Feb. 8, 1938. J. A. B. SMITH 2,107,397

TYPEWRITING MACHINE

Filed Jan. 3, 1933 5 Sheets-Sheet 1

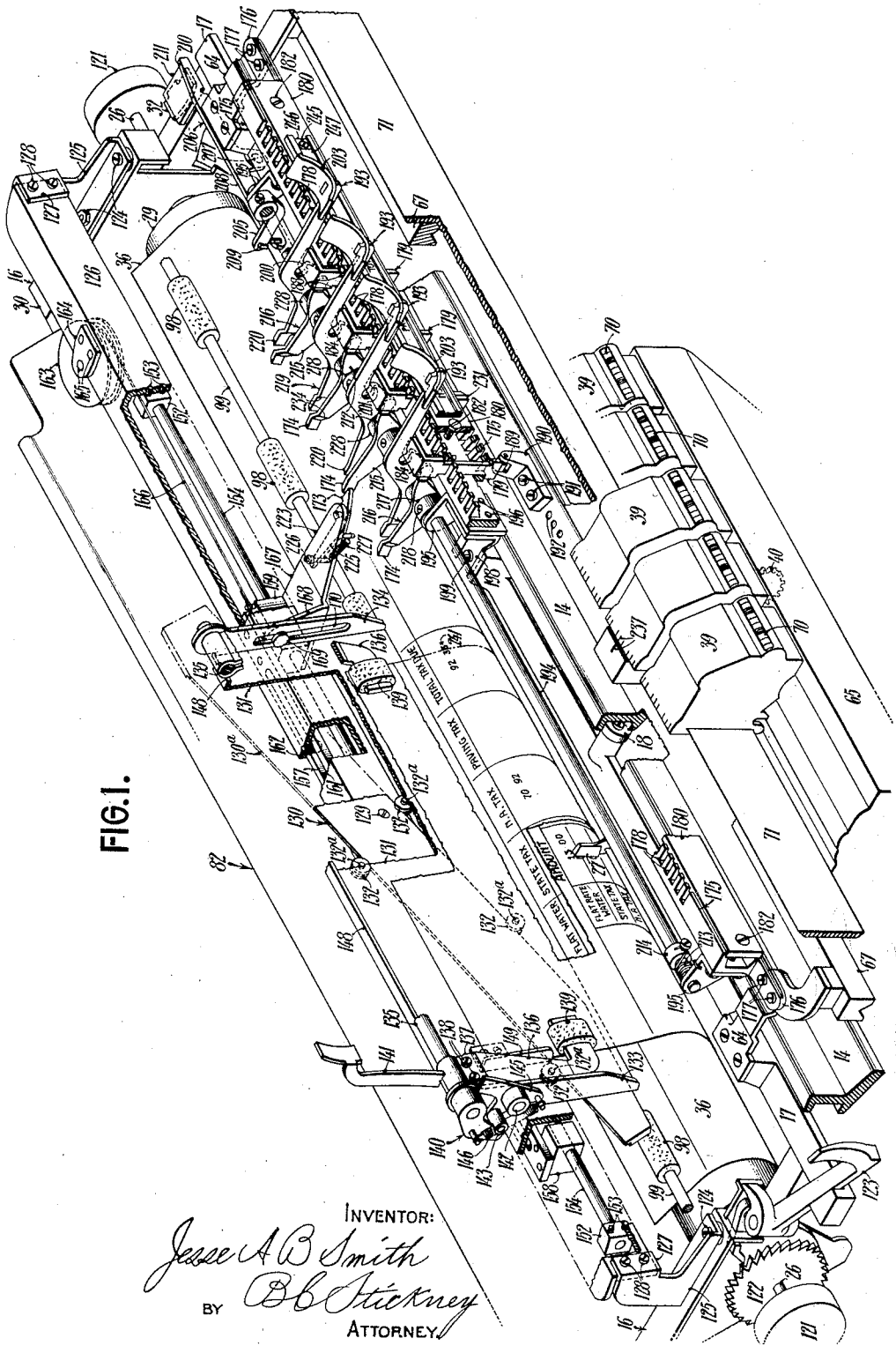


FIG. 1.

