

[72] Inventor **Rentaro Sasaki**
Takasaki, Japan
 [21] Appl. No. **710,894**
 [22] Filed **March 6, 1968**
 Continuation-in-part of Ser. No. 498,659,
 Oct. 20, 1965, now abandoned.
 [45] Patented **Oct. 6, 1970**
 [73] Assignee **Oki Electric Industry Company Limited**
Minato-ku, Tokyo, Japan
 [32] Priority **Nov. 25, 1964, Dec. 26, 1964**
 [33] **Japan**
 [31] **39/90785 and 39/100213**

859,732	7/1907	Birch et al.	197/160
1,690,487	11/1928	Horton	197/151
2,701,045	2/1955	Madsen	197/68X
2,742,132	4/1956	Anderson	197/160
2,757,775	8/1956	Hickerson	197/49
2,769,029	10/1956	Howard	197/49X
2,879,876	3/1959	Palmer et al.	197/16
2,902,136	9/1959	Whippo	197/165
2,905,302	9/1959	Hickerson	197/52
2,978,086	4/1961	Hickerson	197/16
3,042,174	7/1962	Howard	197/55X

Primary Examiner—Ernest T. Wright, Jr.
 Attorney—McGlew and Toren

[54] **SPACING AND RIBBON FEED MECHANISM FOR TYPEWRITERS**
4 Claims, 9 Drawing Figs.

[52] U.S. Cl. **197/48,**
 197/82, 197/151, 197/165
 [51] Int. Cl. **B41j 1/32,**
 B41j 19/00, B41j 33/44
 [50] Field of Search 197/1, 16,
 18, 48, 49, 50, 51, 52, 53, 54, 55, 65, 66, 67, 68,
 82, 151, 160, 161, 162, 163, 164, 165; 101/336,
 93

[56] **References Cited**
UNITED STATES PATENTS
 3,184,028 5/1965 Kleinschmidt et al. 197/161

ABSTRACT: A subassembly for a typewriter includes a type unit mounted for shifting along a shaft operable to oscillate the unit. The unit includes a known rotatable and axially shiftable type head. A ribbon mechanism is disengageably mounted on the unit for operative association with the type head, and includes manual and automatic means for reversing the direction of ribbon feed. A spacing mechanism, of the cable and spring drum type, includes selectively operable means whereby the type unit may be shifted laterally a substantial distance, for observing the typing, with automatic return of the type unit to the proper typing position.

