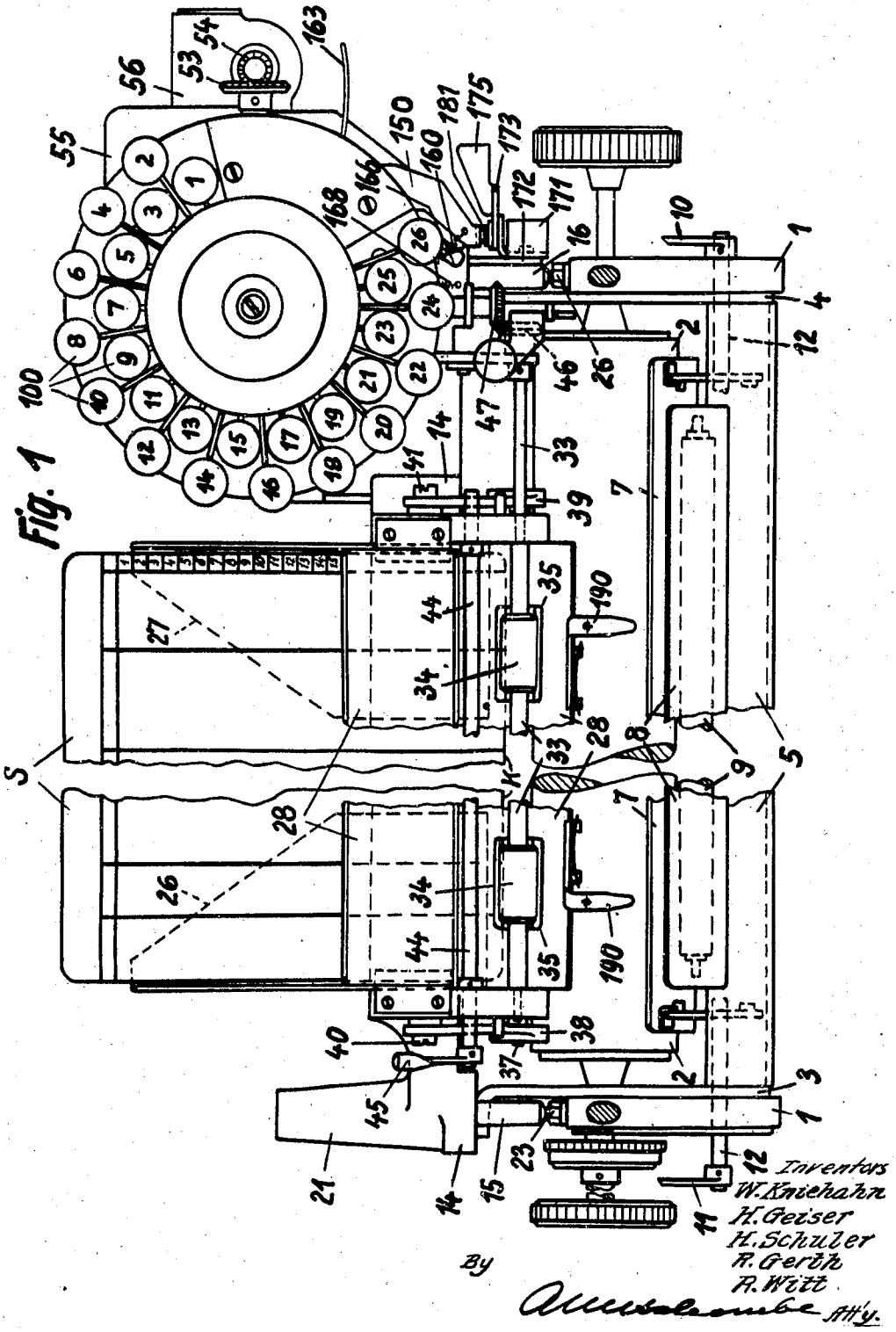
June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 1

Fig. 1

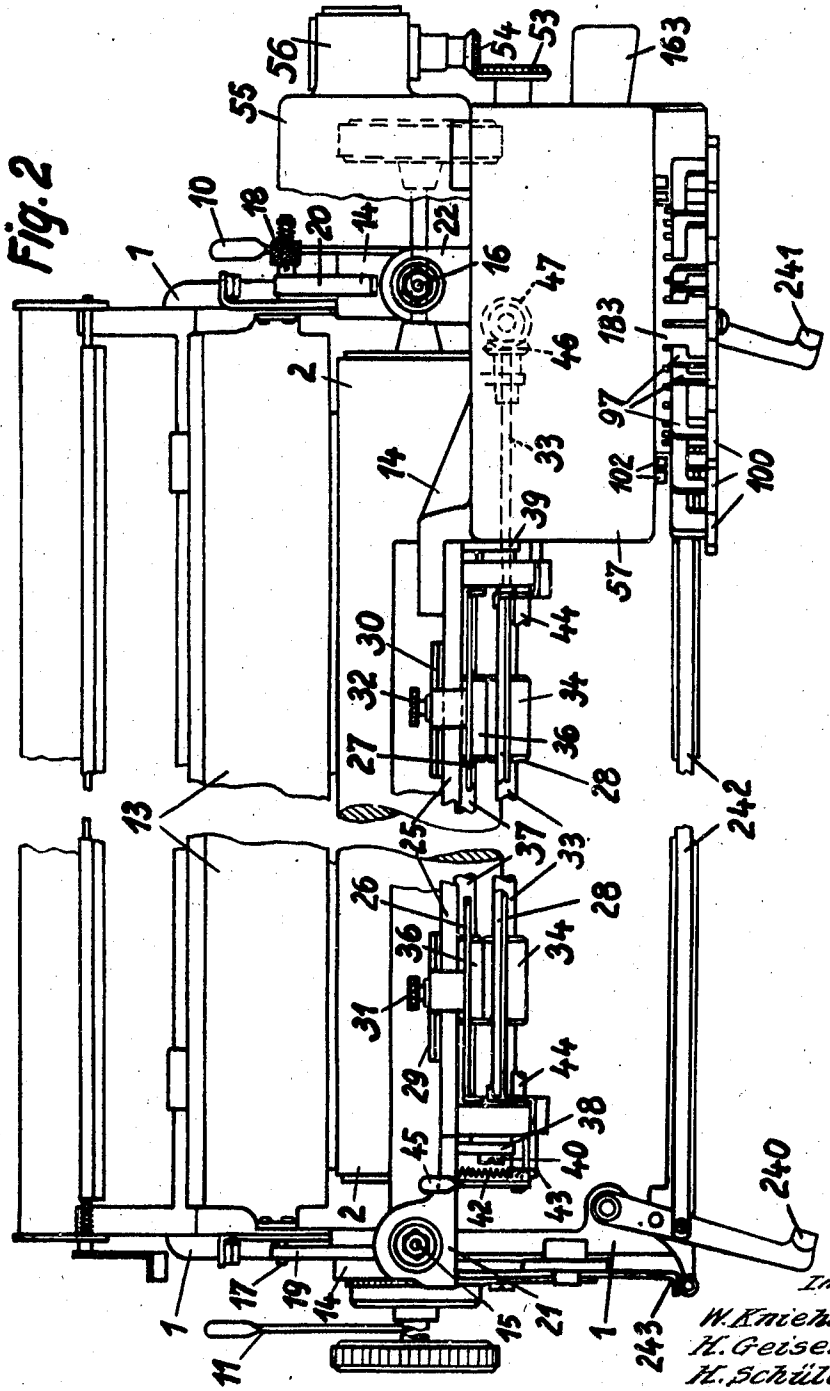


June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 2

Fig. 2



Inventors
W. Kniehahn
H. Geiser
H. Schiller
R. Gerth
R. Witt

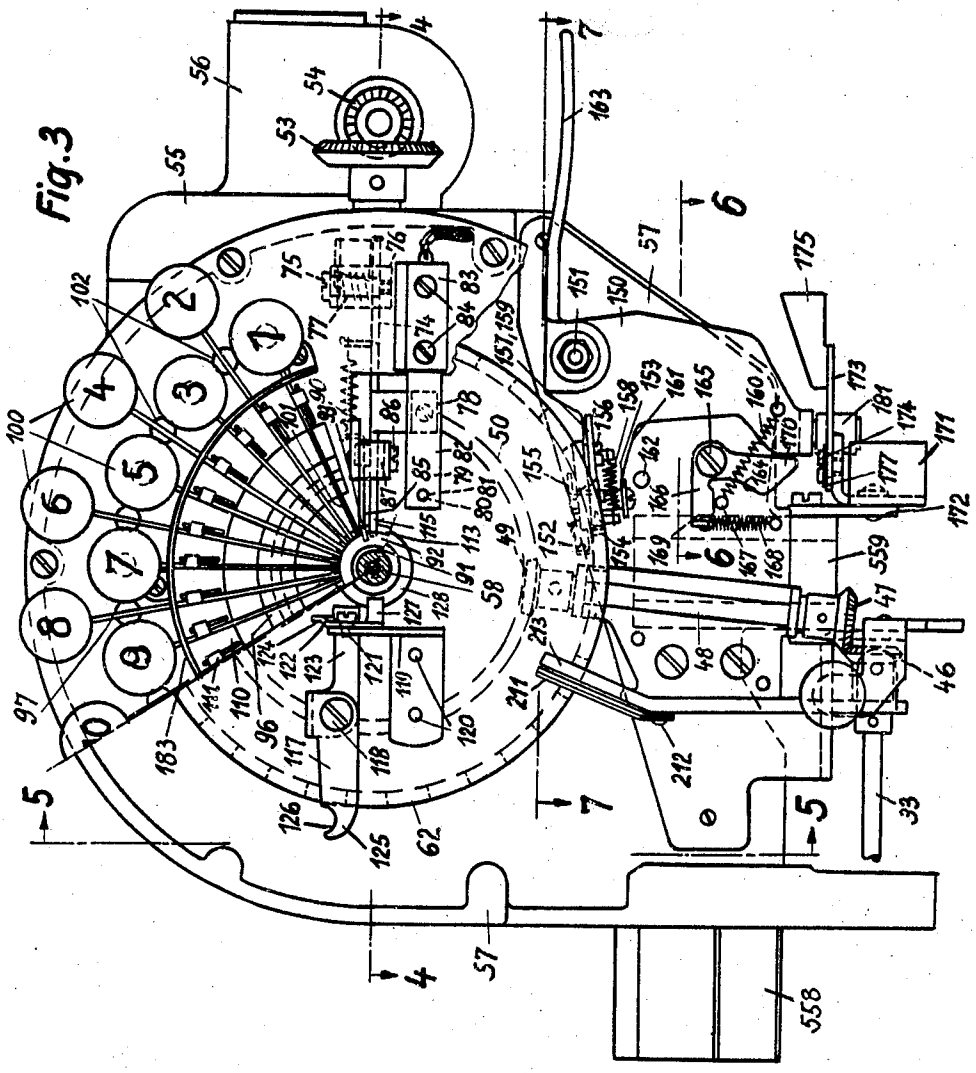
By Attorneys

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 3

Fig. 3



Inventors
W. Kniehahn
H. Geiser
H. Schüller
R. Gerth
R. Witt

By Atty

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 4

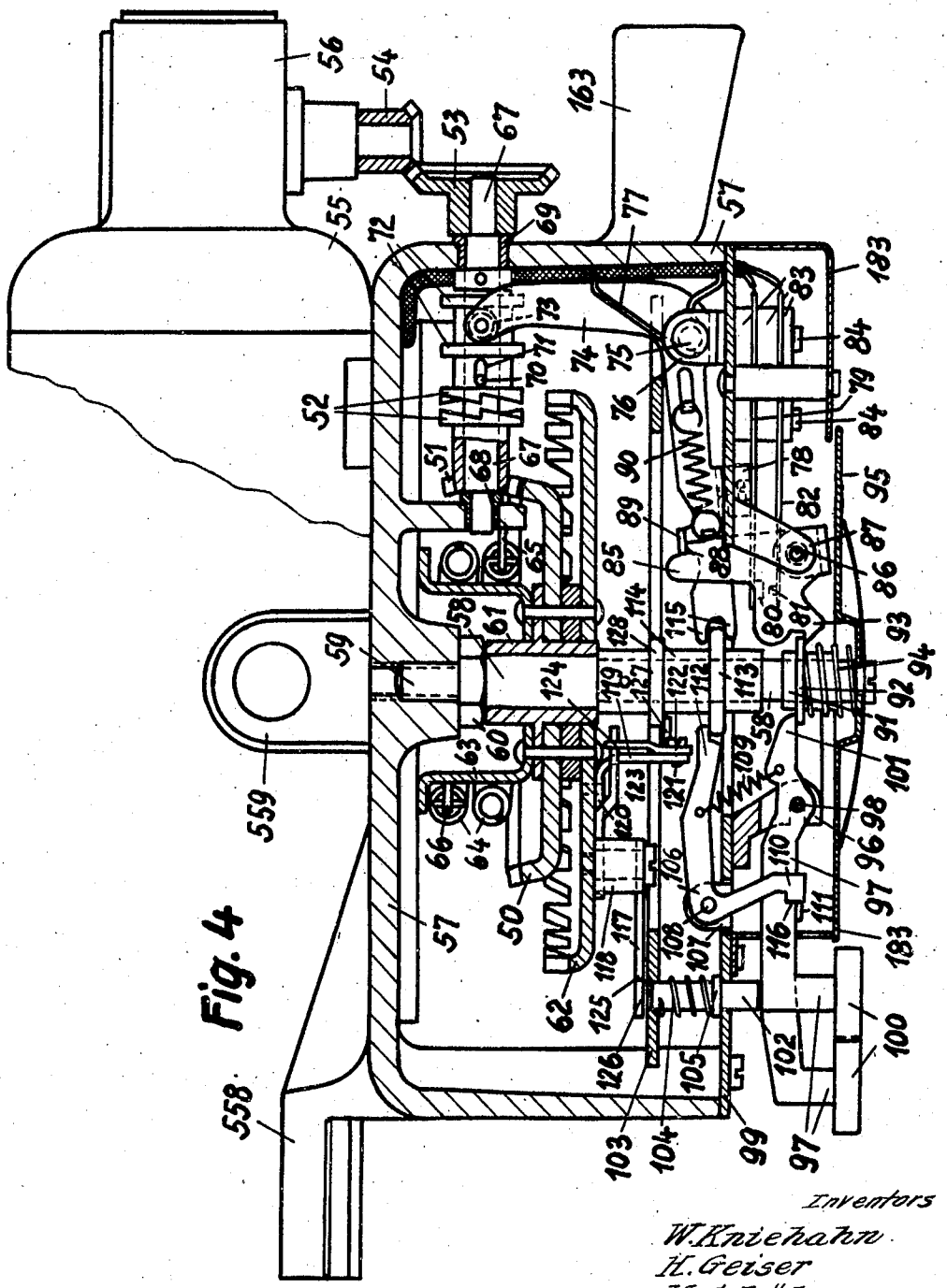


Fig. 4

Inventors

W. Kniehahn

H. Geiser

H. Schüler

R. Gerth

R. Witt

By

Attorneys

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 5

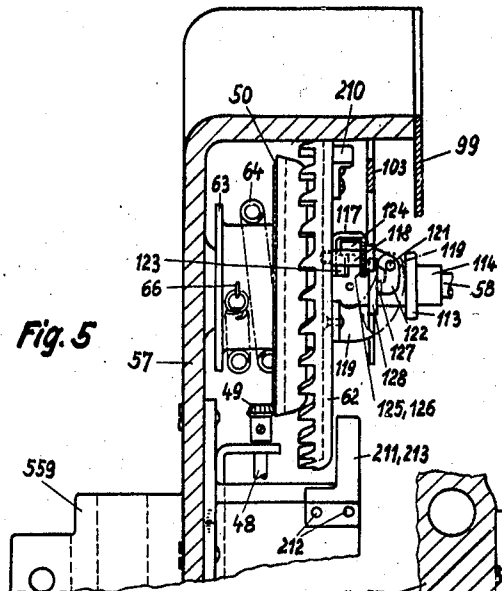


Fig. 5

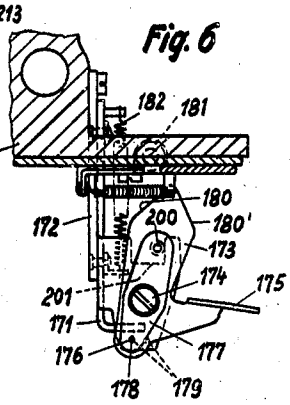


Fig. 6

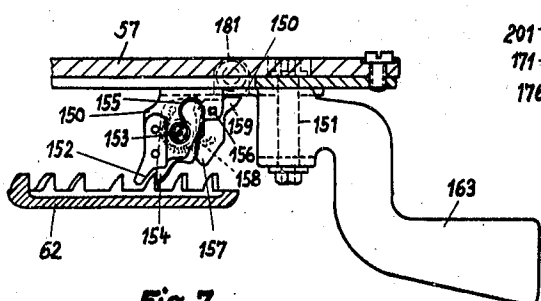


Fig. 7

Inventors

W. Kniehahn

H. Geiser

H. Schüler

R. Gerth

R. Witt

By [signature]