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TYPEWRITING MACHINE

Filed Jan. 3, 1933 5 Sheets-Sheet 2

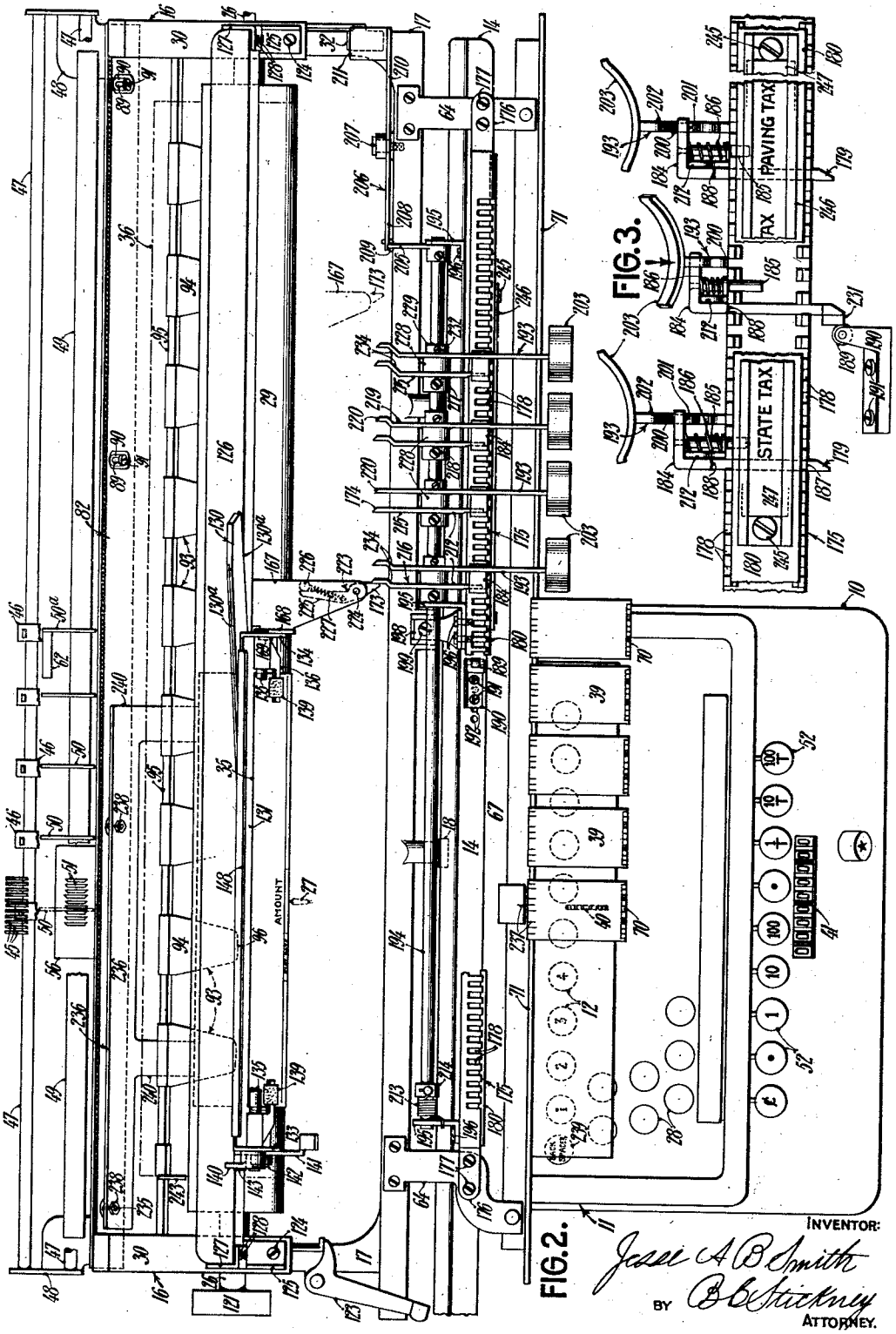


FIG. 2.

FIG. 3.

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TYPEWRITING MACHINE

Filed Jan. 3, 1933 5 Sheets-Sheet 3

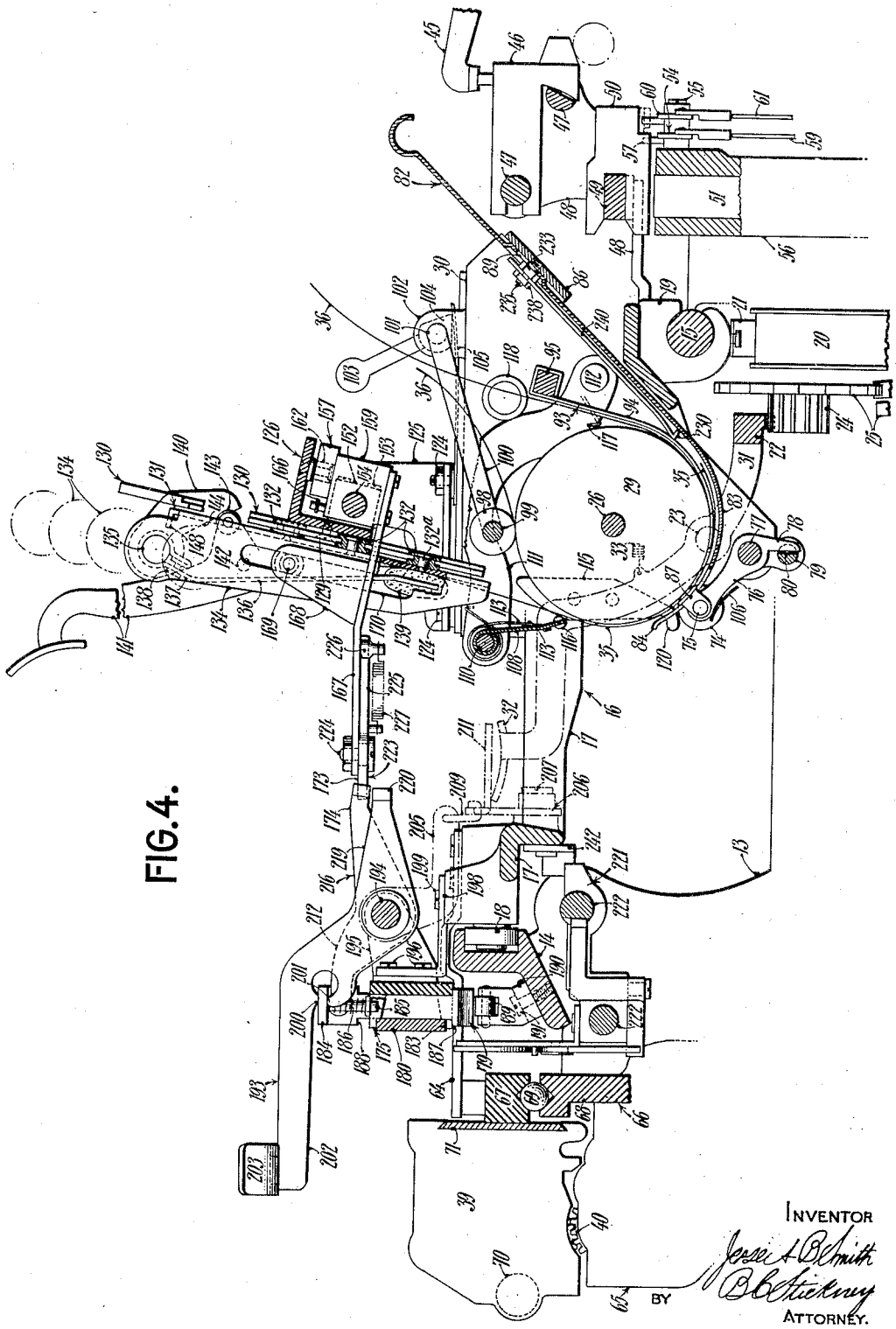


FIG. 4.