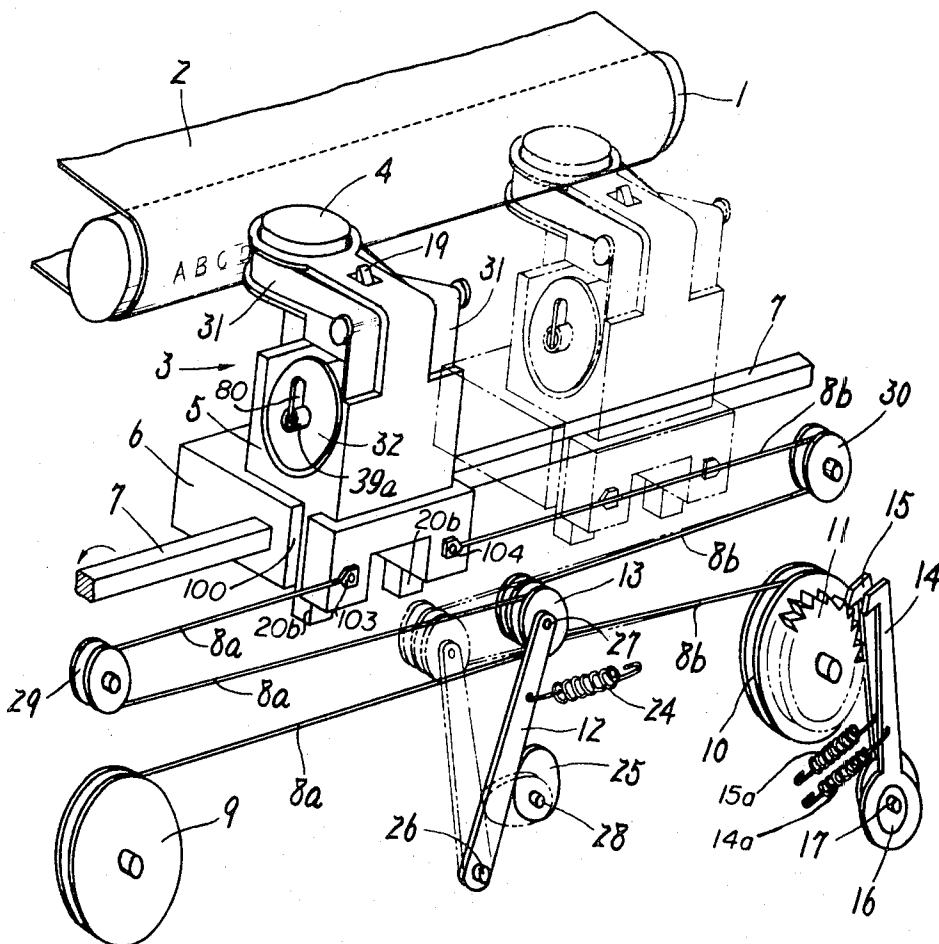


Fig. 1

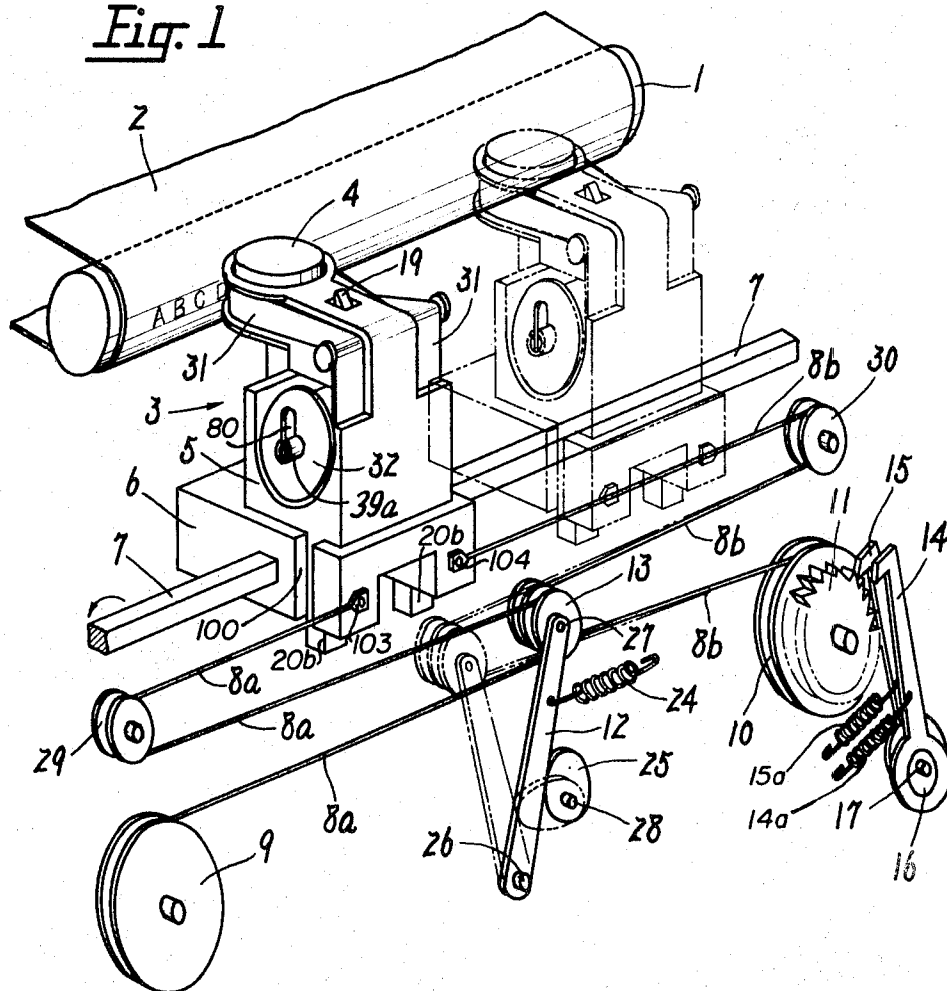
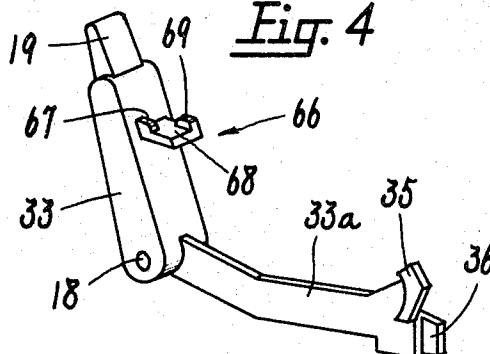