Att'y

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 6

Fig. 8

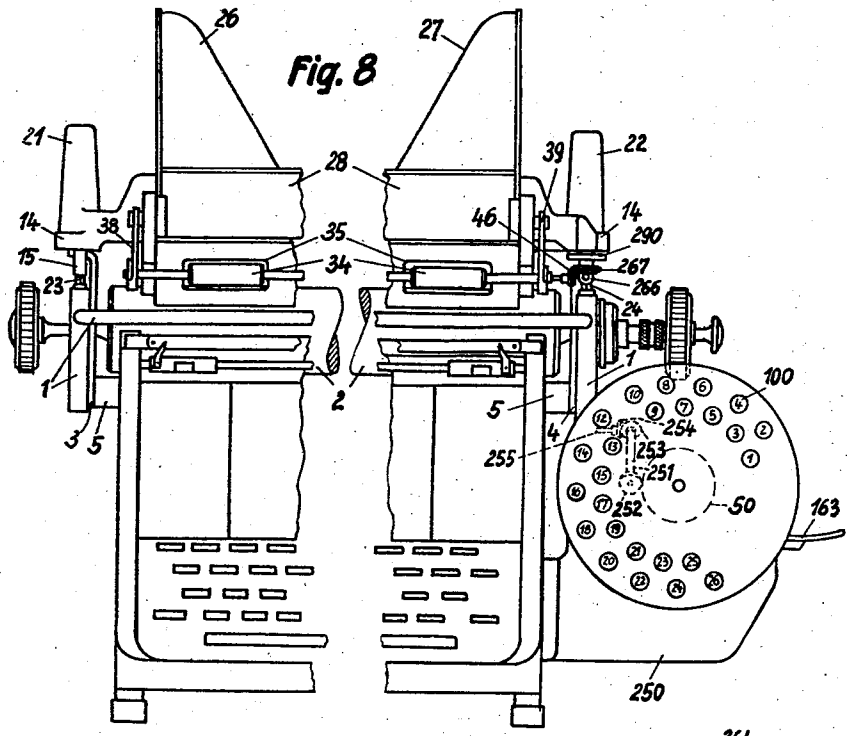


Fig. 12

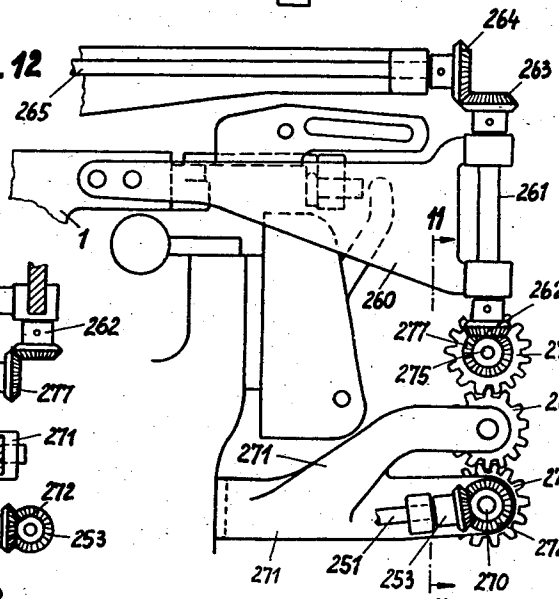
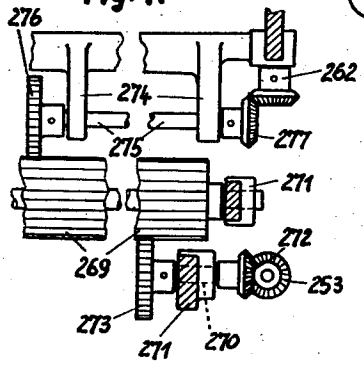


Fig. 11



Inventors
W. Kniehahn
H. Geiser
H. Schüler
R. Gerth
R. Witt

By Atty

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 7

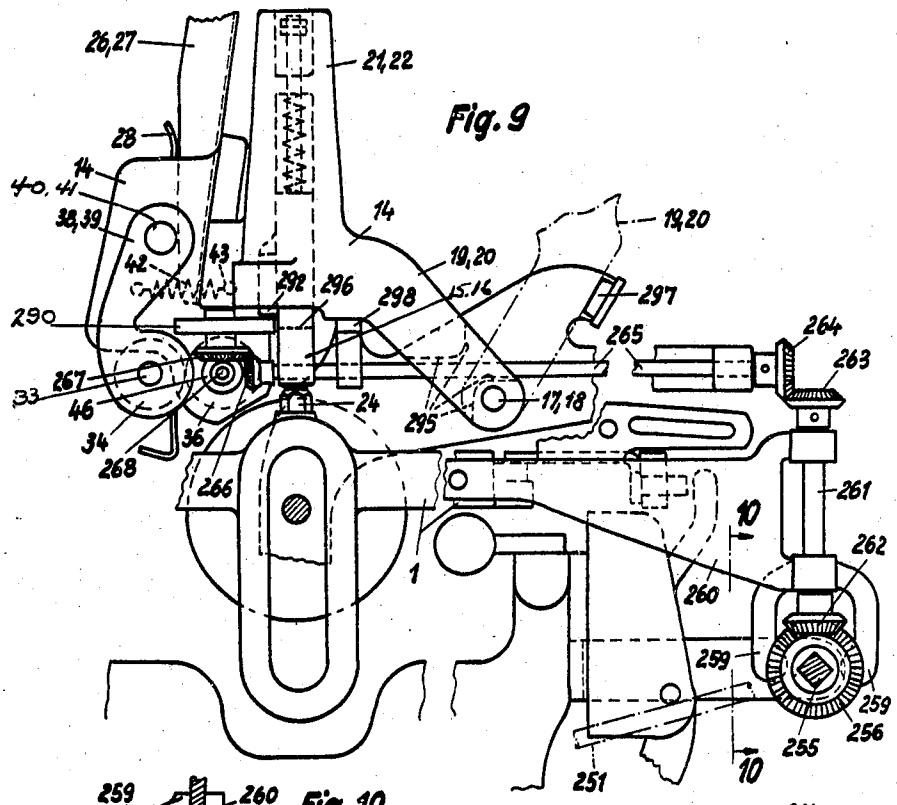


Fig. 9

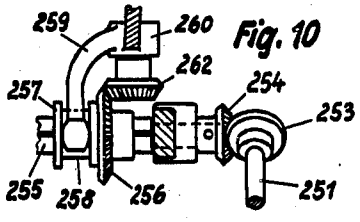


Fig. 10

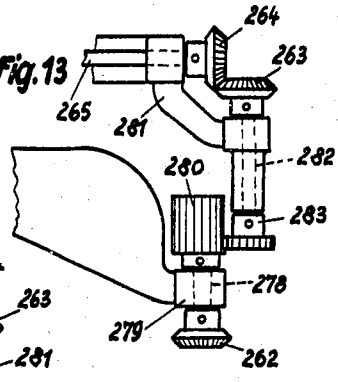


Fig. 13

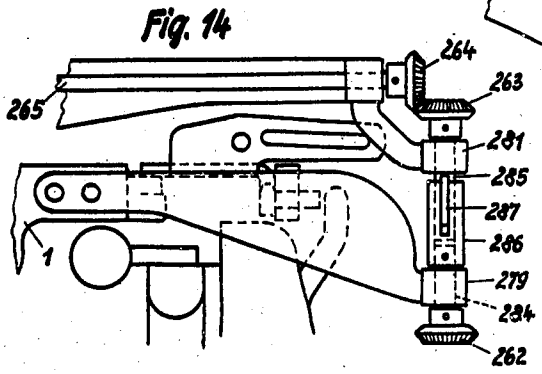


Fig. 14

Inventors

W. Kniehahn

H. Geiser

H. Schüler

R. Gerth

R. Witt

By [signature]

Att'y

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 8

Fig. 15

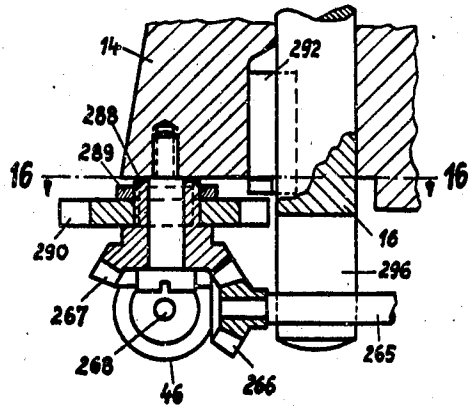


Fig. 16

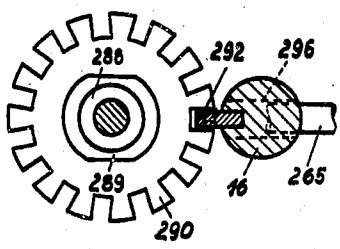
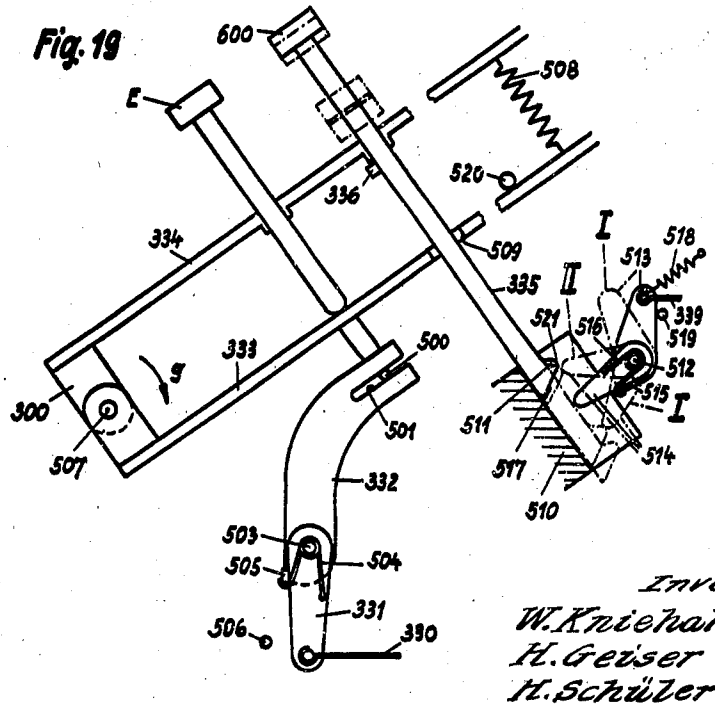


Fig. 19



Inventors

W. Kniehahn

H. Geiser

H. Schüler

R. Gerth

R. Witt

By Attorneys

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 9

Fig. 17

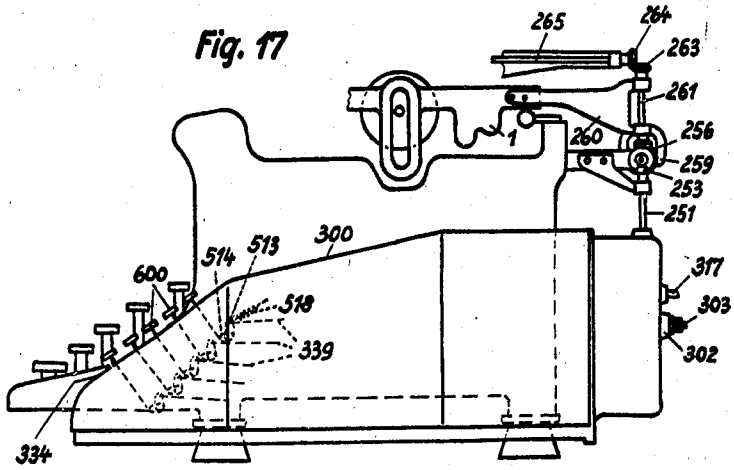
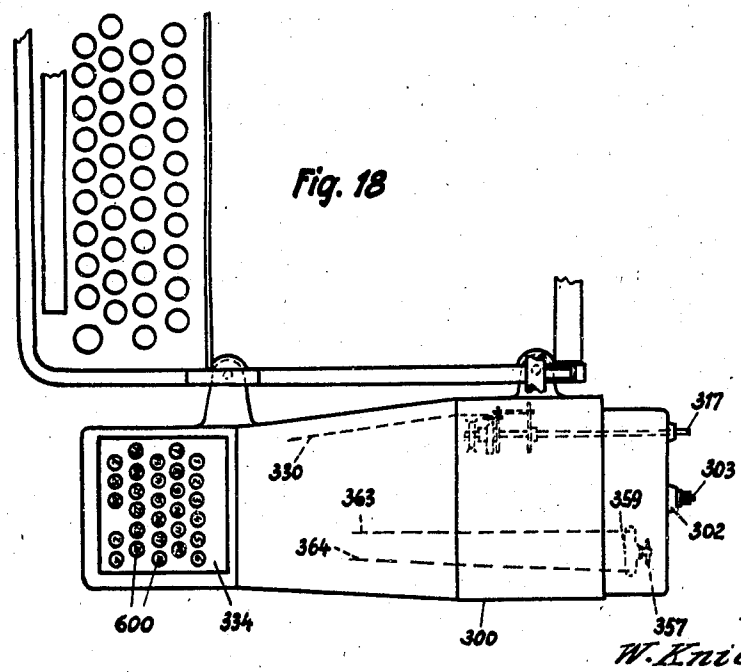