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TYPEWRITING MACHINE

Filed Jan. 3, 1933 5 Sheets-Sheet 4

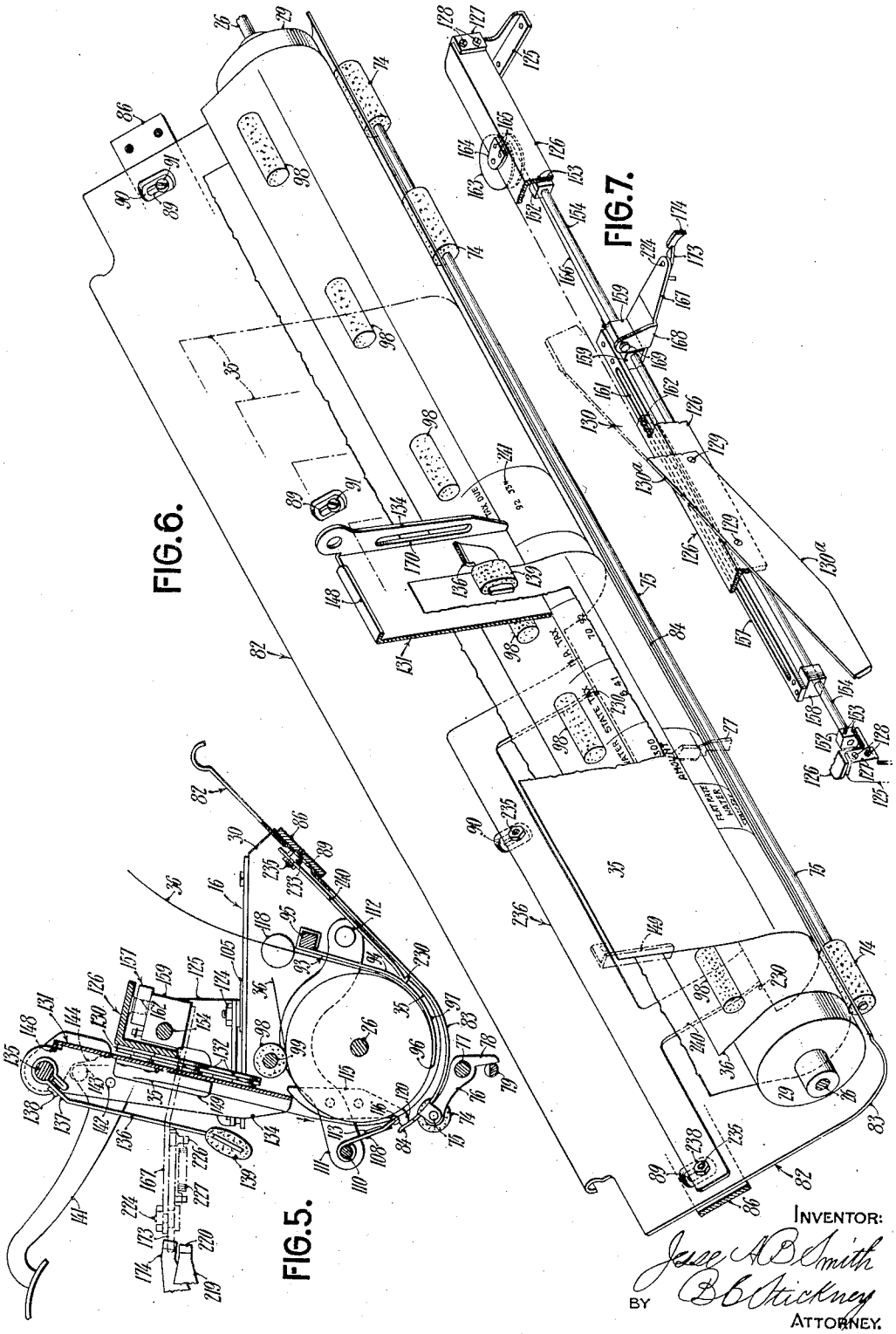


FIG. 6.

FIG. 7.

FIG. 5.

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Feb. 8, 1938. J. A. B. SMITH 2,107,397

TYPEWRITING MACHINE

Filed Jan. 3, 1933 5 Sheets-Sheet 5

FIG. 8.

