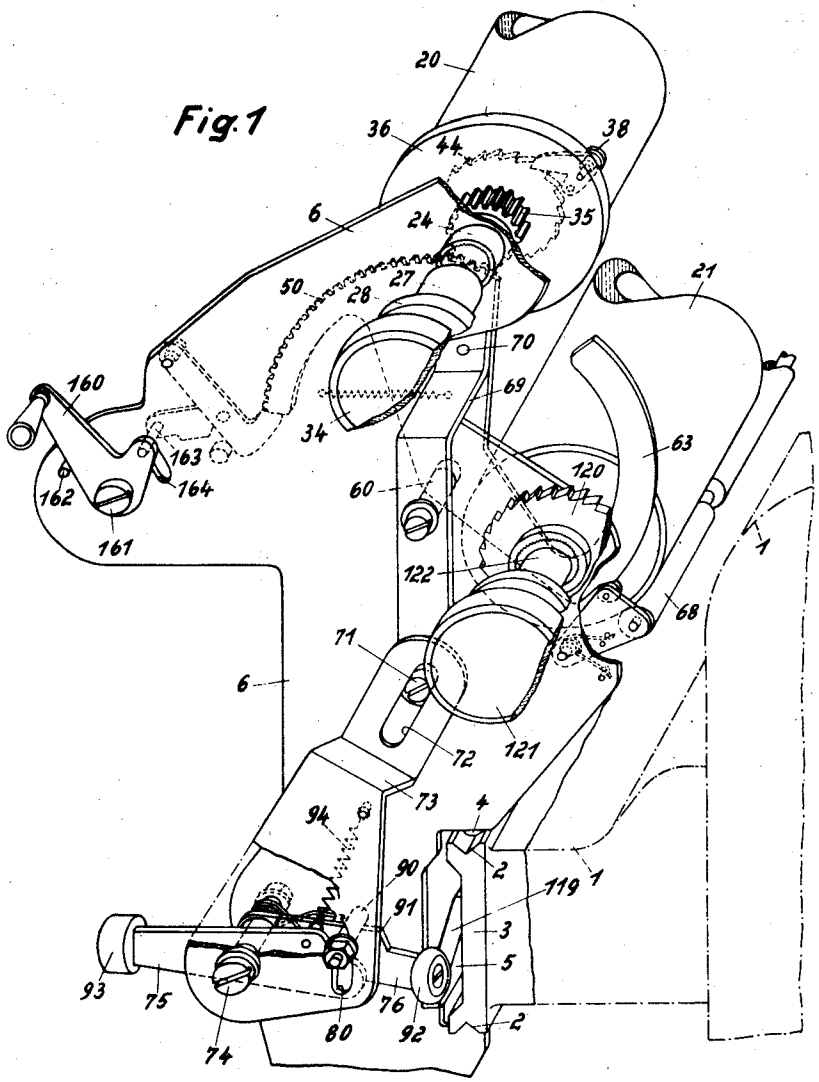
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PAPER FEEDING ARRANGEMENT ON WRITING OR PRINTING MACHINES

Filed Jan. 14, 1939 10 Sheets-Sheet 1

Fig. 1



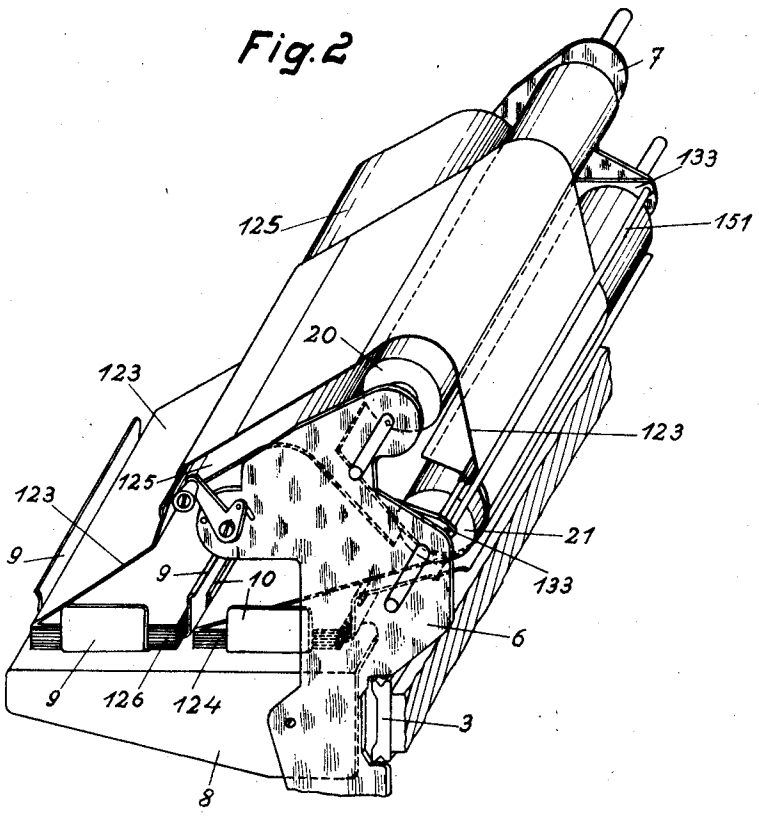
Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young Emery & Thompson
Attorneys

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Fig. 2



Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young Emery & Thompson
Attorneys

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Fig. 3

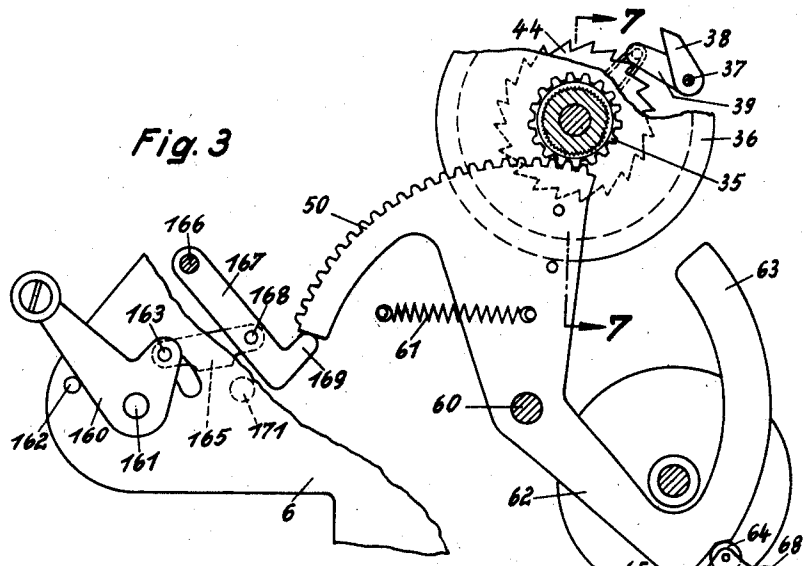
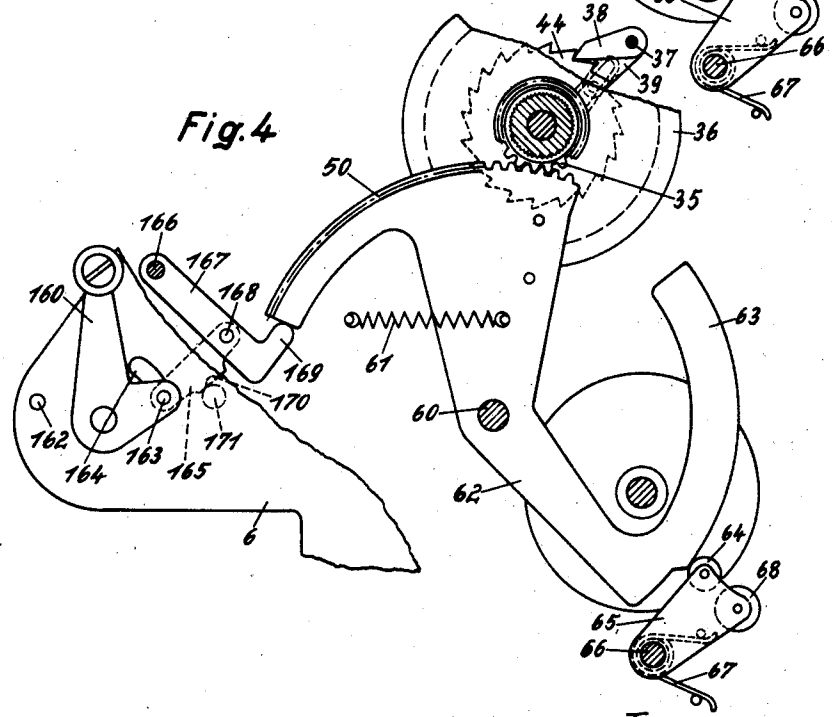


