Aug. 7, 1928. 1,680,135

W. A. DOBSON

TYPEWRITING MACHINE

Filed Sept. 18, 1924 2 Sheets-Sheet 1

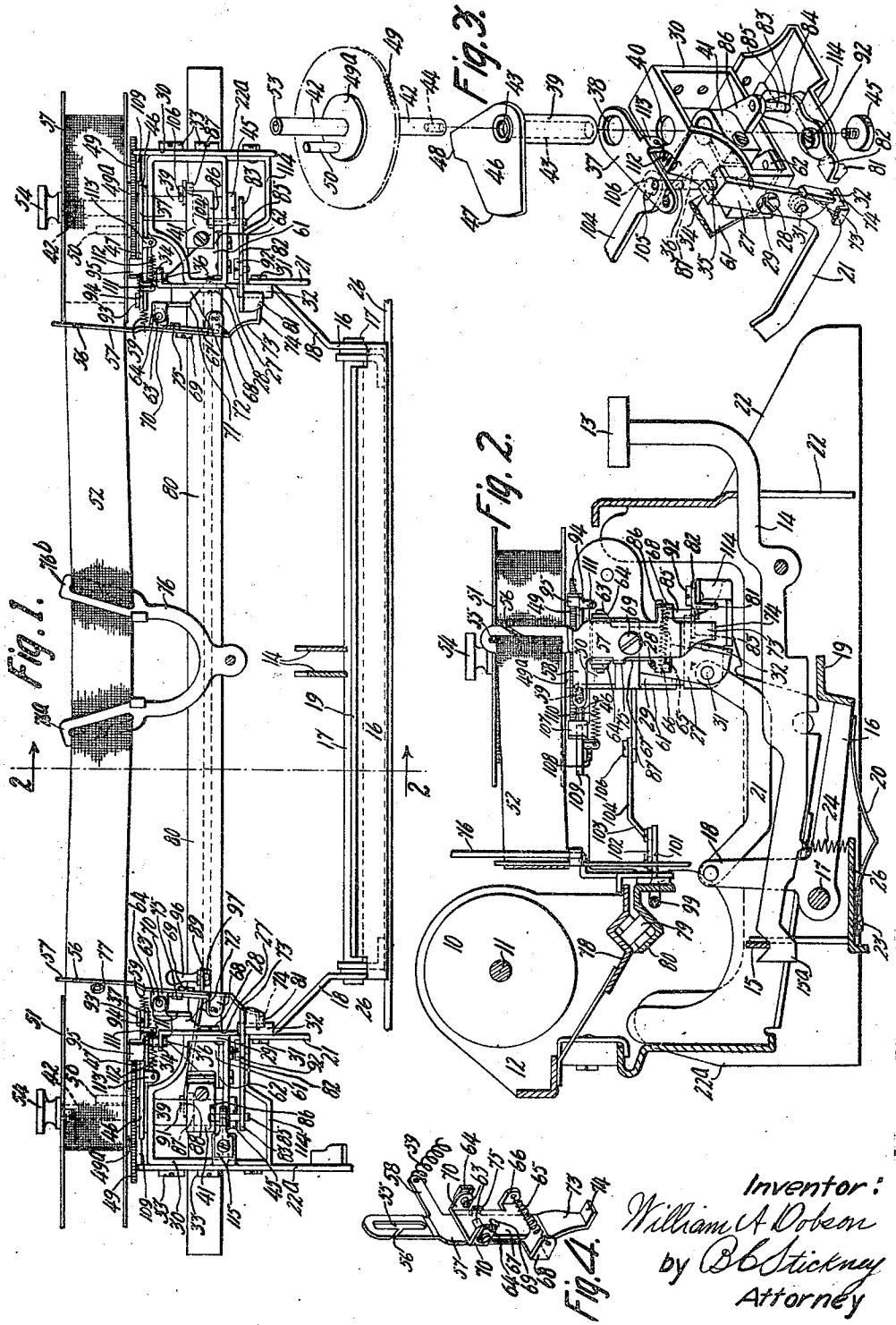

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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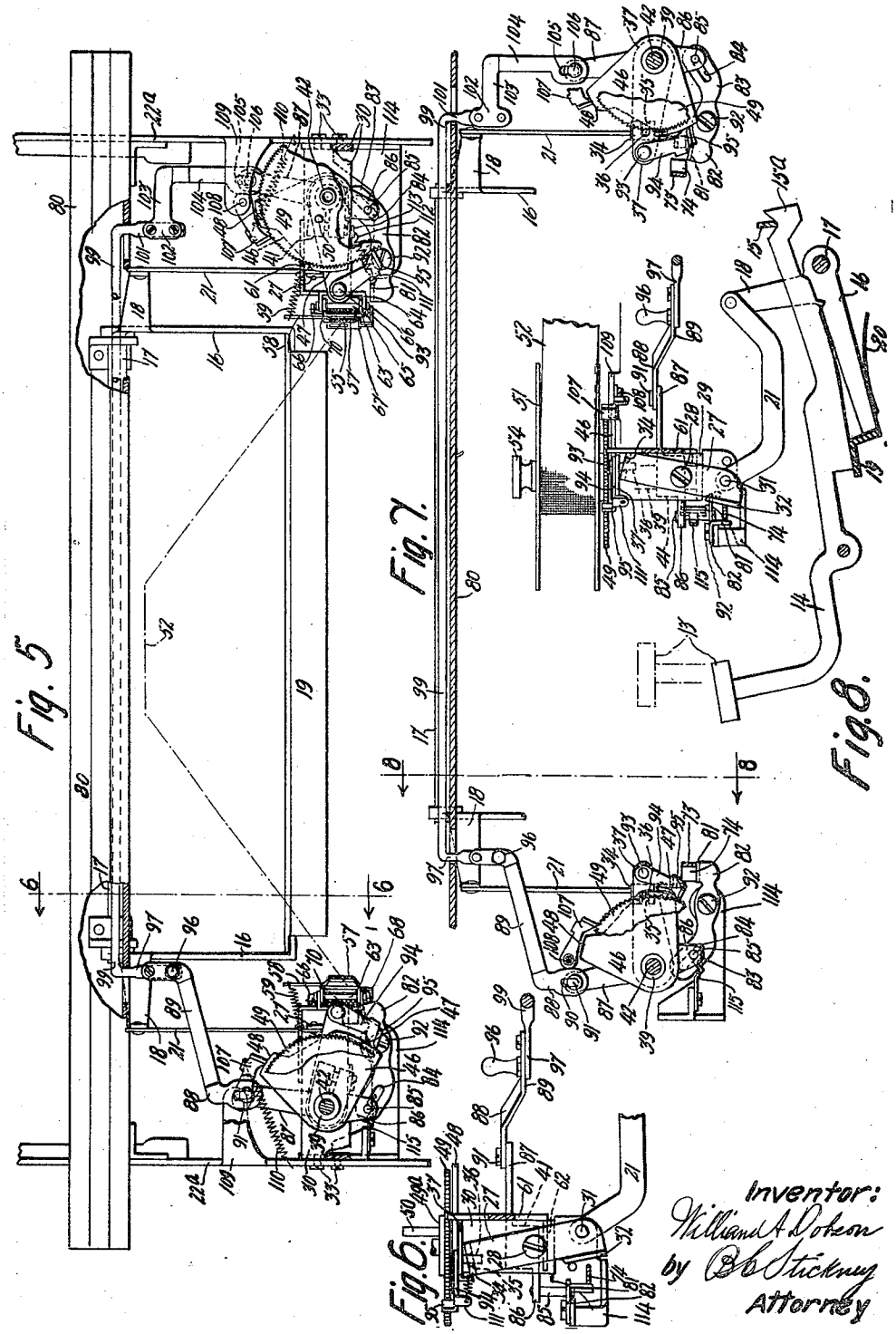

Fig. 5

Fig. 7.

Fig. 8.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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TYPEWRITING MACHINE.

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This invention relates to automatically reversible ribbon-feeding devices for typewriters.

A feature of the invention is the provision of devices which are conditioned by the unwinding of a ribbon from a spool and the tensioning of the ribbon, so that the devices are actuable on the depression of a type-key to reverse the direction of rotation of the spool.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a front elevation of that part of a typewriting machine embodying the present invention.

Figure 2 is a sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a perspective of various parts shown in the order of assembly.

Figure 4 is a perspective view of the follower.

Figure 5 is a top plan view of the parts shown in Figure 1.

Figure 6 is a detail view showing the pawl-actuator and parts cooperating therewith.

Figure 7 is a detail plan view, partly in section, showing the cam-mechanism.

Figure 8 is a detail fragment of the connections from the keys to the pawl-actuating means.

Referring to the drawings, 10 designates the usual platen which is rotatively mounted in the platen-frame 12 by means of shaft 11. 13 designates the usual keys secured upon the levers 14, the rear ends 15^a of which are suitably fulcrumed, in the well-known manner, upon a fulcrum-bar 15. 16 designates a U-shaped universal bar-frame fulcrumed upon a rod 17 and having a bar-section 19 which is engageable by the key-levers 14 against the tension of the usual leaf-spring 20 engaging the under side of said frame and tending to hold the universal bar in the normal operative position shown in Figure 2.