Fig. 18



Inventors
W. Kniehahn
H. Geiser
H. Schüler
R. Gerth
R. Witt

By Attorneys

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 10

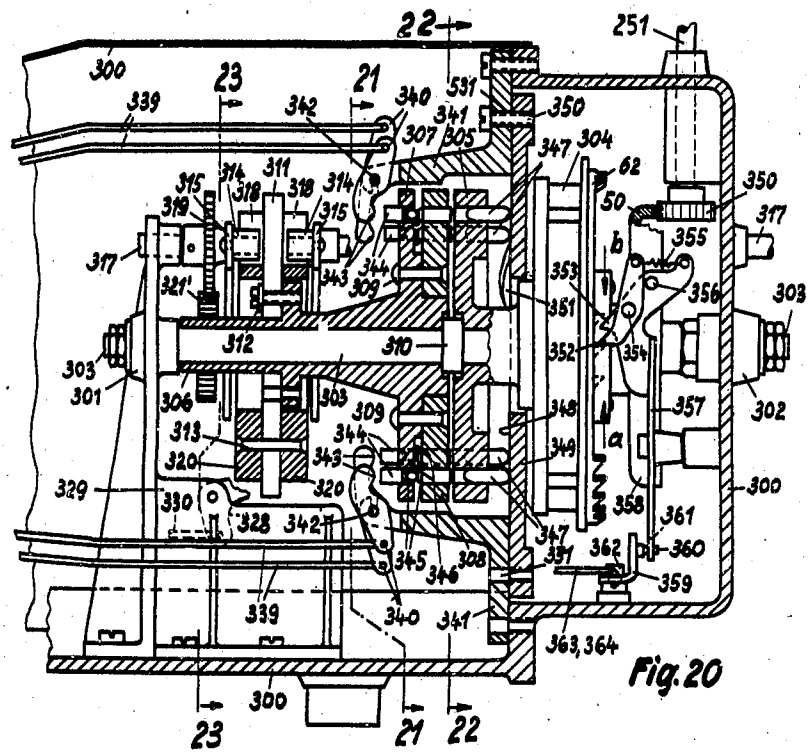
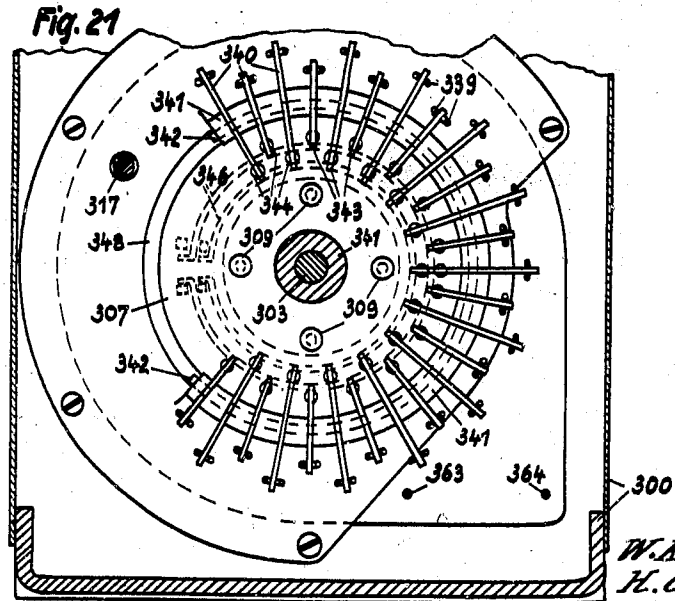


Fig. 20

Fig. 21



Inventors
W. Kniehahn
H. Geiser
H. Schüler
R. Gerth
R. Witt

By [signature] Att'y

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 11

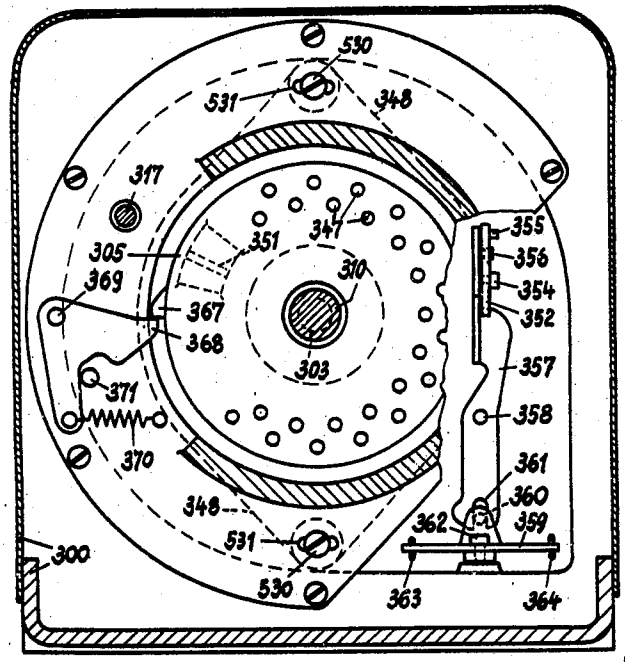


Fig. 22

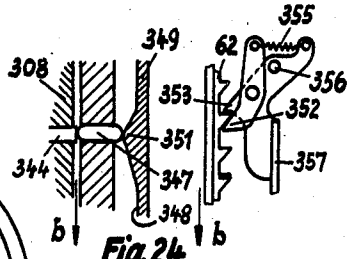


Fig. 24

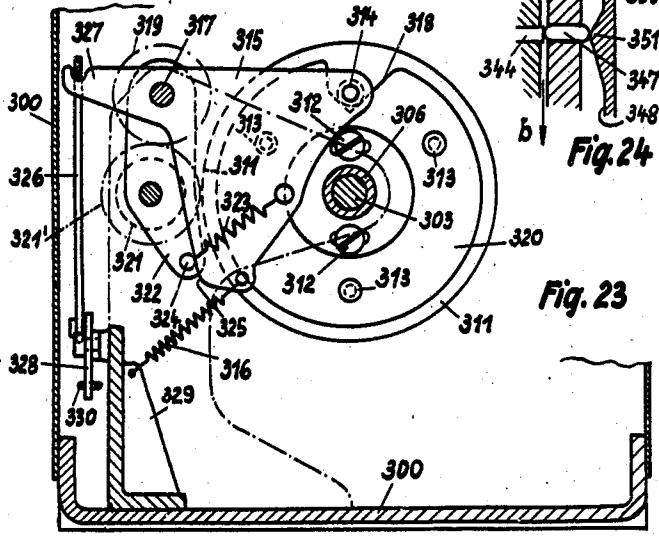


Fig. 23

Inventors
W. Kniehahn
K. Geiser
K. Schüler
R. Gerth
R. Witt

By Atty.

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 12

Fig. 25

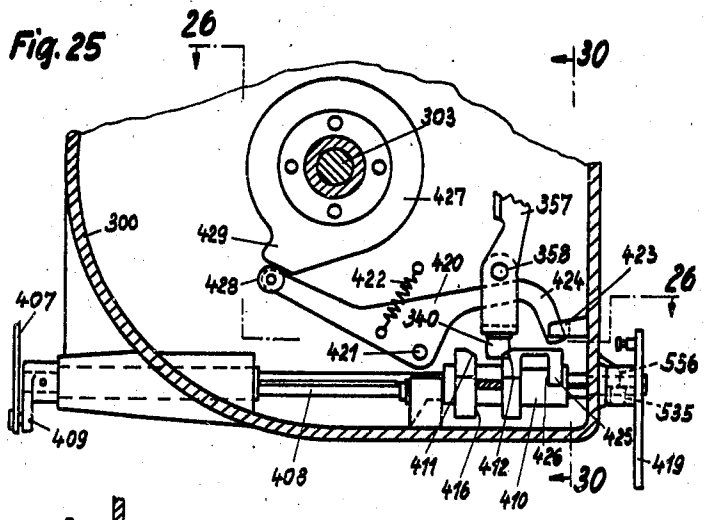


Fig. 30

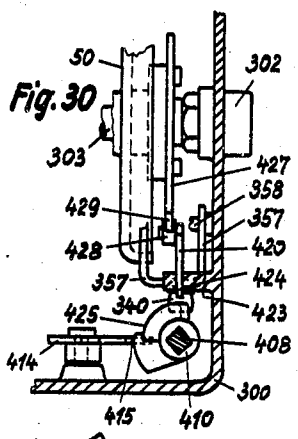
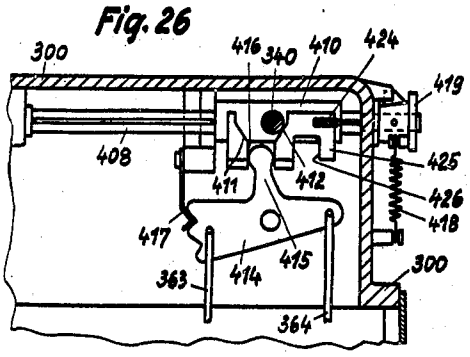


Fig. 26



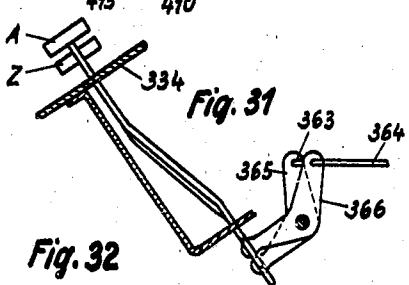


Fig. 31

Fig. 32

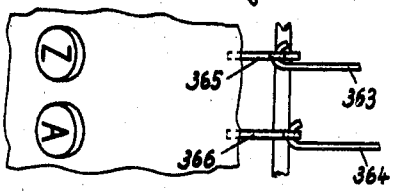


Fig. 27

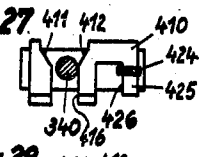


Fig. 28

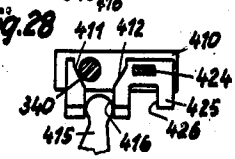
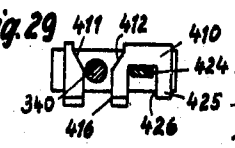


Fig. 29



Inventors
W. Kniehahn
H. Geiser
H. Schuler
R. Gerth
R. Witt

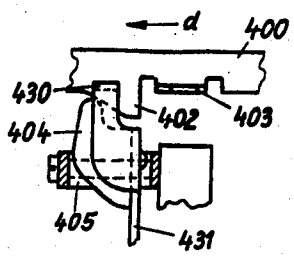
By [signature]
Att'y.

June 6, 1944. W. KNIEHAHN ET AL 2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Filed Nov. 25, 1940 13 Sheets-Sheet 13

Fig. 34



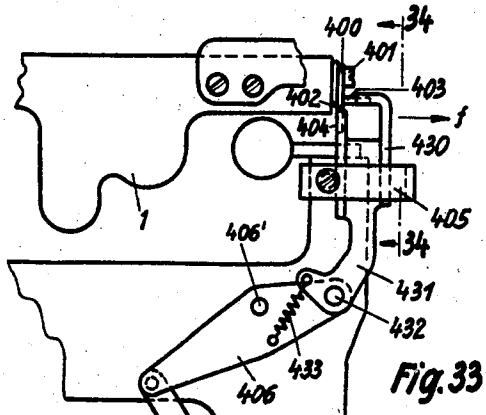


Fig. 33

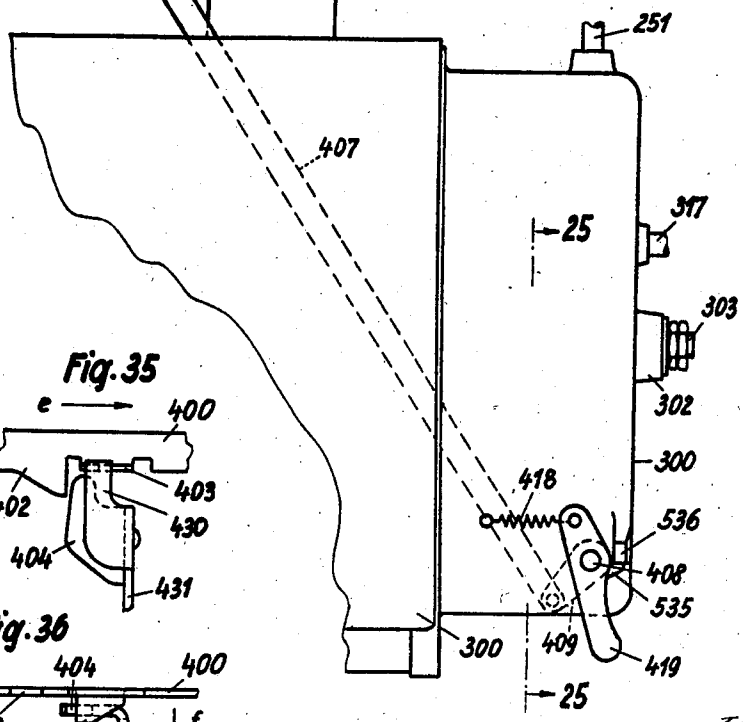
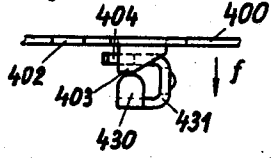


Fig. 35

Fig. 36



Inventors

W. Kniehahn
H. Geiser
H. Schüler
R. Gerth
R. Witt

By Allen & Coombs Att'y.

Patented June 6, 1944

2,350,773

UNITED STATES PATENT OFFICE

2,350,773

DEVICE FOR AUTOMATICALLY INSERTING AND ADJUSTING SHEETS OF PAPER IN TYPING OR PRINTING MACHINES

Werner Kniehahn and Hans Dietrich Geiser, Chemnitz, Hugo Schüler, Siegmar-Schonau, Rudolf Gerth, Wittgensdorf, near Chemnitz, and Raimund Witt, Chemnitz, Germany; vested in the Alien Property Custodian

Application November 25, 1940, Serial No. 367,134
In Germany November 29, 1939

10 Claims. (Cl. 197—127)

The invention relates to a device for automatically inserting and adjusting sheets of paper in typing or printing machines which are equipped with a number of actuating elements for the desired positioning of the paper sheets to be inserted.

By such arrangements sheets of paper are to be pushed forward from the front side of the typing or printing machine, for instance, to a position in front of sheets already previously inserted and wound about the platen, and certain lines of the paper sheets are to be brought into position for typing.

The invention has for its object to ensure an automatic easy insertion of the sheets of paper securely and rapidly and with as little manipulation as possible.

The invention consists in that each actuating element is in operative connection with means for starting the drive and for initiating the inserting movement of the device and with limiting elements adapted to be adjusted into and out of the effective position, so that when an actuating element is actuated the drive of the device is started and the inserting movement initiated, and also the means are brought into operative position which automatically interrupt the inserting movement when the paper sheets have reached the adjusted position corresponding to said actuating element.

