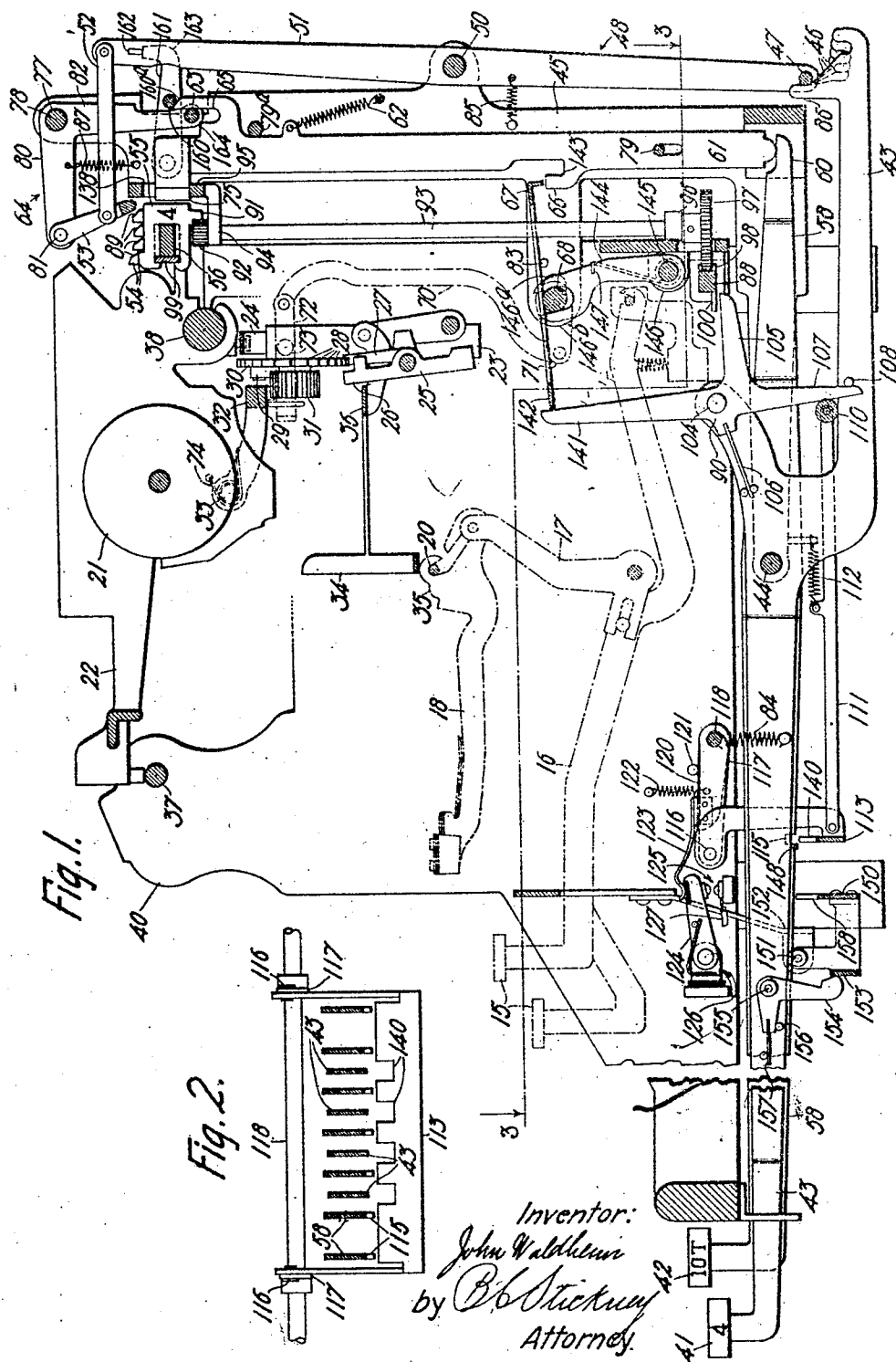


Dec. 26, 1922.

1,440,118

J. WALDHEIM.
TYPEWRITING MACHINE.
FILED JUNE 12, 1920.

6 SHEETS-SHEET 1

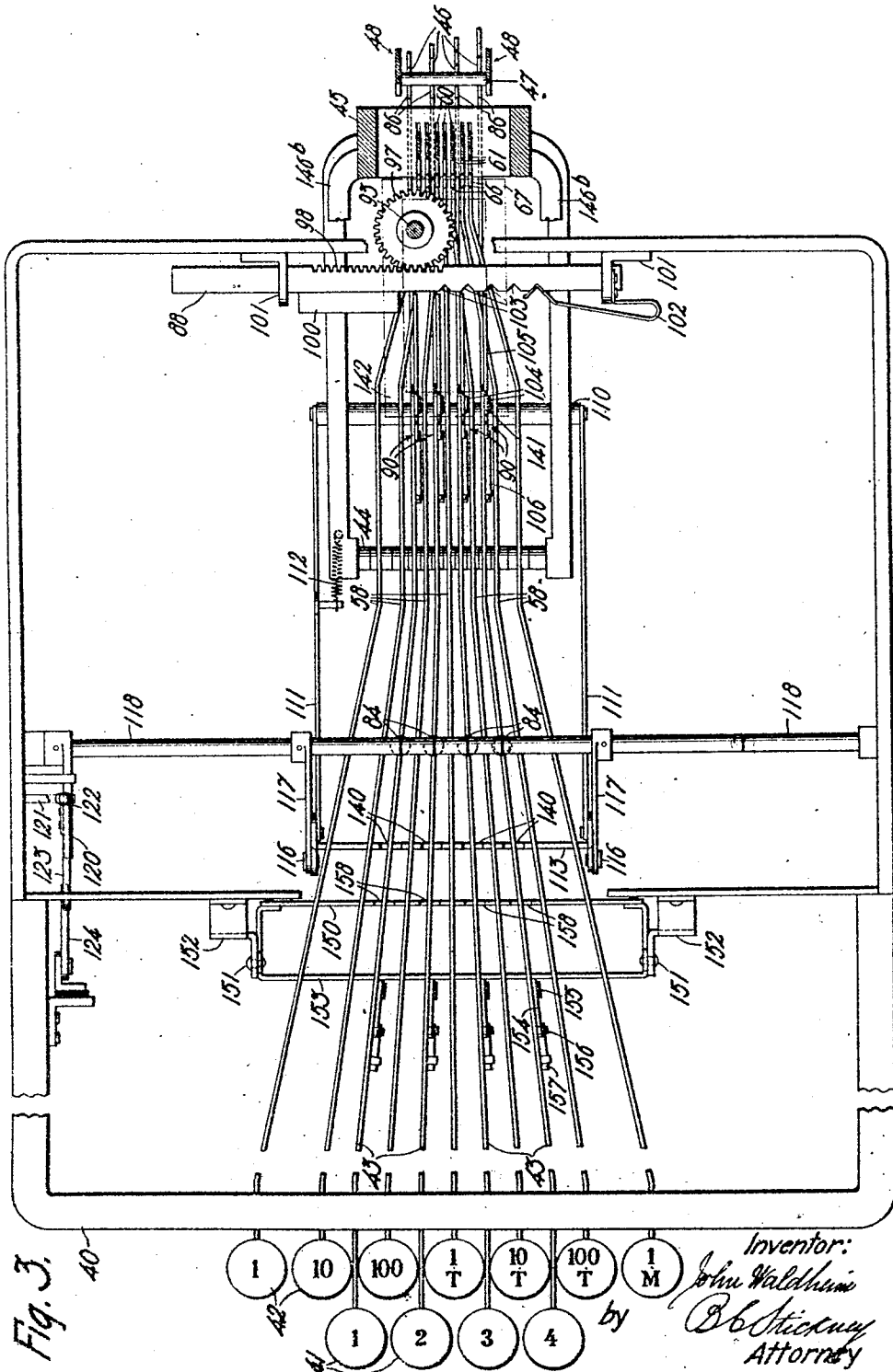


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6 SHEETS-SHEET 2

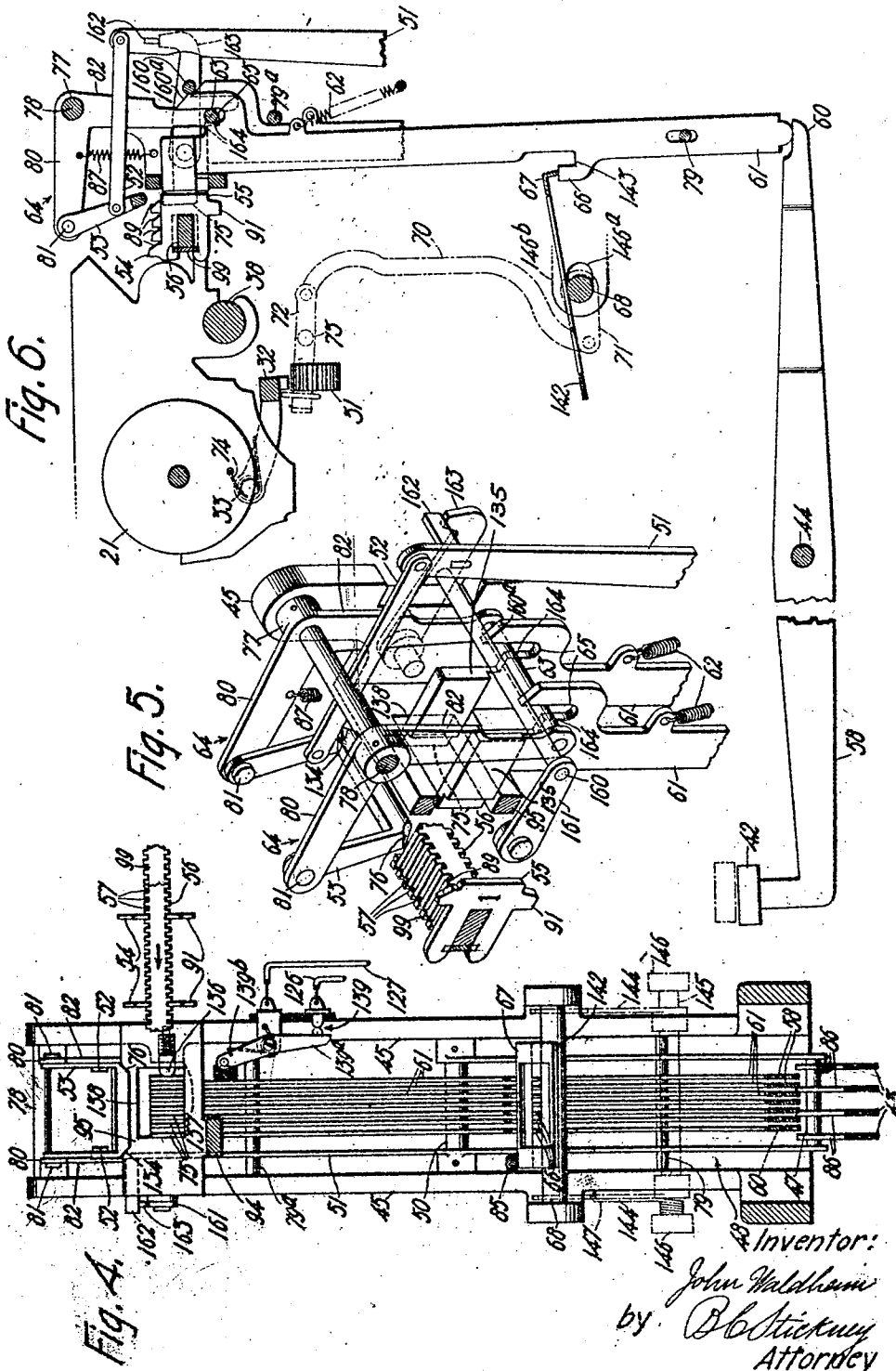


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J. WALDHEIM.
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6 SHEETS-SHEET 3



Dec. 26, 1922.

