tooth, the shaft 12 will shift in the opposite direction and throw gear 13 into mesh with the gear 8 and reverse the ribbon mechanism. This trip means for the bar 38 is connected with a trip actuated and operated by the ribbon spool. The ribbon spools are identical and symmetrical and opposed. The description of one only will suffice.

A finger 44 is provided for contacting with one of the engaging ears 42 at the end of the said bar 38. The finger is carried on the vertical trip rock-shaft 43. The arm 45 on the upper end of the shaft cooperates with the ribbon spool. The arm is urged into contact with the barrels of the spool by a spring 46 connected to the collar 47 and to the frame, thus putting tension upon the arm to cause it to cooperate with the spool. The arm is flat, pointed, thin and curved outwardly at the end for the purpose hereafter described. Each spool consists of top plate 49 and bottom plate 50, which are coupled together by the barrel 52 fitting into annular depressions 51 on the top and bottom of said barrel.

A perforation 54 is in the barrel of such form that a sharp projecting tongue 55 is provided for engaging the end of the ribbon. The barrel 52 is formed of a blank of sheet metal, the ends of which are a little separated, forming a slot 56.—see Figs. VII, VIII and X. The ribbon 48 is hooked onto the hook 55, and wound on the spool, and extends across the gap 56. The end of the trip arm 45, which is slightly curved outwardly and made thin and pointed, rests against the spool barrel and its contents when the same is filled with the ribbon. As the end is slightly outturned, it slips over the ribbon with very little friction, and yet, being of this form and pointed, the end very readily engages the slot 56 when the last turn of the ribbon is unwound. This permits the trip arm 45 to drop into the center of the spool barrel and permits the vertical shaft 43 to swing and carry its trip finger or arm 44 into contact with the outwardly-turned engaging ear 42 on the swinging bar 38, and, by this means, it will be noted that the power stored in the spring 46 will, when the ribbon has been thus unwound, swing the bar 38 and actuate the double toothed pawl, already referred to, and reverse the ribbon winding means. Because the arm 45 is curved and flattened at its end, it slides along the ribbon very readily, and the ribbon is thus reversed without any noticeable strain on the ribbon mechanism. The powerful spring drum does the work of shifting as soon as the trip acts.

The center hole in the lower plate 50 of

the spool is irregular, having inwardly projecting points 51-57 at opposite sides. The upper end of the shaft 4 is notched at 58-58 to receive these points, and the upper end of this shaft extends out through the hole in the upper spool plate 49, whereby the spool can be lifted off the shaft or placed in position very readily without any adjustment further than merely slipping it onto the upper end of the shaft. This makes the spool very effective in use.

It will be observed that the spool is very cheap to manufacture, consisting of merely three pieces of sheet metal punched and rolled to form, and this simple construction produces a device which cooperates with the curved arm 45 perfectly; because, when the ribbon is entirely unwound, the same projects within the barrel of the spool very readily, as appears in Fig. VII, indicated by dotted lines, and, when the ribbon is being drawn off from or wound onto the spool, the finger 45 acts as a brake and guide by gentle pressure and prevents undue slack in the ribbon. These things make a very effective ribbon device for typewriters.

It is desired to comment that the spool is adapted for either vertical or horizontal shafts, and is exceedingly effective, and, as it is so cheap to manufacture, the ribbons can be sold on the spool at the same price as the ribbon with ordinary spools, and it will not be necessary for the operator to wind or unwind the ribbon. All the operator needs to do is to insert the spool, and, when the ribbon is worn out, take out the old spool and put in a new. The advantage of this is very apparent and it is very great.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent is:—

1. A ribbon mechanism for typewriters, consisting of the combination of a pair of spools, each having a sheet metal barrel with an open slot at the side, yielding fingers urged against the said barrels with connections to a suitable trip arranged so that the said yielding fingers can enter the respective slots thereof; gear means for driving said spools; a shiftable driving shaft for the said ribbon spools bearing a suitable gear for meshing alternately with the gears to drive the said ribbon spools; and a shifting means with trip actuated from said yielding fingers, as specified.

2. In a ribbon driving and reversing mechanism, the combination with a spring drum of a typewriting machine, of ribbon spools with gears connected to drive the same; a shiftable driving gear to alternately engage the gears to drive said spools; a driving shaft with a flexible joint actuated from the spring drum; means to swing the shaft from side to side; a ratchet wheel supported on said shaft; a bifurcated ratchet

pawl with oppositely-pointed engaging teeth embracing the said ratchet wheel to react alternately on opposite sides thereof; means for holding the said pawl yieldingly in the central position; and a trip operated from said ribbon spools for actuating the said double pawl and shifting it from one side to the other on the emptying of the spools of the ribbon for reversing the driving gear for the same.