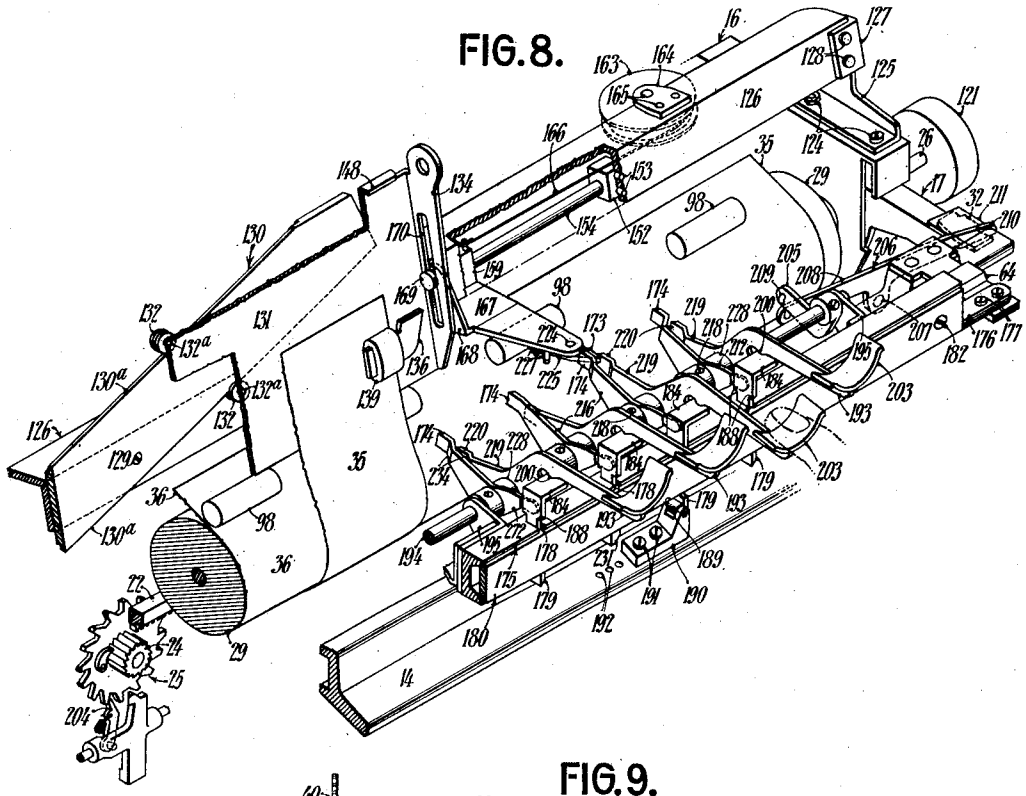
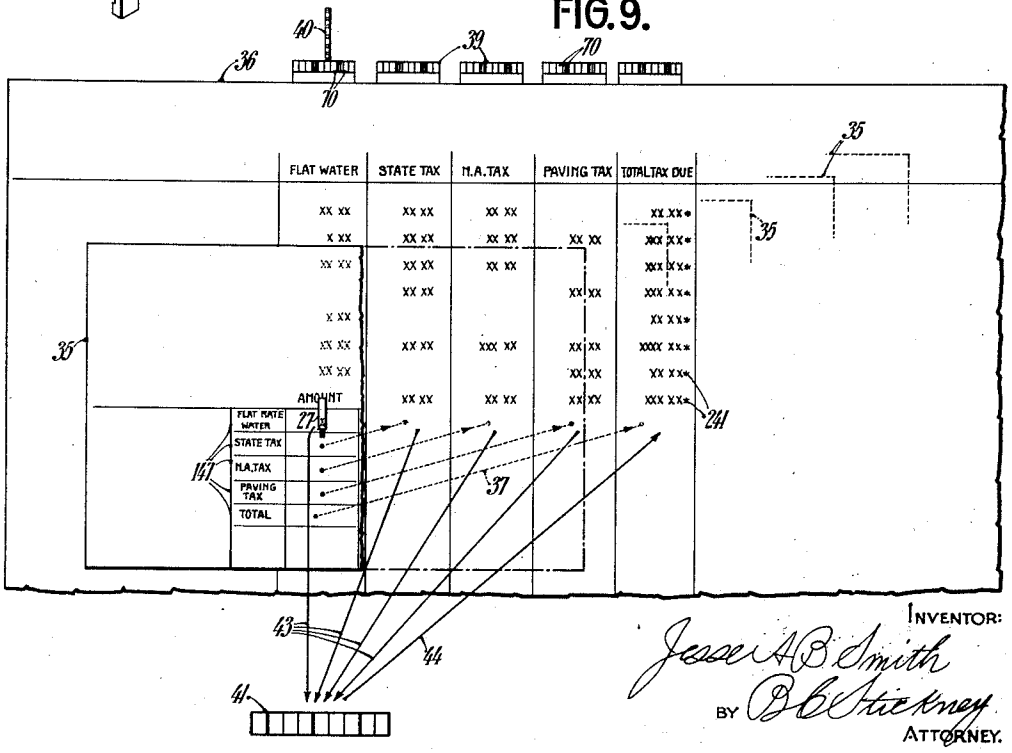


FIG. 9.



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Patented Feb. 8, 1938 2,107,397

UNITED STATES PATENT OFFICE

2,107,397

TYPEWRITING MACHINE

Jesse A. B. Smith, Stamford, Conn., assignor to Underwood Elliott Fisher Company, New York, N. Y., a corporation of Delaware

Application January 3, 1933, Serial No. 649,902

22 Claims. (Cl. 197—127)

This invention relates to sheet-collating mechanism for use in typewriter-manifolding of bills and recording sheets or loose leaves, and especially to machines of the kind which, instead of making a carbon-copy that is an exact duplicate of the original copy in every way, types the items one under another upon one sheet, but at the same operation types one item by the side of another, in a single line, upon another sheet.

After the manifolding of each item, the sheets are recollated relatively to each other, and represented to the types with each sheet occupying a new position. The bill is line-spaced, so that the next item will be typed below the last; while the recording or accounting sheet is not line-spaced, but is shifted to one side, so that the next item will be typed alongside the last and in the same line therewith. Thus the sheets are collated anew after typing of every item, and this recollation is effected automatically by the present invention in an improved manner.