Links 21 are pivotally mounted at one end upon each side arm 18 formed integrally with the universal bar-frame 16 as shown in Figures 1 and 8. 22 designates part of the main frame of the typewriting machine, and 22^a designates the side walls of this main frame. The spring 20 is secured by the fasteners 23 to a shelf 26. Coil-springs 24 are also secured upon the shelf 26 and serve to hold the key-levers 14 in inoperative position. 27 designates two levers which serve to actuate or drive feed-pawls to be described. These levers are vertically disposed and pivoted upon the horizontal pivots 28. Two ratchet-wheels 49 are provided which are arranged above bracket-members 30, the latter being arranged at opposite sides of the sides of the main frame 22. The inner walls 29 of the bracket-members 30 are dished to provide clearance for certain adjacent moving parts. Pivoted on pins 31, secured upon the lower ends respectively of the levers or drivers 27, are the ends of the links 21, the pivots 28 for said drivers being secured upon the walls 29 of the bracket-members 30. The levers 27 have at their lowermost ends outwardly-projecting lugs 32. The bracket-members 30 are secured upon the main frame by means of fasteners 33.

Each of the drivers or levers 27 is provided at its upper end with a fork or bifurcation 34 having a recess 35 engageable with pins 36, depending from cranks 37 loosely assembled upon sleeves 39 which pass through the holes 38 in the latter, and then enter holes 40 in the members 30, and positioned rotatively in these bearings so as to project slightly above the members 30. Secured fast upon the upper projecting ends of these sleeves 39 are the cam-plates, the ratchet-wheels and certain cranks. A clamp 41 is adjustably secured upon each sleeve within each bracket 30. A shaft 42 passes through and takes a bearing within a hole 43 of each sleeve and is provided at its lowermost end with a screw-hole 44 in which is threaded a screw 45 which holds the shaft 42 against vertical displacement from the bracket 30. Cam-plates designated 46 are formed with two angularly-spaced lobes designated 47 and 48. These cam-plates are fast upon the upper projecting ends of the sleeves 39 and one lobe of each cam controls a pawl to engage or disengage the adjacent ratchet-wheel, while the other lobe thereof engages or disengages a detent 107 coacting with said pawl.

The ratchet-wheels designated as 49 are secured to spacing heads 49^a formed integrally with the shafts 42, and each ratchet-wheel includes a spool-driving pin 50 which enters a corresponding hole (not shown) in

the usual ribbon-spools 51, located at each side of the platen-frame as illustrated in Figure 1. The free ends of the shafts 42 are provided with screw-holes 53 in which are threaded thumb-screws 54 which hold the spools against displacement.

Eyes 55 are formed at the upper ends of followers or ribbon-guides 57 which are preferably made from sheet-metal, and each eye is provided with a diagonal kerf 56 through which the ink-ribbon 52 is inserted to enter the eyes 55. Each follower is in the form of a vertical lever designed to have a universal swinging movement. Each follower 57 is formed with a lateral integral arm 58, to which is secured one end of a suitable expansion spring 59, the other end of which is fixedly secured to a standard 61. The standard 61 includes a base-portion 62 secured upon the bottom of each bracket 30.

A fulcrum-pin 63 is carried by two lugs 64 formed integrally with an arm 71 of an extension 72 of each of the standards 61, and a spring 65 extends transversely of each follower 57, and has one end secured to a lug 66 formed upon a ribbon-guide-carrier 67 and its other end secured to a lug 68 formed upon the follower itself. The guide-carrier 67 has two lugs 70 that fulcrum upon the pin 63 and the ribbon-guide fulcrums upon a stud 69 on the carrier 67 so as to be able to swing the guide in two paths at right angles to each other. The lower portion of each follower or ribbon-guide 57 is formed with an arm 73 terminating in an offset lip 74 disposed practically at right angles with respect to the main body-portion of the follower 57. 75 designates stop ear formed upon each follower for the purpose of engaging the adjacent edge of the carrier 67 to prevent the follower from accidentally swinging out of a normal vertical position so that its lip 74 will be interposed between the adjacent lever or driver 27 and an actuator about to be described.

76 designates the usual ribbon-vibrator having the oppositely-inclined eyes or guides 76^a and 76^b through which the ribbon 52 is threaded to be vibrated in the usual manner to the printing zone. The ribbon 52 is provided at each end with a bead or eyelet 77. 78 designates a portion of the frame of the paper-carriage of the machine traveling upon rollers 79 engaging the rail 80 fixed to the main frame. A depending lug 81 is formed upon each of two horizontally-disposed trip levers or triggers 82, each of which levers is pivoted on a fulcrum-pin 92 and is formed with an arm 83. Each arm 83 has a slot 84 therein which receives a pin 85 depending from a crank 86 formed upon each of the clamps 41 on the sleeves 39, said clamps also having another crank 87, formed diametrically opposite the first cranks 86. The cranks 87 are connected to move in unison so that when one is shifted the other will also shift. The connections include a connecting rod 99 which is rearwardly of the front part of the rail 80. The connecting rod 99 terminates in forwardly-directed arms 97 and 101. The arm 97 is rigidly secured to an extension 89 which has a terminal 88 extending at an angle thereto. The terminal 88 is loosely connected to the crank 87 by means of a pin 91 on the crank which is received in a slot 90 in the terminal.