Fig. 4



Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery + Thompson
Attorneys

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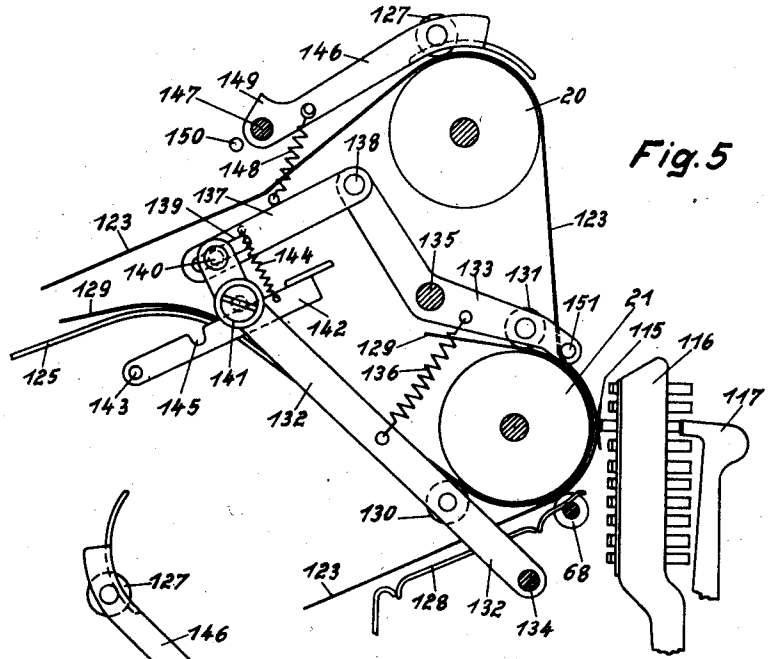


Fig. 5

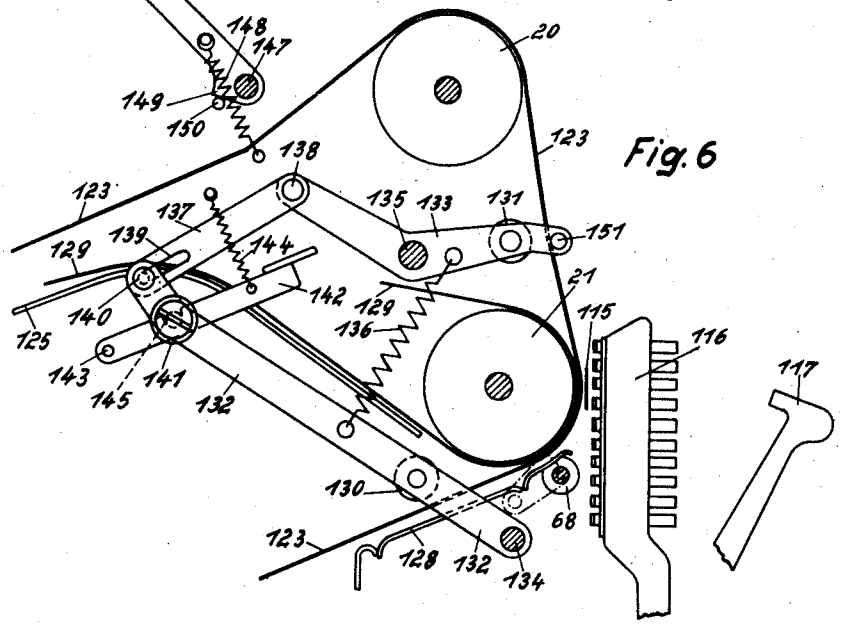


Fig. 6

Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery + Thompson
Attorneys

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Fig. 7

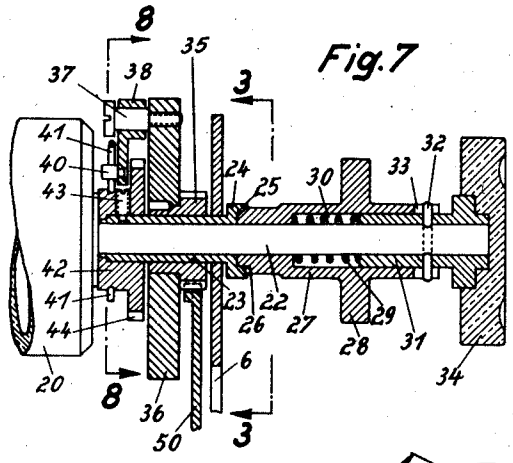


Fig. 8

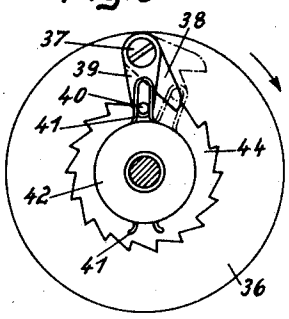
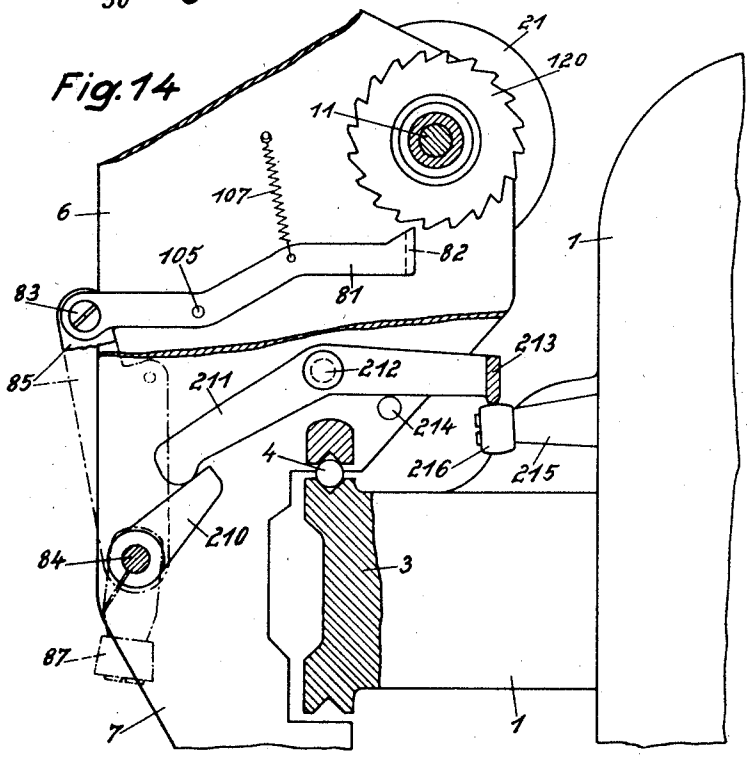