Several embodiments of the invention in application to a typewriting machine are illustrated in the accompanying drawings, in which

Fig. 1 shows in front elevation one form of construction,

Fig. 2 is a top plan view of Fig. 1,

Fig. 3 shows the construction of a selecting and driving device in elevation and partly in section,

Fig. 4 is a part section on line 4—4 of Fig. 3,

Fig. 5 is a side elevation of the arrangement shown in Fig. 3 partly in section on line 5—5,

Fig. 6 shows a detail of the selecting arrangement,

Fig. 7 shows another detail,

Fig. 8 shows in front elevation a second embodiment of the invention on a typewriting machine,

Fig. 9 is a part side elevation of Fig. 8 on larger scale,

Fig. 10 shows a detail in section on line 10—10 of Fig. 9,

Figs. 11 and 12 are elevations of a gear connection,

Figs. 13 and 14 show two different forms of construction of another gear connection,

Figs. 15 and 16 show in two elevations a locking device for the conveying rollers,

Fig. 17 shows in side elevation another embodiment of the invention mounted on a typewriting machine,

Fig. 18 is a top plan view of Fig. 17,

Fig. 19 shows a key arrangement of the device shown in Figs. 17 and 18,

Fig. 20 is a vertical longitudinal section through the rear part of a selecting device of other construction,

Fig. 21 is a section on line 21—21 of Fig. 20,

Fig. 22 is a section on line 22—22 of Fig. 20,

Fig. 23 is a section on line 23—23 of Fig. 20,

Fig. 24 shows a detail of Fig. 20 in diagrammatic view,

Fig. 25 is a section through the rear lower part of the selecting arrangement on line 25—25 of Fig. 33,

Fig. 26 is a section on line 26—26 of Fig. 25,

Figs. 27, 28, 29 show different positions of individual elements of the arrangement according to Fig. 25,

Fig. 30 is a section on line 30—30 of Fig. 25,

Fig. 31 is a side elevation of a key arrangement,

Fig. 32 is a top plan view of Fig. 31,

Fig. 33 shows in side elevation the rear part of a typewriting machine and of the selecting device on an enlarged scale,

Figs. 34, 35, 36 show a detail according to Fig. 33 in different operating positions.

In the figures of the drawings only those parts of the typewriting machine are shown which are essential for the present invention. This typewriting machine is equipped as usual with a paper carriage shiftable in longitudinal direction on the machine frame. The paper carriage consists in known manner of a main carriage frame part and of a case shift frame. The part chiefly consists of the stationary frame 1. The case shift frame is formed chiefly by two side plates 3 and 4 rigidly connected the one with the other near the lower ends by a cross stay 5. In the case shift frame the platen 2 is rotatably mounted. Two paper guides 7, 8 for the paper sheets to be placed around the platen 2 are provided underneath the platen 2 on the case shift frame of the paper carriage. The paper guides may be equipped with guide rollers 9 for the paper. The paper guides can be swung away from and against the platen 2 by means of levers 10, 11 fast on a connecting shaft 12. The paper guides 7, 8 extend towards the rear around the platen 2 and continue upwardly behind the platen to form a paper table or carrying plate 13 for the paper

sheets. The case shift frame of the paper carriage carries a rocking frame 14 supported at both sides of the paper carriage by two pins 15, 16, and pivoted to the side plates 3 and 4, at 17 and 18. This rocking frame includes rearwardly extending arms 19 and 20 for the pivots 17 and 18, and vertically extending, hollow casings 21, 22, for the gauge pins 15 and 16. The frame 14 may be arranged so that it can be oscillated away from and toward the paper carriage about the pivots 17 and 18 provided on arms 19, 20 which have corresponding bores. In its position of rest shown in Figs. 1, 8 and 9, the frame 14 rests with the ends of the pins 15, 16, which are resiliently held by springs accommodated in casings 21, 22 as indicated in Fig. 9 and pressed downwards, on parts 23, 24 of the main carriage frame 1 of the paper carriage, said parts being adjustable for instance by means of screws. When the frame 14 rests on the paper carriage, the pins 15, 16 are pressed into the casings 21, 22 by the weight of the frame and of the elements mounted on the same, so that the cushioning springs (unnumbered) encircling the pins 15 and 16 within their respective hollow casings 19 and 20, will be placed under tension. These springs serve to balance as far as possible the weight of the rocking frame 14 and of the elements on said frame, in order that at the case shifting of the typewriting machine, for instance for typing capital characters, the lifting of frame 14 is facilitated.

Paper guiding means 26, 27, 28 constituting a front feed paper chute, are arranged on the transverse carrier or cross stay 25 on frame 14, as shown in Fig. 2, and form a funnel for the paper sheets S to be inserted. The two angular paper guides 26 and 27 are guided, shiftable in longitudinal direction, on the cross stay 25 by means of slidable pieces 29, 30 and can be secured by means of screws 31, 32 in any desired position as corresponds to the width of the paper sheets to be inserted. The paper guide bar 28 extends over the whole width of frame 14 and constitutes a part of the means for facilitating the insertion of paper sheets. The bar 28 is preferably made of transparent material in order that the matter formerly typed on the paper sheets held in the machine remains visible as much as possible during the typing of other lines; or only a portion of bar 28, for instance the upper portion, may be made of transparent material.

A shaft 33, journaled in frame 14 underneath the paper guiding elements 26, 27, 28, carries several feed rollers 34. These feed rollers 34 extend through recesses 35 in the lower portion of the paper guide bar 28 and cooperate with feed rollers 36 mounted on a shaft 37 parallel to shaft 33, the ends of said shaft 33, Fig. 9, being journaled in arms 38, 39. The shafts 33 and 37 are arranged parallel to the axis of the platen 2. The arms 38, 39 are oscillatably mounted on the frame 14 about pivots 40, 41 and are permanently pulled against shaft 33 by springs 42 the other ends of which are anchored at 43 to the rocking frame 14, so that the feed rollers 34 and 36 are normally pressed the one against the other. By turning by means of a handle 45 a shaft 44 journaled in the frame 14 above the feed rollers 34, 36, said shaft acting simultaneously on both arms 38, 39 by means of cam-like parts, the arms 38, 39 can be swung back against the action of springs 42, whereby the feed rollers 34 are lifted off the rollers 36.

The shaft 33 is extended beyond its right hand bearing, as shown in Figs. 1 and 2, and carries on its right hand end a bevel wheel 46 which meshes with a bevel wheel 47, Figs. 1, 2 and 3.

The bevel wheel 47 is driven, through the intermediary of a shaft 48, as shown in Fig. 3, a bevel wheel 49, a large bevel wheel 50 and a bevel wheel 51, shown in Fig. 4, by means of a clutch 52 and bevel wheels 53, 54 from an electromotor 55 or from another source of power the number of revolutions of which can be transmitted into slow rotation by a gear, not shown, for instance a worm gear, accommodated in a casing 56. If shaft 33 is driven from the electromotor 55 by the gear elements stated above, the feed rollers 34, during their rotation, revolve the feed rollers 36 bearing against them, and a paper sheet inserted into the paper guiding funnel 26, 27, 28 is gripped by the rollers and inserted into the machine, until the electromotor 55 is stopped and thereby the inserting movement is interrupted. In order that the paper sheets can be inserted into the machine to a predetermined point, for instance to a certain line, a selecting arrangement is provided by which the just mentioned problem can be solved.

In a casing 57, shown in Figs. 3 and 4, which is fixed by means of connecting parts 558, 559 for easier attendance of the device preferably at the right hand side, on frame 14, or may even form the right hand part of this frame, the end 59 of an axle 58 is fixed by screw-threads and counter-nut 60. A hub 61 is freely rotatable on this axle, and a bevel wheel 50, a ratchet-wheel 62 and a winding drum 63 are rigidly connected with this hub. A helical spring 64 is wound around the drum 63 one end of this spring being fixed at 65 to the casing 57 and the other end at 66 to the drum, said helical spring being put under tension or de-tensioned according to the direction of rotation of the drum. A spring motor 63 to 66 is formed by this spring arrangement and acts upon the bevel wheel 50 and the ratchet-wheel 62 in a direction opposite to that in which the motor 55 tends to drive these elements. The spring motor 63 to 66 acts, through the intermediary of the bevel wheel 50 and the already mentioned transmission elements 49, 48, 47, 46 and 33, upon the feed rollers 34, 36. The electromotor 55 therefore drives the feed rollers 34, 36 in the direction in which they insert the paper sheets into the machine, whereas the spring motor 63 to 66 tends to rotate the feed rollers 34, 36 in the direction of removing the paper sheets from the machine. The driving connection between the feed rollers 34, 36 and the electromotor 55 can be established and interrupted by the clutch 52. The clutch 52 is a claw clutch in the form of construction shown and permits of the claw sleeves acting the one on the other only in one direction of rotation. This is ensured by the toothed formation of the claws as shown in Fig. 4, this formation effecting a ready engagement of the clutch in any mutual turning position of the clutch-sleeves. One of the clutch-sleeves is preferably made in one piece with the bevel wheel 51 and mounted loosely turnable on shaft 67 which itself is revolvably mounted at 68 and 69 in the casing 57. The other clutch-sleeve is coupled for turning with the shaft 67 by a pin-slot connection 70, 71 and can be shifted on the shaft 67 according to the length of the slot 71 and thereby engaged with and disengaged from the other clutch-sleeve. The shiftable clutch-sleeve has an extension with two flanges 72 between which a roller 73 is gripped, which is mounted on one end of a clutch-shifting lever

74 so that it can loosely turn. The clutch-shifting lever 74 is constructed in the example shown as an elbow lever oscillatable about a bolt 75 in a bearing part 76 in the casing 57. A spring 77 wound around bolt 75 and bearing at one end on the casing 57 and at the other end on the elbow lever 74 continually tends to oscillate this elbow lever 74 in anticlockwise direction as shown in Fig. 4, i. e. in a direction to close the clutch 52. A second arm of the elbow lever 74 carries a pressure element or foot 78 which acts upon a blade spring 79, when the lever 74 is oscillated by the spring 77. The blade spring 79 carries at its end a contact piece 80, which cooperates with a contact piece 81 on the end of a second blade spring 82. The rear ends of the two blade springs 79 and 82 are connected with the cables for the electromotor 55 and are securely mounted, by means of plates 83 of insulating material and by screws 84 suitably spaced, in the casing 57, so that when the device is in inoperative position the contact pieces 80, 81 are at a certain distance the one from the other and the supply of current is interrupted. If the elbow lever 74 is oscillated by the spring 77, the pressure element 78 presses on the blade spring 79 and bends the same towards the spring 82 until the contact pieces 80, 81 contact. In order to hold the elbow lever 74 in opposition to the action of spring 77 during the inoperative position of the device, in a position in which the contact at 80, 81 remains opened, a locking element 85 is provided which is oscillatable about a pivot 86 on an arm 87 of the casing 57. This locking element 85 can bring its nose 88 in front of a lug 89 of the elbow lever 74 and thus prevent the lever 74 from being oscillated by the spring 77. A spring 90, one end of which is fixed on the locking element 85 and the other end on the elbow lever 74, tends to hold the locking element 85 in the locking position, in which the nose 88 comes to lie under the lug 89. The locking element 85 is brought under the action of the spring 90 into the locking position, as soon as at the oscillation of the elbow lever 74 in clockwise direction the left hand edge of lug 89 has passed beyond the right hand side face of the locking nose 88. The unlocking occurs when the locking element 85 is oscillated in opposition to the tension of spring 90 so far, that the lug 89 slips off the locking nose 88. This oscillation in the form of construction shown is derived from an adjusting element 91, for instance a sleeve shiftable on the axle 58, which sleeve by a flange 92 engages on a nose 93 on the locking element 85, so that the locking element or latch can be unlocked as desired when the sleeve 91 is shifted. The sleeve 91 is controlled by a spring 94 which bears against the covering hood 95 fixed on the axle and holds the sleeve 91 in its position of rest as shown in Fig. 4.

Means are provided to enable the sheets of paper to be inserted or injected down the front feed chute various distances to bring a desired working line on the paper to the printing line, and vice versa, to effect the ejection of the sheet upwardly out of the paper chute, to bring successive writing lines to the printing lines of the platen.

Or the sheet of paper may be ejected from between the feed rolls 34, 36 at one continuous ejecting operation.

A single means under control of the operator, enables the operator to eject the sheet step by step, or in one operation, as desired. Key levers 97 are arranged about the axle 58 for instance on a common bearing wire 98 and oscillatable in radial slots of an annular bearing body 96. The bearing body 96 is connected with a cover plate 99 of the casing 57 or made in one piece with this cover plate. The key levers carry each an actuating key 100 which keys are numbered with figures corresponding to the lines to be typed on the paper sheets. In order that a greater number of keys 100, for instance 26, may be accommodated without the necessity of making the keys too small, they are arranged in the present instance alternately displaced along the circumference of two circles having the same centre. The key levers 97 which are consequently of different length are extended beyond the bearings 96, 98 and their inner ends 101 engage on the flange 92 of sleeve 91. The depressing of a key 100 causes shifting of the sleeve 91 in opposition to the action of spring 94, and therefore also shifting of the nose 93 of the locking element 85 by means of the flange 92. The locking element 85 is then oscillated in anti-clockwise direction to free the clutch-shifting lever 74 for operation, and the device is operated by the elements 77, 74, 80, 81, 52. The spring 94 tends to return into their normal not depressed position, by means of elements 91, 92, the key levers 101, 97 and with the same the keys 100.

Under each key lever 97 a stop pin 102 is arranged which is supported and guided in a bore of the cover plate 99 and of the guide plate 103. These bores and also the stop pins 102, according to this form of construction, are arranged along the circumference of a circle, the centre of which is in the axle 58. A pressure spring 104 is laid, between the plates 99 and 103, around each stop pin 102 and bears at the one end against the plate 103 and at the other end against a flange 105 of each stop pin 102, and therefore, tends to pull back the stop pin 102 into its guide bore in plate 103 and to move it towards the key lever 97. This movement is stopped when the flange 105 comes to bear against the inner side of the cover plate 99. When the stop pins 102 are in the inoperative position, as shown in Fig. 4, they are moved towards the key levers 97 so far, that the ends of the stop pins 102 remote from the key levers are pulled back completely or almost completely into the bores in the plate 103. The other ends of the stop pins 102 bear at the same time against the under sides of the key levers 97 and thereby hold these in the inoperative position shown in Fig. 4. Locking levers 106 are mounted on a common bearing wire 108 in radial slits of a ring-shaped bearing body 107 provided on the inner face of the cover plate 99. The bearing body 107 may be made, same as the bearing body 96, in one piece with the plate 99 or fixed on this plate in any suitable manner. One locking lever 106 is coordinated to each key lever 97. Each locking lever 106 is pushed into the locking position by a spring 109, which at one end engages on the locking lever 106 and at the other end on the inner end 101 of the corresponding key lever. The locking levers 106, which in this form of construction are elbow levers, bear with the end faces 116 of their hooked ends 110 against ears 111 of the corresponding key levers which are in the position of rest, and their other ends 112 are pulled by the action of springs 109 against a flange 113 of a sleeve 114 shiftable in longitudinal direction on axle 58.

If a key 100 is depressed, the key lever 97 of this key shifts the corresponding stop pin 102

against the action of the spring 104 in the slots of the plates 99 and 103 so that the end of stop 102 remote from the key lever 97 projects from the guide bore in the plate 103. At the same time the inner end 101 of the key lever shifts sleeve 91 against the action of spring 94, whereby the locking element 85 is disengaged and the elbow lever 74 liberated. The elbow lever 74 then closes under the action of spring 77 the contacts 80, 81 and the clutch 52. The fork shaped end 115 of the elbow lever 74 engages over the flange 113 of sleeve 114 and shifts this sleeve, when the elbow lever is oscillated at the closing or opening of the contacts 80, 81 and of the clutch 52. By this shifting of sleeve 114, the flange 113 is moved away from the inner ends 112 of the locking elements 106, which, as mentioned above, rest on the same when the device is in the inoperative position. As by the depressing of a key lever 97 the ear 111 is at the same time moved by such a distance that it slips off the end face 116, the locking element 106 belonging to the corresponding key lever 97 can then follow the pull of spring 109 and oscillate in clockwise direction, as shown in Fig. 4, whereby the locking hook 110 engages over the ear 111 and securely holds the key lever 97 in the depressed position. The other end 112 of the locking element 106 has again come into contact with the flange 113 of the shifted sleeve 114 when this locking element oscillates.