Fig. 4



INVENTOR
RENTARO SASAKI

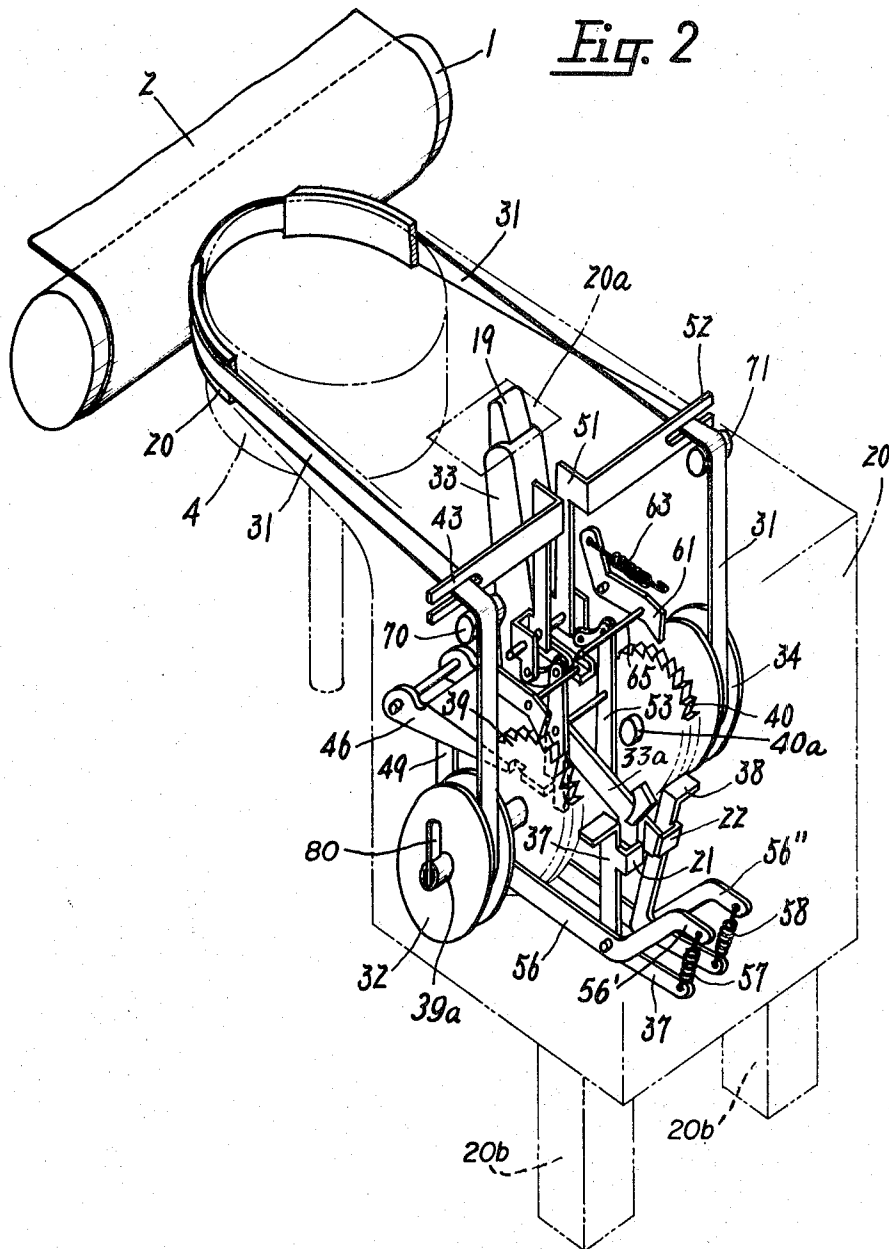
BY

McGraw & Toren
ATTORNEYS

Patented Oct. 6, 1970

3,532,204

Sheet 2 of 4



INVENTOR
RENTARO SASAKI

BY

McBlen & Toru
ATTORNEYS

Fig. 5

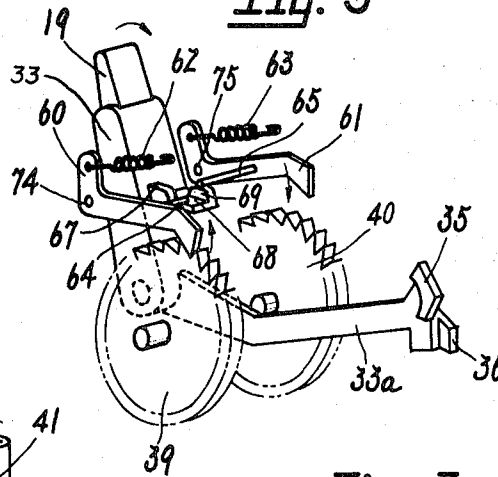


Fig. 6

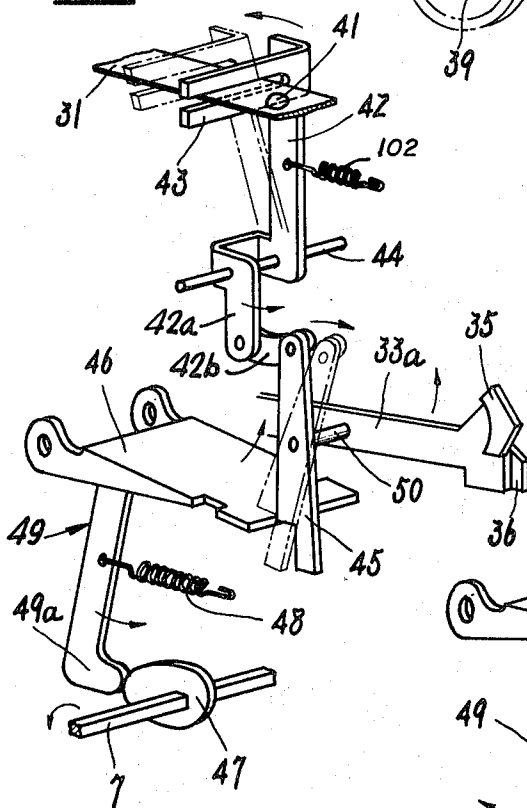
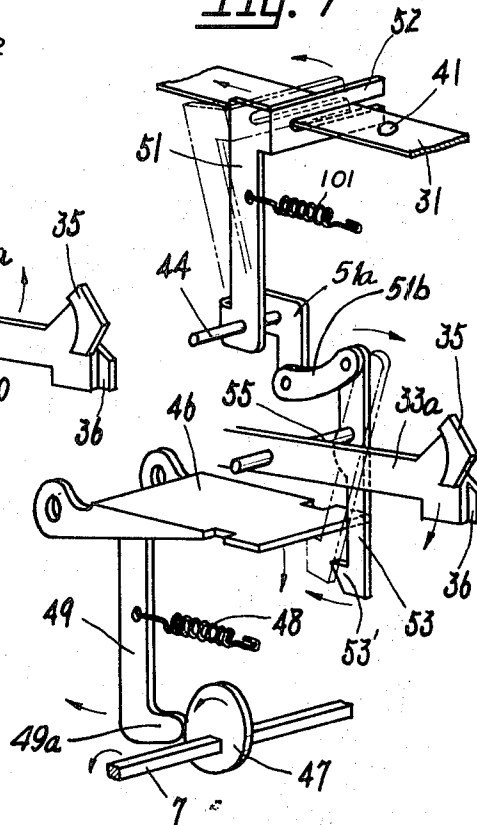