In the patent to Farnham, Smith and Phelps, 1,071,612, of August 26, 1913, a typewriting machine is provided with one letter-feeding carriage which carries the customer's statement or bill-sheet, while upon another carriage is mounted the record-sheet. By complicated individual movements of the separate carriages, the sheets are shifted relatively to each other and also relatively to the types, after the manifolding of every item.

According to certain features of the present improvements, re-collating of work-sheets may be easily and simply performed upon a simple and inexpensive single letter-feeding carriage, having novel automatic mechanism. In the present improvements both sheets are passed around one platen, and after an item is manifolded by means of the types, the record-sheet is shifted laterally relatively to the type-system, so that the next item may be typed in the next column on the record-sheet, in the same line as the last. There is no line-spacing of the record-sheet between items. Concomitantly with the described lateral shifting of the record-sheet, the relatively small bill-sheet is line-spaced, so that the next item will be typed thereon under the last.

These superposed sheets being upon one carriage, and said carriage needing to be tabulated in order to effect the described lateral shifting of the record-sheet, it results that temporarily the bill-sheet is also shifted laterally by the carriage when shifting the record-sheet; but this temporary shifting of the bill-sheet is automatically corrected. In other words, the bill-sheet is back-spaced, so that the items typed thereon may have the arrangement of a column extending down the page.

The next typed item therefore falls under the last on the bill-sheet and to the right of the last on the record-sheet, in line therewith. This recollation of the sheets and re-presentation of the sheets to the types is effected without attention from the operator, who needs only to operate a column-tabulator for shifting the record-sheet; the line-spacing and back-spacing of the bill-sheet being accomplished automatically.

The carriage is tabulated under the control of column-skipping keys, so that a column may be left blank. It is also a feature of the invention to provide a line-space skipper, so that a corresponding blank line will be left in the single column which is being typed on the bill-sheet. Hence, at the column-skipping operation of the carriage, the bill-sheet is line-skipped or advanced an extra line-space. There is thus effected a recollation of the bill and record-sheet after skipping both a line on the bill-sheet and a column on the record-sheet.

The superposed sheets extend around the platen, but the upper end of the bill-sheet is clipped to a truck, shuttle or carrier, which automatically pulls up the bill-sheet for line-spacing, independently of the record-sheet. This truck is lifted by means of a cam which is brought into use by the carriage in tabulating from one column to another. While the truck and bill-sheet incidentally are shifted along the carriage, this shifting is temporary, as they are automatically back-shifted, so as to keep the typewriting in the same column on the bill-sheet. The platen therefore is not used to line-feed the bill-sheet in the usual way. There are no feed-rolls to hold the bill-sheet against the platen, but said bill-sheet is free to move independently of the record-sheet.

At the conclusion of manifolding the group of entries on the bill and record-sheet, the bill is withdrawn, but the record-sheet is retained, and line-spaced, and a fresh bill-blank is inserted. The record-sheet extends between the platen and the bill. Feed-rolls run upon the record-sheet, outside the field that is occupied by the overlying bill. The bill-truck may be pressed down, so that it may present the first line on the bill to the types.

To gain the foregoing ends, the machine is provided with a double carriage, or rather with a carriage having a sheet-truck thereon and movable relatively thereto, to permit data to be typed in a single column on a bill and manifolded in

different columns on a record-sheet without line-spacing.

Depression of any one of a set of keys will tabulate the bill or statement-sheet to a desired vertical position in a single column, while simultaneously tabulating the record-sheet to a desired horizontal columnar position, so that data can be typed on the top sheet in a desired place while the same data is manifolded in a different desired place on the record-sheet. Any one of said keys, mounted on the carriage, may move a tabulating stop into the path of a fixed stop on the stationary machine-frame. This key also releases the carriage. Simultaneously the mechanism holding the truck is also tripped, to release it and permit it to move to the right, i. e., in an opposite direction with respect to the movement of the main carriage. The truck is pulled to the right by its spring a distance which is terminated by a stop on the depressed key, so that the key may first be depressed, and the main carriage released, together with the truck. The main carriage may be held under control by the operator by means of the depressed key, which is sufficiently large to serve as a handle, so that the main carriage is either moved to the left in letter-feeding direction or held stationary, as desired, while the truck is moving to the right to abut against a temporary position-determining stop. Then the two carriers travel in letter-feeding direction until the set tabulating stop strikes against the fixed stop on the machine-frame. This sets the first carriage, together with its record-sheet, in the desired position.

The release of the key now frees the truck and permits it to complete its return movement to set the bill-sheet to the desired line-position and at the desired printing-point in said line, and also in a position whereby the truck will be released upon depression of any of the other tabulating keys.

This action of permitting one carrier to travel to the right while the other carrier is traveling to the left, has the effect of retaining the bill-sheet (attached to the truck) in the same column-typing position, while the sheet held by the main carriage is shifted in letter-space direction to bring a desired column to printing-position.

Means is provided on the first carriage to be effective while it is being tabulated to the left to shift the second carriage or truck upward and thereby line-space-tabulate its sheet to the desired line-position in the vertical column.

The bill-sheet truck is upstanding, inclining upwardly and rearwardly substantially tangent to the delivery side of the platen. The bill is front-inserted and is clamped against the truck-face. The truck is brought to a lowermost position, from which it is subsequently raised step by step for line-spacing the bill. This is automatically effected as a result of the incidental movement of the truck lengthwise of the platen.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a perspective view of the typing-machine-carriage organization in which the invention is embodied.

Figure 2 is a top plan view of a combined typewriting and computing machine having a computing base surmounted by the typewriter, the latter having the carriage in which the invention is embodied, and said base including a totalizer usable for cross-adding. Figure 2 shows how the usual tappets on said carriage may be set for operating the computing-base totalizer for cross-adding in order to get a total of the items in each line of the record-sheet.