Fig. 14



Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery & Thompson
Attorneys

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Fig. 9

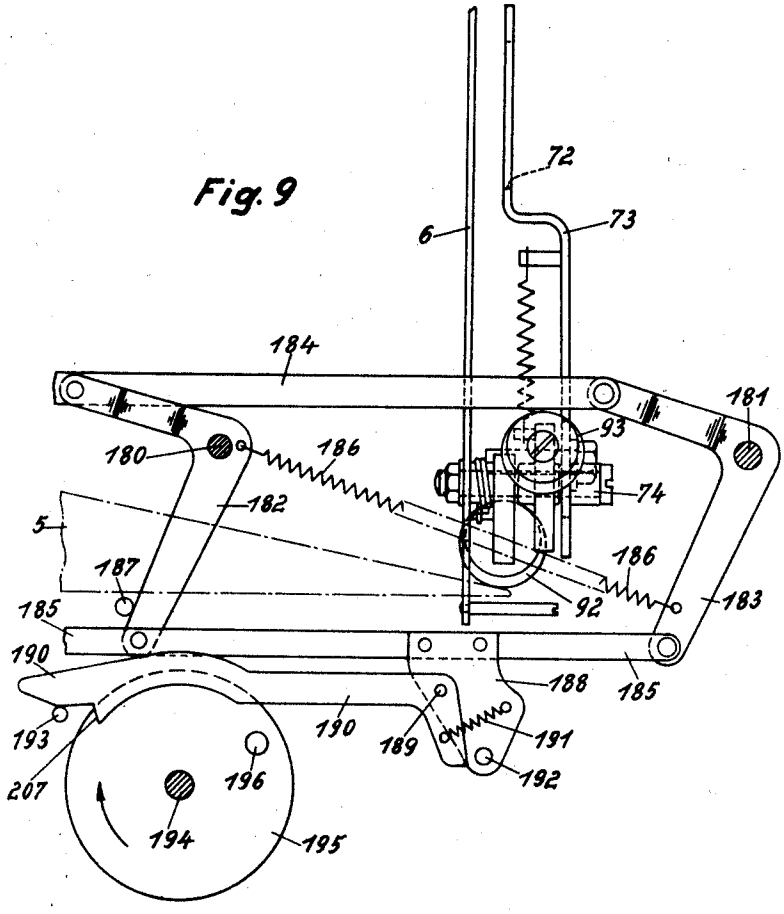
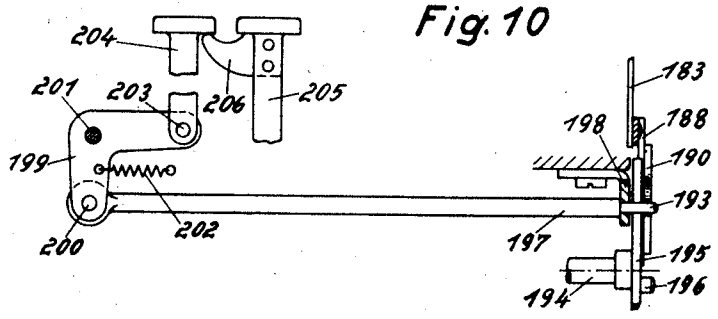


Fig. 10



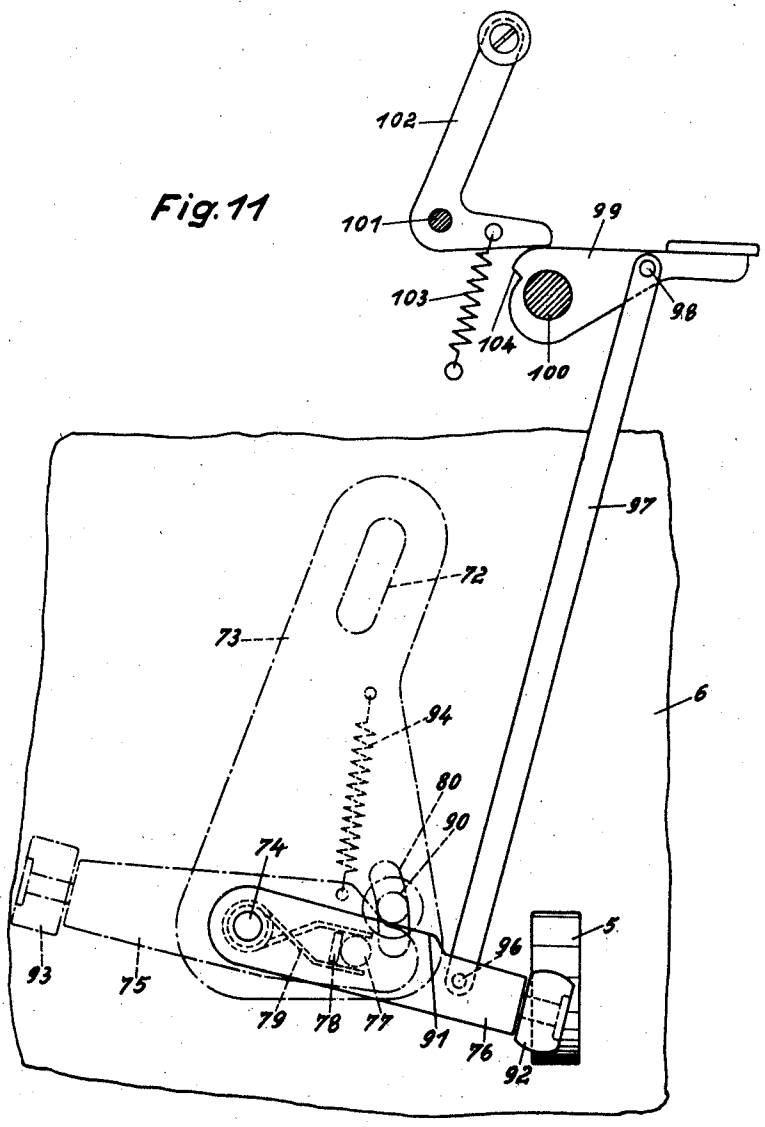
Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery + Thompson
Attorneys

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Fig. 11



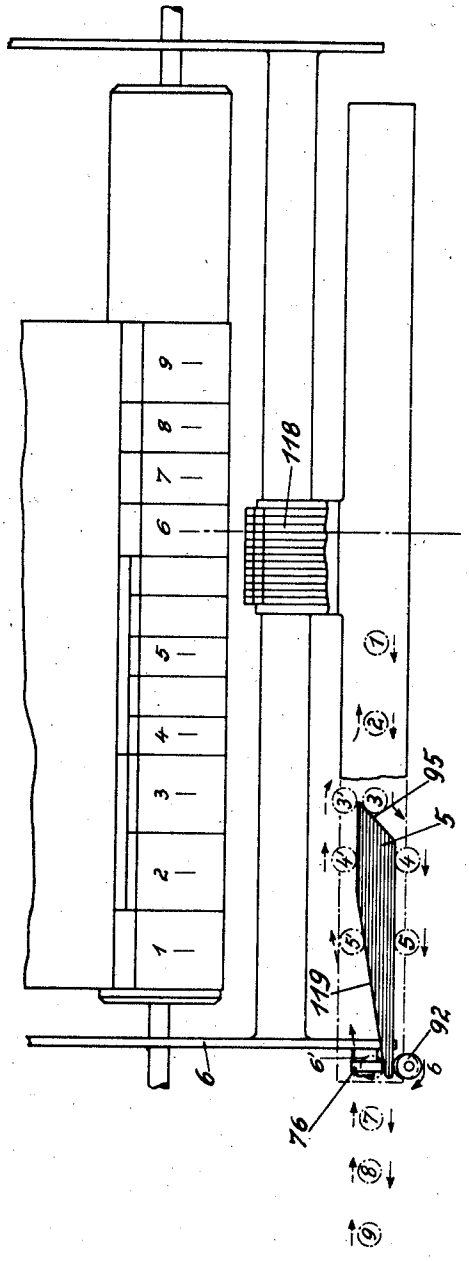
Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery & Thompson
Attorneys