Fig. 7



INVENTOR
RENTARO SASAKI

BY

McGlew & Toru
ATTORNEYS

SPACING AND RIBBON FEED MECHANISM FOR TYPEWRITERS

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 498,659, filed Oct. 20, 1965, for Typing Device for Typewriters, now abandoned.

BACKGROUND OF THE INVENTION

In conventional typewriters, such as that shown in U.S. Pat. No. 2,757,775, a part of a typing mechanism and a ribbon are separated or lowered from a platen, so that letters typed on paper on the platen may be viewed. The operation of known devices for effecting this is complicated to such an extent that difficulties are experienced with either the typing mechanism or the ribbon feeding mechanism. Also, in conventional typewriters, the ribbon mechanism is not detachable as a unit from the typing device or type unit, but is fixed relative to the typing device or unit.

SUMMARY OF THE INVENTION

This invention relates to typewriters and, more particularly, to a novel and improved type unit spacer mechanism and a novel and improved ribbon mechanism for typewriters.

In accordance with the invention, the spacer mechanism is a cable-type spacer mechanism including a pair of cables each having one end attached to a typing unit which is slidable along an oscillatable bar. The cables are trained around respective pulleys located at opposite ends of the path of movement of the typing unit. The opposite end of one cable is attached to a spring wound drum, and the opposite end of the other cable is attached to a ratchet-type mechanism operable by the keys and spacer bar to "step" the typing unit along the platen.

The principal feature of this spacer mechanism in accordance with the invention is the provision of a double groove pulley positioned intermediate the ends of the path of movement of the typing unit and rotatably mounted at the free end of a lever arm. One cable is trained around one groove of this pulley before passing to the spring wound drum, and the other cable is trained around the other groove of the pulley before passing to the ratchet mechanism. A spring biases the double groove pulley to a first or normal position.

A cam is associated with the pivoted lever mounting the double groove pulley. When it is desired to move the typing unit laterally to view a line of type, an operating member is actuated and the cam is turned to swing the pulley mounting lever against the spring bias. This causes a decrease in the length of one cable extending between the double groove pulley and the typing unit. Correspondingly, there is effected an increase in the length of the other cable extending between the double groove pulley and the ratchet mechanism. As a result, the typing unit is displaced by a preset distance laterally, so that the line of type may be viewed. Upon release of the cam operating member, the spring biases the double groove pulley back to its initial position with return of the typing unit to the position it occupied before being shifted laterally for viewing of a line of typing.

The operation of the spacing mechanism and of the ribbon feed is effected by oscillation of the shaft mounting the typing unit, and this shaft, during its oscillation, oscillates cams controlling the ratchet device for the spacing mechanism and cams controlling the ribbon feed. A manual ribbon feed reversing lever is provided and is operable to effect setting of paws, associated with ratchets, to feed the ribbon in either one direction or the other direction. Furthermore, a lever is provided having a forked end through which the ribbon extends between the two ribbon reels and, adjacent either end of the ribbon, a rivet is secured to the ribbon. When this rivet engages the forked end of the mentioned lever, it oscillates the lever and this effects, through interconnected levers, reversal of the direction of ribbon feed, by disengaging the feed for one

direction and engaging the feed for the other direction. The entire ribbon feed mechanism is a unit which is arranged to be mounted on the typing unit, with the ribbon being fed in a loop around guide means operatively associated with the rotatable and axially displaceable typing head.

Another object of the invention is to provide a typing head spacing mechanism, for moving a typing unit supporting the typing head parallel to a platen, and wherein the unit can, at any time, be shifted laterally through a predetermined distance to provide for viewing of the typed characters.

Another object of the invention is to provide such an arrangement in which the typing unit not only supports an axially and angularly displaceable typing head but also supports a unit comprising the ribbon feed mechanism.

A further object of the invention is to provide such an arrangement which is simple, reliable, and easy to operate.

Still another object of the invention is to provide a compact ribbon mechanism including a ribbon feeding mechanism which can be either manually or automatically changed as to direction of feed.

A further object of the invention is to provide such a compact ribbon mechanism which is disengageably mountable as a unit in the typing unit.

Yet, another object of the invention is to provide such a ribbon mechanism in which it is easy to replace the ribbon, and which is simple to handle.

BRIEF DESCRIPTION OF THE DRAWING

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawing.