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6 SHEETS-SHEET 4

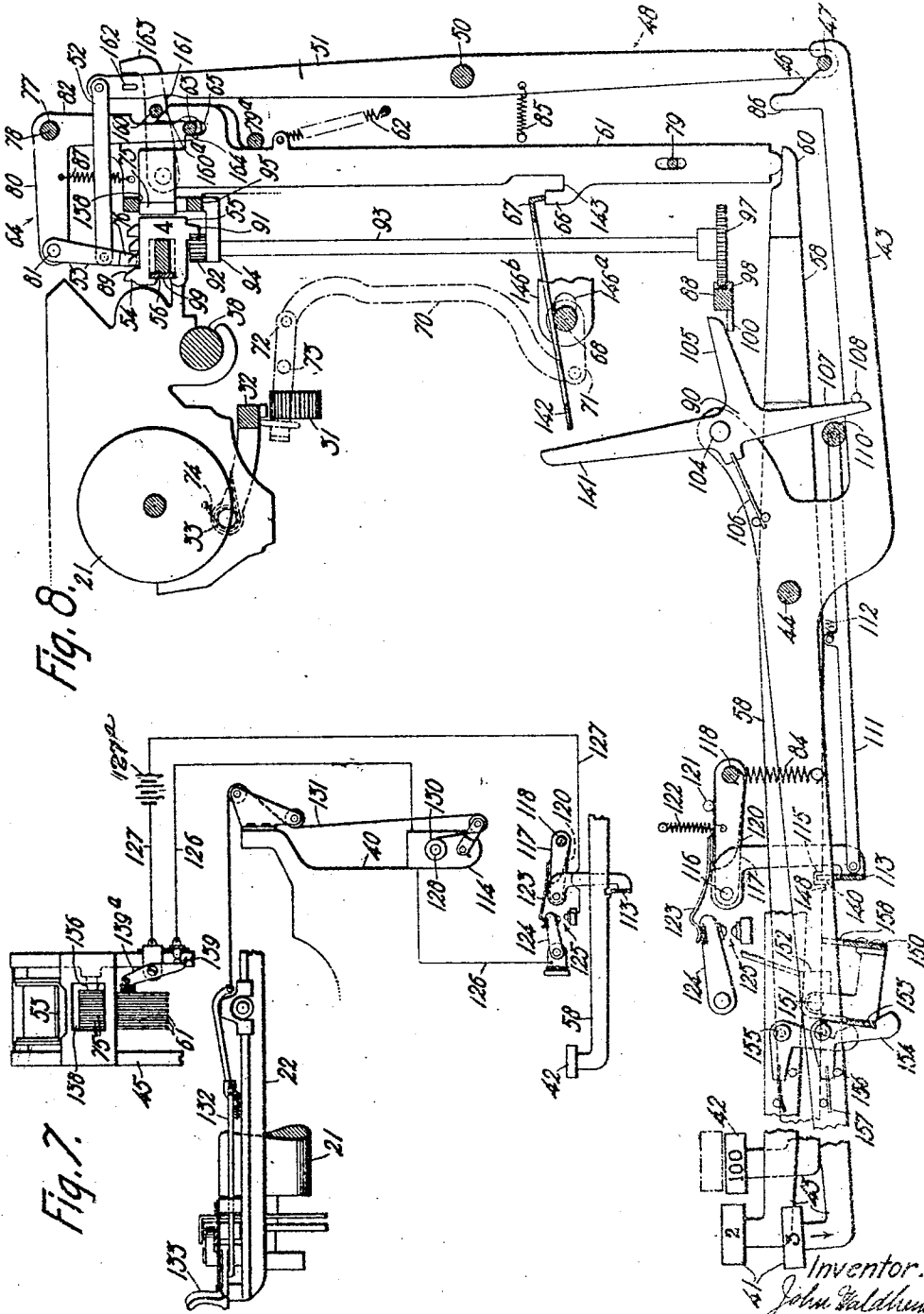


Fig. 8.

Fig. 7.

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by *[Signature]*
Attorney

Dec. 26, 1922.

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6 SHEETS-SHEET 5

Fig. 10.

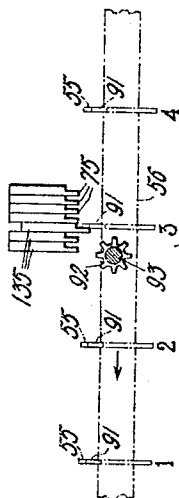


Fig. 11.

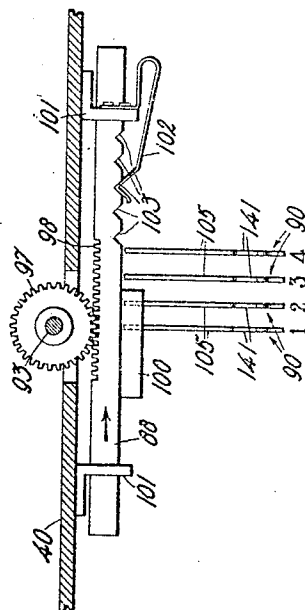
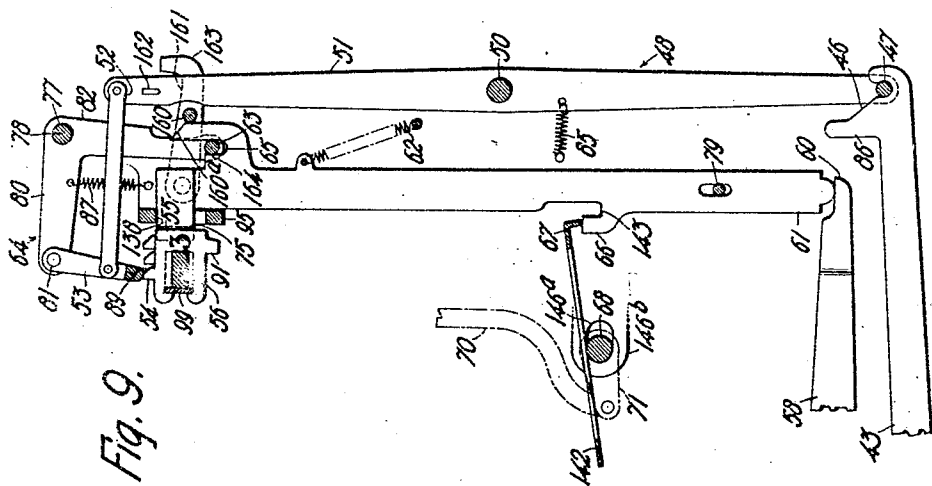


Fig. 9.



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Fig. 13.

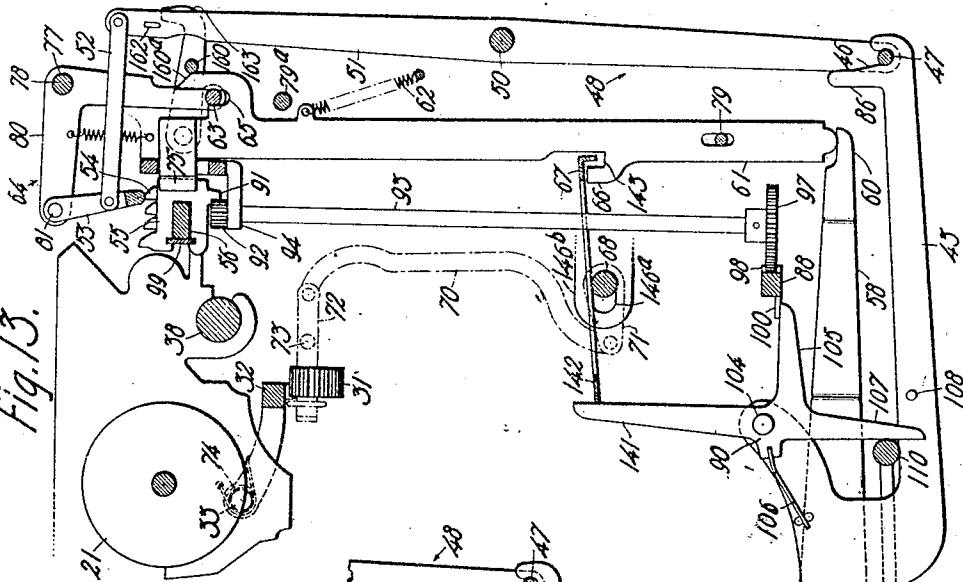
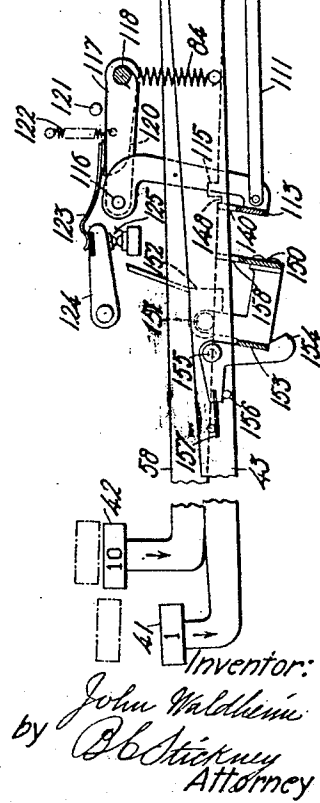
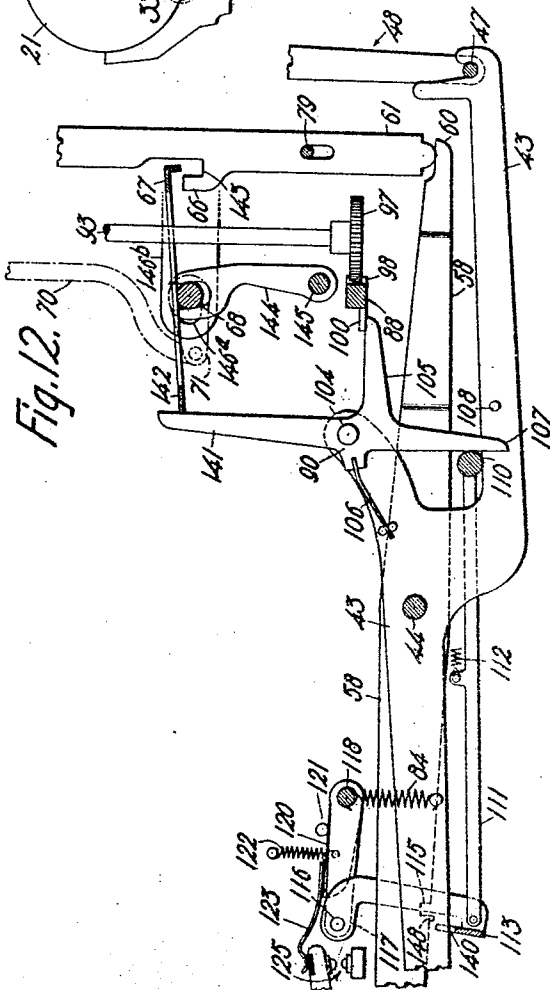


Fig. 12.



Inventor:
John Waldheim
by *Ob. Stickney*
Attorney

Patented Dec. 26, 1922.

UNITED STATES PATENT OFFICE.

JOHN WALDHEIM, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO UNDERWOOD TYPE-WRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPEWRITING MACHINE.

Application filed June 12, 1920. Serial No. 388,450.