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Fig. 12



Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery + Thompson
Attorneys

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Fig. 13

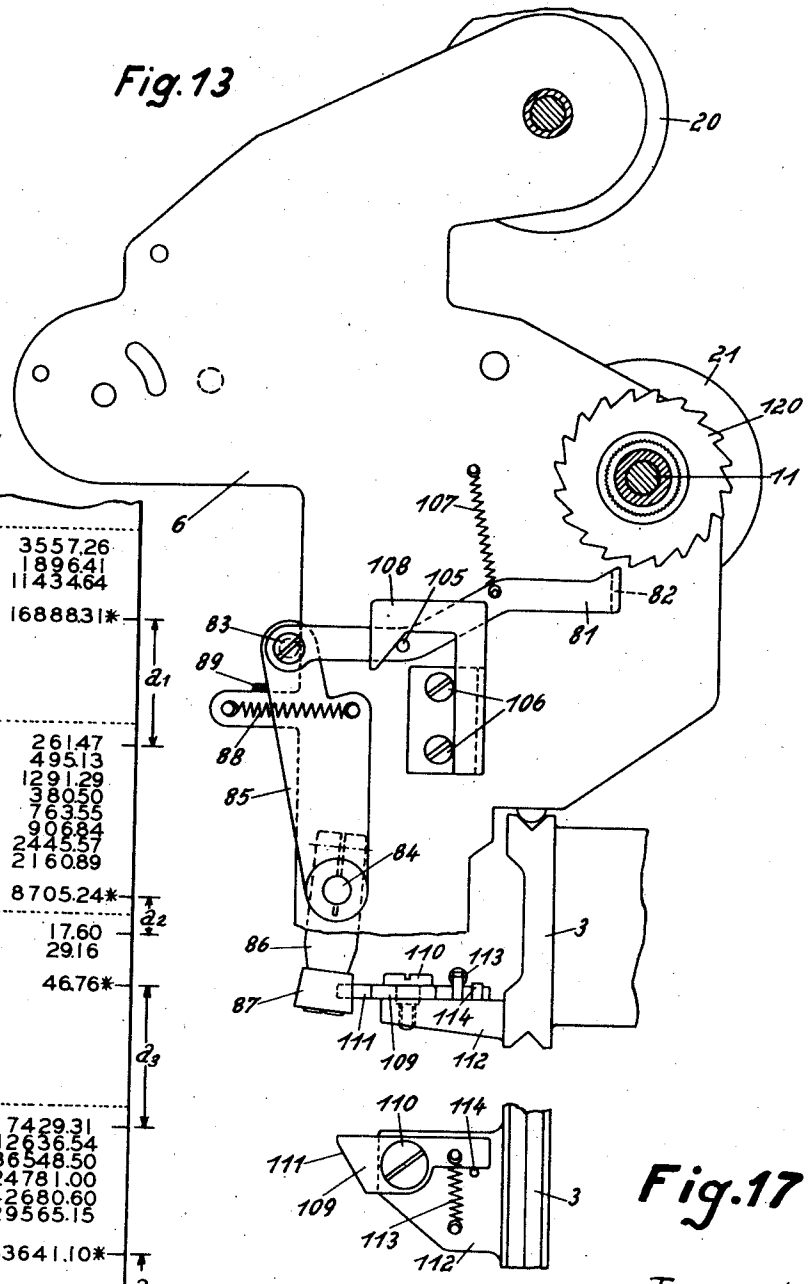


Fig. 16

Fig. 17

Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young, Emery + Thompson
Attorneys

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Fig. 15

VEREINIGTE GAS- und
ELEKTRIZITÄTS-WERKE AG.

Rechnung: Fa. Ewald Gebhardt jr.

Datum der Ablesung	ZÄHLERSTAND alter	ZÄHLERSTAND neuer	TARIFKLASSEN: kWh/cbm 1	2	3	4	5	Betrag	Zählermiete	Sonstiges	Zu zahlender Betrag
30.11.	342716	346331			36			10.80			
	91274	96172				49		7.35			
	243338	243970	6					2.76			
	80715	81832		11				3.85			
	34105	37571					35	6.30	2.15		33.21
	① → ②	③	④		⑤			⑥	⑦	⑧	⑨

VEREINIGTE GAS- und
ELEKTRIZITÄTS-WERKE AG

123

Rechnung: Herrn Hugo Ehring

Datum der Ablesung	ZÄHLERSTAND alter	ZÄHLERSTAND neuer	TARIFKLASSEN: kWh/cbm 1	2	3	4	5	Betrag	Zählermiete	Sonstiges	Zu zahlender Betrag
1. 12.	374.12	382.22	8					3.68		2.85	6.53

VEREINIGTE GAS- und
ELEKTRIZITÄTS-WERKE AG.

Rechnung: Herrn Karl Eggers

Datum der Ablesung	ZÄHLERSTAND alter	ZÄHLERSTAND neuer	TARIFKLASSEN: kWh/cbm 1	2	3	4	5	Betrag	Zählermiete	Sonstiges	Zu zahlender Betrag
1. 12.	513.16	524.19			11			3.30			
	31629.56	31643.40					14	2.52	0.40	4.90	11.12

Inventors:
W. Kniehahn +
F. G. H. Eggers
By Young Emery & Thompson
Attorneys

Patented Sept. 24, 1940 2,216,081

UNITED STATES PATENT OFFICE

2,216,081

PAPER FEEDING ARRANGEMENT ON WRITING OR PRINTING MACHINES

Werner Kniehahn, Chemnitz, and Friedrich Gustav Hugo Eggers, Siegmar-Schonau, Germany, assignors to Wanderer-Werke Aktiengesellschaft, Siegmar-Schonau, Germany

Application January 14, 1939, Serial No. 250,986
In Germany January 19, 1938

6 Claims. (Cl. 197—128)

The invention relates to an arrangement, on writing or printing machines especially on book-keeping machines or typewriters, for feeding strips (for instance composed of detachable sheets) of paper, preferably for making out bills.

Arrangements of this kind feed the strips both "line by line" and by "sections" or relatively wide intervals. The line-spacing feed mechanism serves for inscribing, in succession, the amounts to be entered in the bill, whilst the "sectional" feed supplements the line spacing mechanism to complete the forward movement in such a way as to bring the paper into a predetermined position for recording (for example) the first line of the next bill in each case.

The number of items to be entered, in vertical succession, on a bill varies, and consequently the total vertical feed distance through which the paper of the several bills is advanced by the line-spacing feed must differ in extent. The "sectional" feed which supplements the line-spacing feed, to complete the forward movement of a bill, must therefore also vary in extent. For this reason, the known arrangements of this kind have to be equipped with complicated and expensive control devices which automatically determine the extent of the "sectional" feed stroke in accordance with the number of lines in a bill.

It is an object of the invention to obviate the disadvantages of the known complicated devices by providing an improved arrangement for feeding paper strips both "line by line" and by "sections" or relatively wide intervals.

A more particular object of the invention is to provide two paper feeding devices which operate independently on each other one of which feeds the paper line by line while the other feeds the paper by sections.

Another object is to provide means for automatically actuating each of two paper feeding devices in accordance with the paper carriage movement of a writing or printing machine.

Another object is to provide controllable coupling means for connecting the actuating members of the device for paper feeding by sections with the machine drive of a writing or printing machine, more particularly of a calculating or book-keeping machine.

The invention offers the advantage that a carbon-copy strip, which is to be inscribed at the same time as the "top copy" strip can be passed, conjointly with the latter, over the line-spacing device, and, when the bill is completed can be advanced by merely the space of a single line, whereas the top-copy strip is advanced as far as the first line of the succeeding sheet. Since, for the forward movement through the length of a sheet, the top-copy strip is disconnected from the line-spacing device through the lifting of the pressure rollers, the top-copy strip can be advanced the length of a sheet by the feed device without carrying with it the carbon-copy strip, which remains coupled with the line-spacing device.

Other objects and advantages of the invention will appear from the following specification and drawings.

A typical embodiment of the invention is illustrated in the accompanying drawings in which: Fig. 1 is a partial elevation view, in perspective, of the arrangement. Fig. 2 is a simplified perspective view of the feeding of the bill strip by the arrangement. Fig. 3 shews a partial elevation of the sheet-by-sheet feeding device, in section along the line 3—3 of Fig. 7. Fig. 4 shews the feed device of Fig. 3, with the parts in a different position. Fig. 5 shews the arrangement of pressure rollers for holding the bill strip against feed rollers in the printing positon. Fig. 6 shews the pressure rollers, of Fig. 5, in the lifted position. Fig. 7 is a longitudinal section through a portion of the sheet-by-sheet feeding device, along the line 7—7 of Fig. 3. Fig. 8 is a cross section along the line 8—8 of Fig. 7. Fig. 9 is a special arrangement for actuating the sheet-by-sheet feeding arrangement. Fig. 10 is a control device for the arrangement of Fig. 9. Fig. 11 is a device for putting out of action the members actuating the sheet-by-sheet feeding device. Fig. 12 illustrates the effect of members for controlling the sheet-by-sheet feed. Fig. 13 is an arrangement for actuating the line-spacing device. Fig. 14 is another arrangement for actuating the line-spacing device. Fig. 15 shows a bill strip, and Fig. 16 another bill strip. Fig. 17 is a side view of a detail.

Mounted on the frame of the machine—recognizable by the outline 1 (Fig. 1)—is a guide plate 3, provided with grooves 2. The paper carriage is slidably mounted on the guide plate 3 by means of balls 4. The guide plate 3 carries a cam plate 5, the shape of which is shewn in Fig. 12.

A baseplate 8 is mounted on cheek plates 6, 7 of the paper carriage (Fig. 2), and is provided with two trays, 9, 10 which serve to contain piles formed by folding the bill strip 123 in zigzag form, the strip being detachable into sheets of equal size.

The cheekplates 6, 7 of the paper carrier

support two rollers 20, 21. A shaft 22 of the roller 20 (Fig. 7) is rotatably mounted in a bush 23 which, in turn, is rotatable in the cheekplate 6. The bush 23 has a flange rim 24 which is provided with a tapered inner surface 25 in which a large number of very fine teeth are machined. Coacting with this serrated taper surface 25 is a correspondingly shaped and serrated cone 26 on a sleeve 27 which has a circular flange 28 and is adapted to slide axially on the shaft 22. By means of a spring 29, housed in a bore 30 of the sleeve 27, this latter is pressed against the bush 23, said spring bearing against a bush 31 which is mounted on the shaft 22 and secured thereto by a cotter 32. The right extremity of the sleeve 27 (Fig. 7) is provided with slots 33 embracing the cotter 32. Consequently, the sleeve 27, though able to slide on the shaft 22 against the action of the spring 29, is prevented, by the cotter 32, from turning in relation to the shaft 22. Mounted on the right extremity (Fig. 7) of the bush 31 is a hand wheel 34, the rotation of which enables the shaft 22 and thus the roller 20 to be conveniently actuated, through the bush 31 and cotter 32, as hereinafter described.

