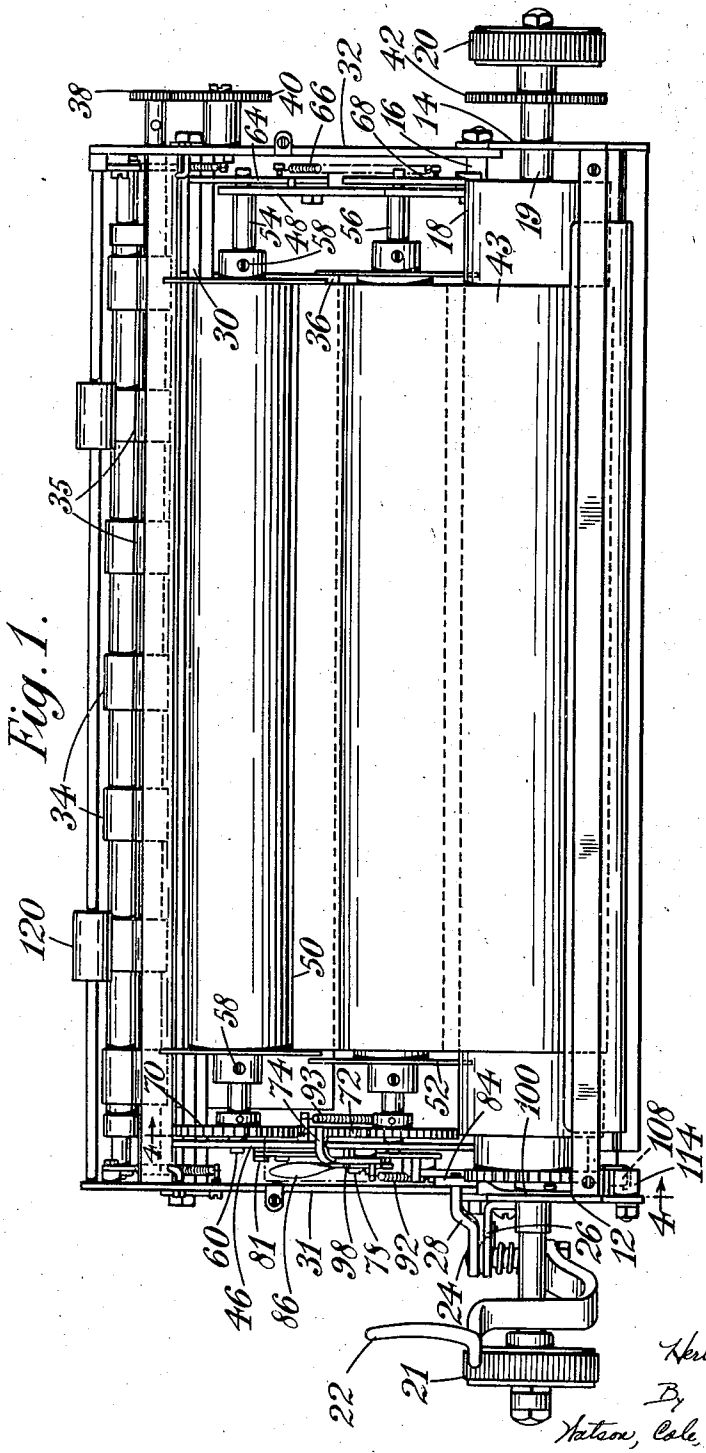
Oct. 1, 1940. H. ETHERIDGE 2,216,409

TRANSFER-SHEET FEED MECHANISM FOR TYPEWRITING, TELEPRINTING, AND LIKE MACHINES

Filed April 7, 1939 3 Sheets-Sheet 1

Fig. 1.



Herbert Etheridge

By

Watson, Cole, Grindle & Watson

Attys.

Oct. 1, 1940. H. ETHERIDGE 2,215,409

TRANSFER-SHEET FEED MECHANISM FOR TYPEWRITING, TELEPRINTING, AND LIKE MACHINES

Filed April 7, 1939 3 Sheets-Sheet 2

Fig. 2.