To all whom it may concern:

Be it known that I, JOHN WALDHEIM, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Typewriting Machines, of which the following is a specification.

This invention relates to typewriting machines, and more particularly to tabulating mechanism for such machines.

An object of the invention is the provision of means whereby the carriage may be tabulated in a single movement either forwardly or backwardly to any denomination position in a selected column.

There is employed a set of column-selecting keys and a set of denomination-selecting keys. A column-selecting key is operated and held while the selected denomination-key is also depressed. The denomination-key controls a stop that is to be engaged by a column-stop on the carriage. The selected denomination-stop, however, is not moved at once into the path of the column-stop, but, when the selected column is reached, part of the column-stop causes a device (which is settable by the column-selecting keys), to move the selected denomination-stop into the path of the column-stop, thereby arresting the carriage. The column-stops have projections, at different positions lengthwise thereof, arranged to engage sooner or later with the controlling device of the column-selecting mechanism.

To effect backward tabulating, there is provided a reverse-feed-determining device which is fed step by step into effective relation with devices or interponents associated with the column-selecting keys, as the carriage vacates the columns corresponding to said keys. When a column-key of a vacated column is operated, the associated interponent starts a motor, and the denomination-key is then operated.

The carriage-returning motor may be in circuit with a switch, the latter being closed when any one of the denomination-selecting keys is depressed. As the carriage is returned to a vacated column, the reverse-feed device moves out of engagement with the interponent of the column-selecting key, but the motor-starting means does not return to normal position, nor open the switch, nor stop the carriage prematurely.

To prevent this, provision is made whereby the motor-starting means becomes connected with any one of the denomination-selecting keys upon its depression, to keep the switch closed until the depressed denomination-selecting key is restored.

No thought on the part of the typist is required as to whether a forward or backward tabulation is to be effected; but the parts are always in position to automatically determine the direction in which the carriage should move. For example, if the carriage is at the beginning of a writing line, and it is desired to tabulate to the first, second or third column, the column-selector-key of the desired column is depressed. The reverse-feed-determining device is at this time out of range of the interponents associated with the column-selector-keys. Consequently, the column-selecting key will be effective only to set the column-determining device, whereupon the desired denomination-selecting key may be operated to effect the release of the carriage by moving the usual feed-rack out of mesh with the escapement pinion. When the carriage is in a position of the third column, past the printing point, the reverse-feed-determining device is in range of the interponents associated with the column-keys of the first, second and third columns. Consequently, when the second column-selecting key is depressed, the associated interponent is operated to swing the motor-starting means to its effective position, whereupon the desired denomination-selecting key is depressed to operate the associated counter-stop and start the motor to pull the carriage back to the selected position.

Means is provided to guard against burning out of the carriage-return motor, which might be caused by repeatedly depressing a key after the carriage has been arrested in its proper position. To do this, an auxiliary switch is provided in the motor-circuit, and is so placed that it may be opened to stop the motor by a sidewise movement of the counter-stops, which occurs when a column-stop strikes an operated counter-stop.

Means may be provided to lock the operated column-selecting key in its depressed position, while the denomination-selecting key is held in its operated position, so as to avoid the return of the column-selecting mechanism to normal position, which might

otherwise result from the premature release of the column-selector-key during forward or backward tabulating. For this purpose, there may be provided a normally ineffective universal bar to be operated by the depression of any one of the denomination-selecting keys, to lock the operated column-selecting key in its operated position until the denomination-selecting key returns to its normal position.

The denomination-selecting mechanism may be used independently of the column-selecting mechanism for tabulating the carriage to consecutive columns. When so used, the counter-stops are moved directly into the path of the column-stops by the depression of the denomination-selecting keys, and at the same time effect the release of the carriage.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side view of the machine, showing my invention applied thereto, the parts being sectioned substantially in front of the "4" column-selecting key of Figure 3, and shown in their normal positions.

Figure 2 is a detail front view of a universal bar, which may be operated by the decimal-tabulator key to start the carriage-return motor.

Figure 3 is a sectional top plan view of the machine, the section being taken substantially on the line 3-3, of Figure 1.

Figure 4 is a front view of the tabulator-bracket, located in back of the machine, and shows the counter-stops of the decimal-tabulating mechanism and some of the column-selecting mechanism.

Figure 5 is a skeleton perspective view, looking from the rear and the upper right-hand corner, of the machine, showing some of the column-selecting mechanism and the denomination-selecting mechanism.

Figure 6 is a diagrammatic side view, showing one of the counter-stops moved into the path of a column-stop by the depression of a decimal-tabulator key.

Figure 7 is a schematic view, showing the carriage-return motor connected to the carriage, a motor-starting switch and a motor-stopping switch being connected in the motor-circuit.

Figure 8 is a diagrammatic side view, showing the "3" column-key and the "100" denomination-key depressed for a forward tabulating operation of the carriage, the parts being shown in position before the carriage enters the third column.

Figure 9 is a view similar to Figure 8, showing the column-selector-mechanism operated, the carriage having entered the third column, and the effective counter-stop moved into the path of the column-stop

corresponding to the third column of the carriage.

Figure 10 is a diagrammatic top plan view, showing the relation of the column-stops and the counter-stops when the carriage is arrested by the "100" denomination-stop in the third column.

Figure 11 is a diagrammatic top plan view of the reverse-feed-determining means, and shows said means in position after the carriage has been arrested, as in Figure 10; the reverse-feed-determining means having been moved into effective relation with the interponents associated with the "1" and "2" column-selecting keys.

Figure 12 is a diagrammatic side view, showing the "1" column-selecting key-lever operated prior to a back-tabulating operation of the carriage to the first column. The universal bar associated with the carriage-releasing mechanism for forward tabulating is also shown rendered ineffective.

Figure 13 is a view similar to Figure 12, and shows the parts in position after one of the denomination-selecting keys has been depressed, thereby closing the motor-switch to start the motor and return the carriage to the desired denominational position in the first column.

The invention is herein shown as applied to an Underwood typewriting machine, in which type-keys 15, when depressed, swing key-levers 16 to operate bell-cranks 17 to swing the type-bars 18 about their pivots 20 to print against the front side of a platen 21. The platen may be rotatably mounted in a carriage 22, which may be fed step by step, from right to left, by a spring-drum 23 connected to the carriage by a strap 24 to feed the carriage step by step during the operation of the type-bars.

To effect the step-by-step movement of the carriage, there is provided carriage-escapement mechanism, comprising a dog-rocker 25, having a fixed dog 26 and a loose dog 27 thereon, which are caused to reciprocate at each type-stroke between teeth 28 of an escapement-wheel 30. The escapement-wheel 30 has the usual one-way driving pawl connection 29 with a pinion 31, the latter meshing with a feed-rack 32, pivoted on the typewriter-carriage at 33. The dog-rocker is reciprocated by means including a curved universal bar 34, which is operated by heels 35 on the type-bars 18, to swing the upper end of the dog-rocker 25 rearwardly, by a cross-bar 36, and against the tension of the usual return-spring (not shown). The carriage may travel back and forth on guide-rails 37 and 38, located at the front and the rear of the machine and secured to a main frame 40.

The carriage may be tabulated forwardly to any denomination position in a selected column. For this purpose, there may be

provided a set of column-selector-keys 41 and a set of decimal-tabulator or denomination-selecting keys 42. When the carriage is in its extreme right-hand position and it is desired to tabulate to hundreds position in the third column, the "3" column-key is depressed (Figure 8), to swing a column-key-lever 43 about a fulcrum-rod 44 carried by a tabulator-bracket 45. Each column-selector-key-lever 43 is provided at its rear end with a cam 46 to engage a cross-bar 47 carried by a column-selector-frame 48, comprising a rock-shaft 50, pivotally mounted in the tabulator-bracket 45. The cams 46 are of different inclinations to swing the frame 48 more or less, according to the column-selector-key operated. When said frame 48 is operated, an upwardly-extending arm 51 thereof is moved forwardly to push a link 52 to set a column-determining device 53 (Figure 8) into the path of a projection 54 on a column-stop 55, to determine at which column the carriage should be arrested; the column-stops being adjustable to columnar positions of the carriage on a stop-bar 56, secured to the carriage, and the stop-bar having slots 57 to receive the column-stops.

The "100" decimal-tabulator-key 42 is then depressed to swing an associated lever 58 about the fulcrum-rod 44 to raise its rear end 60 and move a plunger 61 (one for each key 42) upwardly against the tension of a return-spring 62, to connect it with a cross-bar 63 of an operating frame 64, the cross-bar 63 fitting into a slot 65 of the plunger 61, as seen in Figure 8. This movement of the plunger 61 is also effective to release the carriage. For this purpose, each plunger is provided with a projection 66 to operate a universal bar 67, secured to a shaft 68, to rock the latter and pull a link 70, connected to an arm 71 on said rock-shaft 68, downwardly and swing a release-lever 72 about its pivot 73, to swing the feed-rack 32 about its pivot 33 and against the tension of a spring 74, to raise the feed-rack out of mesh with the escapement-pinion 31.

The upper ends of the plungers 61 are provided with counter-stops 75 to co-operate with the column-stops 55. It will be understood, when the parts are set in position (Figure 8), that, although the carriage is released, the counter-stop 75 remains out of the path of the column-stop 55 until the carriage enters the selected column (column 3). The projection 54 on the "3" column-stop engages a cam 76 (Figures 4 and 5) on the column-determining device 53, to move the latter upwardly to swing the operating frame 64 about its pivot 77, to move the connected plunger 61, to bring the counter-stop 75 into the path of the "3" column-stop by the cross-bar 63 (Figure 9). The movement of the counter-stop 75 into the path of the column-stop 55 may be a swinging movement about

a pivot 79 and may occur one or more letter-spaces before the column-stop of the selected column comes into range of the counter-stop of highest denomination order. The carriage 22 continues to run until it is arrested by the operated counter-stop 75, associated with the "100" decimal-tabulator-key, Figure 10.

The operating frame 64 (Figures 1 and 5) comprises rock-shaft 78, pivotally supported in the tabulator-bracket 45, said rock-shaft having two forwardly-projecting arms 80, upon which the settable column-determining device 53 is pivotally supported at 81. The operating frame further comprises two downwardly-projecting arms 82, joined by the cross-bar 63 which engages in the slots 65 of the plungers 61 as they are rendered effective by the denomination-selector-keys 42.

After the carriage has been located in the denominational position of the selected column, as above described, the typist removes the fingers from the operated keys 41 and 42, the spring 62, which is diagonally disposed, being effective to restore the denomination-selecting key 42, by moving the plunger 61 downwardly and rearwardly to its normal position, where it is arrested by the pivot or fulcrum-rod 79 and a cross-bar 79', respectively. Upon the return of the plunger 61, the feed-rack 32 re-engages the escapement-pinion 31, the universal release-bar 67 following the projection or engaging portion 66 of the plunger 61 (due to the return-spring 74 of the feed-rack) until the universal release-bar is arrested by a stop-pin 83 on the tabulator-bracket 45. A spring 84 returns the column-selector-key 41, whereupon the column-selector-frame 48 is returned by a spring 85, said frame being arrested in its normal position by the cross-bar 47 thereof engaging with projections 86 on the column-selector-key-levers 43. The column-determining device is swung back to its normal position by the links 52, connected to the arm 51 of the column-selector-frame 48, and moves out of engagement with the projection 54 of the column-stop, thus permitting the operating frame 64 to be returned by the spring 87.

The column-selector-projections 54 of the column-stops are provided with cam-faces 89, so that, if the column-determining device 53 should be operated while the carriage is in a column, in other words, if the carriage should be tabulated from a position within a column, the column-determining device will lift itself over the projection on the column-stop in said column, and into the path of projection 54 of the selected column-stop.