The other arm 101 of the connecting rod 99 is secured at 102 to the arm 103 of an extension 104 which is connected to a crank 87 by a pin 106 thereon received in a slot 105 in the extension.

A finger-piece or control handle 96 is secured to the extension 89 by which the connecting rod 99 may be shifted longitudinally for rocking the cranks 87.

Pawls 94 are pivoted upon studs 93 on the cranks 37 which are loose upon the sleeves 39 to vibrate between the faces of the brackets 30 and the cam-plate 46. These pawls have bills 95 arranged to periodically engage with and be disengaged from the teeth of the ratchet-wheels 49, it being understood that these wheels 49 have their teeth slanting in opposite directions. Detents 107 are provided to engage alternately the ratchet-wheels 49 to prevent the retrograde movement thereof when actuated alternately by the feed-pawls 94. These detents are pivoted by means of pins 108 on arms 109 extending from the frame side walls 22^a. Each detent 107 is held in engagement with the adjacent ratchet-wheel by means of a spring 110 which is fixedly secured at one end to the arm 109. Each pawl 94 is provided with a lug 111, to which is secured one end of a spring 112, the other end of which spring is secured to another lug 113 formed upon each of the cranks 37, and in this manner the feed-pawls are held alternately in engagement with the respective ratchet-wheels. The horizontal levers or triggers 82 are fulcrumed upon the pivots 92 which are secured upon an extension 114 of each bracket 30. 115 designates a leaf-spring which acts on the pin 85 for the purpose of determining the position of the triggers 82. This spring 115 is secured by means of a suitable fastener upon each bracket 30.

The operation of the invention is as follows: Normally the two followers 57 are disposed in such a manner that their lower lips are spaced away from contact with the adjacent lugs 81 of the levers 82 while their upper ribbon-threaded ends incline toward the spool-flanges under the influence of the springs 59, as shown at the right-hand spool in Figure 1. One of the cam-plates 46 has one lobe 47 or 48 thereof held in engagement with the pawl 94 thereadjacent and presses this pawl out of engagement with the ad-

jacent ratchet-wheel 49, so that this ratchet-wheel and the spool associated therewith are pulled rotatively by the ribbon 52 which is being wound onto the opposite spool. The other cam-plate 46 is disengaged from the other feed-pawl 94, so that the adjacent ratchet-wheel is engaged by its pawl, the latter being actuated on the down stroke of any key 13, said key vibrating the universal bar 19, thereby conveying movement to the link 21 to swing the vertical lever 27, which, through its slot-and-pin connection with the pawl-operating crank 37, actuates the pawl 94 to rotate the associated ratchet wheel 49.

In this manner a pawl 94 continues to feed the ink-ribbon 52 along the printing line of the machine in a fixed direction, and as the feeding of the ribbon in this direction nears completion, the bead 77 at one end thereof occupies the position just in front of the upper end of the adjacent follower or ribbon-guide 57, and the automatic mechanism for effecting the reverse movement of the ink-ribbon 52 is about to be actuated. As the bead 77 approaches the follower from the left towards the right hand (see Figure 1) it collides with the left-hand follower and pushes the guide end thereof rightwardly, thereby swinging the lower lip 74 of this follower as shown in Figure 1 and interposing the lip between the two lugs 32 and 81 of the respective vertical and horizontal levers 27 and 82. When the next type-key 13 is struck by the typist, the vertical lever 27 is reciprocated, and collides with the interposed follower lug or lip 74 to vibrate the follower upon its stud 69 and against its spring 65 and towards the lug 81 of the horizontal trigger 82 against which it collides, causing this trigger to turn upon its pivot 92 and causing the slotted portion 83 thereof to actuate the pin 85 to turn the crank 86 and thereby turn the sleeve 39, so that the lobe of the cam-plate 46 which up to this time has been active is moved out of engagement with the pawl 94 and allows the pawl, under the tension of the spring 112, to engage the ratchet-wheel. When the sleeve turns, the connecting rod 99 is actuated to operate the other crank 87, which, at the opposite spool, rotates the other sleeve 39, thereby actuating the other cam-plate 46 which results in shifting the lobe thereof into engagement with the adjacent feed-pawl 94 to press this pawl out of engagement with the adjacent ratchet-wheel, so that now the right-hand ratchet-wheel of Figure 1 is idle and turns loosely within its sleeve 49. The engagement of one pawl with its ratchet-wheel and the disengagement of the other pawl from its ratchet-wheel are simultaneous, so that while one spool is turning to wind up the ribbon 52, the other spool is being unwound. In this manner the direction of ribbon-feed is reversed automatically and now feeds from right to left until the bead 77 at the opposite end of the ribbon operates in the manner just described to again automatically reverse the direction of travel of the ribbon.