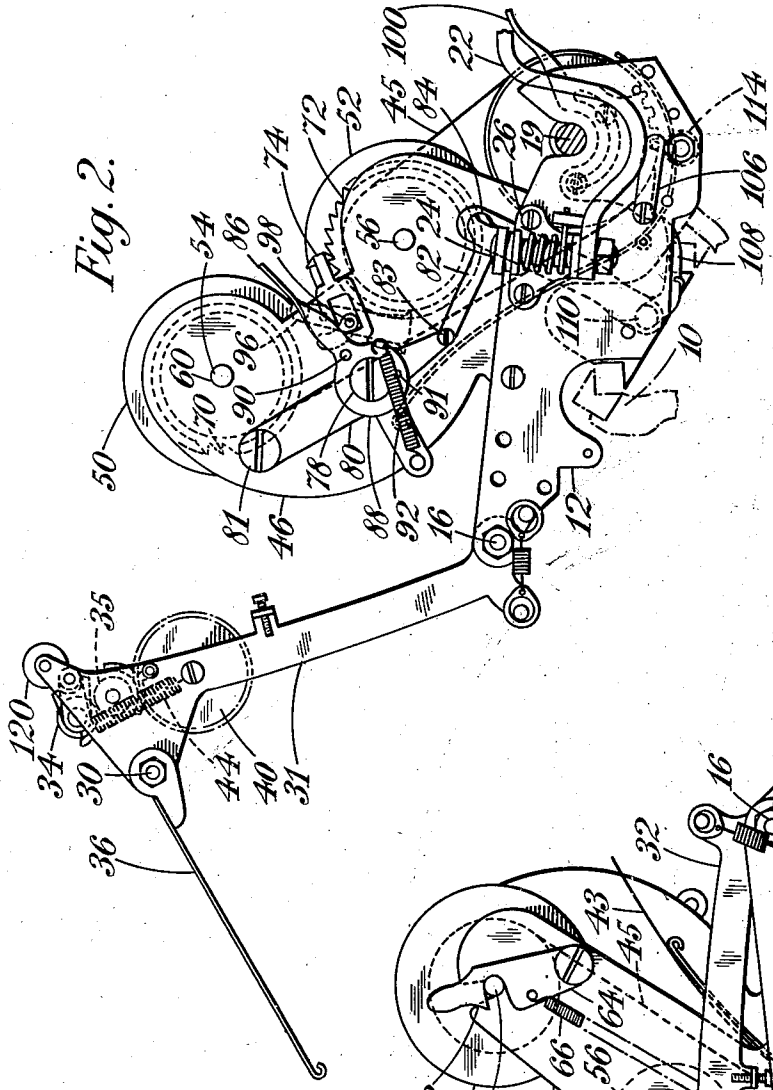
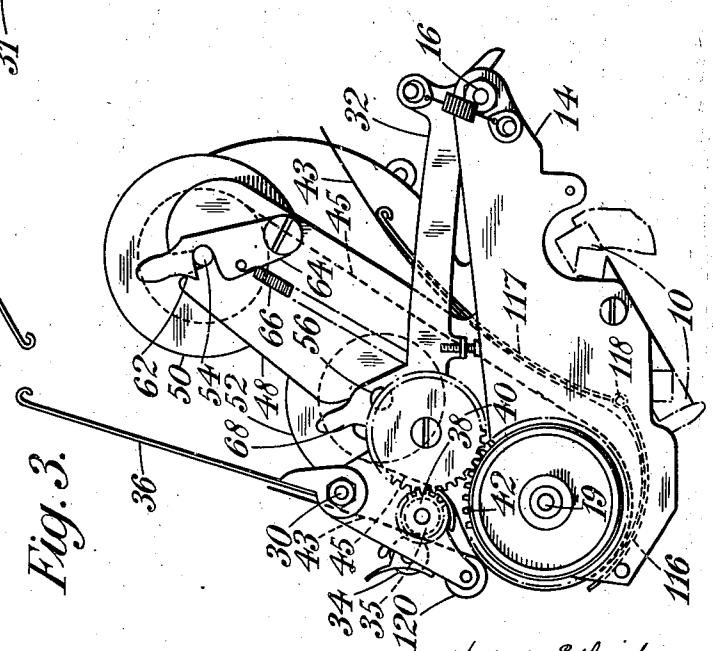


Fig. 3.