The following arrangement is provided for stopping the device at the actually desired point.

On the ratchet-wheel 62 a two-armed intermediate lever 117, as shown in Figs. 3, 4 and 7, is oscillatably mounted on a bolt 118. An angle piece 119 is also fixed on the ratchet-wheel 62, for instance by rivets 120, and carries a two-armed lever 122 oscillatable about a bolt 121. The intermediate lever 117 and the two-armed lever 122 permanently operate together. As a result, the end 123 of lever 117 always is in contact with the end 124 of lever 122, for instance by the action of a spring, so that the movement of the lever 122 is obtained and influenced by the movements of the lever 117. The other end 125 of lever 117 is arranged so that, when the ratchet-wheel 62 rotates, this end 125 sweeps along the inner face of the guide plate 103. The end 125 of lever 117, which may have a concavity 126 adapted to the cross-section of the stop pins 102, comes to bear against a stop pin 102 when the pin projects from a guide bore of plate 103, so that it can no longer rotate together with the ratchet-wheel 62, and the lever 117, whose bearing bolt 118 continues to move with the ratchet-wheel 62, is oscillated. At this oscillation the end 123 of lever 117 presses against the end 124 of lever 122 and causes the other end 127 of this lever 122 to press against the flange 128 of sleeve 114, so that this sleeve 114, which at the starting of the device has been shifted by the forked end 115 of the elbow lever 74 on the axle 58 towards the sleeve 91, is then shifted in opposite direction. During this shifting, the clutch-shifting lever 74, by means of its forked end 115, is drawn along as well as the locking element 106, by means of its end 112, is turned in opposition to the pulling direction of spring 109. The oscillating of lever 74 effects in the manner already described opening of the clutch 52 and interruption of the contacts at 80 and 81, whereupon the locking element 85 engages and secures the device in the disengaged position. By the already mentioned simultaneous turning of the locking engagement element 106, the locking between the elements 111, 110 is released, whereupon the corresponding key lever 97 again moves back into its position of rest under the influence of the springs 94 and 109. The stop pin 102 coordinated to the key lever is liberated hereby and also moves into the inoperative position under the influence of its spring 104, in which position it is pulled back into its guide bore in the guide plate 103 and thus brought out of the path of the end 125, 126 of the intermediate lever 117. From the foregoing explanations can be seen that in this form of construction a key 100 of the machine which has been depressed at the starting of the device is maintained depressed, until the lever 117 has reached the position corresponding to the corresponding stop pin 102 and that the intermediate lever 117, upon its arrest automatically cuts out the communication of power to the paper feed rolls 34, 36, and the corresponding key 100 can again jump back from the depressed position into the position of rest.

When the clutch 52 is open, the spring motor 63 to 66 tends to rotate the bevel wheel 50 and with the same, through the intermediate elements 49, 48, 47, 46, also the shaft 33 and the feed rollers 34 and 36, namely, as already explained, in the direction opposite to the direction of the electromotor-drive. Consequently, when the clutch 52 is opened, a retrograde movement of the feed devices would start, which would expel from the machine the paper sheet which has just been introduced into and adjusted in the machine. To prevent this, the ratchet-wheel 62 is provided, which cooperates with a pawl lock. The pawl lock is arranged in this form of construction on a separate manually operable spacing lever or element 150, as shown in Fig. 7, which is oscillatably mounted on a bolt 151 in the casing 57. The pawl lock, which is shown alone in Fig. 7, comprises a fixed pawl 152 and a loose pawl 154 oscillating about a bolt 153 controlled by a spring 155. An intermediate piece 157, 159 oscillatable around bolt 156 acts upon the loose pawl 154 and tends to oscillate the same under the pull of a spring 158 in the same direction as the spring 155 does. This intermediate piece 157, 159, the part 157 of which bears against the back of the loose pawl 154, and the part 159 of which piece bears against the line-space controlling element 150, limits the oscillation of the loose pawl 154. The line-space controlling element 150 can be oscillated from and to its normal intermediate position in anticlockwise direction, Fig. 3, about the bolt 151, in opposition to the action of the spring 160 fixed at the one end on the casing 57 and at the other end on the line-space controlling element 150, until the edge 161 of the line-space controlling element 150 strikes against a bolt 162 mounted on the casing 57. Normally, i. e. in the position of rest of the line-space controlling element 150 shown in Fig. 3, the loose pawl 154 meshes with the teeth of ratchet-wheel 62 and keeps locked this ratchet-wheel in opposition to the drive of the spring motor 63 to 66. If the ratchet-wheel 62, when the device is driven by the electromotor 55, is turned to tension spring 64 of the spring motor 63 to 66, the backs of the teeth of the ratchet-wheel 62 moving over the back of the loose pawl 154 oscillate this loose pawl 154, so that the ratchet-wheel 62 moves freely past the pawl lock.

The spring motor 63 to 66 has a tendency to oscillate by means of one of the teeth of the

ratchet-wheel 62 the loose pawl 154 in opposition to the action of the springs 155 and 158 until the part 159 of the intermediate element 157 comes to bear against the line-space controlling element 150 and prevents further rotation of the ratchet-wheel 62, as shown in Fig. 7. If then by means of a handle 163 the line-space controlling element 150 is oscillated in anticlockwise direction until it bears against a bolt 162, the loose pawl 154 again comes out of engagement with the ratchet-wheel 62. The fixed ratchet tooth 152 engages at the same time into the teeth of the ratchet-wheel 62, i. e. in the next following gap between teeth, and stops the rotation of the ratchet-wheel 62, and with the same the movement of the whole inserting device, after a short travel up to the next following tooth of the ratchet-wheel. In the meantime the loose pawl 154 has been oscillated by the action of springs 155, 158 so that the loose pawl 154 lies just behind the fixed ratchet tooth and engages, when the line-space controlling element 150 is turned back into the position shown in Fig. 3, in the same gap between teeth from which the fixed ratchet tooth 152 has just been removed. The ratchet-wheel 62 then carries out a short rotation in the course of which the loose pawl 154 is again oscillated by a tooth of the ratchet-wheel until the arm 159 of the intermediate element 157 comes to bear against the line-space controlling element 150 and prevents a further oscillation of the loose pawl 154 and a further rotation of the ratchet-wheel 62. A feeding operation of the pawl ratchet gear is thus terminated. During this feeding operation the ratchet-wheel 62 has been able to rotate by one circular step. To this rotation of the ratchet-wheel 62 by one circular step corresponds a rotation of the paper feeding arrangement by one line spacing in the direction of ejection of an inserted paper sheet. On the inserted sheet the next lower line comes thereby into the position for typing. If, however, the feeding has not to be by only one spacing between lines, but the inserted sheet has to be completely ejected from the machine, the ratchet-wheel 62 has to be freed from the action of the pawl feed gear, in order that following the pull of the spring motor 63 to 66 it can be moved back into the initial position. In this initial position the ratchet-wheel 62 is stopped by an abutment 210 fixed on it as shown in Fig. 5, which abutment strikes against a spring 211 preferably composed of a number of lamellas. The spring 211 is fixed at 212 on the casing and upon contact of the abutment 210 with the free end of the spring 211, the spring flexes until it rests against a support 213 which prevents further bending of the spring 211 and thus finally limits the travel of the abutment 210. By the spring 211 is effected that the shock is damped which occurs when the moved elements are stopped, so that damaging of elements cannot take place.

The releasing of the ratchet-wheel 62 is effected in that the two feed pawls 152, 154, by moving the line space escapement controlling element 150, oscillate in clockwise direction out of the range of the teeth of the ratchet-wheel 62. The line space escapement controlling element 150 is thus oscillated about its bolt 151 in clockwise direction until the edge 164 of an intermediate element 166 oscillatably mounted at 165 bears against the bolt 167 and prevents the further movement of the line space escapement controlling element 150. The backward movement of the line space escapement controlling element 150 is effected by a spring 168 of the intermediate element 166. This intermediate element 166 is then oscillated in anticlockwise direction until its arm 169 strikes against bolt 167 and its face 170 presses against the line space escapement controlling element 150 and returns the same into its inoperative position shown in Fig. 3.

The line space escapement controlling element 150 can be actuated not only by the handle 163, but also simultaneously by the usual line-adjusting arrangement of the machine. With this object in view a slide 171, Figs. 1 and 3, similar to the slide 243, Fig. 2, of the line feeding mechanism arranged on the left hand side of the paper carriage, as shown in Fig. 2, is provided on the right hand side of the machine on frame 14 or on the lower part of the casing 57, for instance by means of a pin and slot guiding on a plate 172, so that it can be shifted towards the platen 2 and away from the same. The slides 243 and 171 are shifted both together by the oscillation of one of the hand levers 240, 241 which are connected the one with the other by a rod 242. The slide 171, as shown in Figs. 3 and 6, carries on a bolt 174 an intermediate element 173 oscillatable about this bolt. By the oscillation of the intermediate element 173 by means of the handle 175 this intermediate element can be brought into two adjusting positions. In these two positions the intermediate element is secured by a safety device which may consist for instance of a ball 176 located in a bore 178 of the intermediate element 173 and, pressed down by a resilient plate 177 according to the adjusted position of the intermediate element 173, seats itself in one of two apertures 179 in the slide 171. In Fig. 6 a portion of ball 176 is visible through the bore 178. In order that the intermediate element 173 cannot be turned beyond the two adjusted positions, a bolt 200 provided on its lower side, projects into a recess 201 of slide 171 and in both adjusted positions bears against the one or other side wall of the recess 201. The intermediate element 173 has a wedge-shaped end with two side faces 180, 180'. According to the position to which the intermediate element 173 has been adjusted, either the face 180 or the face 180' comes, at the shifting of slide 171 at the line-feeding operation of either line-spacing lever 240 or 241, into contact with a roller 181 arranged on the downwardly extending arm of the line-space escapement controlling element 150. If then at the shifting of the intermediate element 173 for instance the face 180 comes into contact with roller 181, when the slide 171 is actuated at the line-feeding operation, it pushes the roller 181 to the left, as shown in Fig. 6. The line-space escapement controlling element 150 is thereby oscillated in clockwise direction, as shown in Fig. 3, until the face 164 of the intermediate element 166 bears against bolt 167. At this occasion, as above described, the pawl ratchet gear is completely disengaged from the teeth of the ratchet-wheel 62, wherefrom results a complete returning of the inserting device into the initial position, in which abutment 210 and counter-abutment 211, 213 touch the one the other and the inserted paper sheets have again been completely ejected.

At the cooperation of the face 180' of the intermediate element 173 in the other adjusting position of the same with the roller 181, a moving of the roller 181 towards the right takes place

at the line spacing operation, which causes an oscillation of the line-space escapement controlling element 150 in anticlockwise direction, until the face 161 of the same bears against the bolt 162 and, as already explained, a further rotation of the ratchet-wheel 62 by one tooth and by one line space of an inserted paper sheet. After the roller 181 has been shifted by the faces 180 or 180' respectively of the intermediate element 173, this element 173 is again oscillated back, together with the slide 171 by the action of a spring 182 fixed at the one end on said slide and at the other end on the plate 172 after the hand levers 240, 241 have been liberated, as shown in Fig. 2, for such a distance that the faces 180, 180' of the intermediate element 173 come out of the range of the roller 181, this being the position shown in Fig. 6. Hereby the possibility is given to the line space escapement controlling element 150 and consequently to the pawl ratchet gear to move back into their positions of rest, shown in Figs. 3 and 7, under the action of the springs 160 or 168.

The casing 57, in which the selecting- and feeding-arrangement described is preferably accommodated, is well closed by the already mentioned covering plate 99 and by covering hoods 183, 95, as shown in Figs. 1 to 4. The covering hoods 183, 95 may be fixed for instance on the covering plate 99 or on the axle 58. Only the elements material for the operation of the device, that is the key levers 97 with their keys 100 and the ends of the stop pins 102, project through the covering plate 99 and through the hood 183. The shanks of the key levers 97 slide in slits of the side wall of the covering hood 183, and the ends of the slits limit the movement of the keys. In the form of construction shown by way of example, selecting arrangement, inserting arrangement and source of power 55 are mounted on the rocking frame 14 adapted to be placed on the paper carriage 1, 2 and to be oscillated away from the same and removed. A compact and clear construction is thus obtained.

The effect of the device and the operation of the same take place as follows: If a paper sheet S has to be inserted into the machine and an entry on the same has to be made, for instance, on line 10, the lower edge of the paper sheet S, that is the line with the highest number at the left, is inserted into the front feed paper guiding funnel 26, 27, 28, the lower edge K of the paper sheet lying in front of the platen 2, and bearing against the contacting points of the feed rollers 34, 36, as shown in Fig. 1. If then the selecting key 100 is depressed, which carries the number "10" and corresponds to the tenth line of the inserted paper sheet, the locking element 85 is disengaged by the end of the key lever 101 through the intermediary of the sleeve 91, whereupon the clutch-shifting element 74, owing to the pull of the spring 77, closes the contact at 80, 81 and engages the clutch 52. The electromotor 55 drives then, by the intermediate elements 46 to 54, 33, the feed rollers 34, 36 and draws the paper sheet S into the machine. Simultaneously with the depressing of a key 100 the corresponding stop pin 102 is also shifted, as already described, to project its end into the path of the end 125, 126 of the intermediate lever 117. By the movement of the clutch shifting element 74, the sleeve 114 is shifted by the fork-part 115 of this element, and therewith the end 112 of the locking element 106 is liberated. After depressing of key 100, the head 110 of the locking element 106 engages and holds the key lever 97 and the engaged stop pin 102 in depressed position.

The inserting movement and therefore also the rotation of the ratchet-wheel 62 continues until the set stop pin 102 and the lever end 125, 126 come into contact the one with the other. Then, the lever 122 is oscillated by the lever 117 during a short further movement of the ratchet-wheel 62. Hereby the sleeve 114 is shifted into the position shown in Fig. 4, whereby also the clutch-shifting element 74 and the locking element 106 are brought into the position of rest, which means that the clutch 52 is opened, the contact 80, 81 is interrupted, the locking elements 88, 89 engaged and the locking elements 111, 110 disengaged. At this disconnection of the drive of the device and interrupting of the circuit, the depressed key lever 100, under the action of the springs 109, 94, and the set limiting pin 102, under the action of the spring 104, jump back into their inoperative positions. The paper feeding arrangement is thus cut out and held, by the action of the pawl locking mechanism 62, 152, 154, in the assumed position, in which the line 10 of the paper sheet S to be inserted is at the typing position. The inserting of paper sheet S into the paper guide 7 and 8 underneath the platen 2 is facilitated by resilient paper holding fingers 190, Fig. 1, mounted on the lower edge of the paper guiding chute plate 28, along which they are shiftable and thereby adaptable, as regards position, to the width of the paper sheet. If after the first entry on the paper sheet S in line 10, for instance a further entry has to be made in line 3, which lies higher up on the paper sheet S than line 10. The paper sheet must be shifted downwards into the paper guide. Therefore it is merely necessary to depress, after the first entry has been made, the key 100 with the number "3," whereupon in the manner already described the feed roll device is started again to feed the inserted sheet still farther downwardly, and automatically cut out by contact of the arm 125 of the front feed-arresting lever 117 with the stop pin 102 set by this key 3. During this additional front feed insertion of the paper sheet, the teeth of the ratchet wheel 62 ratchet past the locking pawl 154, idly rocking the pawl on the pivot 151. If, on the other hand, after typing in line 10 an entry has to be made in another line, for instance in line 22, which lies lower than line 10, to bring this line in writing position the paper sheet must be shifted upwards so many line spaces as exist between lines 10 and 22. A movement in this direction is ordinarily prevented by the locking pawls 152 and 154 respectively. Therefore these locking pawls by means of hand lever 163 or by means of the line feeding levers 240, 241 must be actuated to allow by their alternatively engaging the teeth of the ratchet-wheel 62 a line spacing movement. As the paper has to be fed by 12 lines, the above-said elements have to be actuated twelve times. The intermediate element 173 on the slide 171 must, as can be seen from that which has already been described, be adjusted for this feeding proceeding so that the inclined face 180' cooperates with the roller 181, providing the operator uses either of the line space feed levers 240, 241 to effect the step-by-step escapement of the pawl and ratchet mechanism 62, 152, 154.