Every time the carriage vacates a column while it is moving in a letter-feed direction, or, in other words, forwardly, a reverse-feed-

determining device 88, located at the rear and lower part of the machine-frame 40 (Figure 1), is moved into effective relation with an intermediate device or interponent 90, associated with the column-selector-keys of the vacated column, in preparation for back-tabulating of the carriage, hereinafter described, there being one interponent for each column-selector-key. To set the reverse-feed-determining device 88, which may be done automatically, each column-stop 55 on the carriage may be provided with a projection 91, to operate a star-wheel 92 (Figures 1 and 10), secured to the upper end of a vertical shaft 93, which may be supported at its upper end by a bracket 94 on a front plate 95 of the tabulator-bracket 45, and at its lower end by a bracket 96 on the machine-frame 40. The shaft 93 is rotated a fraction of a revolution whenever a column-stop passes the star-wheel 92, the shaft being provided at its lower end with a gear-wheel 97 (Figures 1, 3 and 11) meshing with a rack 98 on the reverse-feed-determining device 88, to move an obstruction thereon in the form of a ledge 100 into effective relation with the interponents 90. The reverse-feed-determining device may be in the nature of a slide guided in brackets 101, secured to the machine-frame. A detent-spring 102 is provided to engage in notches 103 to hold the reverse-feed-determining device in any position it may be moved to.

To prevent the column-stops 55 from being displaced on the stop-bar 56, which may otherwise occur when their projections 91 engage with the star-wheel 92, there is provided a locking bar 99 (Figures 1, 4 and 5), slidably mounted on the stop-bar 56 to unlock the column-stops, so that they may be removed from the stop-bar, prior to a readjustment of the column-stops.

When the carriage is in its extreme right-hand position, the reverse-feed-determining device 88 occupies the position in Figure 3. After the carriage has passed the first and second columns (Figure 10), the reverse-feed-determining device will have been fed rightwardly from the position in Figure 1, to bring the ledge thereof into effective relation with the interponents 90 associated with the "1" and "2" column-selector-keys 41.

If it should be desired to tabulate the carriage to a vacated column, for example to column 1 from column 3 (Figures 10 and 11), which requires a backward movement of the carriage, the "1" column-selector-key 41 is depressed, (Figure 12), to operate the frame 48 and set the column-determining device 53 in a manner similar to that hereinbefore described, to bring said device into the path of the projection 54 on the "1" column-stop 55. When the "1" column-key is depressed, the associated interponent 90,

which may be pivoted thereon at 104, is operated, due to an arm 105 of the interponent engaging with the ledge 100 of the reverse-feed-determining device 88. The interponent 90 is moved against the tension of a spring 106, and is provided with a downwardly-projecting arm 107, which normally engages a stop-pin 108 on the column-selector-lever 43. The arm, when operated, moves a frame comprising a cross-bar 110 and end-bars 111 against a return-spring 112, to swing a motor-starting universal bar 113, underlying the denomination-selecting-key-levers 58, to an effective position, where it may be operated by the depression of the denomination-selecting-keys 42 to render effective the carriage-reverse-feeding means, comprising a motor 114 (Figure 7), to return the typewriter carriage.

The motor-starting universal bar 113 normally occupies the position in Figures 1 and 2, where it registers with cut-outs 115 of the denomination-selecting key-levers 58, so that the latter may be depressed during a forward-tabulating operation of the carriage, without operating said motor-starting universal bar (Figure 8). When the latter is moved forwardly, preliminary to a back-tabulating operation of the carriage, it is swung about pivots 116 on arms 117 projecting forwardly from a rock-shaft 118, to move the universal bar out of register with the cut-outs 115 (Figure 12). If a denomination-selecting-key 41 is now depressed, the universal bar 113 is moved downwardly to rock the shaft 118 by means of the arms 117. The rock-shaft 118 is provided at one end thereof with a forwardly extending arm 120, which is held against a stop-pin 121 by a spring 122 connected to said arm to return the universal bar 113 to its upper position. The arm 120 is provided with a yielding finger 123, which may be in the nature of a leaf-spring engaging with a pivoted member 124 of a motor-switch 125 mounted on the main frame 40 and suitably insulated therefrom to close said switch, the latter being connected in the motor-circuit, comprising conductors 126 and 127. Current may be supplied by any suitable means such as a battery 127* having different sections of conductor 127 connected with the opposite poles thereof.

The motor 114 may be like that disclosed in the patent to Kupetz, No. 1,186,516, of June 6, 1916, and is herein diagrammatically illustrated (Figure 7). Said motor may be located at the right-hand side of the main frame 40 and comprises a shaft 128, having a drum 130 thereon, which, when the motor is started, winds up a strap 131 guided vertically and then horizontally and connected to a link 132 to operate the usual line-space mechanism comprising a handle 133 to line-space the platen 21 and return 130

the carriage to the selected position. It should be understood that during the return movement of the carriage the effective counter-stop remains out of the path of the column-stops until the projection 54 of the column-stop of the selected column engages a cam 134 on the left-hand side of the column-determining member 53 (Figures 4 and 5), to lift the latter to swing the operating frame 64 and project the effective counter-stop into the path of the column-stop to arrest the carriage in the predetermined position.

The counter-stops 75 are thicker at 135 (Figures 5 and 10), to correspond to letter-space distances on the carriage. They may be urged leftwardly (Figure 4), by a spring-pressed plunger 136 contained within a housing 137 on the tabulator-bracket 45, and held against the end of a slot 138, formed in the front plate 95 of the tabulator-bracket. The slot 138 is wide enough to permit a lateral movement of the engaged counter-stop and of the counter-stops to the right thereof against the spring-pressed plunger 136, to permit the carriage to be properly located in a letter-space position during a rearward tabulating operation; the counter-stops being engaged by the column-stops on the left-hand face or opposite side when back tabulating.

Provision is made to automatically open the motor-circuit when the carriage is back tabulated, to prevent the burning out of the motor, which may otherwise result from carelessness of the typist in retaining the denomination-selecting key 42 depressed after the carriage is arrested at the selected position. For this purpose, there is provided a stopping means for said motor, which may comprise an auxiliary switch 139 (Figure 4) mounted on the tabulator-bracket 45 and suitably insulated therefrom. The auxiliary switch comprises a pivoted member 139^a, which may be operated against a spring 139^b to open the switch 139 by the sidewise movement of the plungers 61, which is effected by the carriage through the column-stop 55, thus opening the circuit to stop the motor.

It will be understood that if a column-selecting key of a column which the carriage has not yet entered is depressed, the interponent 90 is moved up idly by the column-selector-key-lever 43 (Figure 8), thus leaving the motor-starting universal bar 113 in its ineffective position; and consequently a forward tabulation of the carriage is effected upon the depression of one of the denomination-selector-keys 43.

To permit the column-selecting keys to be operated for forward tabulating of the carriage without interfering with the motor-starting universal bar 113, the latter has a series of cut-outs 140, into which the column-

selecting-key-levers 43 may move, when depressed.

It is desirable to render the carriage-releasing mechanism ineffective, so as to keep the feed-rack 32 in engagement with the escapement-pinion 31, during a backward-tabulating operation of the carriage. To do this, the interponents 90, associated with the column-selecting key-levers 43, are each provided with an upwardly-projecting arm 141, which engages an extension 142 of the universal bar 67, to move the latter rearwardly to cut-outs 143 in the plungers 61 (Figure 13), and out of effective relation with the projections 66 of said plungers, so that the plungers may be operated without effecting the operation of the release-bar, thus leaving the feed-rack 32 in mesh with the pinion 31. The release-bar 67 may be returned by means comprising forked arms 144, extending upwardly from, and secured to, a rock-shaft 145, pivotally supported in brackets 146 on the machine frame 40; the arms 144 embracing the rock-shaft 68 to which the universal bar 67 is secured. The rock-shaft 68 may be guided in slots 146^a of arms 146^b, extending from the tabulator-bracket 45. A return-spring 147 is provided to restore the release-bar to its effective position.

It should be understood that the means to render the carriage-releasing means ineffective could be used effectively without the carriage-reversing means, in which case, if the operator selected a position which required a rearward movement of the carriage, the latter would not be reversed, but would simply remain unmoved, thus notifying the operator that the carriage is to be moved rearwardly, which may be done by hand; the carriage being arrested by stops, as above described.

The star-wheel 92 may be located relatively to the counter-stops 75, so as to be operated each time the carriage moves forwardly from the counter-stop 75 corresponding to the lowest denominational position of a column, or, in other words, each time the last digit is typed in a column. Thus, the carriage moves the ledge 100 of the reverse-feed-determining device 88 into effective relation with the interponent 90 associated with the column-selecting key of the vacated column, the interponent 90 being at this time in its normal position, and consequently the column-selecting key is rendered effective for back-tabulating.

During a back-tabulating operation of the carriage, the star-wheel is operated as the carriage re-enters a vacated column, thus shifting the reverse-feed-determining device to move the ledge 100 thereof out of effective relation with the interponent 90 of the column-selector-key corresponding to the re-entered column, consequently rendering

said column-selector-key effective for forward tabulating of the carriage.

Each denomination-selector-key-lever 58 is provided with a projection 148, which moves down in back of the motor-starting universal bar 113 (Figure 13), when the latter is in its effective position, so as to prevent its return and a consequent opening of the switch 125, when the ledge 100 moves out of engagement with the interponent 90 of the operated column-selector-key, which takes place prior to the arresting of the carriage in the selected position in a back tabulation of the carriage.

The strap or band 131 may be connected directly to the carriage 22. By connecting it to the line-space handle, however, as previously described, the platen may be automatically line-spaced during the backward-tabulating operation of the carriage, thus eliminating the necessity of the typist to operate the line-space handle prior to making an entry. This is of especial advantage when typing a single column of numbers. The star-wheel 92, it will be remembered, is so positioned to be operated to set the reverse-feed-determining device into effective relation with the column-selector-key of the vacated column, after the last digit is typed. Consequently, if said column-selecting-key is operated, the carriage is returned and the platen line-spaced upon the depression of the denomination-selector-key of the predetermined position.

Mechanism is provided to prevent a premature return of the column-selecting mechanism which would otherwise result if the typist released the operated column-selector-key before the operated denomination-selecting mechanism, in which case the latter would be ineffective to arrest the carriage. For this purpose, interlocking means is provided which may comprise a universal bar 150 pivotally supported at 151 on fixed brackets 152. The universal bar may extend crosswise of the connections comprising the key-levers 58 of the denomination-selecting mechanism, so as to be operated by any one of said key-levers to swing a cross-bar 153, which may be part of the universal bar 150, into holding relation with a hook-like projection 154 on the operated column-selecting connection or key-lever 43; the column-selector-key-lever 43 being operated prior to the denomination-selector-key-lever as previously described. The hook-like projections 154, of which there is one for each column-selector-key-lever 43, may be pivoted at 155 thereon and held in their normal positions against stop-pins 156 by springs 157. The projections 154 rest against the cross-bar 153, as in Figure 1, and hold the universal bar in its normal position. Consequently, when the universal bar 150 is operated, it swings all the projections 154

against the tension of the springs 157, except the projection of the operated column-selector-key-lever 58, over which the locking bar or cross-bar 153 moves. Thus, it will be seen (Figures 8 and 13) that the typist may remove the finger from the column-selecting key 41, and, by holding the denomination-selector-key 42 operated, the column-selecting key 41 cannot return; consequently preventing a premature return of the column-selecting mechanism including the column-selecting frame 48 and the associated parts. The universal bar may be provided with notches 158 in register with the column-selector-key-levers 43 to permit their depression without interfering with said universal bar.