Herbert Etheridge

By

Watson, Cole, Grindle & Watson

Attys.

Oct. 1, 1940. H. ETHERIDGE 2,216,409

TRANSFER-SHEET FEED MECHANISM FOR TYPEWRITING, TELEPRINTING, AND LIKE MACHINES

Filed April 7, 1939 3 Sheets-Sheet 3

Fig. 4.

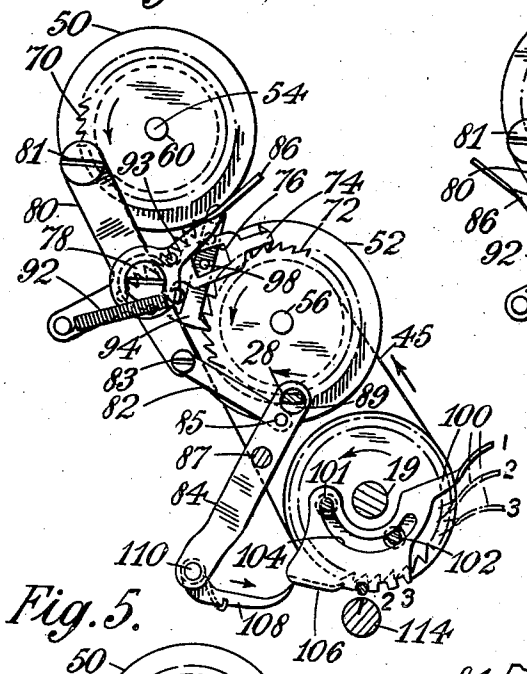


Fig. 6.

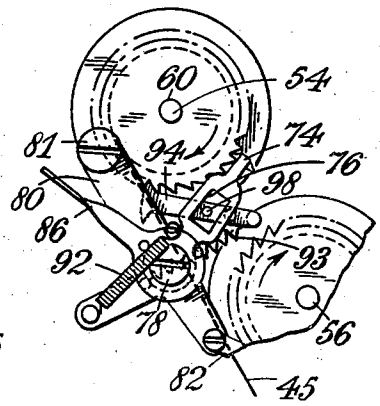


Fig. 7.

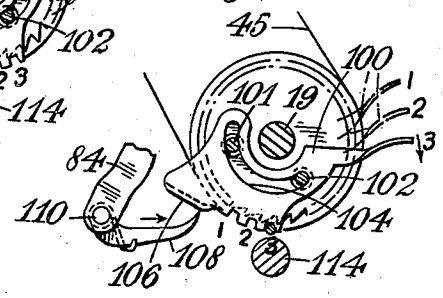
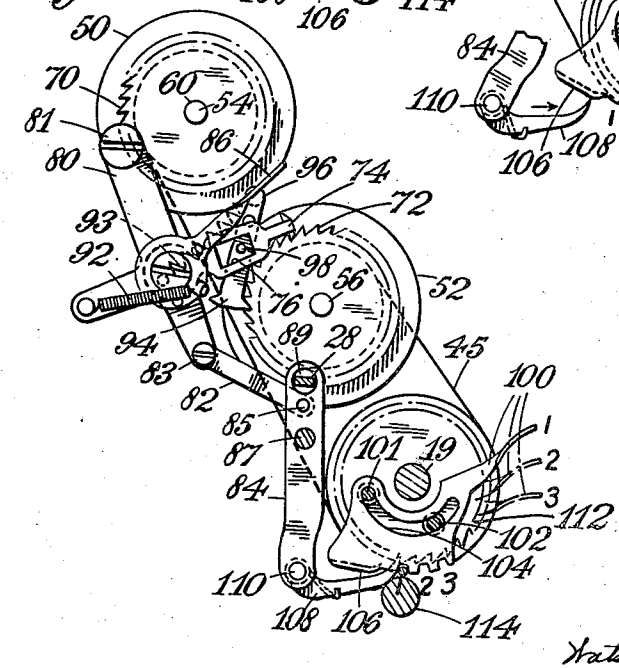