According to a modified form of construction shown in Fig. 8, the selecting arrangement and the source of power are not mounted on the

paper carriage or on a frame 14 adapted to be removably attached to the paper carriage, but in a casing 250, fixed on the machine frame itself, for instance on the right hand side wall of the same. The load on the paper carriage is thus reduced and, on the other hand, an easier and more rapid manner of operation is possible for certain kinds of machines. The modified arrangement may be especially of advantage with very wide paper carriages, as the distance between the normal position of the hands of the typist on the keyboard of the typewriting machine and the selecting arrangement provided on the right hand end of the paper carriage is rather great, which would result in a time-requiring, fatiguing manner of operation of the selecting arrangement. The source of power, for instance an electromotor, not shown, is arranged on the machine frame itself or on the casing 250 of the selecting arrangement. From the wheel 50 a shaft 251 is driven, which extends obliquely upwards towards the rear side of the machine frame and carries two gear wheels 252, 253 at its two ends. The wheel 252 is in mesh with the wheel 50, whereas the other wheel 253 drives, through the intermediary of a wheel 254, a shaft 255 which is journaled on the rear side of the machine, as shown in Figs. 9 and 10, and extends parallel with the letter spacing direction of travel of the paper carriage. This shaft 255 is, for instance, four-cornered so that its rotation is transmitted to bevel wheel 256 shiftable along the shaft 255. The bevel wheel 256 has a spool-like hub 257, the groove 258 of which is engaged by the fork arms 259 of a bearing bracket 260 fixed on the paper carriage, said arms acting as followers. In the bearing bracket 260 a vertical shaft 261 is revolvably mounted, at the ends of which two bevel wheels 262, 263 respectively are fixed. The bevel wheel 262 meshes with the bevel wheel 256. The bevel wheel 263 on the other end of shaft 261 meshes with a wheel 264 which, by means of a shaft 265 and wheels 266, 267, 46, transmits the drive from the source of power to the shaft 268 on which the feed rollers 36 are mounted. Instead of the foregoing transmission train, the transmission of the driving movement could be effected by means of a grooved shaft and of a shiftable bevel wheel equipped with a slide key, or it may also, as shown in Figs. 11 and 12, be effected by a toothed cylinder 269. The toothed cylinder 269 is rotatably mounted on the rear side of the machine frame and extends in the direction of letter spacing movement of the paper carriage. From the toothed wheel 253 a shaft 270 is driven by a bevel wheel 272, said shaft being journaled in the part 271 of the machine frame and drives the toothed cylinder 269 by means of a spur wheel 273. A spur wheel 276, which is arranged on the paper carriage on a shaft 275 revolvable in bearing arms 274, meshes with the toothed cylinder 269 and transmits the movement of this cylinder to a bevel wheel 277, from which the bevel wheel 262 and the shaft 261 are driven. The transmission of the movement up to the front feed rollers 34, 36 may then be effected for instance in the manner illustrated in Fig. 9. During the movement of the paper carriage on the machine frame, the teeth of the spur wheel 276 slide continually in gaps between teeth of the toothed cylinder 269 which extend over the whole width of the machine frame. The driving connection between the source of power and front feed rollers 34, 36 remains therefore preserved in any position of the paper carriage.

The distribution of the gear elements may, however, be different from the form of construction shown. For instance the shaft 255 might be journaled on the paper carriage and, when this paper carriage travels on the machine frame, slide through a corresponding bore in a bevel wheel 256 rotatably mounted on the machine frame. The rotation of shaft 255 might then be conveyed by a spur wheel or bevel wheel keyed on one end of the shaft. The toothed cylinder might also be mounted, instead of in the machine frame, for instance on the paper carriage and mesh with a spur wheel rotatably mounted on the machine frame. Also in this instance the just engaging toothed parts of the cylinder and of the spur wheel would, during the travelling of the paper carriage, slide the one in the other in the direction of the parallel axes of the cylinder and of the spur wheel.

To enable a vertical or perpendicular case shifting movement of the case shifting frame and platen relatively to the main frame of the typewriting machine, the vertical shaft 261 of Fig. 9 may be formed as shown in Figs. 13 and 14. In this instance a shaft 278, journaled in a carrier 279 of the main frame of the paper carriage, carries at its lower end the bevel wheel 262 and at its upper end a large pinion 280. In a bracket 281 of the case shift frame of the paper carriage a shaft 282 parallel to the shaft 278 is journaled. This shaft 282 establishes the driving connection between the pinion 280 and the bevel wheel 264 by spur wheels 283, 263 mounted on its ends. At the case shifting of the machine, that is at the shifting of the elements 279, 281 the one towards the other in the direction of the parallel perpendicular shafts 278, 282, the teeth of wheel 283 slide in the gaps between teeth of the pinion 280, the width of which is greater than the length of the greatest case shifting travel of the paper carriage, so that the driving connection is ensured in any case shifting position of the machine. As shown in Fig. 14, a perpendicular shaft 284 is revolvably arranged, according to a modified form of construction, in the main frame 279 of the paper carriage and a shaft 285, coaxial with shaft 284, in the case shift frame 281 of the paper carriage. A clutch sleeve 286 having a longitudinal bore and slit in longitudinal direction is rigidly connected with the upper end of shaft 284. The lower part of shaft 285, which has a rib 287 engaging in the slit of the coupling device 286 slides in said bore at the case-shifting movement, at which the parts 278, 281 move the one relative to the other in the direction of the perpendicular coaxial shafts 284, 285. By the rib 287 and the slit of the coupling sleeve 286 the driving connection between the two shafts 284, 285 is ensured in any case-shifting position. These arrangements might, however, be omitted when the case-shifting is effected by type lever segments in which case the paper carriage parts and machine frame do not change their mutual position in perpendicular direction. In this instance the construction according to Fig. 12 may be selected.

In order to enable, in spite of the bevel wheel gears which produce the driving connections to the front feed rollers 34, 36, as shown in Fig. 9, an outward-oscillation of the carrying or rocking frame 14 about the pivots 17, 18,

a bevel wheel 267 is provided in the connection between the bevel wheel 46, keyed on the end of shaft 268, and the bevel wheel 266, said bevel wheel 267 meshing from above with the two wheels 46 and 266. If the rocking frame 14 is oscillated away from the case shift frame of the paper carriage by means of the elements 19, 20, 17, 18, the bevel wheel 267 is then lifted off the wheel 266 in upward direction and again brought into mesh with this wheel 266 when the rocking frame 14 is oscillated back into the effective position. It is desirable, that the front feed rollers 34, 36 do not shift during the outward oscillation of rocking frame 14 and when the same is in the oscillated position, in order that, at the subsequent oscillation of the rocking frame 14 into the working position shown in Figs. 8 and 9 so that the wheels 266, 267 cannot get out of meshing position, In order to maintain the wheels 266, 267 in the positions in which they can be lifted off the one from the other, that is in absolutely fitting mutual rotating position, a ratchet-wheel 290 is provided above wheel 267, as shown in Figs. 15 and 16, and rigidly connected with the hub of this wheel by means of screw thread 288 and nut 289, in the gaps between teeth of which ratchet-wheel 290 an extension of pin 16 engages or a wedge 292 mounted in this pin, as soon as, at the outward oscillation or lifting off of the rocking frame 14, the spring in the casing 22 shifts the pin 16 downwards. This locking of the ratchet-wheel 290 and thereby of the wheels 267 and 46 and of the front feed rollers 34, 36 is maintained until at the end of the inward oscillation of the rocking frame 14 into its effective position the pin 16, when striking on its counterbearing 24 on the paper carriage, is pushed back into its bore, and therefore the wedge 292 is pulled back in upward direction out of the corresponding gap between teeth of the ratchet-wheel 290. To avoid interference with the shaft 265 on the right hand side of the case shift frame of the paper carriage, the carrying arm 20, as shown in Fig. 9, has a recess 295, the walls of which extend, for instance like a hyperbola, so that in all positions of oscillation of the rocking frame 14 the free passage and the unimpeded movability of shaft 265 are ensured. Further also pin 16 may have in its lower portion a slit 296 to accommodate the shaft 265. In order to limit the oscillation of the rocking frame 14, a plate 298 on the one side and a plate 297 on the other side are provided on the case shift frame of the paper carriage for holding the arms 19, 20, as shown in Fig. 9.

In the embodiment of the invention illustrated in Figs. 17 to 36, the selecting- and feeding arrangement for the front feed rollers 34, 36 is accommodated in a casing 300 arranged for instance on the right hand side of the machine frame, which casing carries in its front part, besides the key section of the front feed control, a selecting key section, the keys of which are also numbered with the numbers of the individual lines on the paper sheets to be inserted into the machine, in the present instance with the figures 1 to 26. As Fig. 19 shows, a separate key E can be provided, besides the figure keys, serving for switching-in the power drive. The keys Z and A are in this form of construction of the invention substituted for the line-space controlling element 150 and the hand lever 163 of the same in accordance with the above described constructions shown in Figs. 3, 4 and 8. A pressure exerted upon the key Z causes a backward movement of the inserted paper sheet, in the direction of ejection, by one space between lines, whereas a pressure upon the key A effects complete ejecting of the paper sheet from the machine.

In the casing 300, shown in Fig. 20, an axle 303 is rigidly mounted in the parts 301 and 302. On the one hand, a spur wheel 50, a ratchet-wheel 62, a spring motor 304 and a clutch flange 305 rigidly connected the one with the other are mounted on this axle 303 so that they can freely rotate. On the other hand, a clutch flange 307 is mounted freely rotatable on the axle 303. This clutch flange has a long hub 306 and is connected by rivets 309 or the like with a flange 308. The facing sides of the flanges 308 and 305 are spaced apart, the flanges being rotatable about the axle 303. This spacing is ensured by a collar 310 of the axle 303 located between the flanges. A toothed wheel 311 is fixed on hub 306, for instance by clamping screws 312 or the like passing through arcuate slits of the wheel 311, so that it can be adjusted as regards rotation, as shown in Fig. 23. This wheel 311 is rigidly connected by rivets 313 or the like with similarly constructed cam discs 320 mounted on both sides of the toothed wheel. Rollers 314 loosely mounted in adjusting elements 315 so that they can turn, cooperate with these cam discs 320, as shown in Figs. 20 and 23. The rollers 314 are continually pressed against the peripheries of their respective cam discs 320 by springs 316 which act upon adjusting elements 315 mounted to oscillate about a driving shaft 317 of the device, and the rollers 314 are held in recesses 318 of the cam discs 320 when the device is in the inoperative position. A starting position of the cam discs 320 and of the toothed wheel 311 and of all elements connected therewith is thus determined. The spur-shaft 317 may be connected with a driving electromotor not shown in the drawings. As soon as the motor circuit is completed the spur-shaft 317 is permanently rotating. The completing of the motor circuit may be effected by closing a switch diagrammatically shown in Figs. 17 and 18 by pivoting a switch handle 700 mounted on the axis 701 in the casing 300 in clockwise direction (Fig. 17). Thereby the lower part of said handle 700 connected with one electric cable 702 comes into contact with a resilient contact piece 704 mounted in the casing 300 and being connected with another electric cable 703.

The toothed wheel 311 is driven by the power driven shaft 317 for instance through intermediary of the wheels 319, 321' and 321. The intermediate wheels 321' and 321 being fixedly mounted on the same shaft in a cradle 322. Said cradle consists of two rigidly connected side parts oscillatable about the shaft 317. By the oscillatory movement of the cradle 322 the intermediate wheel 321' driven through intermediate wheels 321' and 319 by the spur wheel 317 may be brought in and out of engagement with the wheel 311. In Fig. 23 the cradle is shown in a position where wheels 311 and 321 are out of engagement. The wheels 311, 321, 321', 319 may be friction wheels instead of toothed wheels. The cradle 322 and with the same the intermediate wheel 321 are continually pulled against wheel 311 by a spring 323, which acts at one end on the ends of the side parts of the cradle 322 and is fixed at its other end in the casing 300. The elements 315 prevent, however, when the device is in the inoperative position as shown in Fig. 23, the wheels 321, 311 from coming into mesh the

one with the other and to thus produce the driving connection thereby that the faces 325 of the elements 315 press against the bolt 324 of the cradle 322 under the action of spring 316. The spring 316 must evidently be stronger than the spring 323, in order that it can overcome the pulling effect of spring 323 when the device is in the inoperative position and in order that it can hold the device in the disengaged state. The oscillation of the adjusting elements 315 in anticlockwise direction, as shown in Fig. 23, whereby the rollers 314 are disengaged from the recesses 318 of the cam discs 320, thereby withdrawing the contact face 325 of the adjusting element relatively to the bolt 324 of the cradle, to enable the driving connection of the wheels 321, 311 to be established under the action of the spring 323, may be effected by a pull rod 326 which acts on the arms 327 of the adjusting elements 315. The rod 326 is in connection with an intermediate lever 328, which is oscillatably mounted in a bracket 329 of casing 300. The intermediate lever 328 is displaced by a pull rod 330 which leads to the key section of the selecting arrangement.

The actuation of the pull rod 330 and thereby the disengaging and engaging of the device can be carried out, for instance, in the manner illustrated in Fig. 19. According to this Fig. 19, the pull rod 330 is connected to the end of a lever 331 which can be adjusted by a universal operating element common to all keys E, 600, for instance from a rocking plate 333. The rocking plate 333 is arranged under the heads 600 of the selecting keys and under the cover plate 334 of the key section. The shanks 335 of the selecting keys 600 are guided in the covering plate 334 of the key section and extend through holes 509 in the rocking plate 333. The rocking plate 333 oscillatably mounted at 507 on a part of the casing 300 is pulled by a spring 508 against an abutment 520 and, in the inoperative position shown in Fig. 19, extends parallel to the covering plate 334 of the key section. When one of the key shanks 335 is moved downwards, a nose 336 of this shank 335 encounters, after a certain movement, the rocking plate 333 and oscillates the same in clockwise direction, indicated by the arrow *g* in Fig. 19, whereby spring 508 is put under tension. The holes 509 in the rocking plate 333, through which the key shanks 335 extend, must be so wide that the key shanks 335 cannot jam in these holes 509 when the plate 333 oscillates. A stud projecting from the underside of plate 333 has a slot and pin connection 500, 501 with a lever 332 oscillatable about a pivot 503 in the casing 300. By the lever 331 already mentioned, oscillatable about the same pivot 503 and connected by a spring 504 with a stop 505 of lever 332, the connection to the pull rod 330 of the adjusting device is established, as shown in Fig. 23. If the rocking plate 333 is oscillated in the direction of the arrow *g* by depression of a key through contact of its nose 336 with the rocking plate, the levers 332, 331 are oscillated in clockwise direction, and thus the motor drive connection, i. e. the engagement of the driving connection 321, 311, as shown in Fig. 23, is effected by the pull on rod 330. The lever 331 can be oscillated at this occasion until it strikes against a bolt 506 of casing 300. A further oscillating of the rocking plate 333 effects, that the lever 332 further oscillates relative to the lever 331 which is prevented from oscillation and that the stop 505 on lever 332 swings away from lever 331 in tensioning the spring 504. This arrangement, which thus admits of only a limited engaging stroke of the pull rod 330, is necessary for the reason that the different keys of the key section when depressed impart to the rocking plate 333 oscillations of different amplitudes, as they are at different distances from the fulcrum 507 of the plate 333. The keys 600 of the uppermost row of keys will therefore effect only a slight shifting of lever 332. This shifting is however just sufficient, to effect the driving connection, lever 331 being oscillated up to the stop 506. All keys of the other rows of keys cause a greater movement of the levers 331, 332 in opposition to the tension of spring 508 at the end of the key stroke.