It will be understood that the interlocking means between the column-selecting mechanism and the denomination-selecting mechanism is equally effective during backward tabulating of the carriage, and that, since the column-selector-key is held in its operated position by the universal bar 150, the return of the motor-starting universal bar 113 is also prevented, so as to keep the switch 125 closed.

The denomination-selecting mechanism may be used independently of the column-selecting mechanism for such classes of work in which the carriage is tabulated forwardly to successive columns.

When a denomination-selector key 42 is depressed independently of a depression of a column-selector key 41, the associated counter-stop 75 is projected directly by the denomination-selector key into the path of the column-stop 55. This is caused by a cross-bar 160 of an obstructing frame 161, normally held in position (Figures 1 and 5) by the column-selector frame 48; there being, for this purpose, an extension 162 on the upwardly-projecting arm 51 of the column-selector frame 48, the extension engaging a rearwardly-extending arm 163 of the obstructing frame 161. Each plunger 61 has a cam 160^a thereon to engage the bar 160 on the upward movement of the plunger to move the counter-stop 75 into the path of the column-stop 55 (Figure 6), the release of the carriage being effected at the same time by the universal bar 67, as hereinbefore described, so that it may be moved to the selected position where it is arrested by a column-stop coming into engagement with the projected counter-stop.

The cross-bar or universal bar 63 of the counter-stop-operating frame 64 is moved forwardly by the operated plunger 61, and may lock the rest of the plungers against operation by moving over shoulders 164 on the plungers.

It will further be understood, although the denomination-selector keys 42 are normally effective to project the counter-stops

75 into the path of the column-stops 55, that, as soon as a column-selecting key 41 is operated, the denomination-selecting keys are rendered ineffective to project their associated counter-stops, this being due to the fact that the guide-bar 160 is unlocked by the column-selecting frame 48; the projection 162 thereon moving out of engagement with the arm 163 of said guide-bar; consequently the guide-bar moves idly upward when one of the plungers 61 is operated by its associated key 42. The backward pull of the return-spring 62 is great enough to hold the counter-stops from moving outwardly; thus the denomination-selecting keys are ineffective to move the counter-stops into the path of the column-stops after a column-selecting key is operated, the denomination-selecting keys being effective to cause the carriage to project the counter-stops through the medium of the column-determining device 53 and the operating frame 64.

The invention may also be used to rapidly position the carriage when typing the date, name and address of a letter. To do this, the column-stops 55 may be set at positions corresponding to the date, name, street and city. The "4" column-selector-key may then be depressed, and the denomination-selector-key of lowest order (which may be the units key) may be operated, whereupon the carriage is tabulated forwardly or backwardly, according to the position from which it is to be moved, to the date position. After the date is typed, the "1" column-selector-key is depressed and the units denomination-selecting key operated to start the carriage-motor to line-space the platen and return the carriage until it is arrested in the name position. If the name, street and city should appear in stepped relation, the "2" and "3" column-selecting keys may be operated successively with the units denomination-selecting key in a similar manner to so position the carriage. The carriage may be returned to the beginning of a paragraph in a similar manner by first operating a column-selecting key and then depressing the denomination-selecting key.

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

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a carriage, of a set of column-keys to select the column to which the carriage is to be moved, a set of denominational keys to select the denomination to which the carriage is to be moved in the selected column, and carriage-moving means thrown into action by the successive actuation of a key of one set and a key of the other set to move the carriage in either di-

rection, according to its position, to the position selected by the column-key and denominational key operated.

2. In a typewriting machine, the combination of a carriage, movable back and forth, column-selecting means comprising keys and column-controlling means settable by said column-selecting keys, denomination-selecting keys, and means settable by said denomination-selecting keys to determine the denominational position in which the carriage is to be arrested, the first-mentioned settable means being operable by the carriage, when the latter reaches the corresponding column, in either direction, to operate the second-mentioned settable means to arrest the carriage at the selected position.

3. In a typewriting machine, the combination of a transversely movable carriage, column-stops, a counter-stop, and means for tabulating the carriage in either direction, comprising column-selecting means including keys and column-controlling means settable by the column-selecting keys and operable by the carriage to move the counter-stop into the path of the selected column-stop and arrest the carriage in the selected column.

4. In a typewriting machine, the combination of a transversely movable carriage and means to effect tabulation of the carriage to a selected denominational position in a selected column by a single movement of the carriage in either direction, said tabulating means comprising column-stops on said carriage, denomination-selecting mechanism including selectively settable denominational stops and column-selecting mechanism including column-determining means settable in accordance with the column selected, and operable by the column-stop corresponding to the selected column to operate the selectively set denominational stop and move the same into the path of the column-stop corresponding to the selected column.

5. In a typewriting machine, the combination of a carriage, movable back and forth, column-stops on said carriage, a set of denominational stops arranged side by side, column-selecting mechanism, a cam-member extending crosswise of the set of denominational stops, said cam-member being substantially as long as the breadth of the set of denominational stops, and settable by said column-selecting mechanism in accordance with the column selected, denomination-selecting mechanism to selectively set any one of said denominational stops, and projections on said column-stops differently positioned thereon in accordance with the corresponding columns so as to engage and operate said cam-member only when the latter is selectively positioned to

be engaged thereby, and means whereby actuation of said cam-member will effect movement of the set denominational stop to position the carriage at the selected denomination, in the selected column, by a single movement of the carriage.

6. In a typewriting machine, the combination of a carriage, movable back and forth, column-stops, counter-stops, column-selecting mechanism including a cam-member extending crosswise of and normally located adjacent said counter-stops, and said cam-member being settable so that it may be engaged by any one of the column-stops, and so shaped that it may be actuated by the carriage when the latter is moved into the selected column in either direction, operating means actuable by said column-stops through the intermediary of said cam-member, and means to set said counter-stops, one at a time, into effective relation with said operating means, so that the latter may move the effective counter-stop into the path of the column-stop engaging with the cam member, when the carriage is moved in either direction.

7. In a typewriting machine, the combination of a carriage, column-stops on said carriage and having engaging portions arranged in stepped relation in accordance with the corresponding column, denominational stops, a frame for operating said denominational stops to bring them into the path of the column-stops but normally ineffective on said denominational stops, a device pivoted on said operating frame to be moved into different positions to be engaged by different ones of said engaging portions and operated thereby to actuate said operating frame, column-selecting keys, a frame universal to and actuable by said column-keys through varying distances to move said device into position to be actuated by one of said engaging portions, and denomination-selecting keys to move a denominational stop corresponding to a selected denomination into effective relation with said frame, to be moved by the latter into the path of the column-stop of the selected column when the carriage reaches that column.

8. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, column-selecting keys, cams operable by said column-selecting keys, a universal bar operable through varying distances by said cams, a device settable by said universal bar, so that it may be engaged by any one of said column-stops, operating means comprising a frame upon which the settable device is carried, and denomination-selecting keys to move counter-stops into effective relation with said operating means, said carriage being effective through the column-stop corresponding to

a selected column, to actuate the operating said frame through the intermediary of the settable device, to move the effective counter-stop into the path of the column-stop of the selected column.

9. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, counter-stops, an operating frame, means to connect any one of said counter-stops with said operating frame, and a settable device operatively connected with said operating frame and operable by said column-stop, when set in accordance with the corresponding column, to actuate said operating frame to move the connected counter-stop into the path of the column-stop.

10. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, an operating frame, keys to selectively connect any one of said counter-stops with said operating frame, a settable device pivoted on said operating frame and operable, when properly positioned, by the column-stop of the selected column to actuate said operating frame and move the connected counter-stop into the path of the column-stop, and keys to selectively set the device.

11. In a typewriting machine, the combination of a carriage, a column-stop, counter-stops, operating means, means to connect any one of said counter-stops with said operating means, and means operable by said carriage to move the connected stop into the path of the column-stop, said operating means being effective to lock the disconnected counter-stops against actuation.

12. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, counter-stops, operating means, means to connect any one of said counter-stops with said operating means, means engageable by the column-stop to actuate said operating means to move the connected counter-stop into the path of the column-stop, and shoulders on said counter-stops, said operating means comprising a universal bar which is moved into effective relation with said shoulders to lock the disconnected counter-stops against actuation.

13. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denomination-selecting keys, plungers having denominational stops at their upper ends, said plungers being operable by said keys, and means actuable by said column-stop and effective upon any one of said denominational stops whose plunger has been operated by the corresponding key to move the denominational stop on which it is effective at right angles to the movement caused by the operation of the corresponding denominational key, to bring the denominational stop into the path of the column-stop.

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14. In a typewriting machine, the combination of a carriage, column-stops, denominational stops, a movable universal guide-bar, and keys to operate any one of said denominational stops, to move them against said guide-bar, to enable the guide-bar, when actuated, to move the operated denominational stop into the path of the column-stops.

15. In a typewriting machine, the combination of a carriage, column-stops on said carriage, a set of plungers having at their upper ends denominational stops, cams for said plungers, and a universal bar with which said cams engage to move the denominational stop of an operated plunger into the path of the column-stops.

16. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a set of vertically disposed plungers having at their upper ends denominational stops, keys to move said plungers upwardly, a guide-rod near the lower ends of said plungers, and means to swing the operated plunger about said guide-rod, to bring the denominational stop of the operated plunger into the path of the column-stop.

17. In a typewriting machine, the combination of a carriage, a stop-bar on said carriage, column-stops on said stop-bar, a set of plungers having denominational stops at their upper ends, said denominational stops being located in back of said stop-bar, a universal bar, and keys to operate said plungers to cause the latter to engage said universal bar individually to move the denominational stop on the operated plunger forwardly into the path of the column-stops.

18. In a typewriting machine, the combination of a carriage, a stop-bar on said carriage, column-stops on said stop-bar, denomination-selecting mechanism comprising a set of plungers with denominational stops located to one side of the stop-bar, means to guide the lower ends of said plungers substantially vertically, and means to guide the upper ends of said plungers to cause them to move substantially horizontally, to bring the operated denominational stop into the path of the column-stops.

19. In a typewriting machine, the combination with a carriage, of a set of column-selecting keys, a set of denomination-selecting keys, carriage-shifting means thrown into action, by the successive actuation of a key of one set and a key of the other set, to move the carriage in either direction according to its position with reference to the position selected by the column-selecting key and the denomination-selecting key operated, and carriage-arresting means in which a preliminary column-selecting condition has been set up by the column-selecting key depressed and a preliminary denomination-selecting condition has been set up by the denomina-

tion-selecting key depressed, said carriage-arresting means being rendered effective by said carriage when the latter reaches the selected column.

20. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denominational stops, operating means, means to move any one of said denominational stops into effective relation with said operating means, and means on said carriage to actuate said operating means to move the effective denominational stop into the path of the column-stop.

21. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denominational stops, operating means comprising a universal bar, and means to cause any one of said denominational stops to embrace the universal bar of said operating means, said column-stop being effective to actuate said operating means to move the connected denominational stop into the path of the column-stop.

22. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denominational stops, operating means, and a set of keys, one for each denominational stop, whereby the denominational stops may be selectively moved in one direction into effective relation with the operating means, the column-stop being effective to actuate said operating means to move the effective denominational stop crosswise of the path of the movement imparted thereto by the operated key.

23. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denomination-selecting keys, plungers having denominational stops at their upper ends, each plunger being movable in one direction by its associated key, means to move the denominational stop of the operated plunger at right angles to the first direction of movement of the plunger, to bring the denominational stop into the path of the column-stop, and means to lock the other plungers against actuation when one of the plungers is operated.

24. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, denomination-selecting keys, plungers having counter-stops at their upper ends, each plunger being movable in one direction by its associated key, means to move the counter-stop of the operated plunger at right angles to the first direction of movement of the plunger, to bring the counter stop into the path of the column-stop, and a locking bar, said locking bar being movable by the operated plunger to lock the other plungers against actuation.

25. In a typewriting machine, the combination of a carriage, column-stops on said carriage, denomination-selecting keys, plungers having counter-stops at their upper

ends, each plunger being movable in one direction by its associated key, means to move the counter-stop of the operated plunger at right angles to the first direction of movement of said plunger, to bring the counter-stop into the path of the column-stops, and a pivoted universal bar, each plunger having a cut-out, so that any plunger, when operated, may embrace the universal bar to swing the latter into locking relation with the other plungers to prevent their actuation.

26. In a typewriting machine, the combination of a carriage, column-stops, counter-stops, a guide-bar, keys to operate said counter-stops to move them against said guide-bar, said guide-bar being effective to move the operated counter-stop into the path of the column-stops, and locking means operable by the counter-stop when the latter is moved into the path of the column-stops, said locking means being effective to prevent the operation of the ineffective counter-stops.

27. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a set of vertically-disposed plungers having at their upper ends counter-stops, keys to move said plungers upwardly, a guide-rod near the lower ends of said plungers, means to swing the operated plunger about said guide-rod, to bring the counter-stop of the operated plunger into the path of the column-stop, and a universal bar, each plunger having a slot extending lengthwise thereof, so that it may, when operated by its associated key, embrace said universal bar, so that the universal bar may be swung into locking relation with the ineffective counter-stops.

28. In a typewriting machine, the combination of a carriage, movable back and forth, column-stops, column-selecting mechanism, a counter-stop, means to set said counter-stop from its normal position to a preliminary position for tabulating, and counter-stop-actuating means settable by said column-selecting mechanism and actuable by the column-stop corresponding to the setting of the settable means, when the carriage is moved in either direction into the selected column, to move the set counter-stop from its preliminary position to a final effective position to arrest the carriage in the selected column at the conclusion of a single movement of the carriage.

29. In a typewriting machine, the combination of a carriage, a set of column-selecting keys operable to select any one of a plurality of columns, a set of denomination-selecting keys operable to select a position in the desired column, and means to effect movement of the carriage either forwardly or backwardly to the predetermined position, said means being controlled automatically in accordance with the position of the

carriage and the selected column and being actuable by the keys of one of said sets.

30. In a typewriting machine, the combination of a carriage, a set of column-selecting keys operable to select any one of a plurality of columns, a set of denomination-selecting keys operable to select a position in the selected column, and means to effect movement of the carriage either forwardly or backwardly to the predetermined position in the selected column, said means being controllable in accordance with the position of the carriage with reference to the selected column and being actuable by said denomination-selecting keys.

31. In a typewriting machine, the combination of a carriage, a set of column-selecting keys operable to select any one of a plurality of columns, a set of denomination-selecting keys operable to select a position in the selected column, means to move the carriage forwardly, means to move the carriage backwardly, and automatically-controlled means to determine which carriage-moving means should be effective to position the carriage, when a key of one of said sets is operated.

32. In a typewriting machine, the combination of a carriage, a set of column-selecting keys operable to select any one of a plurality of columns, a set of denomination-selecting keys operable to select a position in the desired column, and means associated with one set of keys, to effect movement of the carriage either forwardly or backwardly to the predetermined position comprising devices, one for each of the last-mentioned set of keys, for determining the direction of movement of the carriage and means to control said devices in accordance with the position of the carriage.

33. In a typewriting machine, the combination of a carriage, column-selecting mechanism including a set of keys, to determine the position to which the carriage should be moved, means to propel said carriage in a letter-feed direction, carriage-reversing means, carriage-releasing means operable to effect a forward movement of the carriage, interponents operable by said keys, and a settable element to determine whether the carriage-releasing means or the carriage-reversing means should be effective when one of the keys is operated.

34. In a typewriting machine, the combination of a carriage, column-selecting mechanism including a set of keys, to determine the position to which the carriage should be moved, means to propel said carriage in one direction, carriage-reversing means, carriage-releasing means operable to effect a forward movement of the carriage by the propelling means, reverse feed-starting means, interponents associated with said column-selecting keys, and a device settable

by the carriage into effective relation with the interponents as the columns are vacated by said carriage, so that the interponent associated with the column-key of the vacated column may be operated by its associated key, to render the carriage-releasing means ineffective and the reverse-feed-starting means effective.

35. In a typewriting machine, the combination of a carriage, means to propel said carriage forwardly, carriage-reversing means, column-selecting mechanism including keys, denomination-selecting means including keys, carriage-releasing means including a universal bar normally effective to be operated by the denomination-selecting means, reverse feed-starting means including a universal bar operable by the denomination-selecting means to start said carriage-reversing means, interponents operable by the column-selecting keys, and a device settable relatively to the interponents to determine which universal bar should be effective after a column-selecting key is operated, the denomination-selecting means being effective by the operation of one of the denomination-selecting keys to operate the effective universal bar to effect the movement of the carriage to the selected position.

36. In a typewriting machine, the combination of a carriage, column-stops on said carriage, means to propel said carriage forwardly, carriage-reversing means, column-selecting means including a set of keys, denomination-selecting means including a set of keys, denomination-stops, connections between the denomination-selecting keys and said denomination-stops, carriage-releasing means to be operated by said connections to release said carriage, interponents operable by the column-selecting keys, a device settable relatively to said interponents to determine whether or not the interponents should be operated when the associated column-selecting key is operated, and reverse-feed starting means, each interponent when operated being effective to render the carriage-releasing means ineffective, and render the reverse-feed starting means effective, so that the latter may be operated by one of said connections to start the carriage-reversing means.

37. In a typewriting machine, the combination of a carriage, means to propel said carriage forwardly, carriage-reversing means, column-selecting means, denomination-selecting means, carriage-releasing means normally effective to be operated by said denomination-selecting means, starting means for said carriage-reversing means, devices, operable by said column-selecting means, for determining the direction of movement of the carriage, and an element settable relatively to said devices, so that any one of said devices may be operated to

render the carriage-releasing means ineffective, and the reverse-feed starting means effective, so that the latter may be operated by the denomination-selecting means to effect a reverse movement of said carriage to the selected position.

38. In a typewriting machine, the combination of a carriage, means to propel said carriage in a letter-feed direction, carriage-escapement mechanism including a pinion, a feed-rack on said carriage to mesh with said pinion, column-stops on said carriage, column-selecting mechanism including keys, denomination-selecting mechanism including keys, carriage-releasing mechanism normally effective to be operated by said denomination-selecting mechanism to release said carriage by disengaging the feed-rack from said pinion, direction-determining devices associated with the column-selecting keys, an element settable into effective relation with said devices by means engaging with the column-stops on said carriage, carriage-reversing means, and starting means therefor, said devices being effective when operated to render said starting means effective and the carriage-releasing mechanism ineffective to retain the feed-rack in mesh with the pinion when the carriage is reversed.

39. In a typewriting machine, the combination of a carriage, column-stops on said carriage, at columnar positions thereof, column-selecting keys, one for each column-stop, interponents associated with said column-selecting keys, carriage-returning means, carriage-return-determining means, means operable by each column-stop to move said carriage-return-determining means into effective relation with the interponent of the corresponding column-selecting key, a carriage-return motor, motor-starting means, said carriage-return-determining means being effective to cause the interponent to be operated by the operation of the corresponding column-selecting key, to set the motor-starting means, denomination-selecting keys, said motor-starting means, after it is set, being operable by any one of the denomination-selecting keys to start said carriage-return motor, and counter-stops, one for each denomination-selecting key, to arrest said carriage in a predetermined denominational position of the selected column.

40. In a typewriting machine, the combination of a carriage, movable back and forth, column-selecting means including key-levers, column-stops on said carriage, and means operable by said column-stops to determine whether the carriage should be moved forwardly or backwardly when a column is selected by one of the key-levers.

41. In a typewriting machine, the combination of a carriage, movable back and forth, column-selecting means including key-levers, interponents associated with said

key-levers, and an obstructing device to be moved into and out of effective relation with said interponents, to determine whether the carriage should be moved forwardly or backwardly when a key-lever is operated.

42. In a typewriting machine, the combination of a carriage, movable back and forth, column-selecting means including keys, column-stops on said carriage, interponents associated with said keys, an obstructing device to be moved into effective relation with the interponents, one by one, as the carriage vacates the columns corresponding with the keys, and means operable by said interponents, whereby the return of the carriage to the corresponding column may be effected.

43. In a typewriting machine, the combination of a carriage, column-stops on said carriage, a co-operative stop, means including a key-lever to operate said co-operative stop, means to release said carriage, so that it may be arrested by said co-operative stop, means settable by said column-stops as the carriage moves in a letter-feed direction, a carriage-return motor, and interponents operable, by said key-lever, to engage said settable means, to set a motor-starting member to a position where the latter may be operated to start the motor.

44. In a typewriting machine, the combination of a carriage, movable back and forth, column-selecting mechanism for said carriage, devices corresponding to the various columns, said devices being associated with said column-selecting mechanism, each device being ineffective before the carriage enters the corresponding column, means movable into effective relation with said devices individually as the carriage vacates the corresponding columns, so that any one of the devices of the vacated columns may be operated by the column-selecting mechanism to determine the backward movement of the carriage.

45. In a typewriting machine, the combination of a carriage, movable back and forth, column-stops on said carriage, column-selecting keys, means to determine the direction in which the carriage is to move, said means being settable by said carriage as it passes through the various columns, column-determining means settable by the column-selecting keys into effective relation with the column-stop of the selected column, and a counter-stop operable by the column-determining means when the latter is operated by said carriage.

46. In a typewriting machine, the combination of a carriage, movable forwardly and backwardly, column-stops on said carriage, means to propel said carriage forwardly, column-selecting mechanism, a counter-stop, means to release said carriage, to permit it to be moved by the propelling means until

it is arrested by the counter-stop, an element settable by the carriage, and means to engage said element to render the carriage-releasing means ineffective, when the carriage is to be moved to a vacated column.

47. In a typewriting machine, the combination of a carriage, movable forwardly and backwardly, column-stops on said carriage, means to propel said carriage forwardly, column-selecting mechanism, a counter-stop, means to release said carriage, to permit it to be moved by the propelling means until it is arrested by the counter-stop, and an element settable by the carriage, to determine whether or not the carriage-releasing means should be effective when the carriage is to be moved to a selected column.

48. In a typewriting machine, the combination of a carriage, driving means for said carriage, column-stops, a counter-stop, keys, bell-cranks associated with said keys, an element settable by said carriage relatively to said bell-cranks, said bell-cranks being operable when the settable element is in co-operative relation therewith, and means operable by any one of the bell-cranks, whereby the driving means may be rendered effective.

49. In a typewriting machine, the combination of a carriage, driving means for said carriage, column-stops, a co-operative stop, key-levers, intermediate levers pivoted on said key-levers, an obstructing element settable by said carriage into and out of effective relation with said intermediate levers, each key-lever being effective to swing its associated intermediate lever about its pivot when the obstructing element is in effective relation therewith, and means operable by the intermediate levers, whereby the driving means may be rendered effective.

50. In a typewriting machine, the combination of a letter-feeding carriage, column-selecting mechanism, denomination-selecting mechanism, carriage-returning means, normally ineffective starting means for the carriage-returning means, and means operable by said column-selecting mechanism to render said starting means effective, so that it may be operated by the denomination-selecting mechanism to start said carriage-returning means to move said carriage to a selected position.