Fig. 5.



Inventor

Herbert Etheridge

By

Watson, Cole, Grindle & Watson Attys.

Patented Oct. 1, 1940 2,216,409

UNITED STATES PATENT OFFICE

2,216,409

TRANSFER-SHEET FEED MECHANISM FOR TYPEWRITING, TELEPRINTING, AND LIKE MACHINES

Herbert Etheridge, Leicester, England, assignor to Imperial Typewriter Company Limited, Leicester, England, a British company

Application April 7, 1939, Serial No. 266,675
In Great Britain May 27, 1938

4 Claims. (Cl. 197—1)

This invention relates to typewriting, teleprinting and like machines of the type (hereinafter referred to as the type described) comprising line-spacing mechanism and master-sheet feed means actuated thereby for providing typed lines of characters spaced apart on an original, master or work sheet that is being produced, and transfer-sheet feed mechanism, also operable by the line-space mechanism, for feeding transfer sheets in continuous form, hereinafter referred to generally as carbons, to the writing platen of the machine, and comprising intermittently-operated carbon-feed-means adapted at each operation thereof to feed a carbon through a controlled distance less than that through which the work sheets are moved, preferably through a distance which is at least equal to, but does not substantially exceed the heightwise dimension of the tallest type characters of the machine.

Such transfer-sheet feed mechanism is particularly applicable for making a reverse master copy, as in the hectograph process, by placing in the typewriting machine or the like, a special carbon sheet behind the work sheet with the transfer surface of the carbon against the work sheet. Heretofore, a supply roll of the carbon sheet has been carried by a spindle connected by gearing to the line-spacing mechanism of the machine, and after passing always in the same direction under the platen and across the printing point, the sheet was led out freely from the machine, a fresh supply roll being placed on the same spindle after the first roll was used up.

It is an object of the present invention to enable the carbon sheet to be rewound on the machine after use, and to arrange the feed of the master or work sheet in relation to that of the carbon sheet in an improved manner. It is to be understood that the term "carbon" or "carbon sheet" used herein refers not only to sheets of paper coated with carbon, for duplicating purposes, but also to other kinds of transfer or duplicating sheets.

According to the present invention there is provided in or for use in a typewriting or like machine, feed-mechanism of the type described, wherein the carbon-feed means comprises two spindles, from one of which the carbon is to unwind, and about the other of which it is to be wound up after use at the platen of the machine, and the master-sheet feed-means arranged to feed a master sheet to line-space it comprises at least one feed roll arranged to lie, when in use, at or near the upper part of the platen above the writing line.

Preferably, the master-sheet feed-means comprises a pair of feed rolls that are carried by a pivoted member movable towards and away from the platen, and are arranged to be geared to the platen to revolve at the same peripheral speed therewith.

Conveniently, the said pivoted member is constituted by a U-shaped frame mounted to swing towards and away from the platen, and one of the feed rolls is provided at one end with a pinion arranged to mesh with a gear wheel on the spindle of the platen when the U-shaped frame is swung into its operative position.

An important advantage of the top feed of the master-sheet provided by the feed rolls arranged as described above is that it enables typed matter to be written over almost the entire area of the master sheet, even to its extreme bottom edge.