In the drawing:

FIG. 1 is a somewhat schematic perspective view of a typing unit, ribbon unit and typing unit spacer mechanism embodying the invention;

FIG. 2 is a perspective view of the ribbon mechanism unit, with the typing unit being shown in phantom;

FIG. 3A is a perspective view of a portion of the ribbon mechanism, as disassembled;

FIG. 3B is a perspective view of another portion of the ribbon mechanism, as disassembled;

FIG. 3C is a partial perspective view illustrating part of the means for automatically reversing the direction of ribbon feed as the ribbon approaches a condition in which it is substantially completely unwound from one reel or the other;

FIG. 4 is a perspective view of a ribbon feed reversing lever;

FIG. 5 is a perspective view illustrating the relation between the ribbon feed reversing lever and the ribbon feed ratchet means shown in FIGS. 3A and 3B; and

FIGS. 6 and 7 are somewhat schematic and exploded perspective views illustrating the operation of the ribbon feed reversing mechanism as the ribbon nears its right end and nears its left end, respectively.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, a typewriter is partially illustrated as including the usual platen 1 on which there is positioned a paper 2 to be typed. A typing mechanism or unit is illustrated at 3 as comprising a known type of angularly and axially displaceable typing head 4, a ribbon feed mechanism 5 and a carrier 6. Carrier 6 for the typing unit 3 is mounted slidably on a shaft 7 which is oscillatable as indicated by the arrow. As stated, typing head 4 is mounted on carrier 6 for displacement both axially and angularly. Ribbon mechanism 5 is disengageably inserted into the carrier 6, in a manner described more fully hereinafter, and moved therewith along shaft 7.

The spacing mechanism for stepping carrier 6 along shaft 7 comprises two cables 8a and 8b, each having an end secured to carrier 6. These cables 8a and 8b may be in the form of ropes, chords or wires. Cable 8a has one end 103 fixedly secured to the left side of carrier 6, as viewed in FIG. 1, and then extends around a pulley 29 and around one groove of a

double groove pulley 13, with the opposite end of cable 8a being secured to a spring wound drum 9. Cable 8b has one end 104 secured to the right side of carrier 6, as viewed in FIG. 1, and then extends around a pulley 30 and around the other groove of double groove pulley 13, with the opposite end of cable 8b being connected to a drum 10 fixed to rotate with a ratchet 11 having operatively associated therewith pawls 14 and 15 spring biased by respective springs 14a and 15a to engage the teeth of ratchet 11. The pulleys 29 and 30 are rotatably mounted at each end of the path of travel of carrier 6 along shaft 7.

Double groove pulley 13 is rotatably mounted, at 27, on the free end of a lever 12 which is pivoted to a fixed portion of the typewriter at 26 and is spring biased, by a spring 24, into engagement with a cam 25 fixed to a shaft 28. The levers 14 and 15 are reciprocated, relative to ratchet 11, by respective cams 16 secured to a shaft 17, with the levers 14 and 15 operating in alternation on ratchet 11 so that one lever 14 will move the ratchet 11 in one angular direction while the other lever 15 restrains reverse rotation of the ratchet 11, the two levers 14 and 15 reversing functions on the next operation of cams 16.

Spring drum 9 is constantly biased to rotate in a counterclockwise direction so as to maintain tension on cable 8a and bias carrier 6 to the left as viewed in FIG. 1. The shaft 17 carrying the cams 16 is oscillated, in a known manner, by operation of a typewriter key or by operation of the typewriter space bar. The operation of the pawls 14 and 15 steps carrier 6 to the right as viewed in FIG. 1 responsive to each key or space bar operation. To effect the typing, the ribbon mechanism includes a ribbon 31 which is wound on one spool 32 while being unwound from a spool 34 (FIG. 2) or vice versa, and the ribbon 31 extends around the typing head 4. In the usual manner common with typewriters employing rotatable and axially displaceable typing heads, such as the typing head 4, shaft 7 is oscillated, each time a key or a space bar of the typewriter is depressed, to oscillate carrier 6. Through known mechanism, oscillation of shaft 7 effects oscillation of shaft 17, and also effects oscillation of other cams to be described hereinafter, likewise in a known manner and through the use of known intermediate mechanism. Such mechanisms are shown, for example, in U.S. Pat. No. 2,879,876 and U.S. Pat. No. 2,978,086.

When it is necessary or desirable to inspect a portion of a line of typing on the paper 2, shaft 28 is angularly displaced, by suitable manual or automatically operable means connected thereto, to rotate cam 25 to swing lever 12 counterclockwise from the position illustrated in solid lines in FIG. 1 to the position illustrated in phantom in FIG. 1. This movement is effected against the bias of spring 24. As a result of the swinging of lever or arm 12, double grooved pulley 13 is displaced to the left to the position illustrated in phantom in FIG. 1. This effects a drawing of cable 8b, and a corresponding release of cable 8a, so that carriage or support 6 is moved to the right from the position illustrated in solid lines to the position illustrated in phantom, thus allowing a portion of a typed line to be viewed. After the typed line has been reviewed, shaft 28 is manually rotated back to the position illustrated in solid lines and spring 24, maintaining arm 12 in contact with cam 25, swings arm 12 clockwise thus moving double grooved pulley 13 back to its previous position. The momentary displacement of the typing unit 3, for viewing of a portion of a typed line, has no disturbing effect on the subsequent spacing and typing operations, inasmuch as the typing unit 3 is returned to exactly its original position.