51. In a typewriting machine, the combination of a letter-feeding carriage, column-selecting mechanism including keys, denomination-selecting mechanism including keys, carriage-returning means comprising a motor normally ineffective, starting means for said motor, and means operable by the column-selecting keys to render said starting means effective, so that it may be operated by the denomination-selecting keys to start said motor to return said carriage to a selected position.

52. In a typewriting machine, the combination of a letter-feed carriage, column-stops on said carriage, a counter-stop, column-selecting keys, one for each column, means settable by said keys, means to propel the carriage in a letter-feed direction, carriage-reversing means, means including a key to set the counter-stop and release said carriage, means on said carriage to operate the settable means to actuate the set counter-stop to arrest the carriage in a selected column, a reverse-feed-determining device, and means operable when the carriage vacates a column to render said reverse-feed-determining device effective for the vacated column, so that the carriage-reversing means may be rendered effective to return the carriage to any one of the vacated columns by operating the column-selecting key corresponding to the desired column and operating the counter-stop setting key.

53. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a column-key, means settable by said key, a counter-stop, means including a key to set said counter-stop, means to feed the carriage in a letter-space direction, carriage-reversing means, an interponent associated with the column-key, and reverse-feed-determining means settable by the carriage into effective relation with said interponent as the carriage moves in a letter-feed direction, and as it passes out of a column, so that the interponent may be operated by the column-key to render the carriage-reversing means effective to return said carriage to the vacated column, said carriage being effective to operate the settable means to move the counter-stop into the path of the column-stop to arrest said carriage.

54. In a typewriting machine, the combination of a carriage, column-stops on said carriage, column-selecting keys, a column-determining device settable by said column-selecting keys, a counter-stop, means including a key to set said counter-stop, means to feed the carriage in a letter-space direction, carriage-reversing means, interponents associated with the column-selecting keys, reverse-feed-determining means settable by the carriage into effective relation with said interponents as the carriage moves in a letter-feed direction, and as it passes out of a column, so that the interponents may be operated by the column-selecting keys, a universal bar operable by said interponents, and means operable by said universal bar, so that the last-named means may be operated by the counter-stop setting key to start the carriage-reversing means to return said carriage, said carriage being effective to operate the column-determining device to

move the set counter-stop into the path of the column-stops to arrest the carriage.

55. In a typewriting machine, the combination of a letter-feeding carriage, carriage-returning means, a key, normally ineffective starting means for said carriage-returning means, means to set said starting means into effective relation with said key, so that it may be operated thereby to effect the return of said carriage, and carriage-arresting means controlled by said key.

56. In a typewriting machine, the combination of a letter-feeding carriage, carriage-returning means, keys, normally ineffective starting means for said carriage, means to set said starting means into effective relation with said keys, so that it may be operated by any one of the keys to effect the return of said carriage to a position dependent upon the operated key, and stops to arrest said carriage.

57. In a typewriting machine, the combination of a letter-feeding carriage; stops on said carriage; carriage-returning means; tabulating mechanism comprising keys, counter-stops, and connections between the keys and the counter-stops; normally ineffective starting means for said carriage-returning means, said starting means comprising a universal bar; and means to set said universal bar into effective relation with said connections, so that it may be operated by any one of the connections to effect the return of said carriage to a position dependent upon an operated key.

58. In a typewriting machine, the combination of a letter-feeding carriage; stops on said carriage; carriage-returning means; tabulating mechanism comprising keys, counter-stops, and connections between the keys and the counter-stops; normally ineffective starting means for said carriage-returning means, said starting means comprising a universal bar; means to set said universal bar into effective relation with said connections, so that it may be operated by any one of the connections to effect the return of said carriage to a position dependent upon an operated key; and means to retain the universal bar in effective relation with the connection actuated by the operated key.

59. In a typewriting machine, the combination of a letter-feed carriage, column-selecting mechanism, denomination-selecting mechanism, carriage-driving means including a motor, starting means comprising a normally ineffective universal bar, and means operable by said column-selecting mechanism to render the universal bar effective, so that it may be operated by the denomination-selecting mechanism to start the motor to drive the carriage to a selected position.

60. In a typewriting machine, the combination of a letter-feeding carriage, carriage-returning means, a key, normally ineffective starting means for said carriage-
 5 returning means, means to set said starting means into effective relation with said key, so that the starting means may be operated thereby to effect the return of said carriage, carriage-arresting means, and means to prevent the moving of the starting means out of
 10 effective relation with said key while the latter is operated.

61. In a typewriting machine, the combination of a letter-feeding carriage, carriage-
 15 driving means, key-operated means, normally ineffective starting means for said carriage-driving means, means to set said starting means into effective relation with said key-operated means, so that the driving
 20 means may be operated thereby to effect the driving of said carriage, carriage-arresting means, and means on said key-operated means to retain the starting means effective while said key-operated means is in its oper-
 25 ated position.

62. In a typewriting machine, the combination of a carriage, column-stops on said carriage, means to propel said carriage in a letter-feed direction, carriage-returning
 30 means, column-selecting mechanism comprising a key and an interponent associated therewith, a device operable by said key, an element settable by the column-stops into and out of effective relation with said device, denomination-selecting means comprising
 35 a key, starting means for the carriage-returning means, said starting means being normally ineffective and shiftable to an effective position when the interponent is
 40 operated by said column-selecting key, and means to keep said starting means in effective relation with the denomination-selecting key after said element has been moved out of effective relation with the interponent
 45 by the return of said carriage.

63. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising keys, denomination-selecting mechanism comprising keys, carriage-returning means, starting means comprising a normally ineffective universal bar, a device settable by the carriage, and inter-
 50 ponents to engage the settable device and operable by the column-selecting keys to set the universal bar into effective relation with the denomination-selecting keys, so that the
 55 universal bar may be operated by any one of the denomination-selecting keys to start the carriage-returning means.

64. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising keys, denomination-selecting mechanism comprising keys, a carriage-return motor, a switch in the motor

circuit, a normally ineffective universal bar, 65
 a device settable by the carriage, and interponents to engage the settable device and operable by the column-selecting keys to set the universal bar into effective relation with the denomination-selecting keys, so that the
 70 universal bar may be operated to close the switch to start the motor.

65. In a typewriting machine, the combination of a carriage, carriage-driving means, column-selecting mechanism comprising 75
 keys, column-stops, a counter-stop, a key to render the counter-stop effective, starting means comprising a normally ineffective universal bar, a device settable by the carriage, and interponents to engage the set-
 80 table device and operable by the column-selecting keys to set the universal bar into effective relation with the counter-stop key associated therewith, so that the universal bar may be operated to start the carriage-
 85 driving means.

66. In a typewriting machine, the combination of a carriage, column-selecting mechanism including a set of keys, denomination-selecting mechanism including a set
 90 of keys to determine the position to which the carriage should be moved, two devices to effect the movement of the carriage, one of said devices being operable to effect a forward movement of the carriage, the other
 95 device being operable to effect a rearward movement of the carriage, interponents operable by one set of keys, and an element settable relatively to said interponents to determine which device should be effective
 100 when one of the interponents is operated.

67. In a typewriting machine, the combination of a carriage, means to propel said carriage forwardly, tabulating mechanism including arresting means for said carriage,
 105 means operable by said tabulating mechanism to release said carriage, so that it may be moved forwardly by said propelling means, and means to render the carriage-releasing means ineffective when the carriage
 110 is to be tabulated to a position which requires a backward movement of the carriage.

68. In a typewriting machine, the combination of a carriage, means to propel said carriage forwardly, tabulating mechanism
 115 including arresting means for said carriage, carriage-releasing means, an element settable by said carriage, and means operable to engage with said element and render the carriage-releasing means ineffective when the
 120 carriage is to be tabulated to a position which requires a backward movement of the carriage.

69. In a typewriting machine, the combination of a carriage, means to propel said
 125 carriage forwardly, tabulating mechanism including arresting means for said carriage, escapement mechanism for said carriage,

said escapement mechanism including a pinion, a feed-rack on said carriage meshing with said pinion, means operable by said tabulating mechanism to disengage said feed-rack from said pinion to release said carriage, so that the latter may be moved forwardly by said propelling means to a predetermined position, and means to render said carriage-releasing means ineffective when the carriage is to be tabulated to a position which requires a backward movement of the carriage.

70. In a typewriting machine, the combination of a carriage, means to propel said carriage forwardly, denomination-selecting mechanism, means operable by said denomination-selecting mechanism to release said carriage, so that the latter may be moved forwardly by said propelling means, column-stops on said carriage, column-selecting mechanism, said denomination-selecting mechanism comprising counter-stops to engage with said column-stops to arrest said carriage at a predetermined position, means settable relatively to said column-selecting mechanism as the carriage vacates a column, and means to engage with said settable means and operable by said column-selecting mechanism, to render said carriage-releasing means ineffective when the carriage is to be tabulated to a position in a vacated column.

71. In a typewriting machine, the combination of a carriage, means to propel said carriage in a letter-feed direction, carriage-escapement mechanism including a pinion, a feed-rack on said carriage to mesh with said pinion, tabulating mechanism comprising stops to arrest the carriage when the latter is moved either forwardly or backwardly, carriage-releasing means to be operated by said tabulating mechanism to move said feed-rack out of mesh with said pinion, carriage-reversing means, starting means operable by said tabulating mechanism to start said carriage-reversing means, a settable device, and means to co-operate with said settable device to render said starting means effective, and to render said carriage-releasing means ineffective, so as to retain the feed-rack in mesh with said pinion during the rearward movement of said carriage.

72. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising key-operated connections, denomination-selecting mechanism comprising key-operated connections and spring-pressed pawls on said last-named connections, and locking means comprising a universal bar held in its normal position by the spring-pressed pawls, said universal bar being operable by any one of the denomination-selecting connections to bring it into

locking relation with the pawl of an operated column-selecting connection, to retain the column-selecting connection in its operated position until the operated denomination-selecting connection is restored to its normal position.

73. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, key-operated means normally effective to operate said counter-stops to bring them individually into the path of the column-stops, column-selecting mechanism, and means operable by said column-selecting mechanism to render said key-operated means ineffective to move the counter-stops into the path of the column-stops.

74. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, key-operated means normally effective to operate said counter-stops to bring them individually into the path of the column-stops, column-selecting mechanism, means operable by the column-selecting mechanism to render said key-operated means ineffective to move the counter-stops into the path of the column-stops, and means operable by the column-selecting mechanism to bring the counter-stops under the control of the carriage.

75. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, denomination-selecting keys normally effective to operate said counter-stops to bring them individually into the path of the column-stops, column-selecting mechanism including keys, and means operable by the column-selecting keys to render the denomination-selecting keys ineffective to move the counter-stops into the path of the column-stops.

76. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, denomination-selecting keys normally effective to operate said counter-stops to bring them individually into the path of the column-stops, column-selecting mechanism including keys, means operable by the column-selecting keys to render the denomination-selecting keys ineffective to move the counter-stops into the path of the column-stops, and means operable by each column-selecting key to bring the counter-stops under the control of the carriage.

77. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, denomination-selecting keys associated with said counter-stops, means normally effective to cause said counter-stops to move individually into the path of the column-stops when the associated key is operated, column-selecting mechanism, means operable by said column-

selecting mechanism to render the first-mentioned means ineffective, and means rendered effective by said column-selecting mechanism to be engaged by said carriage 5 to operate the counter-stops.

78. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, denomination-selecting keys associated with the counter-stops, a normally effective guide-bar, locking means for said guide-bar to cause said counter-stops when operated by their keys to move individually into the path of the column-stops, column-selecting mechanism, 15 means operable by said column-selecting mechanism to unlock said guide-bar to render it ineffective, and a column-determining device to be engaged by said carriage to operate the counter-stops.