It will be obvious that the typist need not wait for the end of the ribbon to effectuate this reversal of the ribbon, but may manually operate the handle 96 at the left of the machine to shift the connecting rod 99 in the proper direction to either engage or disengage the feed-pawl 94 and its detent pawl 107 with or from the adjacent ratchet-wheel 49.

It will be noted that each ribbon-guide 57 operates at one time as a ribbon-guide to direct the traveling ribbon to a winding-up spool, and becomes operative at another time at the paying-out spool to interpose itself between a movable part of the ribbon-feeding mechanism and the ribbon-reversing mechanism to automatically effect a change in the direction of the ribbon-feed; that the longitudinal feed of the ribbon takes place during the down stroke of the character key; that the ribbon-carrier is simultaneously vibrated by the key to cover the typing position; that both these latter operations place the ribbon under a sudden stress that tends to spin the free-running paying-out spool to create a slack in the ribbon intermediate the two spools; that the part 57 at the winding-up spool responds through its flexibility to the sudden key-imparted stress on the ribbon by vibrating about its pivot 69 against tension of the spring 65 and said guide becomes effective to prevent an impulsive ribbon-feeding jerk being transferred to the ribbon; that the guide, in being restored by its spring during the return of the ribbon-carrier, takes up any slack in the straightened-out ribbon between spools; that the reversal of the direction for ribbon-feed is practically instantaneous and accomplished during the typing of a single character; and that the only stress placed upon the ribbon during the ribbon-reversal movement is the swinging of the carrier and the light spring-pressed guide, as an interponent between a movable ribbon-feeding element and a normally inactive ribbon-reversing mechanism.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination of ribbon-spools, vertical shafts upon which said spools are mounted, a sleeve embracing each of said shafts rotatably, a ratchet-wheel secured upon each of said shafts, cams secured upon each of said sleeves, a feed-pawl operatively associated with each of said ratchet-wheels, and arranged to engage said cams, mechanism for

rotating each of said sleeves in opposite directions, respectively, a trigger for actuating each of said mechanisms, vertical levers arranged, when tilted, to actuate said pawls alternately, key-controlled connections for operating said levers, and a ribbon-controlled follower intervening between each vertical lever and one of said triggers and being engaged by said vertical lever to actuate the adjacent trigger to cause said cams to be actuated.

2. In a typewriting machine, the combination of oppositely-arranged vertical shafts, bearings for said shafts, ratchet-wheels fixed upon said shafts, feed-pawls engageable with said ratchet-wheels, respectively, sleeves surrounding rotatably said shafts in said bearings, cam-plates arranged to be swung by said sleeves, means for rotating one sleeve to move one cam against one of said feed-pawls to disengage said pawl from said ratchet-wheel, means controlled by the last-named sleeve for turning the other sleeve to cause the other cam to move the other pawl into engagement with the other ratchet-wheel, ribbon-spools fixed upon said shafts, a ribbon trained upon said spools, a vertical lever pivoted upon each bearing and engaging the adjacent feed-pawl to actuate the latter, key-controlled means for oscillating each of said vertical levers, means for actuating the first-named means, and a follower pivoted vertically upon each of said bearings and operated by one oscillating vertical lever to cause it to operate the actuating means.

3. In a typewriting machine, the combination of bearings, vertical shafts mounted rotatably therein, sleeves embracing said shafts, cranks on said sleeves, a connecting rod secured to said cranks, cranks on said sleeves diametrically opposite the other cranks, horizontal levers for operating said last-named cranks, a trigger carried by each lever, a ratchet-wheel secured upon each shaft, a ribbon-spool secured upon each shaft, feed-pawls operatively mounted adjacent each ratchet-wheel, a cam-plate secured upon each sleeve, lobes upon said cams so disposed relatively to said feed-pawls that while one lobe engages one pawl the other lobe is disengaged from the other pawl, said cams turning with said sleeves, a driver for each feed-pawl, and a follower pivoted upon said bearing and associated with each trigger, each of said followers being alternately arranged to intervene between one driver and one trigger so as to be tilted by said driver in order to engage said trigger to tilt one of said levers to actuate said sleeves.