Rotatably mounted on the bush 23 is a small pinion 35 to which is secured a disc 36 on which a pawl 38 (Figs. 7, 8) is pivotally mounted by means of a threaded pin 37. An arm 39 of the pawl 38 carries a pin 40 surrounded by a spring 41 clamped on to the extended hub 42 of a ratchet wheel 44 secured to the bush 23 by means of a screw 43. The pawl 38 coacts with the ratchet wheel 44.

The above described members for actuating the roller 20 function in the following manner. Rotating the pinion 35 in the clockwise direction according to Fig. 8, first causes the disc 36, connected to the pinion 35 to describe an idle movement, during which the pivot 37 of the pawl 38 moves through an arc, and the pin 40 of the arm 39 of the pawl 38 slides down, inside the loop of the spring 41, since said spring is firmly retained, by friction, on the stationary hub 42 of the ratchet wheel 44. The descent of the pin 40, in the loop of the spring 41, rocks the pawl 38 clockwise (Fig. 8) and comes into engagement with the ratchet wheel 44 after the disc 36 has described an idle movement of predetermined length. By this means, positive connection is established between the ratchet wheel 44 and the pinion 35, through the pawl 38 and disc 36. Consequently, in the event of any further clockwise movement (Fig. 8) of the pinion 35, the ratchet wheel 44 will be actuated by the pawl 38, and thus the bush 23, mounted in the cheekplate 6, will also be rotated. By means of the serrated cone 25, 26, sleeve 27 and cotter 32, the bush 23, in turn, actuates the roller axis 22, and thereby the roller 20.

A subsequent rotation of the pinion 35 in the counter-clockwise direction (Fig. 8) causes the pivot 37 of the pawl 38 to move in the anticlockwise direction (Fig. 8), so that the pin 40 of the arm 39 of the pawl 38 slides up inside the loop of the fixed spring 41, thus disengaging the pawl 38 from the ratchet wheel 44. Accordingly, a counter-clockwise rotation (Fig. 8) of the pinion 35 does not actuate the roller 20.

Independently of the above described mechanical actuation of the roller 20 by means of the pinion 35, said roller can also be adjusted at will by hand. This is effected by turning the handle 34 in the desired direction, whilst, at the same time, the sleeve 27 is moved towards the right (Fig. 7). For this purpose, the operator grasps the handle 34 in the palm of the hand and with the assistance of the middle, or index finger, engaging the flange 28 of the sleeve 27, he can move the sleeve conveniently towards the right (Fig. 7) thereby disconnecting the sleeve 27 from the bush 23. The roller axis 22 can then be adjusted, as desired, through the cotter 32, without any resulting rotation of the bush 23 and of the ratchet wheel 44 secured thereto by means of the screw 43. Consequently, the mechanical actuation of the roller by means of the pinion 35 is rendered inoperative as the result of displacing the sleeve 27 towards the right.

Gearing with the pinion 35 is a toothed quadrant 50, which is pivotally mounted on an axis 60 (Figs. 3, 4) a spring 61, bearing against the quadrant 50 on the one hand, and the cheekplate 6 on the other, tends to draw the quadrant in the counterclockwise direction in Fig. 3. The quadrant 50 is provided with an arm 62, the lower end of which carries a cam 63, of circular design, coacting with a roller 64 mounted in a frame 65. Said frame 65 is pivotable on a shaft 66 mounted in the cheekplates 6, 7, a spring 67, tending to rock said frame in the anticlockwise direction. Rotatably mounted in the frame 65 is a roller 68 (Fig. 1) serving to press the roller 21.

A cranked arm 69, attached to the quadrant 50 by rivets 70 (Fig. 1) is rockably mounted—also on the axis 60—on the outer side of the cheekplate 6, and carries, on its lower end, a pin 71. The pin 71 projects into a slot 72, in a cranked lever 73 mounted on an axis 74 on the cheekplate 6. The axis 74 also carries two pivotally mounted levers 75 and 76, the latter carrying a pin 77. Fixed on the cheekplate 6 is a square pin 78. The pins 77 and 78 are embraced by the branches of a spring 79, which is coiled round the axis 74, and tends to hold both the pins 77 and 78 in the position shewn in Fig. 11. When the lever 76 is turned up or down in Fig. 11, the pin 77 arranged on the lever 76 slides in relation to the pin 78 arranged on the cheekplate 6, the two branches of the spring 79 being consequently caused to diverge. After the release of the lever 76, the spring 79 always returns this lever—by means of the pins 77, 78—into the position shewn in Fig. 11.

The lever 73 is provided with a slot 80, in which a stop 90 can be clamped in any position. A shoulder 91 on the lever 76 coacts with said pin 90 in such a manner that an anticlockwise movement of the lever 76 brings the shoulder 91 into contact with the pin 90, and, during the further movement of the lever 76, turns the lever 73 in the anticlockwise direction by means of the pin 90. On its free end the lever 76 carries a roller 92 coacting with the cam member 5 attached to the guide plate 3. By varying the setting of the pin 90,—the stroke of the lever 76 remaining unaltered—the shoulder 91 can be brought into contact with the pin at different periods of said stroke, thereby varying the residual portion of said stroke that is available for rocking the lever 73. Consequently, the lever 73 describes different amplitudes of throw, in accordance with the setting of the pin 90, without any alteration of the stroke of the lever 76.

The lever 75 carries a roller 93 and its other end is maintained in contact with the pin 90 by a spring 94. Consequently, when the lever 75 is moved in the anticlockwise direction on the shaft 74, an anticlockwise movement is imparted to the lever 73 by the pin 90; whereas a clockwise movement of the lever 75 is not followed by any move-

ment of the lever 73, the spring 94 alone being stressed.

The cam plate 5 (Fig. 1) mounted on the guide plate 3 is designed in such a manner that, when the paper carriage is moved from left to right—viewed from the front of the machine—the roller 92 runs up the cam member 5, thereby rocking the lever 76 to a definite extent. If, during the further travel of the paper carriage, the roller 92 passes beyond the cam member 5, the lever 76 will be turned, in clockwise direction, by the spring 79 and returned into its normal position shewn in Fig. 1. During a subsequent movement of the paper carriage, from right to left—viewed from the front of the machine—the roller 92 of the lever 76 (which is in its normal position) comes into contact with the cam member 5 about midway along the guiding surface 95 of the latter (Fig. 12). During the further movement of the paper carriage from right to left, the surface 95 depresses the roller 92 out of its normal position, so that it runs along the underside of the member 5. When the roller passes beyond the left end of the member 5, the spring 79 returns the lever 76, and with it the roller 92, into the normal position shewn in Fig. 1.

In order to be able to prevent the lever 76 from being rocked (as the result of the upward travel of the roller 92 on the member 5) during the movement of the paper carriage from left to right, the lever 76 is connected at 96 (Fig. 11) with a rod 97 which is articulated at 98 to a manually operable lever 99, which is adapted to turn on a pivot 100 mounted on the cheekplate 6. By depressing the lever 99, the roller 92 is depressed, out of its normal position and against the action of the spring 94, to such an extent that, during the movement of the paper carriage from left to right, it runs along the under side of the member 5. Mounted on a pivot 101, on the cheekplate 6, is a bell-crank lever 102, the short arm of which is engaged by a spring 103, tending to turn it in the clockwise direction. The short arm of the lever 102 coacts with a nose 104 of the lever 99 in such a manner that, when the lever 99 is depressed, the short arm of the lever 102 drops behind the notch 104 and retains the lever 99 in the depressed position as long as may be desired. Turning the lever 102 in the anticlockwise direction releases the lever 99, so that the spring 79 can return the lever 76 into its normal position.

Mounted on the shaft 11 of the roller 21 is a ratchet wheel 120 (Fig. 13), which is connected with the shaft 11 of the roller 21 in the same manner as the ratchet wheel 44 is with the shaft 22 of the roller 20. The roller 21 also is provided with a hand wheel 121 (Fig. 1) which serves—in the same manner as the hand wheel 34 of the roller 20—to adjust the roller 21 independently of the actuation of the ratchet wheel 120, when a sleeve 122 is displaced, axially, at the same time that the ratchet wheel 120 is actuated. The manual adjustment device 121, 122 for the roller 21 is designed in the same manner as the already described device 34, 27 for the roller 20, so that there is no need to describe it more fully here.