3. In a ribbon driving and reversing mechanism, the combination with a spring drum of a typewriting machine, of vertical shafts carrying the said ribbon spools with horizontal intermediate shafts for driving the same, having beveled gears and also gears to mesh with a gear on a driving shaft; a shifting driving gear to alternately engage the gears to drive the said spools; a driving shaft with a flexible joint actuated from the spring drum; means to swing the shaft from side to side; a ratchet wheel supported on said shaft; a bifurcated ratchet pawl with oppositely-pointed engaging teeth embracing the said ratchet wheel to react alternately on opposite sides thereof; means for holding the said pawl yieldingly in the central position; and a trip finger resting on the body of each of the said spools and coacting with a slot therein for actuating the said double pawl and shifting it from one side to the other on the emptying of the spools of the ribbon for reversing the driving gear for the same.

4. A ribbon spool having a hollow drum containing a narrow slot in its side; and a finger conformed to enter the said narrow slot and resting yieldingly on the body of said spool, the inner end of which finger is pointed and curved inwardly and then tangentially and arranged to enter the slot of the said drum without resistance when the ribbon is unwound, as specified.

5. A ribbon spool having a hollow drum containing a narrow slot in its side; and a finger conformed to enter the said narrow slot and resting yieldingly on the body of said spool, arranged to enter the slot of the said drum when the ribbon is unwound.

6. In a typewriting machine, the combination of a ribbon spool having a hollow sheet metal drum with a narrow slot therein; and a trip finger resting upon the said drum and slightly out-curved to enter the said slot when the same is uncovered by the unwinding of the ribbon, coacting for the purpose specified.

7. In a ribbon mechanism for typewriting machines, the combination of suitable vertical ribbon shafts with ribbon spools provided with trip devices and oppositely facing beveled gears for driving the same; a driving shaft for the ribbon mechanism with a loose connection to the hub of a driving wheel driven by the spring drum of a

typewriter; a beveled reverse gear fixed on said shaft for engaging the opposed beveled gears of the ribbon mechanism; a pivoted arm supporting the front of said shaft; a
 5 ratchet wheel fixed on said shaft in proximity to the said beveled reverse gear; a bifurcated pawl with oppositely-faced teeth embracing the said gear and adapted to stand in a neutral position and be thrown
 10 from side to side to engage the same; a spring for holding said pawl in its neutral disengaged position; an arm on said pawl extending laterally therefrom; a transverse bar connected to said arm and disposed
 15 across the typewriter with engaging portions at opposite ends thereof; a supporting link parallel with the arm on said pawl, whereby the said bar will have a horizontal parallel movement; and means for engaging
 20 the said bar to shift the reversing pawl from side to side with connection to the trip mechanism for said ribbon spools, coacting for the purpose specified.

8. In a ribbon mechanism for typewriting machines, the combination of suitable
 25 vertical ribbon shafts with ribbon spools provided with trip devices and oppositely-facing beveled gears for driving the same; a driving shaft for the ribbon mechanism
 30 with a loose connection to the hub of a driving wheel driven by the spring drum of a typewriter; a beveled reverse gear fixed on said shaft for engaging the opposed beveled
 35 gears of the ribbon mechanism; a pivoted arm supporting the front of said shaft; a ratchet wheel fixed on said shaft; a bifurcated pawl with oppositely-faced teeth embracing the said gear and adapted to stand
 40 in a neutral position and be thrown from side to side to engage the same; a spring for holding said pawl in its neutral disengaged position; an arm on said pawl extending laterally therefrom; a transverse bar connected to said arm and disposed

across the typewriter with engaging portions at opposite ends thereof; a supporting link parallel with the arm on said pawl, whereby the said bar will have a horizontal parallel movement; and means for engaging the said bar to shift the reversing pawl from side to side, with connection to the trip mechanism for said ribbon spools, coacting for the purpose specified.

9. In a mechanism for driving and reversing a typewriter ribbon, the combination of a transverse detachable frame bar for securing the same to the frame of a typewriter; bearing brackets on said bar; vertical ribbon shafts therein; gears carried by said bar for driving the same; a
 60 shifting arm supported on said bar; a swinging shaft carried by said arm; a reversing gear carried on said shaft; means to automatically shift said gear; vertical rock shafts supported on said frame bar;
 65 and trip devices on said rock shaft arranged to cooperate with the ribbon spools, all constituting a unitary ribbon driving and reversing means, coacting for the purpose specified.

10. In a mechanism for driving and reversing a typewriter ribbon, the combination of a detachable auxiliary frame structure for said ribbon device; ribbon shafts supported thereon; gears for driving the
 75 same; a reversing gear mechanism carried thereby; and trip devices carried by the said auxiliary frame for reversing the said gear mechanism, all coacting substantially as described.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

WILLIAM R. FOX. [L. s.]

Witnesses:

LENA CHURCH,
 VINA DUNHAM.