4. In a typewriting machine, the combination of ribbon-spools, an ink-ribbon trained thereupon, ratchet-wheels turning with said spools, respectively, and having their teeth facing in opposite directions so as to be driven in opposite directions, feed-pawls and detents engageable with said respective ratchet-wheels, cam-plates having lobes movable relatively to said ratchet-wheels in projecting relation thereto, said lobes being so arranged for movement that as one pushes the adjacent pawl out of engagement with one ratchet-wheel, the other pulls the adjacent pawl into engagement with the other ratchet-wheel, means for imparting movement to each cam-plate, means for actuating each of said last-named means including a trigger, a follower projecting alongside each spool in a plane with said ribbon and actuated by the latter periodically, horizontal pivots upon which said followers are mounted, means for allowing each of said followers to swing in a direction towards said triggers so as to actuate the latter, said followers, when actuated by said ribbon swinging on said horizontal pivots, to be in the path of said triggers, and key-controlled means for actuating said pawls alternately, said last-named means alternately urging one of said followers to engage one of said triggers.

5. In a typewriting machine, the combination of bracket-members, vertical shafts therein, sleeves surrounding said shafts, pawl-shifting cam-plates on said sleeves above said members, ratchet-wheels fixed upon said shafts, ribbon-spools moving with said ratchet-wheels and having oppositely-inclined teeth, feed-pawls horizontally-disposed and held adjacent the respective wheels, one in engagement and the other out of engagement with the respective ratchet-wheels so as to drive said ratchet-wheels in opposite directions, cranks upon said sleeves designed to turn said sleeves to cause said cams to reverse the positions of said pawls, horizontal triggers on said members pivotally connected at one end to each of said cranks, respectively, a lug formed terminally upon each trigger, levers pivoted vertically to said members and being loosely pivoted to said pawls for operating the latter, key-controlled means for moving said levers to actuate them, a pair of followers pivoted upon said members, each follower consisting of a portion pivoted for movement in the direction of one of said members, and another portion pivoted for movement in the direction of said trigger, a ribbon trained upon said spools, and means on said ribbon for tilting one of said followers to cause it to project between one of said levers and triggers, respectively, so as to be impelled forward by said lever to impart movement to said trigger.

6. In a typewriting machine, the combination of a pair of oppositely-disposed bracket-members, vertical shafts therein, ribbon-spools mounted fixedly upon said shafts, sleeves surrounding said shafts, cam-

plates on said sleeves and moving therewith, an ink-ribbon associated with each spool for simultaneously causing one spool to move in the same direction with the other spool, a ratchet-wheel for each spool to rotate the same, means including feed-pawls for advancing said ratchet-wheels, said cam-plates engaging with said feed pawls to time the actuation of the latter, cranks on said sleeves, means controlled by said ink-ribbon for turning either of said cranks, another crank upon each of said sleeves, a handle for manually operating one of the last-named cranks, and means connecting the last-named cranks for causing them to move in unison and to so position them that when one cam-plate engages a feed-pawl, the other cam-plate is disengaged from its feed-pawl.

7. In a typewriting machine, the combination of a frame, a pair of ribbon-spools mounted rotatably thereon, shafts upon which said stools are journaled, ratchet-wheels associated with said spools and having their teeth curving in opposite directions, feed-pawls arranged to engage with each of said wheels, cams set so as to respectively hold one pawl in and the other pawl out of engagement with said ratchet-wheels, so that each pawl is enabled to rotate the adjacent ratchet-wheel in an opposite direction, key-controlled mechanism for operating said pawls to drive them in the same directions, a ribbon on said spools arranged to turn the latter in the same direction, diametrically-opposed cranks designed to operate said cams interchangeably, a hand lever connected to one of said cranks, a trigger connected to the other of said cranks, followers disposed adjacent said mechanism, means on said ribbon for swinging either of said followers to cause it to project between said trigger and said mechanism, each of said followers arranged to swing in the direction of said trigger and being actuated by said mechanism to engage said trigger swingingly to operate the latter, and means for holding either of said spools against retrograde movement.

8. In a typewriting machine, the combination of a carriage, a main frame, bracket-members secured at opposing sides of said frame, vertical shafts mounted in said members, sleeves around said shafts, cranks fixed upon said sleeves above said members, cranks on said respective sleeves in said members, spools fixed upon said shafts, ratchet-wheels fixed upon said shafts under said spools, pawls mounted upon said first-named cranks, springs urging said pawls in engagement with said ratchet-wheels, cam-plates secured to said sleeves above said first-named cranks and set so that one cam-plate holds one pawl out of engagement with one ratchet-wheel against the tension of one spring, while the other cam-plate holds the other pawl in engagement with the other ratchet-wheel under tension of the other spring, as said sleeves are rotated, an ink-ribbon on both spools and causing them to rotate in the same direction, levers pivoted to said members and arranged, when actuated, to operate said second cranks to turn said sleeves, key-controlled means on each member for driving said pawls to alternately turn said ratchet-wheels, and means whereby either of said key-controlled means may actuate one of said levers.