Connecting means that operatively connects the said carbon-feed means to the line-spacing mechanism of the machine may comprise manually-operable change-over mechanism arranged selectively to place either of the two spindles at will into driving engagement with, and to disengage the other spindle from the line-spacing mechanism of the machine. When the machine comprising such a change-over mechanism is in use, two spools will be carried one on each spindle, and will operate alternately one as a feed spool and the other as a take-up spool, with the continuous carbon sheet extending around the platen. When the take-up spool is filled with a used carbon and is removed from the machine, a fresh supply spool can be placed on its spindle which, when the change-over mechanism has been thrown over, will be a supply spindle, and the fresh carbon sheet will be fed in the opposite direction to the empty spool on the other spindle, whereby the manipulation of the machine is facilitated.

An idler roll, for facilitating the insertion of the master sheet, may be carried by said pivoted member and arranged to lie, when in use, between the feed rolls and the typing line.

One embodiment of the invention is diagrammatically illustrated by way of example in the accompanying drawings, wherein—

Figure 1 is a front elevation showing a carriage of a typewriting machine provided with one form of feed mechanism according to the invention for feeding carbons to the platen on the carriage, and

Figure 2 is a vertical section taken on the bent line 2—2 in Figure 1, a pair of feed rolls for the master sheet on which the characters are to be

typed being shown swung into their upper inoperative position in both of these Figures;

Figure 3 is an end elevation of the carriage shown in Figure 1, as viewed from the right-hand end thereof, but with the pair of feed rolls swung into their lower normal or operative position;

Figures 4 and 5 are vertical sectional elevations taken on the line 4—4 in Figure 1 but showing some of the parts in different positions, and

Figures 6 and 7 are detail views in end elevation showing in different positions some of the parts illustrated in Figures 4 and 5.

Like reference characters designate like parts throughout the several views.

Referring to the drawings, the carriage of a typewriting machine has a main frame that is movable endwise on a track 10 (see Figure 3) provided on the body of the machine and comprises two end plates 12, 14 and a rear rod 16. A cylindrical platen 18 has its spindle 19 journalled as usual in the plates 12, 14, and can be turned manually by knobs 20, 21 fast on the ends of the spindle 19. A spring-controlled line-space lever 22 is fulcrumed at 24 in a bracket 26 fast on the frame plate 12, and has a lever arm 28 for actuating the carbon-sheet feed means described hereinafter. A U-shaped frame comprising a front square rod 30, and two side limbs 31, 32 carries two master-sheet feed rolls 34, 35 adjacent to the rod 30 to which a guide plate 36 is attached. One end of the roll 35 carries a pinion 38 that meshes with a spur gear 40 journalled on the side limb 32 in such a position that when the U-frame 31, 32, 33 is rocked downwards into its normal operative position shown in Figure 3, the wheel 40 meshes with a companion toothed wheel 42 that is fast on the spindle 19 of the platen at a situation between the knob 20 and the frame plate 14. Consequently, when either of the knobs 20, 21 is turned for rotating the platen, the rolls 34, 35 which are pressed together by springs 44 are rotated and feed a master sheet shown at 43.

Feed mechanism for feeding a carbon sheet 45 to the platen 18 comprises intermittently operated feed means adapted at each operation thereof to feed a carbon through a distance which is at least equal to, but does not substantially exceed the heightwise dimension of the tallest type character of the machine, and an operative connection is provided between said feed means and the line-spacing mechanism of the machine. This carbon feed mechanism is in the form of an attachment that can be applied to the typewriting machine, and comprises, as illustrated, two end bearing plates 46, 48 which are parallel to and respectively mounted on the frame plates 12 and 14. A pair of spools 50, 52 are respectively carried by spindles 54, 56 on which they are slidable endwise and can be fixed in their adjusted position by screws 58, which spindles are journalled in the plates 46, 48 so as to be removable therefrom. Referring to the upper spool 50, one end of its spindle extends through a hole at 60 in the plate 46, while its other end is received in an open-ended slot 62 (see Figure 3) in the plate 48, and is retained therein by a pivoted catch 64 that has a notch for engaging the spindle and is held in its operative position by one end of a spring 66; the other end of this spring is attached to a similar catch 68 that secures one end of the spindle 56 of the other spool in position in the plate 48 in a similar manner.