Figure 3 is a front elevation presenting an enlarged view of the novel tabulating stops for the typing-machine carriage and the associated novel tabulating-key levers.

Figure 4 is a cross-sectional side view of the typing-machine carriage and the upper portion of the typewriter, and showing mainly the bill-truck and novel tabulating devices.

Figure 5 is a fragmentary cross-section view indicating how the typing-machine carriage and the bill-truck are conditioned for introducing a statement-sheet.

Figure 6 is a perspective diagram showing the statement and record sheets positioned in respect to the platen, and indicating how the statement-sheet moves from an initial position to subsequent positions relative to the record-sheet.

Figure 7 is a detached perspective view of the bill-truck and its mounting, parts of the latter being broken away to bring out certain details.

Figure 8 is a perspective view showing one of the novel tabulating-key levers in depressed position, the bill-truck being temporarily held by the column-selecting stop at the rear of said lever, pending the release of said lever by the operator's finger, and the typing-machine carriage being shown as having been moved to the position controlled by the stop-plunger which is depressed by said lever.

Figure 9 is a diagram of the statement and record sheets, indicating how the item-amounts appearing in a vertical column on the statement-sheet are entered in a line extending across the record-sheet and how said item-amounts are transferred to the item-totalizers and to the cross-totalizer.

The invention is illustrated in connection with an Underwood "Universal" typewriting and computing machine (see application of Otto Thieme No. 504,501, filed December 24, 1930), in which a base **10** houses a cross-adder. Said Thieme computing base **10** supports the Underwood typewriting machine which is generally indicated by the number **11**, Figure 2, and which has a keyboard including a row of numeral-type keys **12**. A main frame **13**, Figure 4, of the typewriting machine supports front and rear rails **14** and **15** upon which travels the typing-machine carriage generally indicated by the number **16** and including a carriage-frame **17**. Said carriage-frame rides along the front rail **14** by means of rollers **18** and has at its rear side lugs **19** which ride upon the rear rail **15**. The typing-machine carriage is urged in letter-feeding direction by a spring-motor **20** connected to the carriage by a draw-band **21**.

A letter-feeding rack **22** on the carriage is hung upon pivots **23** so that it may be swung upwardly to release the carriage from a letter-feeding pinion **24** which co-operates with escapement-devices **25** to advance the carriage in letter-feeding steps at each operation of one of the usual type-bar trains, not shown in detail. Each type-bar train includes either a numeral-key **12** or an alphabet-key **28**, these keys being represented in Figure 2. Each type-bar train also includes a type-bar **27** represented in Figures 1 and 6. The type-bars **27** strike against the front of a revoluble platen **29** journaled by means of a shaft **26** in end members **30** of the carriage **16**. The letter-feeding rack **22** has the usual side arms

31, whereby it is hung upon the pivots 23. The right-hand arm 31 is extended upwardly and forwardly beyond the pivot 23 so as to provide the usual depressible finger-piece 32, whereby the rack 22 is raised clear of the pinion 24 for releasing the carriage from the escapement-devices. A spring 33 applied to the extended arm 31 holds the rack 22 in engagement with the pinion 24.

In the diagram at Figure 9 is shown a tax-statement or bill-sheet 35 and a record-sheet 36. Dotted lines 37 indicate how the different tax-items, typed one under another in a single vertical column on the statement-sheet 35, appear all in a single line on the record-sheet in columns spaced across the record-sheet. Lines of entry are made on the record-sheet 36 prior to beginning the typing on the bill 35. The top line or block in the single column on the bill is shown in said Figure 9 as collated over the first column of the record-sheet and with the next lower printing-line which follows the last entered line on said record-sheet.

Preferably a vertical totalizer 39 is represented at the head of each record-sheet column in the Figure 9 diagram, each totalizer 39 serving to accumulate all the amounts entered in the corresponding record-sheet column. The several totalizers 39 are adjusted on the typewriter-carriage 16 in reference to the spacing of the record-sheet columns and to a non-traveling master-gear 40 co-operating with digit-evaluating mechanism driven by the numeral-type keys 12.

In the Figure 9 diagram there is represented a cross-adder 41 in base 10, which serves to accumulate a total of all the tax-item amounts typed in the column on one statement-sheet. The movement of the typewriter-carriage 16, to bring different record-sheet columns into use, is effective to enter the amounts typed in said columns into the cross-totalizer 41, from which the total may be copied in the lowermost block on the statement, and in the last column of the record-sheet. The full lines 43 in the Figure 9 diagram represent the entries of the several tax-item amounts into the cross-totalizer 41 and the full line 44 represents the copying of the cross-total.

The manner of registering amounts in the cross-totalizer 41 is set forth in said Thieme application. Denomination-selecting trains (such as shown in Minton Patent 1,280,065) include each a jack 45, Figures 2 and 4, serving to depress corresponding push-rods not shown, each rod serving when depressed to slightly advance to pin-setting position a rack-bar that subsequently drives one of the dials of the cross-totalizer 41. A vertically-adding numeral-type key 12 is enabled to also set a corresponding digit-pin in the advanced bar, as disclosed by Thieme. As the typewriter-carriage traverses a computing zone at the operation of the numeral-type keys 12 the jacks 45 are operated seriatim by a tappet 46, settable along cross-rods 47 mounted in brackets 48 secured to the rear of the typewriter-carriage frame 17.