9. In a typewriting machine, the combination of a frame, bracket-members arranged at opposite sides thereof, each of said bracket-members consisting of a boxing having its front wall indented inwardly to provide a recess externally thereof, a sleeve rotatably mounted so as to have its bearings in the upper and lower walls of each boxing but projecting above its upper wall, a shaft projecting through each sleeve thereabove, ribbon-feeding means co-operatively carried by both shafts, a crank secured upon each sleeve, pins depending from each crank, a web projecting outwardly from each boxing, a lever pivoted upon each web and having a terminal slotted portion receiving, respectively, one of said pins, horizontal pivots secured in spaced-apart relation from the front walls of said boxings, followers having lugs fulcrumed upon said pivots so as to swing towards said boxings, means for causing said followers to swing at right angles to its first swinging movement so as to be engageable with said levers, means for timing the last-named swinging movement of said followers, said ribbon-feeding means movable in one direction, means controlled by either of said sleeves for actuating said ribbon-feeding means, means on said sleeves co-operating with the last-named means to reverse the direction of movement of said ribbon-feeding means, and key-controlled mechanism for operating intermittently said sleeve-controlled means.

10. In a typewriting machine, the combination of oppositely-arranged bearings, horizontal pivots projecting therefrom, levers fulcrumed upon said pivots, sleeves in said bearings, cranks operatively movable above said bearings, and connected to said sleeves, right angular forks formed upon the upper ends of said levers, pins depending from said cranks received in said forks, means controlled by said cranks and designed to feed an ink-ribbon in one direction, means designed to allow the last-named means to reverse the direction of feeding of said ink-ribbon, means on each bearing for actuating the adjacent sleeve, followers, means for universally pivoting each follower adjacent each lever, ribbon-controlled means for tilting one follower in the path of pivotal movement of the adjacent lever, and key-

controlled mechanism actuating the last-named lever to cause it to swing the adjacent follower along with it in order to cause the sleeve-actuating means to become active.

11. In a typewriting machine, the combination of oppositely-arranged bearings, arms secured thereto, each arm having a pair of lugs, a horizontal pivot in each pair of lugs, levers having lugs fulcrumed upon each pivot, a lug formed integrally upon each of said levers at its lower end, a pair of vertically-disposed followers secured pivotally upon said levers, an integral lug formed at the lower end of each of said followers, coil-springs secured respectively to the lugs formed at the lower ends of each follower and lever, outwardly-projecting arms upon said followers, springs secured to said arms and to said bearings for holding said followers at a normal bias, forwardly-projecting lips formed upon the lower ends of said followers, the upper portions of said followers being slotted to receive and hold an ink-ribbon, mechanism for feeding said ribbon in one direction, means for causing said mechanism to feed said ribbon in a counter direction, means engaged by the lip of either follower for actuating the last-named means, and means for actuating said mechanism and for predeterminately actuating either of said followers to cause it to swing over so as to engage said reversing means.

12. In a typewriting machine, the combination of a vertical shaft, a bearing therefor, a ribbon-spool on said shaft, a ratchet-wheel on said shaft, a crank movable around said shaft, a cam movable about said shaft, a pawl on said crank, a spring holding said pawl pressed in the direction of said cam, said cam pressing said pawl out of engagement with said ratchet-wheel and having a surface movable into engagement with said pawl to allow it to engage said ratchet-wheel, reciprocating means for actuating said pawl in a ratchet-wheel-driving direction, an ink-ribbon passing upon said spool, key-controlled mechanism, a connection between said mechanism and said reciprocating means, a follower having its upper end spaced from said cam and having its lower end projecting inwardly, means controlled by the last-named end of said follower for moving said cam, and means for positioning said follower for predeterminately disposing it in the path of movement of said reciprocating means so as to be actuated by the latter to operate said last-named means.

13. In a typewriting machine, ribbon-reversing mechanism, an oscillatable member controlling the same, a crank-arm for actuating said member, a horizontal lever connected so as to operate said crank-arm, a depending lug upon said lever, a vertical lever pivoted so as to swing over toward said lug when actuated and actuate it to start said horizontal lever, key-controlled mechanism, and means acting in time with said last-named mechanism for predeterminately shifting said lever against said lug.

14. In a typewriting machine, the combination of ribbon-reversing mechanism, a bearing, a vertical follower pivoted thereto and having a ribbon movably threaded into its upper portion, a horizontally-disposed trigger also pivoted thereto, at right angles to said follower, a spring on said bearing normally inclining said follower to separate its lower end from the outer end of said lever, means acting in time with the movement of a ribbon for tilting said follower, against the tension of said spring, into engageable relationship with said lever, ribbon-feeding mechanism, means whereby said last-named mechanism may cause said follower to push said lever, and means actuated upon the pushing of said lever for actuating said ribbon-reversing mechanism.