The ratchet wheel 120 serves to actuate the roller 21 for line spacing, and is actuated by a pusher 81, with a flange 82 on its free end. The pusher 81 is articulated, at 83, to a lever 85 secured to a shaft mounted in the cheekplates 6, 7. Clamped on the shaft 84 is an arm 86 carrying a roller 87. The lever 85 is engaged by a spring 88, which is secured to the cheekplate 6 and tends to keep the lever 85 in contact with a lug 89 on said cheekplate. The pusher 81 carries a pin 105 coacting with a wedge-shaped stop 108 secured to the cheekplate 6 by screws 106. The pin is maintained in contact with the stop 108 by a spring 107. The stop 108 is designed in such a manner that, when the pusher 81 moves to the right, in Fig. 13, the pin 105 ascends and engages with the ratchet wheel 120. The further movement of the pusher 81 towards the right affects the line spacing. When the pusher 81 moves towards the left, the pin 105 slides down the stop 108 and effects the positive disengagement of the pusher from the ratchet wheel 120.

Within the reach of the arm 86 and the roller 87, a stop 109 is attached to the guide plate 3 by means of an arm 112, on which said stop is adapted to pivot at 110. A control face 111 is formed on the stop 109, and this latter is maintained in contact with a pin 114 by means of a spring 113. The stop 109 is so arranged that, when the paper carriage moves from left to right—viewed from the front of the machine—the roller 87 runs up the face 111 of the stop 109, thereby rocking the arm 86 in the clockwise direction. This movement of the arm 86 rotates the shaft 84 and thus rocks the lever 85 in the clockwise direction, so that the pusher 81 is moved towards the right in Fig. 13 and produces a line-spacing movement of the roller 21. When the paper carriage moves from right to left—viewed from the front of the machine—the roller 87 encounters the stop 109 and rocks it in the anticlockwise direction, against the action of the spring 113. The deflection of the stop 109 prevents the arm 86 from being turned. Consequently, line-spacing takes place only when the paper carriage moves from left to right.

As will be evident from Fig. 2, the bill strip 123, composed of a plurality of bill sheets, is taken up from the pile 124 bounded by the plates 9, and is led, over the rollers 21, 20 and over a guide plate 125, to a pile 126 bounded by the plates 10. The strip 123 is pressed against the rollers 20 and 21 by means of rollers 68 and 127, so as to move in accordance with the actuation of the rollers. A guide plate 128 (Figs. 5, 6) serves to feed the strip under the lower roller 21. The guide plate 125 also extends close up to the roller 21, and enables a special backing sheet 129, under the strip 123, to be also fed to the impression point by means of the roller 21. Said backing sheet is pressed against the roller 21 by means of two rollers, 130, 131.

The rollers 130, 131 can be lifted away simultaneously by a handle. With this object, the rollers 130, 131 are mounted in two-armed levers 132, 133 adapted to pivot on axes 134, 135. In addition, a guide rail 151 is mounted (Fig. 2) in the levers 133. A spring 136 causes the rollers 130, 131 to press the backing sheet 129 against the roller 21. The two levers 132, 133 are connected together by a link 137, which is articulated to the lever 133 at 138, and provided, at the other end, with a slot 139 engaged by a pin 140 arranged on the lever 132. The spring 136 holds the parts in the position shewn in Fig. 5. In order to lift the rollers 130, 131, the lever 132 must be swung anticlockwise on its pivot 134 by means of a handle 141, whereupon, after a short stroke, the pin 140 encounters the left end of the slot 193, and on the lever 132 being moved further, also imparts an inticlockwise movement to the lever 133, through the link 137. This movement of the levers 132, 133 lifts the two roll-

ers 130, 131 away from the roller 21 (Fig. 6). The rollers 130, 131 can be locked in the operative position by a notched lever 142. This lever is adapted to turn clockwise on its axis 143, against the action of the spring 144, and is provided with a notch 145 (Fig. 5). The notch 145 snaps into engagement with the pin on the handle 141 of the lever 132, when this is swung anticlockwise, and holds the levers 132, 133 in the position shewn in Fig. 6. On the lever 142 being slightly depressed, the notch 145 releases the lever 132, and the levers 132, 133 return into the position shewn in Fig. 5, under the action of the spring 136.

The roller 127 which presses the strip 123 against the roller 20, is mounted in a frame 146 adapted to turn on an axis 147. A spring 148 engaging the frame 146 keeps the roller 127 pressed against the roller 20. The frame 146 can be turned, by hand, in the anticlockwise direction until a lug 149 comes in contact with a pin 150. This movement brings the spring 148 into position (Fig. 6) beyond the axis 147, thus retaining the frame 146 in the inoperative position.

As already described, when the quadrant 50 is actuated, the cam 63 lifts the presser roller 68 away from the roller 21, to which it is allocated (Fig. 4). To enable the presser roller 68 to be moved out of the way, independently of the action of the quadrant 50, in order to insert a fresh bill strip 123, a lever 160, pivotable on the axis 161, is provided on the cheekplate 6. The anticlockwise movement of this lever is prevented by a pin 162. A pin 163 provided on the lever 160, projects through a slot 164 in the cheekplate 6 and is connected to a link 165 (Figs. 3, 4) which, in turn, is articulated, at 166, to a lever 167 pivotally mounted at 168. The lever 167 has a hooked extension 169, against which, when in the normal position (Fig. 3) the quadrant 50 is caused to bear by the action of a spring 61. When the lever 160 is turned in the clockwise direction, a notch 170 in the link 165 engages with a stop pin 171 (Fig. 4). When the members 160, 165 are moved from the position shewn in Fig. 3 into that of Fig. 4, the lever 167 is turned, counterclockwise, through a corresponding angle, the quadrant 50 being thereby moved, clockwise, against the action of the spring 161. The arrangement of the members 160, 165, 167 is such that, after the shoulder 170 of the link 165 comes in contact with the pin 171, said members have a toggle-lever action and cannot be returned by the force of the spring 61, into the normal position shewn in Fig. 3. On the contrary the said return into normal position (Fig. 3) can be effected only by moving the lever 160 in the anticlockwise direction.

The abovedescribed movement of the lever 160 imparts to the quadrant 50 a movement that is sufficient to bring the pawl 36 into gear with the ratchet wheel 44. Although the movement of the lever 160 imparts a movement to the pinion 35 that movement is too small to bring the pawl 33 into operation. Nevertheless, this movement of the quadrant 50 is sufficient to advance the cam far enough for it to displace the roller 64 and thus move the presser roller 68 away from the roller 21 (Fig. 4). Consequently, the movement of the lever 160 from the position of Fig. 3 into that of Fig. 4, enables the presser roller 68 to be moved out of the way, independently of the mechanism actuating the roller.

The lever 75 (Figs. 1, 11) for rocking the lever 73 is—in contrast to the lever 76—not influenced by the paper carriage, but by power members actuated by the driving motor. For this purpose, two bell-crank levers 182, 183, connected together by links 184, 185, are mounted on axes 180, 181 on the rear side of the machine frame. The upper arms (Fig. 9) of the levers 182, 183 are cranked, so that the link 184 lies in the plane of the roller 93 of the lever 75. The two levers 182, 183 are connected together by a spring 186, in such a manner that the spring tends to turn them clockwise, until the lever 182 comes in contact with a pin 187. Attached to the link 185 is a lug 188, on which a lever 190 is pivoted at 189. A spring 191 tends to hold the lever 190 in contact with a pin 192 attached to the lug 188. In the normal position (Fig. 9) the left end of the lever 190 bears against a pin 193, thereby setting the spring 191 in tension. A disc 195, to which is attached a pin 196, is seated on a shaft 194, to which a single movement is imparted by the driving motor at each working operation of the machine.

The pin 193 is attached to a rod 197 (Fig. 10) and guided in a bore in a bracket 190 secured to the machine frame. The other end of the draw-rod 197 is articulated, at 200, to a bell-crank lever 199. Said lever is mounted on an axis 201 and is turned, anticlockwise, by spring 202, until the rod 197 comes in contact with the bracket 198. The lever 199 is connected at 203, with a key 204. Adjoining the key 204 is another key 205, the stem of which is provided with a lug 206 engaging under the head of the key 204. The key 205 is the totalising key of the machine. The result obtained by the provision of the lug 206 is that, on the key 204 being depressed, the totalising key 205 is depressed at the same time, whereas, on the other hand, the key 204 is not affected when the key 205 is depressed.