Referring to FIG. 2, a ribbon mechanism frame 20, preferably formed of a hard light material, such as a suitable synthetic resin, comprises a unit in which the elements shown in solid lines in FIG. 2 are suitably mounted and housed. Frame 20 is detachably mounted on carrier 6 in any suitable manner such as, for example, by inserting its legs 20b into recesses 100 in carrier 6. Frame 20 can be readily removed from carrier 6 by withdrawing legs 20b from the recesses 100.

The ribbon mechanism will be described in detail with particular reference to FIGS. 2 through 7. Of these figures, FIG. 2 is a perspective view of the ribbon mechanism as a whole, illustrating the means for shifting or reversing the feeding of ribbon 31. Ribbon 31 is secured to a lefthand spool 32 and a righthand spool 34, and is arranged to be unwound from one spool while being wound on the other, and vice versa, so that the ribbon 31 can be used repeatedly. Spools 32 and 34 are removably mounted on shafts 39a and 40a, respectively, of respective ratchets 39 and 40, the spools 32, 34 being maintained on their respective shafts 39a, 40a by suitable means such as, for example, pivoted fingers 80 of which one is shown in FIG. 2. Also in the usual manner, each spool 32 and 34, when mounted on a shaft 39a or 40a, is fixed against rotation relative to its mounting shaft 39a, 40a, as by suitable key means.

In accordance with the present invention, the forward feed and reverse feed can be shifted or interchanged either manually or automatically, and the manual shifting mechanism will be explained first. Again referring to FIG. 2, a ribbon feed reversing lever 33, also illustrated in FIGS. 3A and 5 and, in somewhat greater detail, in FIG. 4, is fixed to a pivot shaft 18 which is rotatably supported in the housing or frame 20. An end 19 of lever 33 projects through an opening 20a of the ribbon mechanism frame or unit 20, as shown in FIG. 2, whereby lever 33 can be operated manually. Lever 33 is a two-arm lever, including an arm 33a fixedly extending at an angle from the arm carrying the manual operating part 19. Arm 33a has its outer end formed with a cam part 35 for forward feed of ribbon 31 and a cam part 36 for reverse feed of ribbon 31, the cam parts 35 and 36 being in vertically spaced relation to each other as particularly shown in FIG. 4. Referring to FIGS. 2 and 3A, 3B and 3C, a reverse feed pawl 37 is illustrated, more particularly in FIG. 3A, as a two-arm lever pivoted on a pivot 72. One arm of lever 37 is connected to a tension spring 57 which biases lever 37 to swing counterclockwise so that the opposite end of the other arm of lever 37 will be engaged with reverse feed ratchet 39 whenever a lug or abutment 21 on this arm of lever 37 is out of contact with the ribbon forward feed cam 35 of lever 33. Similarly, a forward feed pawl 38 is illustrated as a two-arm lever pivoted on a pivot 73, and having a tension spring 58 secured to the outer end of one arm and biasing lever 38 to swing counterclockwise. The outer end of the other arm of lever 38 is engaged with a forward feed ratchet 40 whenever an abutment 22 on this arm is not engaged by the reverse feed cam 36.

Referring to FIG. 5, a check pawl 60 is pivoted at 74 and is spring biased by a tension spring 62 so that its operative end will remain in engagement with reverse feed ratchet 39 as long as a projecting pin 64 rides on the lower stepped part 68 of a cam 66 forming a fixed part of lever 33 and operable to control pawl 60. Another check pawl 61 is pivoted at 75 and spring biased by a tension spring 63 to engage forward feed ratchet 40. A pin 65 projects to the left from pawl 61, in opposition to the direction of projection of pin 64, and is arranged to engage either the lower stepped part 68 of cam 66 or a higher stepped part 69 thereof. When engaged with the lower stepped part 68 of cam 66, pin 65 provides for pawl 61 to operatively engage ratchet 40. Similarly, when pawl 60 has its pin 64 engaged with a higher stepped part 67 of cam 66, pawl 60 is lifted out of engagement with ratchet 39.

A ribbon feed cam 54, best seen in FIG. 3B, and a ribbon reversing cam 47, best seen in FIG. 3A, are slidably mounted on shaft 7 but are fixed against rotation relative to this shaft 7. It should be noted, at this point, that intermediate its ends, ribbon 31 extends over guide rollers 70 and 71.

Referring again to FIG. 3B, a cam follower lever 56 is pivotally mounted at 76 and is spring biased to rotate counterclockwise by a tension spring 59. Lever 56 has an end 56a of one arm continuously engaged with cam 54 under the bias of spring 59. The lever 56 has a pair of additional arms 56b, arranged in spaced parallel relation, and each of these arms has an upwardly offset portion 56' or 56" to which the opposite

end of a tension spring 57 or 58, respectively, is secured. Pawl 37 is pivoted to one arm 56b at 72, and pawl 38 is pivoted to the other arm 56b by pivot 73. The ends of springs 57 and 58, respectively, are connected to the outer ends 37' and 38', respectively, of the respective pawls 37 and 38.