15. In a typewriting machine, the combination of a bearing, a vertical shaft therein, a spool on said shaft, a ratchet-wheel on said shaft, a feed-pawl, means on said shaft for reciprocating said pawl, one stroke of said pawl positioning it for turning said ratchet-wheel and the other stroke thereof effecting said rotation, means engaging said pawl to hold it disengaged from said ratchet-wheel while being reciprocated, a spring pressing said pawl against said wheel, or against said pawl-engaging means, means for disengaging said pawl-engaging means to allow said pawl to turn said wheel and spool, a trigger actuating the last-named means, a vertical lever positioned to simultaneously engage with said reciprocating means and said trigger and operated by the former during the first-named stroke of said pawl so as to be contacted with said trigger to actuate the latter, and a spring normally holding said lever in a position to be disengageable from said reciprocating means and trigger.

16. A ribbon-controlled follower, consisting of a sheet-metal member having one end formed with a guide-slot having a lateral kerf, a lateral ear formed on one edge, a lateral arm formed on its opposite edge, a rightangular lug formed upon said lateral arm extending in the same direction as said ear, a downwardly-extending arm formed at its opposite end, slanting forwardly toward the extremity of said lug, and an angular lug formed upon said last-mentioned arm.

17. In combination, a carrier formed at its upper end with a pair of lugs, a third lug formed on said carrier extending in the same direction as said other lugs, a ribbon-controlled follower overlying said carrier and extending above and below said carrier, a pivot on said carrier upon which said follower is fulcrumed, a lug on said follower

opposite the third lug on the carrier, an ear on one edge of said follower contacting the adjacent edge of said carrier, and a coiled spring secured between one lug on the carrier and the lug on the follower and operative to resiliently hold said ear in contact with the adjacent edge of said carrier to hold said follower in alignment therewith.

18. In a typewriting machine, the combination of a pair of rotatable spools having a ribbon trained thereon, a ribbon-guide for each spool pivotally mounted for universal movement and engaged by said ribbon, key-driven means for rotating each ribbon-spool, means for each spool for rendering its rotating means inoperative and simultaneously rendering the rotating means of the other spool operative, thus reversing the direction of ribbon-feed during the down stroke of the key, and yieldable means for holding each ribbon-guide in a uniform normal position, each guide being swingable from the normal position by said ribbon into co-operative relation with one of said rotating means, and swingable thereby to drive the means operative to reverse the direction of ribbon-feed.

19. In a typewriting machine, the combination of a pair of rotatable spools having a ribbon trained thereon, a follower for each spool pivotally mounted for universal movement and engaged by said ribbon, key-operated means including a pivoted pawl-carrying lever for rotating each ribbon-spool, and means for each spool including a pivoted pawl-lifting cam for rendering its pawl inoperative, and at the same time rendering the pawls of the other spool operative, thus reversing the direction of ribbon-feed, each follower being swingable by said ribbon into co-operative relation with one of the pawl-carrying levers, and swingable thereby to actuate the pawl-lifting cam to effect a reversal of the direction of ribbon-feed.

20. In a typewriting machine, the combination with a ribbon mechanism including ribbon-spools, key-driven mechanism for feeding the ribbon from spool to spool, and means to vibrate the ribbon to cover the typing position, of a ribbon-guide for each spool having a pivoted carrier pivotally supporting said guide, said guide being operative in one direction of its swing to equalize the stress placed on the ribbon by the vibrator in covering the typing position and operative in the swinging direction of the carrier by the feeding of the ribbon to predetermine the direction of feed for the ribbon.

21. In a typewriting machine, the combination with a ribbon mechanism including ribbon-spools, mechanism for feeding the ribbon from spool to spool, and means to vibrate the ribbon to cover the typing position, of a ribbon-guide for each spool and each guide operative to swing about separate pivots, said guide swingable about one pivot to respond to the tension placed upon the ribbon by the vibrator in covering the typing position and swingable about the other pivot through the feeding of the ribbon to predetermine the direction of feed for the ribbon.

22. In a typewriting machine, the combination with a ribbon mechanism including ribbon-spools, mechanism for feeding the ribbon from spool to spool, and means to vibrate the ribbon to cover the typing position, of a ribbon-guide for each spool and each guide operative to swing about separate pivots at right angles to each other, said guides swingable about one pivot to respond to the tension placed on the ribbon by the vibrator in covering the typing position and swingable about the other pivot by the feeding of the ribbon to predetermine the direction of feed for the ribbon.

23. In a typewriting machine, the combination with a ribbon mechanism, including a pair of ribbon spools, key-driven mechanism operative to rotate either spool and feed the ribbon from spool to spool on the down stroke of the key, and a reversing mechanism operative to reverse the direction of the spool-fed ribbon, of a vertically-disposed carrier pivotally mounted upon the frame adjacent each spool, and a ribbon-guide pivotally mounted upon each carrier, each guide being swingable upon its carrier to tension the ribbon in typing, and swingable with its carrier under a ribbon-feeding stress to determine the direction of the ribbon-feed from spool to spool.

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