The shaft of the key designated by E in Figs. 18 and 19 extends only up to the rocking plate 333 and thus influences only this plate 333 and the drive connection control, 331, 332, 330, 321, 311. The other keys which are marked with numerals carry each at the lower end of its shank 335, which slides in a separate guide 510, a cam 511, the face 517 of which cooperates with the end of a corresponding lever 514. The lever 514 is oscillatable about the pivot 512 in casing 300 and cooperates with a lever 513 with which it is connected by a stop 515 of the lever 513 and by a spring 516. The levers 514, 513 are continually influenced in clockwise direction by pull springs 518 fixed at the one end on lever 515 and at the other end on casing 300 and their extreme position is determined by the abutment 519 of casing 300, against which lever 513 can bear under the action of said spring 518. With the end of each lever a pull rod 339 is connected, said pull rods leading to a selecting arrangement. If one of the keys 600 is depressed, the surface 517 of cam 511 carries along the end of the lever 514 during the downward movement of the key, said lever 514 effecting, through the intermediary of the stop 515 an oscillation of lever 513 in anticlockwise direction and in opposition to the action of spring 518 and therefore, pulling rod 339. As the depression of the key continues, the point of contact between the surface 517 and the end of the lever 514 shifts continually towards the highest part 521 of cam 511. If the end of lever 514 escapes past the part 521, in the position I of the levers 513, 514 shown in dash dot line in Fig. 19, this end of lever 514 under the action of spring 518 slides off the surface 517 of cam 511, and the elements 514, 513 and 339 return into their initial positions shown in full lines. Upon continued downward movement of the key shank 355 the nose 336, owing to its special arrangement on the key shank 335, acts upon the universal rocking plate 333 and engages, through the elements 333, 500, 332, 331, 330 the drive of the device. Upon a key depression, the selecting arrangement is actuated first, and thereafter the device is started.

In operating the front feed control according to the foregoing description, it is evident that sufficient pressure must be exerted on the selected front feed limiting key 600 to overcome the usual key restoring spring (not shown) as well as the frictional engagement between the cam 511 on the key stem and the spring-pressed levers 513, 514 (Fig. 19) after which, pressure is required to cause the nose 336 on the key stem to rock the universal motor-clutch control plate 333 against the action of its spring 508 and to overcome the spring 316 (Fig. 23) of the adjusting number 315. When the nose 336 of key shank 335 strikes on the plate 333, a resistance occurs which clearly indicates to the operator that the switching in of the selecting arrangement has taken place. The stop-

selecting keys 600 need only be used to select the desired stop, and switching in of the drive of the device after such a preliminary selection can then take place at any desired moment by depressing the switching in key E. This kind and manner of actuation can be of advantage especially when between preliminary selection, i. e. depressing of the key 600, and switching in of the drive, i. e. depressing of key E, any other manipulations have to be carried out.

At the return-movement of the corresponding key 600, which takes place under the action of a spring not shown, the end of the lever 514, which has returned into the inoperative position and is then opposite the thinner portion of the key shank 335 above cam 511, is carried along in clockwise direction by the part 521 of cam 511. As the lever 513 bears against the abutment 519 and cannot oscillate, the connecting spring 516 is stretched between the levers 513 and 514 and lever 514 is oscillated away from the laterally turned lip 515 of lever 513. If the end 511 of the key shank 335 has moved upward a certain distance, the end of the lever 514, as shown in the position II of lever 514 indicated by dash dot lines in Fig. 19, by the action of spring 516 slides off the apex 512 of cam 511 and returns into the inoperative position shown in full lines.

The rear ends of the pull rods 339, actuated from the levers 514, 513, are connected to stop-setting levers 340 of the selecting device as shown in Figs. 20, 21. All stop-setting levers 340 are oscillatably mounted in an annular body 341, preferably on a common bearing wire 342. Each stop-setting lever 340 acts with its free end 343 upon a coupling pin 344. As many coupling pins 344 are provided as there are stop-setting levers 340 and numeral keys 600. The coupling pins 344 are shiftable in longitudinal direction in bores of the flanges 307 and 308 and can be secured in both extreme positions by means of grooves 345 and ring-springs 346 cooperating with these grooves. In the inoperative position those ends of all coupling pins 344, which are remote from the levers 340, are situated in a plane just adjacent the opposing face of the coupling flange 305, as shown in Fig. 20. The coupling flange 305 has bores which, as regards number, arrangement and size, accurately correspond to the bores in the flanges 307, 308. Restoring pins 347 are loosely inserted in these bores. These restoring pins 347 replace in this form of construction the stop pins of the first described form of construction of the invention. If the device is in the inoperative position, the bores in the parts 307, 308 on the one hand and 305 on the other hand register. If then a number key 600 of the selecting arrangement is actuated, the corresponding coupling pin 344 is shifted in the direction towards the coupling flange 305 through the intermediary of the connecting rod 339 and of the corresponding lever 340, and the end of the coupling pin enters into the corresponding bore of the coupling flange 305 and shifts the restoring pin 347 in this bore until the end of the same projecting form the coupling flange 305 strikes against the face 348 of a plate 349 adjustably mounted and fixed in the casing by means of clamping screws 530 and arcuate slots 305. If in this position of a coupling pin 344 and of a restoring pin 347 the corresponding selecting key 600 is further depressed, the levers 513, 514 and with the same also the rod 339 and the corresponding lever 340 return into the inoperative position, whereupon in the above described manner the drive is engaged through the intermediary of the universal motor-controlling plate 333 and the elements 500, 332, 331, 330, 328, 326, 315, 321. Together with the wheel 311 the elements 306, 307 and 308 then rotate and draw along, by means of the engaged coupling pin 344, the coupling flange 305 and the elements connected with the same, i. e. the spring casing 304, ratchet-wheel 62 and bevel wheel 50, whereby also pinion 350 and for instance the elements 251, 263, 264, 265, 266, 287, 46, 268 as shown in Fig. 9 and the front feed rollers 34, 36 are driven. During the movement of the coupling flange 305 the preferably rounded ends of engaged restoring pins 347 slide on the face 348 of the plate 349. The plate 349 is equipped with a cam 351 which projects into the path of the ends of the restoring pins 347 traversing a circular path on the face of plate 349. When a projected restoring pin 347, in the course of its travel, reaches the cam 351, it slides upwards in the course of rotation of the coupling flange 305, on one side of cam 351, and is thereby pushed back in its bore in the coupling flange 305. During such return, the restoring pin also pushes back the corresponding coupling pin 344. The height of cam 351 is such that it pushes back the restoring pins 347 in the flange 305 until the coupling connection between the elements 307, 308 on the one hand and the coupling flange 305 on the other hand is interrupted, whereupon the driving connection between the elements 307, 308 and 305 is thus interrupted and the drive of the elements 304, 62, 50 and of all elements connected with the same, including the front feed rollers 34, 36 is terminated. In order that the said elements shall not continue to turn under their own momentum, or turn back under the action of the spring motor 304, a locking pawl mechanism cooperating with the ratchet-wheel 62 is provided, which consists essentially of a loosely pivotable feed pawl 352 and a fixed feed pawl 353. The two pawls are connected the one with the other by a pivot-bolt 354 and mounted on the pawl carrier 357. In the position shown in Fig. 20, they are held by the spring 355 and by the abutment 356. Normally the pawl carrier 357, constructed as a two-armed lever pivoted in the casing 300 at 358, under the action of a spring not shown is in the position according to Figs. 20 and 22, in which the loosely pivoted feed pawl 352 engages in the teeth of the ratchet-wheel 62. The spring of the spring motor 304 influences the ratchet-wheel 62 in such direction, that the teeth act upon the feed pawl 352 in the direction of the arrow *a* in Fig. 20 and tend to turn this feed pawl in clockwise direction. This turning is limited by the abutment 356 and thus the ratchet-wheel 62 and all elements 304, 305, 50 connected with the same are held in opposition to the action of the spring motor 304. If the ratchet-wheel 62 is driven in the direction of the arrow *b* by the drive of the device, the teeth of the ratchet-wheel 62 slip past the loose feed pawl 352. On the lower end of the pawl carrier 357 an adjusting element 359 engages which is connected by pin 360 and slot 361 with the pawl carrier 357, as shown in Figs. 20 and 22. The adjusting element 359 is oscillatable about bolt 362 of the casing 300 by means of two pull rods 363, 364 and held, by a spring not shown, in the median position shown in Figs. 20 and 22, in which the loose pawl 352 of the pawl carrier 357 engages in the ratchet-wheel 62. The pull rods 363 and 364 are connected with the keys Z

and A, respectively, by intermediate levers **365**, **366**, as shown in Figs. 31 and 32.

A pressure upon the key Z adjusts the feed element **359** and the pawl carrier **357**, so that the loose feed pawl **352** disengages from the corresponding gap between teeth of the ratchet-wheel **62** and the fixed pawl **353** engages in the same gap between teeth. The ratchet-wheel **62** and the elements connected with the same rotate under the action of the spring motor **304** up to the moment when the tooth of the ratchet-wheel liberated by the loose feed pawl **352** strikes against the interposed stationary pawl **353**. When the elements move back into the initial position by the action of springs not shown, the loose feed pawl **352** engages in the next following gap between teeth of the ratchet-wheel **62**. The ratchet-wheel **62** rotates, when the fixed feed pawl **353** is oscillated out of the teeth, until the loose feed pawl **352** which has been entered into the next following gap between teeth has caught the corresponding tooth of the ratchet-wheel. At one depression and releasing of the key Z rotation of the ratchet-wheel by one tooth of the same takes place, which corresponds to a feeding of the inserted paper sheet upwardly the distance of one line space by the spring motor **304** through the intermediary of the front feed rollers **34**, **36**.

The pressure upon the key A effects an oscillation of the adjusting element **359** and of the pawl carrier **357** in opposite direction. The two feed pawls **352**, **353** are then brought out of engagement with the teeth of the ratchet-wheel **62**, whereby this ratchet-wheel and all elements connected with the same, especially also the front feed rollers **34**, **36**, are entirely free to be driven by the spring motor **304** and returned by the same into their initial positions. The initial position is determined by contact of a nose **367** of the coupling flange **305**, as shown in Fig. 22, against an abutment **368**, as soon as the coupling flange **305** has returned to its initial position. The abutment **368** is constructed as an elbow lever oscillatably mounted on a bolt **369** in the casing **300** and continually influenced in anticlockwise direction by a spring **370** and held in a position in which it bears against an abutment pin **371** mounted on the casing **300**, as shown in Fig. 22. The spring **370** is stronger than the spring of the spring motor **304**, so that, due only to the impetus of the elements, when the nose **367** strikes against the stop **368**, this stop can be slightly moved. By the action of the spring **370** the elements return then into the position shown in Fig. 22. Herefrom results a cushioned, elastic stopping of the moved elements.

In Fig. 24 the mutual position of the elements, when a feed pin **347** runs up on the cam **351**, is shown. Accordingly the position of the bores for the feed pins **347** in the coupling flange **305** and consequently also the position of the feed pins **347** relative to the teeth of the ratchet-wheel **62** on the one hand and the position of the cam **351** relative to the teeth of the loose feed pawl **352** on the other hand is arranged so that, at the moment at which a feed pin **347** has just reached the apex of the cam **351**, the tooth of the ratchet-wheel **62** coordinated to the feed pin has already passed the pawl **352** in oscillating the same. By shifting the feed pin **347** and therewith the corresponding coupling pin **344**, the driving connection to the power drive of the device, owing to the just described arrangement, is released only when the lock-pawl **353** has engaged into the corresponding gap between teeth and thus a backward rotation of the arrangement after the uncoupling is effectively prevented.

In order to effect the automatic feeding of the paper sheet inserted into the machine to the next following line after the several lines have been typed, or in order to effect the automatic ejection of the paper sheets, the pawl carrier **357** is controllable by the movement of the paper carriage. On the rear side of the paper carriage **1** a bar **400** is therefore fixed in a suitable manner, for instance by screws **401**, as shown in Fig. 33. This bar **400** carries a cam **402** which projects downwards and a second cam **403** which projects rearwards. The cam **402** serves to release the ejecting of the paper sheet which has been inserted. The cams may be mounted on the bar in any known manner, for instance in the manner of a rider. Several cams **402** may also be provided or attached at any desired points of bar **400**. The cam **402** cooperates with a movable tappet **404** during the return of the paper carriage towards the right, as indicated by the arrow *d* in Fig. 34, which return might be effected automatically by a source of power, for instance by the same source of power which drives the inserting device, for instance by engaging a separate clutch. The tappet **404** constitutes part of a by-pass pawl **431** which is oscillatably mounted on a pivot **432** on an intermediate lever **406**. The element **431** is continually pulled into the position shown in Fig. 33 by the action of a spring **433**, in which position the element is supported by the guide **405**. When the tappet **404** encounters the cam **402**, during carriage return, this tappet and the element **431** are pressed downwards in the guide **405** and transmits this movement to the intermediate lever **406** oscillatable about a bolt **406'**, which lever, by means of a connecting rod **407** and of a lever **409**, turns a four-cornered shaft **408** journaled in the casing **300**. On the four-cornered shaft **408**, an operating element **410**, shown in Figs. 25 to 30, is mounted to shift along the shaft, which operating element **410** cooperates by its oblique control faces or skew cams **411**, **412** with a roller **340** freely rotatably arranged on the lower end of the pawl carrier **357** so that, when the operating element **410** is turned, the roller **340** is shifted to the right or to the left according to whether the operating element **410** is in its right hand or left hand shifted extreme position. The shifting of the operating element **410** is effected by a three-armed adjusting element **414**, on which the already above mentioned pull rods **363**, **364** leading to the key Z and A can act. One arm **415** of the three-armed adjusting element **414** engages a recess **416** of the operating element **410** and thus during its oscillation can shift this element. In its two positions the operating element **410** is secured by a spring **417** the end of which engages in one of two notches of the adjusting element **414**.

If key Z is depressed and the adjusting element **414** is moved through the intermediary of the elements **365**, **363** into the position shown in Fig. 26 and the operating element **410** moved into its left extreme position, the right hand cam face **412** of the operating element **410** cooperates, at the turning of the four-cornered shaft **408**, with the roller **340** of the pawl carrier **357** and shifts this roller towards the left into the position shown in Fig. 27. Herefrom results an oscillation of the pawl carrier **357** in clockwise direction, whereby the loose pawl **352** is disengaged from the ratchet-wheel **62** and the fixed pawl

353 is engaged with this ratchet-wheel. The spring 418, attached to the casing 300 and to a hand lever 419 keyed on the four-cornered shaft 408, tends to continually turn the shaft 408 in anticlockwise direction, as shown in Fig. 33, and to therefore return the rods 409, 407, 406, 431, 404 to the original positions shown in Fig. 33. After the elements have returned into their initial positions, a feed of the paper sheet a distance of one line space has been effected.