Said brackets 48 also support the tabulating rack 49 along which a computing-zone-tabulating stop 50 is settable in appropriate relation to the setting of the computing-zone tappet 46. The zone-tabulating stop 50 may co-operate with any one of a series of denominational stops 51. Each of the latter is in the form of a vertical slide which may be pushed upwardly from the Figure 4 retracted position into the path of the zone-stop 50. Denominational keys 52, Figure 2, elevate the stops 51 and release the letter-feed rack 22.

As seen in Figure 2 a number of jack-operating tappets 46 and corresponding zone-stops 50 may be employed, the Figure 2 set-up being for the record-sheet 36 seen in Figure 9.

The computing base 10 includes a general operator which reciprocates the aforesaid rack-bars that drive the dials of the cross-totalizer 41 according to the digits set up by the type-keys 12.

Automatic initiation of a general-operator cycle is effected as the typewriter-carriage takes its letter-feeding step upon the typing of the last digit of an item-amount in a computing zone. To this end, the zone-stop 50 is employed as a tappet on the typewriter-carriage to engage and operate a lever 54, Figure 4, as the carriage takes said letter-feeding step. The lever 54 is pivoted to a stud 55 fastened to a column 56 of the machine-framework in which the denominational stops 51 are retained. Referring to Figure 4, said lever 54 has extending toward the far side of the pivot-stud 55 an arm which bears a cam-nose 57 which the zone-stop 50 overrides in said letter-feeding step to thereby actuate said lever 54. The latter also has an arm, extending toward the near side of the pivot-stud 55, which is connected by means of the partially shown link 59 to a trip-mechanism forming part of the computing base 10. Operation of said trip-mechanism by means of the lever 54 causes the general operator to cycle the cross-totalizer 41.

The mechanism may be conditioned for subtraction. As the typewriter-carriage enters a subtraction-computing zone, a corresponding stop or tappet 50^a actuates a lever 60 similar to the lever 54, see Figure 4. Lever 60 is connected by a link 61 to a trip which releases means for conditioning the mechanism for subtraction.

There extends leftward of the subtraction-zone stop 50^a the usual finger 62, Figure 2, which depresses the subtraction-lever 60, and thereby actuates the latter as soon as the carriage enters a subtraction-zone, to set the machine to subtraction.

Upon typing the last digit of a subtractive item, the subtraction-zone stop 50^a actuates the cycling-trip lever 54. In the resulting machine cycle the mechanism in the computing base 10 is restored to its normal additive condition.

The vertical totalizers 39 which travel with the typewriter-carriage 16, and the co-operating digit-evaluating mechanism, whereby the vertical totalizers are driven by the pin-setting numeral-type keys, are disclosed in said Thieme application. The vertical totalizer-driving devices are represented at 65, Figure 4, and are supported by a casing 66. Pendant links (not shown) of said mechanism 65 connect the latter to the pin-setting type-keys 12. Said indexing devices 65 include the aforementioned master-gear 40 with which the denominational dial-trains of a kind totalizer coact seriatim, as the latter travels with the typewriter-carriage 16. The carriage-frame 17 has forwardly-extending brackets 64 supporting a cross-rail 67 which rides upon a similar rail 68 by means of antifriction rolls 69. The latter rail 68 is part of the casing 66 for the digit-evaluating mechanism. Each vertical totalizer 39 displays a set of denominational dials 70 and is settable along a bar 71 fastened to the front face of the traveling rail 67.

For positioning and feeding the record-sheet 36 around the typewriter-platen 29 and for front-inserting the statement-sheet 35 over the record-

sheet, there is preferably employed the front-insertion organization shown in the copending application of W. F. Helmond, Serial No. 570,845, filed October 24, 1931 (now Patent No. 1,994,647, dated March 19, 1935). In said Helmond organization lower feed-rolls 74 are rotatable upon a rod 75. For releasing the rolls, the rod 75 is supported upon arms 76, rockable about a fulcrum-rod 77. The rock-arms have downward extensions 78, each arm and its extension constituting a lever whereby a cam-shaft 79, when rotated, is enabled to cast the lower feed-rolls 74 away from the platen. The cam-shaft 79 has flattened portions 80 normally facing the rock-arm extensions 78 as seen in Figure 4. By means of a crank-arm, link and finger-lever (not shown herein), the cam-shaft 79 may be rocked between the Figure 4 and Figure 5 positions.

A rear paper-table 82 has an apron 83 reaching under and around the platen to a point above the lower feed-rolls 74, said apron terminating above said lower feed-rolls in an edge 84 which is flared forwardly to facilitate the front-insertion of the bill or statement-sheet. To further facilitate said insertion, the entire paper-table 82, including its apron 83, is used as a truck or sheet-carrier, and is slidable up and down upon a cross-bar 86 that is supported by the end members 30 of the typewriter-carriage. The truck or table slides in the direction of its inclination. The feed-roll arms 76 swing in substantially the same direction as the slope of the rear portion of the paper-table 82, and the forward part of the apron 83 is attached by means of ears 87 to the feed-roll rod 75, as indicated in Figure 4.

For slidably retaining the rear portion of the paper-table 82 against the cross-bar 86, the rear portion of the paper-table has slots 89 extending in the direction in which the paper-table slides. Said slots 89 are formed in indentations 90, Figure 6, punched in the upper surface of the paper-table to form bosses resting against the cross-bar 86, as seen in Figure 4. The indentations 90 permit the heads of screws 91 to be sunk below the paper-table surface, said screws passing through and fitting the slots 89 to slidably retain the rear portion of the paper-table against the cross-bar 86.

Between the paper-table 82, including its apron 83, and the platen-surface, there is interposed another paper-table 93, in the form of individual fingers 94, seen in Figure 2, the several fingers 94 being mounted on a cross-rod 95 supported between the end members 30 of the typewriter-carriage. Each finger 94 curves around the bottom of the platen and reaches to a point 96 short of the lower feed-rolls 74. The several fingers 94 taken collectively thus form a curved lower apron 97 which is at all times in close contact with the platen 29.