The operation of those parts of the ribbon mechanism mentioned thus far will now be described. Operation of the typing keys or of the space bar oscillates shaft 7 in the direction indicated by the arrow. This causes lever 56 to rotate in a clockwise direction so that ribbon reverse feed pawl 37, engaged with reverse feed ratchet 39, rotates this ratchet 39 clockwise with reverse rotation of ratchet 39 being prevented by check pawl 60. Thus, the left-hand spool 32 is rotated in a clockwise direction so that ribbon 31 is fed in the direction indicated by the solid line arrow in FIG. 3A. At this time, feed pawl 38 is disengaged from ratchet 40 and check pawl 61 is also disengaged from this ratchet 40.

To change the direction of feed of ribbon 31 to that indicated by the broken line arrow in FIG. 3A, ribbon feed reversing lever 33 is manually displaced in a clockwise direction as indicated by the solid arrow in FIG. 3A. By virtue of such movement of lever 33, forward feed cam 35 at the outer end of arm 33a of lever 33 engages lug 21 of feed pawl 37 to pivot feed pawl 37 clockwise so that its operative end is disengaged from reverse feed ratchet 39. By virtue of this movement of lever 33, reverse cam 36 of lever 33 is disengaged from lug 22 of forward feed pawl 38, so that the latter can swing counterclockwise under the influence of spring 58, to engage forward feed ratchet 40. At the same time, pin 64 moves from stepped surface portion 68 onto the raised stepped portion 67, so that check pawl 60 is disengaged from reverse feed ratchet 39. Correspondingly, pin 65 moves from raised stepped portion 69 of cam 66 onto the lower stepped portion 68, so that check pawl 61 is moved into operative engagement with forward feed ratchet 40 under the bias of spring 63.

Consequently, by pivoting lever 33 clockwise, feed pawl 37 and check pawl 60 are effectively disengaged from ratchet 39, and feed pawl 38 and check pawl 61 are effectively brought into operative association with ratchet 40, so that the direction of feed of ribbon 31 is reversed so that right-hand ribbon spool 34 is rotated clockwise step-by-step upon each operation of a typewriter key or typewriter space bar.

Automatic reversal of the ribbon feed is effected in a manner which will now be described. Referring to FIG. 3C, when that portion of ribbon 31 wound on left-hand spool 32 is almost entirely unwound therefrom, an eyelet 41 anchored in ribbon 31, will engage the bifurcated arm 43 of a left ribbon end lever 42, the spacing between the bifurcations of member 43 being just sufficient for ribbon 31 to pass therethrough without engagement therewith, but insufficient for eyelet 41 to pass therethrough. When eyelet 41 engages member 43, lever 42 will be rotated counterclockwise about a shaft 44, against the bias of a spring 102, as best seen in FIG. 6. Lever 42 includes an arm 42a which is articulated, by a link 42b, to the upper end of a left hook lever 45. Consequently, lever 45 will be swung clockwise from the solid line position of FIG. 6 to the phantom position of FIG. 6. This will bring the notched lower end of lever 45 above a plate 46 forming part of a ribbon reversing cam lever 49. A spring 48 biases lever 49 in a counterclockwise direction to maintain an end 49a thereof in engagement with cam 47 fixed to oscillate with shaft 7. The cam 47 will thus oscillate lever 49 including plate portion 46.

During each oscillation of lever 49, hook lever 45, whose notched end is now engaged over plate portion 46, will be lifted by plate 46. A pin 50, pivotally mounting hook lever 45, is connected to arm 33a of feed reversing lever 33. Consequently, during an upward movement of hook lever 45, feed reversing lever 33 will be swung counterclockwise to shift the direction of ribbon feed in the manner already explained with respect to manual shifting of the ribbon feed. This causes ribbon 31 to be fed in the reverse direction as indicated by the solid line arrow in FIG. 3A.

Referring now to FIGS. 2 and 7, when ribbon 31 is nearly completely unwound from right-hand spool 34, an eyelet 41 secured to ribbon 31 near this end of the ribbon 31 will engage a bifurcated member 52 of a right ribbon end lever 51 also pivoted on the shaft 44. This will pivot lever 51 counterclockwise, against the bias of a spring 101, so that its arm 51a, articulated by a link 51b to a right hook lever 53, will swing lever 53 clockwise from the solid line position of FIG. 7 in the direction of the arrow therein to the phantom position of FIG. 7. Due to the aforementioned oscillation of lever 49 and plate 46, the plate 46, during clockwise movement thereof, will engage a hook end 53', brought beneath the plate 46 by swinging of lever 53, and pull hook lever 53 downwardly. Hook lever 53 is pivoted on a pin 55 secured to arm 33a of feed reversing lever 33. Thus, feed reversing lever 33 will be swung clockwise and, in the manner described above for manual operation, will again reverse the direction of ribbon feed so that the ribbon 31 will be fed in the direction indicated by the broken line arrow of FIG. 3A.