At the depression of the key A the operating element 410 is shifted to the right by means of the elements 366, 364, 414, 415, 416, so that now as shown in Fig. 28 the roller 340 of the pawl carrier bears against the left hand cam face 411 of the operating element 410 by which it is shifted towards the right into the position shown in Fig. 29 at the turning of the operating element 410 when abutment 402 passes over tappet 404. The pawl carrier 357 is thus oscillated so that by the oscillation of both pawls 352, 353 out of the teeth of the ratchet-wheel 62 this ratchet-wheel is liberated. The paper sheet is therefore ejected from the machine under the action of the spring motor 304. As complete ejecting of the paper sheet requires a certain time, whereas the influencing of the abutment 404, of the operating element 410 and of the pawl carrier 357, that is the releasing of the ratchet wheel 62, lasts only the short time during which the traveling cam 402 moves over the tappet 404, means is provided, which holds the operating element 410 in the position shown in Fig. 29 until by backward turning of the front feed rollers 34, 36 the paper sheet is completely ejected from the machine. With this object in view a locking element 420 is oscillatably mounted at 421 on the casing 300. A spring 422 tends to oscillate the locking element 420 so that a toe 424 of the locking element 420, guided in a guide 423 of the casing 300, is pressed against the operating element 410. In the left hand position of the operating element 410 the toe 424 is opposite the same in the position shown in Figs. 26 and 27, whether the operating element 410 is in the position of rest or turned. The toe 424 then slides on the cylindrical surface of the extension 425 of the operating element 410 and cannot hold this element. If the operating element 410 is, however, in the right hand adjusting position as shown in Figs. 28, 29, the toe 424, when the operating element 410 is in the turned position shown in Fig. 29, comes just above the recess 426 and can then, under the pull of the spring 422, engage in this recess 426. The operating element 410 can not therefore follow the action of the spring 418 after the cam 402 has passed over the tappet 404 and returned into its position of rest, and the two feed pawls 352 and 353 remain disengaged from the ratchet-wheel 62 during the time the toe 424 engages the recess 426. The turning back of the front feed rollers 34, 36 and therewith the ejecting of the inserted paper sheet can then take place without hindrance. At this ejection, which takes place under the action of the spring motor 304, a cam disc 427 rotates, as shown in Figs. 25, 30, with the bevel wheel 50 and the ratchet-wheel 62, on the outer surface of which cam disc 427 a roller 428 runs which is mounted on one end of the locking element 420. This roller 428 is pulled against the periphery of the cam disc 427 by the action of the spring 422. During the whole ejection movement of the front feed rollers 34, 36 the roller 428 runs on the circular periphery of the cam disc 427 and runs only at the end of the movement, when the ejecting of the paper sheets has been completed, upon the oblique face of a cam 429 of this cam disc 427, whereby the locking element 420 is oscillated in anticlockwise direction and in opposition to the tension of the spring 422 and the toe 424 is pulled back from the recess 426 in the operating element 410. The operating element 410 can then follow the pull of the spring 418, which turns it back into its initial position shown in Figs. 25, 30, by means of the four-cornered shaft 408, whereby also the abutment 404 is pushed back into the initial position through the rods 409, 407, 406, 431.

If the paper carriage is not returned in the direction of the arrow *d*, Fig. 34, but moved in typing direction in the direction of the arrow *e* as shown in Fig. 35, the traveling cam 402 moves from the left towards the counter-tappet 404 and would be stopped by the same. This might result in damaging the elements of the device which is prevented by moving the tappet 404 out of the path of the traveling cam 402. This is effected by means of a displacing cam 403 on the bar 400, said displacing cam 403 influencing a displacing tappet 430 mounted on the element 431. The abutments are arranged displaced so that, when the paper carriage moves in the direction of the arrow *e*, first the displacing cam 403 comes into operation with the displacing tappet 430 and shifts this displacing tappet 430 in the direction of the arrow *f*, as shown in Fig. 36. Hereby the element 431 which carries the two tappets 404, 430 is oscillated about its pivot 432 in opposition to the action of spring 433 in the guide 405 in the direction of the arrow *f*. Whilst the element 431 and the tappet 404 are in oscillated position, the traveling cam 402, at the farther movement of the paper carriage in the direction of the arrow *e*, passes along the displacing tappet 404 without influencing the same.

In addition to the means for effecting the automatic line spacing, or complete ejection of the paper sheets incident to the return of the paper carriage at a predetermined point or points in the path of return of the paper carriage, corresponding to the position of the cam 402 on the paper carriage, a manual line space feed is provided. For this purpose, a hand lever 419 is mounted on shaft 408 by which this shaft can be turned. The spring 418 is also fixed to this lever 419. A nose 535 may be provided on lever 419 for determining the inoperative position of the lever 419 and consequently also of the operating element 410, of the elements 409, 407, 406, 431, 404, 430 and of the escapement and locking pawl mechanism, said nose bearing under the action of the spring 418 against the abutment 536 on the casing 300 when the elements are in the position of rest. The nose 535 and abutment 536 might also be adjustable.

In all forms of construction devices for the interlocking of the keys may be provided, so that the actuation of one key excludes the simultaneous actuation of other keys of the selecting arrangement. This may be of advantage for protecting against wedging of simultaneously engaged elements and against danger of breakage.

The device according to the invention relieves the operator of the work and time required to insert and remove the paper sheets by hand, this being especially of advantage when the sheets to be inserted oppose considerable resistance against the insertion around the platen owing to their thickness and stiffness.

We claim:

1. In a front-strike printing machine, the com-

bination with a platen; of means to insert work sheets different distances downwardly in front of the platen during non-rotation of the platen, and to eject such sheets upwardly by line space increments, or wholly, and irrespective of the platen, including a front feed chute; front feed rolls to which the chute leads the work sheets; a motor to drive the front feed rolls in a direction to insert the sheets downwardly in front of the platen; front feed roll driving means interposed between the motor and the front feed rolls, including manually controlled, normally disengaged means to connect the motor and the driving means; selective keys to effect the manual control of the connecting means between the motor and the driving means; means controlled by the same keys to determine the extent of insertion of the front-fed work sheets, and to automatically effect the disengagement of the connecting means between the motor and the driving means upon completion of the front feed insertion; a spring motor connected with the driving means, and tensioned by the first-named motor, said spring motor effective upon the driving means to cause the front feed rolls to feed an inserted work sheet out of the machine; a locking and escapement mechanism to hold the drive means against operation under the influence of the spring motor; and manually operable means shiftable in either of two opposite directions to control the locking and escapement mechanism to enable the front feed rolls under power of the tensioned spring motor, to eject the inserted work sheet by successive line space increments of movement, or to eject the work sheet at a single operation.

2. In a front-strike writing and printing machine, the combination with a platen; of a front feed device for inserting work sheets different distances downwardly in front of the platen without rotating the platen, and to eject such sheets upwardly either by successive line space increments, or at a single operation, including front feed rolls; a motor to drive the front feed rolls in a direction to insert the work sheets downwardly in front of the platen, past the printing line thereof; front feed roll driving means interposed between the motor and the front feed rolls to transmit motion to the rolls, including manually controlled, normally disengaged means to connect the motor and the driving means; selective keys, depression of any of which effects said manual control of the connecting means between the motor and the driving means; means also controlled by the keys to variously determine the extent of insertion of the work sheets according to the key depressed, and to effect the automatic disengagement of the means connecting the motor and the driving means upon completion of the front feed insertion of the work sheets; a normally ineffective motor connected with the front feed roll driving means and rendered potentially effective by the operation of said driving means by the first-named motor; means to latch the driving means and front feed rolls in the positions which they occupy upon the disengagement of the motor and the driving means; and means controlling the latch means, and operable in opposite directions from a normal intermediate position to enable the second-named motor to operate the front feed rolls to eject the inserted work sheets step by step, or by continuous rotation, as desired.

3. In a front-strike printing and writing machine, the combination with a platen; of means to insert work sheets different extends, downwardly in front of the platen past the printing line thereof, and to eject such sheets upwardly by line spacing increments, or at one continuous operation, irrespective of the platen, including a front feed chute; front feed rolls to which the paper chute leads the work sheets; a motor to drive the front feed rolls in a direction to insert the sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective means to engage said connecting means; means also controlled by the selective means to automatically disengage said connecting means at various times, whereby to determine the extent of insertion of the front fed work sheets; means to reversely rotate the front feed roll driving means; means to latch the front feed roll driving means in the position occupied at the time of disengagement of said connecting means; and means to release the latching means.

4. In a front-strike printing and writing machine, the combination with a platen; of means to insert work sheets different extents, downwardly in front of the platen past the printing line thereof, and to eject such sheets upwardly by line spacing increments, or at one continuous operation, irrespective of the platen, including a front feed chute; front feed rolls to which the paper chute leads the work sheets; a motor to drive the front feed rolls in a direction to insert the sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective means to engage said connecting means; means also controlled by the selective means to automatically disengage said connecting means at various times, whereby to determine the extent of insertion of the front fed work sheets; means to reversely rotate the front feed roll driving means; means to latch the front feed roll driving means in the position occupied at the time of disengagement of said connecting means; latch-releasing means manually adjustable relatively to the latch to determine whether the inserted work sheets shall be ejected by line space increments, or by a continuous operation; and carriage controlled means to operate the latch-releasing means.

5. In a front-strike printing and wiring machine, the combination with a platen; of means to insert work sheets different extents, downwardly in front of the platen, and to eject such sheets upwardly either by line space increments, or at one operation, irrespective of the platen, including a front feed chute; front feed rolls to which the chute leads the work sheets; a motor to drive the front feed rolls in a direction to insert the sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective keys to render said connecting means effective; a rocking member mounted to move both with, and relatively to the front feed drive mechanism; spaced stops individual to, and projectible by, the selective keys into the path of the rocking member, said rocking member being rocked relatively to the front feed roll driving mechanism, upon its collision with the projected stop; and means operable by the rocking member during

such rocking movement to automatically disconnect the motor and the front feed driving mechanism upon completion of the desired extent of insertion of the work sheets.

6. In a front-strike printing and writing machine, the combination with a platen; of means to insert work sheets different extents, downwardly in front of the platen, and to eject such sheets upwardly either by line space increments, or at one operation, irrespective of the platen, including a front feed chute; front feed rolls to which the chute leads the work sheets; a motor to drive the front feed rolls in a direction to insert the sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective keys to render said connecting means effective; a rocking member mounted to move both with, and relatively to the front feed drive mechanism; spaced stops individual to, and projectible by, the selective keys into the path of the rocking member, said rocking member being rocked relatively to the front feed roll driving mechanism, upon its collision with the projected stop, to variously determine the extent of insertion of the front feed work sheets, and to automatically effect the disconnection of the motor and said front feed driving mechanism of the work sheets; means to latch the selected key in its operated position; and means actuated incident to the disconnection of the motor and said front feed driving mechanism, to displace the latch and free the operated key for return to normal position.

7. In a front-strike printing and writing machine, the combination with a travelling carriage, and a platen; of a front feed roll frame pivotally mounted on the carriage; a pair of front feed rolls carried by the frame; spring-pressed supports mounted in the frame and resting on the carriage; a motor to drive the front feed rolls in a direction to cause them to feed work sheets downwardly in front of the platen past the printing line thereof; front feed roll drive mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said drive mechanism, and disengageable gears connecting the front feed rolls and said drive mechanism; selective keys to effect engagement of the connecting means; means also controlled by the selective keys to arrest the front feed roll drive mechanism at different points by disengagement of said connecting means, whereby to control the extent of insertion of the work sheets; means to reversely rotate the front feed roll drive mechanism; means to latch the front feed roll drive mechanism in the position occupied at the time of disengagement of the connecting means; a peripherally notched member rotatable with the front feed rolls; and a normally idle locking element controlled by one of the spring-pressed supports to automatically enter a registering notch in the disc incident to rocking the front feed roll supporting frame away from the carriage, to prevent accidental movement of the front feed rolls while a work sheet is gripped therebetween.

8. In a front strike printing and writing machine, the combination with a platen; of means to insert work sheets different extents downwardly in front of the platen past the printing line thereof, and to eject such sheets upwardly either by line space increments, or wholly at one operation, irrespective of the platen, including a front feed chute, front feed rolls to which the chute leads; a motor to drive the front feed rolls in a direction to insert the work sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including a pair of normally disengaged clutch members, the driving member of which is always returned to a predetermined position; manipulative means; means individually settable by said manipulative means and uniformly spaced around one of the clutch members, to connect said clutch members at any one of a plurality of circularly arranged points; a stationary element positioned in the paths of said settable clutch connecting means, to effect automatic disconnection of the clutch members at any of a plurality of uniformly spaced points in the rotational travel of the clutch, according to the position of the selected settable clutch connecting means, to determine the extent of insertion of the front fed work sheets; means tending to reversely rotate the driven member of the clutch; means to latch the driven member in the position occupied at the time of disconnection of the clutch members; and means to release the latching means.

9. In a front-strike printing and writing machine, the combination with a platen; of means to insert work sheets different extents downwardly in front of the platen past the printing line thereof, and to eject such sheets upwardly either by line space increments, or wholly at one operation, irrespective of the platen, including a front feed chute; front feed rolls to which the chute leads; a motor to drive the front feed rolls in a direction to insert the work sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective means to engage said connecting means; means also controlled by the selective means to effect the automatic disengagement of said connecting means at various uniformly spaced points in the travel of said driving mechanism, whereby to determine the extent of insertion of the front fed work sheets; means coordinated with the automatic disconnecting means, whereby to latch the front feed roll driving mechanism in the position occupied at the time of disengagement of said connecting means; and means to release the latching means.

10. In a front-strike printing and writing machine, the combination with a platen; of means to insert work sheets different extents downwardly in front of the platen past the printing line thereof, and to eject such sheets upwardly either by line space increments, or wholly at one operation, irrespective of the platen, including a front feed chute; front feed rolls to which the chute leads; a motor to drive the front feed rolls in a direction to insert the work sheets downwardly in front of the platen; front feed roll driving mechanism interposed between the motor and the front feed rolls, including normally disengaged means to connect the motor and said driving mechanism; selective means to engage said connecting means; means also controlled by the selective means to effect the automatic disengagement of said connecting means at various uniformly spaced points in the travel of said driving mechanism, whereby to determine the extent of insertion of the front fed work sheets; means to reversely rotate the front feed roll driving means; means to latch the front feed roll driving means in the position occupied at the time of disengagement of said connecting means; carriage

controlled means to release the latching means, and adjustable to effect a step by step release of the latching means to enable the front feed rolls to be reversely rotated by successive line space increments to eject the sheet, or to eject the work sheet at one continuous operation; and locking means to co-act with said adjustable means, and operable by said front feed roll driving mechanism to retain the adjustable means in one of its set positions until the completion of the sheet ejecting operation.

WERNER KNIEHAHN.
HANS DIETRICH GEISER.
HUGO SCHÜLER.
RUDOLF GERTH.
RAIMUND WITT.