79. In a typewriting machine, the combination of a carriage, column-stops on said carriage, counter-stops, denomination-selecting keys for said counter-stops, said keys being normally effective to move their associated counter-stops into the path of the column-stops to assist in positioning the carriage in successive columns, column-selecting mechanism, means operable by said column-selecting mechanism to render the denomination-selecting keys ineffective to move their associated counter-stops into the path of the column-stops, and operating means settable by the column-selecting mechanism and actuable by said carriage, said denomination-selecting keys being effective to connect their associated counter-stops individually with said operating means. 30

80. In a typewriting machine, the combination of a carriage, column-stops on the carriage, denominational stops, denomination-selecting keys normally effective to move the denominational stops into the path of the column-stops, column-selecting keys, means operable by said column-selecting keys to render the denomination-selecting keys ineffective to move their associated denominational stops into the path of the column-stops, and means operable by said carriage to move the denominational stops into the path of the column-stop at the selected column of the carriage. 40

81. In a typewriting machine, the combination of a carriage, column-stops on said carriage, denominational stops, denomination-selecting keys, an element normally effective to cause any one of the denominational stops when actuated to move into the path of the column-stops, column-selecting mechanism, the latter, when operated prior to the operation of one of the denomination-selecting keys, being effective to render said element ineffective, so that any one of the denomination-selecting keys, when operated subsequently to the operation of the column-

selecting mechanism, is ineffective to move the associated denominational stop into the path of the column-stops, operating means with which any one of the denominational stops may be connected, and means on the carriage to actuate said operating means to move the connected denominational stop into the path of the column-stops when the column-stop at the selected column comes into range of the denominational stops in the travel of said carriage. 65 70 75

82. In a typewriting machine, the combination of a carriage, means to drive said carriage, key-operated means, an operating device settable by the carriage, means to engage said device, said last-named means being actuable by said key-operated means to start the driving means, and means to arrest the carriage at a predetermined position. 80

83. In a typewriting machine, the combination of a carriage, means to drive said carriage, denomination-selecting mechanism including keys, means operable by any one of the denomination-selecting keys to start the driving means, and stopping means for the driving means, said stopping means being operable by the denomination-selecting mechanism as the carriage reaches a selected position. 85 90

84. In a typewriting machine, the combination of a carriage, an electric motor to drive said carriage, a normally open switch, a normally closed switch in the motor circuit, and denomination-selecting mechanism including a key to close the first-mentioned switch to start the motor to return said carriage, the second-mentioned switch being opened by said denomination-selecting mechanism to stop said motor as the carriage reaches a selected position. 95 100 105

85. In a typewriting machine, the combination of a carriage, a column-stop, a counter-stop movable into the path of the column-stop, said counter-stop being so supported as to be given a sidewise movement when engaged by the column-stop during a return movement of the carriage, means to return said carriage, key-operated means to set said counter-stop and to start the carriage-returning means, and stopping means operable by a sidewise movement of said counter-stop, when engaged by the column-stop, to stop the carriage-returning means as the carriage reaches the position determined by said stops. 110 115 120

86. In a typewriting machine, the combination of a carriage, an electric motor to return said carriage, column-stops on said carriage, a normally open switch, a normally closed switch in the circuit, and denomination-selecting mechanism including keys and counter-stops, the latter to be engaged by the column-stops, the first-mentioned switch being operable by said keys to effect the return 125

of said carriage by said motor, the second-mentioned switch being operable by a side-wise movement of any one of the counter-stops to open the motor circuit to stop the motor as the carriage reaches the selected position.

87. In a typewriting machine, the combination of a letter-feeding carriage, column-selecting mechanism, denomination-selecting mechanism, carriage-returning means, normally ineffective starting means for the carriage-returning means, means operable by said column-selecting mechanism to render said starting means effective, so that it may be operated by the denomination-selecting mechanism to start said carriage-returning means to return said carriage to the selected position, and means operable by said denomination-selecting mechanism as the carriage reaches the selected position to render the carriage-returning means ineffective.

88. In a typewriting machine, the combination of a letter-feeding carriage, column-stops on said carriage, column-selecting mechanism including keys, denomination-selecting mechanism including keys, carriage-restoring means comprising a motor, normally ineffective starting means for said motor, means operable by the column-selecting keys to render said starting means effective, so that it may be operated by the denomination-selecting keys to start said motor to return said carriage to the selected position, said denomination-selecting mechanism including counter-stops to be engaged by the column-stops on said carriage to arrest the latter, said counter-stops having a sidewise movement when engaged by said column-stops, and means operable by said counter-stops during the sidewise movement thereof to stop said motor.

89. In a typewriting machine, the combination of a carriage, means to return said carriage, denomination-selecting mechanism including a key, normally ineffective means to start the carriage-returning means, means to render the starting means effective, so that it may be operated by said key, and stopping means for said carriage-returning means, said stopping means being operable by said carriage when the latter reaches the selected position.

90. In a typewriting machine, the combination of a carriage, an electric motor to return said carriage, a normally open switch, a normally closed switch in the motor circuit, a normally ineffective universal bar, denomination-selecting mechanism including a key, and means to set the universal bar into effective relation with said key, so that the latter may operate the universal bar to close the first-mentioned switch, to cause the return of said carriage by said motor, the second-mentioned switch being opened by said denomination-selecting

mechanism to stop the motor when the carriage has reached the selected position.

91. In a typewriting machine, the combination of a letter-feeding carriage, a platen in said carriage, line-spacing mechanism for said platen, a carriage-return motor, a switch in the motor circuit, column-selecting mechanism, denomination-selecting mechanism, and means operable by the denomination-selecting mechanism to close the switch to effect the line-spacing of the platen and the return of the carriage by said motor.

92. In a typewriting machine, the combination of a carriage, means urging the carriage in a letter-feeding direction, an escapement mechanism to control the movement of the carriage in the letter-feeding direction, column-stops on said carriage, a counter-stop to be moved into the paths of said column-stops, counter-stop-actuating means actuable by the column-stops irrespective of the direction of movement of the carriage, column-keys to select the column-stop to actuate the counter-stop-actuating means, carriage-return means, and column-key-actuated means effective, in accordance with the position of the carriage, either for releasing the escapement mechanism to permit movement of the carriage in the letter-feeding direction, or for starting said carriage-return means.

93. In a typewriting machine, the combination of a carriage, means urging the carriage in a letter-feeding direction, an escapement mechanism to control the movement of the carriage in the letter-feeding direction, column-stops on said carriage, a counter-stop to be moved into the paths of said column-stops, counter-stop-actuating means actuable by the column-stops irrespective of the direction of movement of the carriage, column-keys to select the column-stop to actuate the counter-stop-actuating means, carriage-return means, column-key-actuated means effective, in accordance with the position of the carriage, either for releasing the escapement mechanism to permit movement of the carriage in the letter-feeding direction, or for starting said carriage-return means, and means to render said carriage-return means ineffective upon engagement between the counter-stop and a column-stop when the carriage is being returned by said carriage-return means.

94. In a typewriting machine, the combination with a carriage, of means urging the carriage in a letter-feeding direction, an escapement mechanism to control the movement of the carriage in the letter-feeding direction, column-stops at letter-space intervals, a counter-stop to co-operate with said column-stops, counter-stop-actuating means actuable by the column-stops, irrespective of the direction of movement of the carriage, to cause engagement between the counter-

stop and the column-stop actuating the same, column-keys to select the column-stop to actuate the counter-stop-actuating means, carriage-return means, and column-key-actuated means effective, in accordance with the position of the carriage, either for releasing the escapement mechanism to permit movement of the carriage in the letter-feeding direction, or for starting said carriage-return means.

95. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a counter-stop arranged behind the path of travel of the column-stop, said counter-stop extending downwardly and being pivoted at its lower end and an actuator for said counter-stop, said actuator being pivoted intermediate its ends, the upper end of said actuator being movable rearwardly through the medium of the column-stop by a movement of the carriage, the lower end of the actuator engaging the counter-stop to swing it forwardly about its pivot and into the path of the column-stop to arrest the carriage.

96. In a typewriting machine, the combination of a carriage, column-stops, a counter-stop, column-selecting means comprising an actuator, key-levers to cause a relative setting between the actuator and the column-stops, carriage-returning means, intermediate levers pivoted on said key-levers, a universal bar operable by said intermediate levers, means operable by said universal bar to render said carriage-returning means effective, and an engaging portion on the actuator to be selectively engaged by the column-stop of the selected column to operate said actuator to move the counter-stop into the path of said selected column-stop.

97. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising key-levers, a carriage-return motor, intermediate actuators operable by said key-levers, a universal bar operable by said actuators, and a switch to be closed to start said motor by said universal bar when the latter is operated by any one of said actuators.

98. In a typewriting machine, the combination of a carriage, column-selecting mechanism comprising key-levers, a motor for said carriage, intermediate actuators operable by said key-levers, a universal bar operable by said actuators, and a starting device for said motor, said starting device being operable by the universal bar when the latter is actuated by said key-levers.

99. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a counter-stop, an actuator for the counter-stop, column-selecting keys to set said actuator into effective relation with any one of the said column-stops, carriage-advancing means to be rendered effective by

said keys, carriage-returning means to be rendered effective by said keys, and a device settable by said carriage to determine whether the carriage-advancing means or the carriage-returning means shall be effective when one of the keys is operated.

100. In a typewriting machine, the combination of a carriage, a column-selecting mechanism comprising key-levers, a carriage-return motor, intermediate actuators operable by said key-levers a universal bar operable by said actuators a switch to be closed by said universal bar to start said motor, escapement mechanism for said carriage, a carriage-advancing motor, and releasing means operable by said key-levers to set the carriage free of the escapement mechanism, each intermediate actuator being effective to render said releasing means ineffective when the carriage-return motor is rendered effective by the actuation of the associated key-lever.

101. In a typewriting machine, the combination of a letter-feeding carriage, a tabulator-key-lever, a driving device to move the carriage in the letter-feeding direction, means to limit the action of said driving device to letter-space movements of the carriage, a second driving device to move the carriage in the reverse direction, said driving devices being renderable effective, one at a time, by said key-lever to effect tabulating movements of the carriage, means to automatically determine which one of the driving devices is to effect a tabulating movement of the carriage when the key-lever is actuated, and means to arrest the carriage.

102. In a typewriting machine, the combination of a carriage, a column-stop on said carriage, a key-lever, a driving device to move the carriage in one direction, a driving device to move the carriage in a reverse direction, said driving devices being renderable effective, one at a time, by said key-lever, means operable by the column-stop to determine the driving device to be effective when the key-lever is actuated, and means to arrest the carriage.

103. In a typewriting machine, the combination of a carriage, column-selecting keys, a letter-feeding motor for said carriage, escapement mechanism to control the letter-feeding movements of said carriage, carriage-releasing means, a carriage-return motor, means operable by said keys to render said carriage-return motor effective, a device operable by said carriage, the effectiveness of the carriage-releasing means or the carriage-return motor, when one of the column-selecting keys is operated, being dependent upon the position of said device, and means to arrest the carriage.

104. In a typewriting machine, the combination with a main frame, of a carriage on said main frame, a column-stop on said car-

riagē, a pivoted counter-stop on said main frame, a counter-stop actuator pivoted intermediate its ends, and means to set one end of the actuator into effective relation with the column-stop, so that the actuator may be operated by said column-stop when the carriage is moved, the outer end of said actuator engaging with the counter-stop to swing it about its pivot into effective relation with the column-stop to arrest the carriage.

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