I claim:

1. In a typewriter of the type including a platen and a typing unit mounted adjacent the platen for movement parallel to the axis of the latter, the typing unit including a type head and a ribbon cooperable therewith, and spacer mechanism connected to the typing unit and operable, responsive to selective actuation of the typewriter keys and space bar, to step the typing unit in a direction parallel to the axis of the platen, the spacer mechanism including a cable secured to the typing unit and having its ends connected to indexing pulley means, the improvement comprising, in combination, selectively operable typing unit shifting means operatively associated with said cable intermediate the ends thereof and selectively operable on said cable, when actuated and when said typing unit is in an indexed position, to draw said cable, with said indexing pulley means remaining stationary, to move said typing unit through a preselected number of indexing steps from said indexed position, to expose typed matter on a paper on said platen; said shifting means, when released, effecting return of said typing unit to said indexed position; ribbon feed mechanism on said typing unit and operatively associated with said ribbon; said ribbon feed mechanism comprising a mechanism supporting frame having a pair of depending legs; said typing unit being formed with a pair of recesses removably receiving said depending legs whereby said ribbon feed mechanism may be disengageably mounted as a unit on said typing unit.

2. In a typewriter of the type including a platen and a typing unit mounted adjacent the platen for movement parallel to the axis of the latter, the typing unit including a type head and a ribbon cooperable therewith, and spacer mechanism connected to the typing unit and operable, responsive to selective actuation of the typewriter keys and space bar, to step the typing unit in a direction parallel to the axis of the platen, the spacer mechanism including a cable secured to the typing unit and having its ends connected to indexing pulley means, the improvement comprising, in combination, selectively operable typing unit shifting means operatively associated with said cable intermediate the ends thereof and selectively operable on said cable, when actuated and when said typing unit is in an indexed position, to draw said cable, with said indexing pulley means remaining stationary, to move said typing unit through a preselected number of indexing steps from said indexed position, to expose typed matter on a paper on said platen; said shifting means, when released, effecting return of said typing unit to said indexed position; ribbon feed mechanism on said typing unit and operatively associated with said ribbon; said indexing pulley means comprising a pair of spring wound drums each having a respective end of the cable secured thereto; said shifting means comprising a double groove pulley intermediate said spring wound drums and having the end of the cable extending to each spring wound drum extending around a respective groove as a bight in the cable, the two bights facing in opposite directions, a lever pivotally mounted on the typewriter frame and rotatably supporting

said double groove pulley at its free end, and means selectively operable to swing said lever in a direction to increase the length of cable between said double groove pulley and one spring wound drum with a corresponding and equal decrease in the length of the cable between said double groove pulley and the other spring wound drum.

3. In a typewriter, the improvement claimed in claim 2, including a pair of further pulleys each interposed between said double groove pulley and a point of fixation of said cable and having said cable trained therearound to reverse the cable direction.

4. In a typewriter of the type including a platen and a typing unit mounted adjacent the platen for movement parallel to the axis of the latter, the typing unit including a type head and a ribbon cooperable therewith, and spacer mechanism connected to the typing unit and operable, responsive to selective actuation of the typewriter keys and space bar, to step the typing unit in a direction parallel to the axis of the platen, the spacer mechanism including a cable secured to the typing unit and having its ends connected to indexing pulley means, the improvement comprising, in combination, selectively operable typing unit shifting means operatively associated with said cable intermediate the ends thereof and selectively operable on said cable, when actuated and when said typing unit is in an indexed position, to draw said cable, with said indexing pulley means remaining stationary, to move said typing unit through a preselected number of indexing steps from said indexed position, to expose typed matter on a paper on said platen; said shifting means, when released, effecting return of said typing unit to said indexed position; ribbon feed mechanism on said typing unit and operatively associated with said ribbon; said ribbon feed mechanism comprising a pair of ribbon spools having said ribbon wound thereof for extending between said type head and said platen; respective ratchets each fixed to rotate with a respective ribbon spool; respective

pawls, each associated with a respective ratchet, and operated, responsive to typing and spacing operations on the typewriter, to advance the associated ratchet step-by-step; cam lever means operable to maintain one pawl retracted from its associated ratchet while providing for the other pawl to remain in operative engagement with its associated ratchet; manually operable selector means connected to said cam lever means to operate the latter to select the direction of ribbon feed; ribbon feed reversing means connected to said cam lever means and operable by the ribbon as the latter is substantially fully unwound from one ribbon spool and substantially fully wound on the other ribbon spool, to actuate said cam lever means to reverse the direction of ribbon feed; said cam lever means comprising one arm of a two-arm cam lever, the other arm of said two-arm cam lever being formed for manual operation; means pivotally mounting said two-arm cam lever; respective cam means on the free end of said one arm each engageable with a respective pawl to retract the same from operative engagement with its associated ratchet responsive to movement of the other arm of said two-arm cam lever in a selected direction; said feed direction reversing means comprising a second pivotally mounted two-arm lever oscillated responsive to typing and spacing operations on the typewriter, a pair of pivotally mounted second levers each having a forked end through which the ribbon extends and engageable by abutment means on the ribbon adjacent each end thereof, and a respective stop articulated to each respective second lever and normally retained by the latter out of operative relation with said second two-arm lever; each second lever, responsive to swinging thereof by an abutment on the ribbon, moving its associated stop into the path of oscillation of said second two-arm lever; and means on each stop engageable with said two-arm cam lever to swing the same to reverse the direction of ribbon feed.

40

45

50

55

60

65

70

75