Depressing the key 204 moves the lever 199 clockwise, against the action of the spring 202, thereby displacing the attached draw-rod 197 towards the left in Fig. 10. The pin 193 is thus slid so far towards the left as to release the lever 190, which then, assisted by the action of the spring 191, moves in the anticlockwise direction until it encounters the pin 192. A nose 207, provided on the lever 190, is thus brought within reach of the pin 196, located on the disc 195 which makes one revolution each time the machine is operated. The contact of the pin 196 against the nose 207 moves the lever 190 towards the right in Fig. 9 and thus, through the medium of the link 185, turns the levers 182, 183 anticlockwise, against the action of the spring 186. This counterclockwise movement of the levers 182, 183, depressed the link 184 and, by means of the roller 93, imparts an anticlockwork movement to the lever 75. In this way, the lever 73 also turns in the anticlockwise direction, in the same manner as the lever 76 is turned by the movement of the paper carriage.

The typical arrangement described functions in the following manner. In order to explain the working of the typical embodiment a bill strip according to Fig. 15, constituted by a number of electricity- and gas-bill sheets, of uniform size, will first be taken as a basis. The bill strip 123 is folded, zigzag, in accordance with the several uniform sheets, and laid, in the form of a pile 124, on the baseplate 8 (Fig. 2). By moving the handle 141 from the position shewn in Fig. 3 into that represented in Fig. 4, the presser rollers 130, 131 are lifted away from the roller 21. By moving the lever 160 from the position

in Fig. 3 into that in Fig. 4, a movement is imparted to the quadrant 50—and therefore to its arm 62—which is sufficient to move the presser roller 68 away from the roller 21. By turning the frame 146 in the anticlockwise direction, the presser roller 127 is moved away from the roller 20. The backing sheet 129 can now be inserted, by means of the guide plate 125, under the roller 21 and brought into the position shewn in Fig. 6. By means of the guide plate 126, the strip 123 can then be passed under the roller 21, between the rod 151 and the presser roller 131, and over the roller 20, its forward portion being piled, in zigzag form, between the plates 9 of the baseplate 8. The frame 146 carrying the presser roller 127 is now swung clockwise, so that the pressure roller comes to bear against the roller 20, as in Fig. 5. Pressure on the lever 142 causes the notch 145 to release the handle 141, and the pull of the spring 136 brings the two pressure rollers 130, 131 to bear against the roller 21, thereby pressing the backing sheet 129 against the latter. As the pressure rollers 130, 131 make contact, the guide rod 151 bears against the strip 123 in such a manner that the said strip kinks (Fig. 5) in passing between the rollers 20, 21. Turning the lever 160 back from the position shewn in Fig. 4 into that shewn in Fig. 3, also causes the presser roller 68 to bear once more against the roller 21 which holds the backing sheet 129 and strip 123 at the same time. Arranged in front of the strip 123 is an ink ribbon 115 which serves to imprint on the bill strip the characters set by means of type carriers 116. The rear side of the bill strip 123 is preferably coated, wholly or in part, with an inking medium so that the characters printed on the strip are simultaneously visible on the backing sheet 129. Of course, with the same object, carbon paper of any kind, or a suitable ink ribbon, may also be arranged between the backing sheet and the bill strip.

The person operating the machine now brings the paper carriage into its terminal right hand position as viewed from the front of the machine, so that the first column, for inserting the date of the bill to be made out comes into position facing the printing mechanism 118 of the machine. For clarity, this column is indicated by the numeral 1 in Fig. 12. When column 1 faces the printing mechanism 118, the roller 92 of the lever 76 (see Fig. 1) occupies the position 1 (in Fig.12) in relation to the cam plate 5. After the date has been entered, the operator moves the paper carriage, successively into the positions corresponding to the columns marked 2 and 3, which serve to accommodate the old and new meter readings. When column 3 is opposite the printing mechanism, the roller 92 will lie on the surface 95 of the member 5, as indicated by the numeral 5 in Fig. 12. The operator will now move the paper carriage through such a distance that the tariff column (e. g. column 5) corresponding with the meter reading concerned comes opposite, the printing mechanism, and enters in that column the consumption, that is to say, the difference between the two meter readings. In order to pass from column 3 to column 5, the paper carriage must be moved further from right to left in Fig. 12. In this movement the roller 92 is depressed by the face 95 of the guide member 5, against the action of the spring 94 (Fig. 11) so that during the further movement of the paper carriage the roller 92 runs on the under side of the member 5. When the column 5 is in position facing the printing mechanism 118, the roller 92 assumes the position marked 5 in relation to the guide members 5. The consumption enters in the tariff class concerned, and multiplied by the corresponding charge rates is entered as the sum due in column 6. The operator must therefore move the paper carriage, for example from column 5 to column 6. In so doing the roller 92 travels further under the guide members 5, and finally reaches the position marked 6 in relation to the cam plate 5 in Fig. 12.

If the operator now wishes to enter a further reading in the corresponding section of the bill, the paper carriage must be moved from column 6 back to column 2. During this movement of the paper carriage from left to right in Fig. 12 the roller 87 (Fig. 13) runs up the inclined face 111 of the member 109 and is swung clockwise, so that the roller 21 is automatically turned to set the next line, through the action of the shaft 84, lever 95 and pusher 81. At the same time the roller 92 also moves from left to right in Fig. 12, and finally passes, through the positions 5, 4, 3, into the position 2. If several successive entries are to be made in columns 1—6, for example, those relating to different meter readings of the same consuming apparatus, line-spacing will be effected during the return of the paper carriage from left to right, but no forward movement to the full extent of a bill sheet. In so doing, the roller 92 never passes beyond the left end of the guide member 5. It is not until the column 7 is set facing the impression point that the roller 92 passes beyond the guide member 5 and is then returned by the spring 79 (Fig. 11) into normal position, viz. that marked 7 in Fig. 12. For printing in the other columns, such as 8 and 9, the roller 92 reaches the positions marked 8 and 9 in Fig. 12. Columns 7 and 8 of the typical bill represented in Fig. 14 serve for entering meter rent and sundry charges. These amounts are added, by the calculating mechanism of the machine, to those representing the consumption, so that the total amount due can be recorded, thus completing the bill. The several items and the total are printed, at the same time, and in the manner already described, on the backing sheet underneath the bill strip.

In returning the paper carriage from column 9 to column 1, i. e. from left to right in Fig. 12, the bill strip 123 is automatically advanced in such a manner as to bring the first line to be inscribed on the next bill, in each case, into position facing the impression point, as hereinafter described. During the return movement of the paper carriage, the roller 92 moves out of the position 9 and through 8 and 7 into the position 6'. In this position the column 6 faces the impression point, and the roller 92 comes just into contact with the face 119 of the cam plate 5. During the further movement of the paper carriage from left to right, when the columns 5, 4, and 3 in succession pass the impression point, the roller 92 is moved upwards by the surface 119 until it reaches the position 4' or 3' in Fig. 12. During the upward movement of the roller 92, the lever 76 (Fig. 1) is turned anticlockwise and, after its shoulder 91 encounters the pin 90, carries the cranked lever 73 with it, also in anticlockwise direction. By means of the pin-and-slot connection 71, 72, a clockwise turn is thus imparted to the lever 69, which, in turn, rocks the quadrant 50 in the clockwise direction, to a corresponding extent. In this movement of the quadrant 50, and before the pawl 38 has been

brought by the loop of the spring 41 (Fig. 8) into engagement with the ratchet wheel 44, the presser roller is moved away by the cam 63 mounted on the arm 62. During the further movement of the quadrant 50, the pawl 38 engages the ratchet wheel 44, and the roller 20 is turned by this latter. By suitably adjusting the pin 90 in the slot 80 (Fig. 1), the movements imparted to the several actuating members by the ascent of the roller 92 on the surface 119 of the guide member 5 are so harmonised that the extent of the effective movement of the roller 20 corresponds exactly with the height of a bill-sheet on the strip 123. Owing to the friction produced by the pressure of the roller 127 on the roller 20, the strip 123 is carried onward by the movement of the roller 20, and drawn past the lower roller 21, the presser roller 68 of which has been moved out of contact. The strip 123 is thus automatically drawn from the pile 124 and deposited on the pile 126.