The upper spool 50 is a feed spool from which the carbon 45 is fed to the lower or take-up spool 52 by a pawl-and-ratchet mechanism, described hereinafter, which is actuated, each time the line-spacing mechanism is operated, to turn one of the spools so as to advance the carbon, which passes partly around the platen 18, the relatively short distance required.

In order to enable either spool to be a feed spool so that the carbon can be wound from either spool on to the other, the two spindles 54, 56 of the spools respectively carry ratchet wheels 70, 72 (see Figures 1, 4 and 5) with either of which an opposed tooth pawl 74 can be placed at will into engagement. This pawl 74 has a slot 76 extending in the direction of its length, and is pivoted to swing about a pivot pin 78 constituted by a screw fast on a lever 80 that is fulcrumed at 81 and forms part of a linkage connected to the line-space lever 22 of the machine. As shown most clearly in Figures 4 and 5, this linkage comprises a link 82 having one end pivotally connected at 83 to the lever 80, and its other end pivotally connected at 85 to the upper part of an upwardly-directed driving lever 84 fulcrumed at 87. The upper end of this driving lever 84 has in it a hole 89 through which the free end of the lever arm 28 slidably extends with play. When the line-space lever 22 is swung from the position shown in Figure 1 towards the right-hand in order to rotate the platen and feed the master sheet for line-spacing purposes, its arm 28 swings about its pivot pin 24 and, by means of the driving lever 84 and link 82, rocks the lever 80 in a clockwise direction as viewed in Figures 2, 4 and 5, whereby the pawl 74, in engagement with the ratchet wheel 72, is moved endwise and rotates the take-up spool 52 an angular distance equivalent to one tooth of its ratchet wheel.

Change-over mechanism comprising a change-over lever 86 is also provided for moving the pawl 74 into driving engagement with the ratchet wheel 70, when it is desired to use the spool 50 as a take-up spool. This lever 86 has a circular end 88 that is freely rotatable about the pivot pin 78. This circular part 88 lies close to the fulcrumed end of the pawl 74 which extends between two pins 90, 91 that are carried by the circular part 88 of the lever 86, to which a spring 92 is attached in such a position that it tends to hold the lever 86 at either side of its centre of oscillation in which it may be placed. The two pins 90, 91 are spaced so far angularly apart that when the change-over lever 86 is rocked about its fulcrum, the pawl 74 is thrown into, and held in engagement with one or other of the ratchet wheels 70, 72.

A second, opposed-tooth, non-return or holding detent 94, also controlled by the change-over lever 86, is provided for preventing reverse movement of that one of the two ratchet wheels 70, 72 which, at any given time, has the driving pawl 74 in engagement with it. This detent 94 is controlled by a spring 93 and is fulcrumed at 96 on the side of the plate 46 away from the pawl 74, and carries between its ends a pin 98 that extends through an arcuate slot in the plate 46 and into the slot 76 in the pawl 74. As shown in Figures 2, 4 and 5, when the driving pawl 74 is in engagement with the ratchet wheel 72, the non-return pawl is in engagement with the same wheel, and as shown in Figure 6, when the driving pawl 74 is swung over to the wheel 70, it rocks the non-return pawl 94 over with it in the same direction by means of the pin 98.

It will be understood from the above that when the platen 18 is line-spaced, one or other of the carbon spools 50, 52 is positively rotated by the

described feed mechanism. The pitch of the ratchet teeth of the wheels 70, 72 and the throw of the driving pawl 74 are such that the operation of the line-space lever 22 moves one of the ratchet wheels through an angular distance (e. g., that of one tooth pitch) which gives to the carbon an advance equal to the distance or height of the highest type character of the machine.

A line-space lever 100 may be set, as usual, into any one of three different positions indicated 1, 2 and 3 in Figures 4, 5 and 7 for providing various line spaces of the typed matter. This lever has its movement limited, as usual, by two pins 101, 102 that are fixed on the frame plate 12 and extend into an arcuate slot 104 in the lever. The lever 100 has a flat portion 106 constituting a cam on which rests the free end of a spring-pressed pawl 108 that is pivoted at 110 on the lower end of the lever 84. For single spacing, the setting lever 100 is in the position 1 shown in Figure 4, and for treble spacing, it is in the position 3 shown in Figure 6, while for double spacing it will be in the position 2 indicated in broken lines. Assuming that the parts are in the position shown in Figure 4, and that the line-space lever 22 is shifted at the end of a line for line-spacing, the pawl 108 travels first along the cam 106 and then engages a tooth of the ratchet wheel 112 of the platen and rotates the latter one tooth until it is arrested by a stop 114 that is fast on the frame plate 12 and limits the movement of the line-space lever 22 in the line-spacing direction. If the parts are in the position shown in Figure 7, when the line-space lever 22 is shifted, the pawl 108 engages earlier with the teeth of the ratchet wheel 112 and rotates the platen three teeth before being arrested by the stop 114. In each case, however, the lever 84 of the described feed mechanism linkage is rocked through the same angular distance, and one or other of the spools 50, 52 is rotated the same angular distance to advance the carbon as described above. Consequently, it will be understood that no matter how many line spaces the line-space lever 100 is set for feeding the master sheet, the carbon 45 is only advanced the width of the line of typescript.

The master sheet 43 may be fed into the machine either from the back or from the front at the top of the platen by feed mechanism comprising the two above-mentioned feed rolls 34, 35 which are approximately the length of the platen and normally lie directly above and close to the writing line The feed roll 35 is connected to the platen by gearing comprising the wheels 38, 40 such that both the roll 35, and the platen 18 turn at the same peripheral speed. When, therefore, the platen is rotated, the feed rolls 34, 35 revolve and carry the master sheet around the platen. An idler roll 120 journalled between the side limbs 31, 32 of the U-frame so as to lie parallel with the feed rolls 34, 35 serves as a guide for holding the master sheet 43 against the platen 18. When the master sheet is in use in the machine and extends downwards in front of the carbon 45, on reaching the part 116 of the guide 116, 117, it will follow the contour of the latter and sag away from the platen and in so doing avoid contact with the carbon sheet which is pressed tightly against the platen, so that the risk of the master sheet being smeared by the carbon is diminished.

When typing an inverse master copy, a sheet is fed into the machine around the platen and gripped between the feed rolls 34, 35, adjusted to position and line-spaced in the usual manner. Automatically, with the line spacing of the master sheet, the carbon is advanced by means of the described pawl-and-ratchet feed mechanism one narrow space at a time, so that although the transcript may appear on the master copy with wide or unequal line-spacing and margins, the carbon only shows a uniform narrow line-for-line typing or impression. When after many master copies have been typed and all of the carbon roll has been typed upon, the used roll can be readily removed from the machine and a new one inserted. The loose end of the new roll is inserted around the platen to the empty spool and suitably attached thereto, and the pawl 74 and detent 94 are switched over so that the empty spool winds up the carbon from the newly inserted spool.

Various modifications may be made in the details of construction described above without departing from the invention. For example, instead of using spools for the carbon sheet, rollers may be employed. Such a roller may be slidably mounted on a square rod having cylindrical ends journalled in bearings in the attachment, one end of which square rod has a ratchet wheel attached to it.