During the further rightward movement of the paper carriage the roller 92 finally passes beyond the guide member 5 and returns into the position marked 2 or 1. The lever 76 is returned into normal position by the spring 79 (Fig. 11) and thus imparts an anticlockwork movement to the lever 73 and—through the members 71, 72, 69—a similar movement to the quadrant 50. This anticlockwork movement of the quadrant 50 moves the disc 36—through the pinion 35—in the anticlockwise direction in Fig. 8. At the same time, the pin 40 of the pawl 38 rises in the loop of the friction-tight spring 41, so that the anticlockwise movement of the disc disengages the pawl 38 from the ratchet wheel 44. During this movement of the disc 36, or of the quadrant 50, the roller 20 is not moved, neither does the pawl slide on the ratchet wheel 44.

The rollers 20 and 21—of which the upper roller 20 serves for advancing the strip a full bill sheet height, and the lower roller 21 for line spacing—are actuated quite independently of each other. If several lines are to be entered, in succession, on a sheet of the bill strip, for example in between the columns 2 to 6, then during each return movement of the paper carriage from column 6 to column 2—as already described—the roller 21 is actuated by the pusher 81 and ratchet wheel 120, but not the roller 20, inasmuch as the roller 92 does not run up the surface 119 of the guide member 5. In line spacing by the roller 21, the strip 123 is held by the pressure of the roller 127 (Fig. 5) on the roller 20, and through the line spacing movement of the roller 21, a loop—corresponding in size with the number of lines spaced—is formed in the strip 123 between the rollers 20 and 21. This loop formation of the bill strip is facilitated by the arrangement of the guide rod 150 which, when the strip is taut, kinks the latter between the rollers 20 and 21 (Fig. 5). When the strip is subsequently advanced the full height of a bill sheet by means of the roller 20, the strip is first held between the two rollers 20 and 21 without slipping over the roller 21, and it is not until the strip 123 has been advanced, by the roller 20, in accordance with the size of the loop formed during the preceding line spacing, that further rotation of the roller 20 also advances the strip 123 in relation to the roller 21. If, for example, as in the upper sheet on Fig. 16, five line-spacing movements have occurred, the roller 20 will afterwards first advance the strip 123 in accordance with these five lines, and not until this has been done does it draw the remainder of the sheet past the roller 21, so as to bring into the printing position the first line to be printed on the middle sheet.

When a new backing sheet 129 is to be inserted, while the strip 123 rests on the two rollers 20, 21 (according to Figs. 5 and 6), the presser rollers 130, 131 are lifted away from the roller 21 by turning the handle 141 in the manner already described. The presser roller 68 is moved away from the roller 21 by means of the quadrant 50, on the lever 160 (Fig. 3) being rocked. The backing sheet can now be slipped sideways under the strip 123 and on to the guide plate 125, and passed, under the strip 123, over the roller 21. After the backing sheet 129 has been set to correspond with the first line to be printed, the presser rollers 68, 130, 131 are again brought to bear on the roller 21, so that during the next line spacing movement of the roller 21, the second line of the backing sheet comes into the printing position.

For constructional reasons, the relative arrangement of the two rollers 20 and 21 may also be varied without deviating from the invention. The bill strip may also be led over more than two rollers.

Fig. 16 represents a bill strip with component sheets of uniform size, and rows of figures such as may occur, for example in pay sheets &c. For making entries on such bill strips, the paper carriage—in contrast to making entries on a bill sheet according to Fig. 15—is moved to and fro, but remains in one and the same position. Consequently, the arrangement according to the invention cannot be actuated by means of the guide members 5 as already mentioned. In such case, therefore, the forward movement through the full length of a sheet is initiated by means of the arrangement shown in Fig. 9. After the items to be entered on the bill sheet concerned have been printed, the key 204, which acts on the totalising key, by means of the attachment 206, is depressed. This action causes the lever 75 (Fig. 11) to be rocked, by the operation of the machine, in the manner already described, and the lever 73 (Fig. 1) actuates the roller 20 in the same manner as the movement of the paper carriage. As will be directly evident from Fig. 16, the distances a_1 to a_4 between the last line total of one sheet and the first line (entry) on the next sheet, differ considerably. The different dimensions of the spaces a_1 to a_4 are automatically taken into account by the separate operation of the two rollers 20, 21.

For making entries on a bill strip of the kind shown in Fig. 16, the line spacing is no longer effected by the paper carriage but by the drive of the machine. With this object a special arm 210 is attached (Fig. 14) to the shaft 84 (Fig. 13), in the vicinity of the cheekplate 7. Coacting with the arm 210 is a two-armed lever 211, which is mounted at 212 on the cheekplate 7. Connected with the right arm of the lever 211 is a bar 213 extending across the whole paper carriage. The free end of the bar 213 is connected with a lever (not shown in Fig. 14) mounted on the cheekplate 6. Normally, the right arm of the lever 211 bears against a pin 214. The bar 212 coacts with a roller 216 secured on an arm 216. When entering several amounts in successive lines—for example as shown in Fig. 16—the arm 215 describes—as the result of actuating the known vertical motor key—an upward movement in Fig. 14, at each working operation of the machine, thereby rocking the lever 211 anticlockwise, owing to the

contact of the roller **216** with the bar **213**. The lever **211** turns the arm **210**, and therefore the shaft **84**, in the clockwise direction. The lever **85** (see also Fig. 13) connected with the shaft moves the pusher **81** towards the right in Fig. 14 and thus—through the ratchet wheel **120**—imparts a line-spacing movement to the roller **21**.

The arrangement according to the invention can also be applied to commercial writing machines which have no tranversely-displaceable paper carriage, but are equipped with a non-displaceable paper roller. In such case, the arrangement according to the invention is attached to the frame carrying the paper roller, the lever **75** and roller **93** in Fig. 1 being turned by the device according to Figs. 9 and 10 actuated by the drive of the machine. At the same time, the bell-crank lever **199** is preferably connected directly with the totalising key **205**, so that the key **204** is superfluous. After the total has been printed, the roller **20** which advances the strip sheet by sheet is automatically actuated, by the operation of the machine, in the manner already described.

We claim:

1. An arrangement for feeding paper strips, on writing or printing machines especially on calculating or bookkeeping machines having a paper carriage movable in a machine frame, comprising a device adapted to feed a strip of paper line by line, at least one presser roller for pressing the paper strip against the feeding device, means for lifting away the said presser roller, a second feeding device adapted to feed a strip of paper by sections or relatively wide intervals, a pinion connected to the second feeding device, a rack sector engaging the pinion for driving the second feeding device, a spring forcing the rack sector back to its position of rest, and a clutching device effective only in one direction of rotation and operating with a short idle stroke and arranged between the pinion and the second feeding device, the said lifting means being connected to the rack sector in such a manner that the said presser roller is lifted away during said short idle stroke upon operation in clutching direction and maintained lifted during the operation of the second feeding device.

2. An arrangement according to claim 1, in which a setting member of limited stroke is provided for moving the rack sector an extent corresponding to the idle stroke of the clutching device.

3. An arrangement according to claim 1, in which a guiding member having an upper and a lower inclined surface is provided disposed on the machine frame and in which a member is provided connected to the rack sector and is adapted to cooperate with either of the said inclined surfaces during displacement of the paper carriage, the one inclined surface being effective when the paper carriage is moved in one direction and causing the said member to actuate the said second feeding device while the other inclined surface is effective when the paper carriage is moved in the opposite direction and moves the said member to an inoperative position.

4. An arrangement according to claim 1, in which a guiding member is provided having an upper and a lower inclined surface and is disposed on the machine frame, a member is provided connected to the rack sector adapted to cooperate with either of the said inclined surfaces during displacement of the paper carriage, the one inclined surface being effective when the paper carriage is moved in one direction and causing the said member to actuate the said second feeding device while the other inclined surface is effective when the paper carriage is moved in the opposite direction and moves the said member to an inoperative position, a manually operable adjusting device provided to set the said member to its inoperative position, and in which means are provided for locking the adjusting device in its effective position.

5. An arrangement according to claim 1, in which a driven member is provided connected to the rack sector, and in which a manually controllable coupling device is provided disposed between the machine drive and the said member.

6. An arrangement according to claim 1, in which a driven member connected to the rack sector is provided, and in which a coupling device is provided controllable by manually operable means disposed between the machine drive and the said member, the manually operable means being adapted to control at the same time the totalizing operation of the calculating machine.

WERNER KNIEHAHN.
FRIEDRICH GUSTAV HUGO EGGERS.