I claim:

1. In a typewriting or like machine of the character described, the combination with a platen, line-space mechanism for rotating the platen, and master-sheet feed means actuated by the line-spacing mechanism for providing typed lines of characters spaced apart on a master sheet that is being produced, of transfer-sheet feed mechanism operable simultaneously with the master-sheet feed means by the line-space mechanism for feeding a strip of transfer material in continuous form to the platen, which transfer-sheet feed mechanism comprises intermittently-operated transfer-sheet feed means that is adapted at each operation thereof to feed said strip through a controlled distance less than that through which the master sheet is moved, characterized in that the transfer-sheet feed means comprises two spindles, from one of which the strip is to unwind, and about the other of which it is to be wound up after use at the platen, and the master-sheet feed means adapted to feed a master-sheet to line-space it comprises a pair of feed rolls arranged to lie, when in use, near the upper part of the periphery of the platen above the writing line for providing a top feed of the master sheet.

2. In a typewriting or like machine of the character described, the combination with a platen, line-space mechanism for rotating the platen, and master-sheet feed means actuated by the line-spacing mechanism for providing typed lines of characters spaced apart on a master sheet that is being produced, of transfer-sheet feed mechanism operable simultaneously with the master-sheet feed means by the line-space mechanism for feeding a strip of transfer material in continuous form to the platen, which transfer-sheet feed mechanism comprises intermittently-operated transfer-sheet feed means that is adapted at each operation thereof to feed said strip through a controlled distance less than that through which the master-sheet is moved, characterized in that the transfer-sheet feed means comprises two spindles, from one of which the strip is to unwind, and about the other of which it is to be wound up after use at the platen, and the master-sheet feed means adapted to feed a master-sheet to line-space it comprises a pivoted

member movable towards and away from the platen, a pair of feed rolls carried by the pivoted member and arranged to lie, when in use, near the upper part of the periphery of the platen above the writing line, and means operatively connecting the feed rolls, when in their position of use, to the platen to revolve at the same peripheral speed therewith during the line-spacing operation.

3. In a typewriting or like machine of the character described, the combination with a platen, a gear wheel rotatable therewith, line-space mechanism for rotating the platen, and master-sheet feed means actuated by the line-spacing mechanism for providing typed lines of characters spaced apart on a master-sheet that is being produced, of transfer-sheet feed mechanism operable by the line-space mechanism for feeding a strip of transfer material in continuous form to the platen, which transfer-sheet feed mechanism comprises intermittently-operated transfer-sheet feed means that is adapted at each operation thereof to feed said strip through a controlled distance less than that through which the master-sheet is moved, characterized in that the transfer-sheet feed means comprises two spindles, from one of which the strip is to unwind, and about the other of which it is to be wound up after use at the platen, and the master-sheet feed-means comprises a U-shaped frame mounted to swing towards and away from the platen, a pair of feed rolls carried by the U-shaped frame and arranged to lie, when in use, near the upper part of the periphery of the platen above the writing line, one of which feed rolls carries a pinion arranged to mesh with said gear wheel, when the U-shaped frame is swung into its operative position, and to rotate the feed rolls at the same peripheral speed as the platen during the line-spacing operation.

4. In a typewriting or like machine of the character described, the combination with a platen, line-space mechanism for rotating the platen, and master-sheet feed means actuated by the line-spacing mechanism for providing typed lines of characters spaced apart on a master-sheet that is being produced, of transfer-sheet feed mechanism for feeding a strip of transfer material in continuous form to the platen, connecting means operatively connecting the transfer-sheet feed-mechanism to the line-space mechanism, which transfer-sheet feed-mechanism comprises intermittently operated transfer-sheet feed means that is adapted at each operation thereof to feed said strip through a controlled distance less than that through which the master-sheet is moved, characterized in that the transfer-sheet feed means comprises two spindles, from one of which the strip is to unwind, and about the other of which it is to be wound up after use at the platen, the master-sheet feed-means comprises a pair of feed rolls arranged to lie, when in use, near the upper part of the periphery of the platen above the writing line for providing a top feed of the master-sheet, and said connecting means comprises manually-operable change-over mechanism arranged selectively to place either of the two spindles at will into driving engagement with, and to disengage the other spindle from the line-space mechanism.

HERBERT ETHERIDGE.