The record-sheet 36 is introduced into the rear throat formed by the paper-table 93 and the platen 29. The top of the record-sheet may be brought above the printing-line and introduced between upper feed-rolls 98 and the platen 29. Said upper rolls 98 co-operate with the lower feed-rolls 74 in line-feeding the record-sheet around the platen after each bill is typed.

In order that the upper feed-rolls 98 may be raised to facilitate the insertion thereunder of the top of the record-sheet 36, said feed-rolls are mounted upon a cross-rod 99 of a bail having side arms 100 pivoted at 101 in ears 102 rising from the end members 30 of the typewriter-carriage. By a handle 103 the bail may be swung to raise the rolls 98. Secured to the journals of the bail are lugs or arms 104, against the ends of which flat springs 105 press upwardly, thereby enabling the bail to press the upper feed-rolls 98 against the platen. The lower feed-rolls may be pressed against the platen by springs 106 pressing upon the lower feed-roll arms 76. The upper feed-roll mechanism is omitted in Figure 2 to avoid obscuring the showing of other parts in said figure.

For front-insertion of the statement-sheet 35, the lower feed-rolls 74 and outer apron 83 are cast off to the Figure 5 position, thereby forming an open throat or passageway between the apron 83 and the platen 29. A plate 108 extending across the front of the platen is normally well above the printing-line, in the position seen in Figure 4.

Said plate may be lowered to the Figure 5 position, where it serves to facilitate the front-insertion of the statement-sheet 35 into the throat formed by the apron 83 and the platen 29. In order that the plate 108 may be thus lowered and its lower edge brought close to the platen, that is to say, between the apron-edge 84 and the platen 29, as seen in Figure 5, it is pivoted upon a cross-rod 110, supported between side arms 111, pivoted to the carriage-frame end members 30 at 112. The upper edge of the plate 108 is curled around the cross-rod 110, and the plate is thereby swingable upon said rod. A spring 113 urges the plate 108 to rotate about the cross-rod for bringing its lower edge toward the platen. Co-operating with said spring 113 for keeping the lower edge of said plate in proper position relative to the platen-surface, there is provided on each carriage-frame end member 30 a cam-plate 115, said cam-plate 115 having a suitably formed front cam-edge, which, under the influence of the spring 113, is followed by lugs 116 projecting from the plate 108. The plate 108 is held in its uppermost position by means of springs 117 applied to the side arms 111, between which said plate 108 is supported.

Said side arms, under the influence of the springs 117, normally abut stops 118 projecting from the carriage-end members 30, and the upper position of the plate 108 is thereby determined. The cam-plates 115 have at their lower ends projections 120 against which the lugs 116 of the plate 108 abut to determine the lowered position of said plate, as seen in Figure 5.

The platen-shaft 26 has the usual finger-knobs 121. The usual Underwood platen-line-space mechanism is represented in Figure 1 by the line-space ratchet-wheel 122 and line-space lever 123.

The bill-truck runs upon a guide, mounted upon the typing-machine carriage, extending lengthwise of the platen and sloping away from the printing-line and toward the right in such degree that the rightward movement thereon of the holder to bring the statement-sheet column back to the proper printing-position for the next item also advances said holder sufficiently to bring the next lower line on the statement-sheet to the printing-line of the platen.

The novel mechanism whereby the statement-sheet or bill 35 is shifted crosswise of the record-sheet to collate its single vertical item-amount column with successive columns of the record-sheet as said record-sheet columns and corresponding vertical totalizers are brought into use, will now be described.

Rising from each carriage-end member 30, and

secured thereto by screws 124, there is a bracket 125 supporting an angle-bar 126 extending lengthwise of and above the platen 29. Each bracket 125 has an ear 127, to which the adjacent angle-bar end is fastened by screws 128. As seen in Figure 1, a downwardly-extending leg of the angle-bar presents a front face parallel to the platen lengthwise. To said front face there is fastened as by screws 129, Figures 1 and 7, an inclined rail-plate 130 having parallel rail-edges 130a sloping upwardly toward the right. Said rail-plate 130 supports for movement lengthwise of the platen a movable holder or truck for the statement-sheet 35. Said holder may be in the form of a plate 131 facing the rail-plate 130 and provided at its rear side with rollers 132 which contact with the upper and lower inclined edges of the rail. The rollers 132 may be grooved or flanged to prevent derailing and may be pivoted upon studs 132a. The plate 131 thus mounted upon said rail-plate 130 presents a front face or paper-table which stands substantially at a tangent with the front or delivery side of the platen and against which the statement-sheet 35 may be clamped. The sides of the plate 131 have forwardly-projecting left and right flanges 133 and 134, perforated at their upper ends so that a cross-shaft 135 may be journaled therein. Fastened to said cross-shaft, at the inner side of each flange 133, 134, is a downwardly-extending paper-clamp arm 136. Each arm 136 is curled at its upper end around the cross-shaft 135, the curled portion terminating in an extension 137 overlying the body of the arm, so that screws 138 passing through said extension and body may draw the two together, and thereby fasten the clamp-arm 136 upon the cross-shaft 135. Each clamp-arm 136 is formed at its lower end to receive a resilient pad 139, between which and the face of the plate 131 the statement-sheet may be gripped near its side edges, as indicated in Figure 1.

Fastened to the cross-shaft 135, at the outer side of the left flange 133, is a shaft-rotating arm 140 co-operating with a finger-lever 141 for rotating the cross-shaft 135 for releasing the statement-sheet or for causing said sheet to be gripped against the front face of the plate 131. Said finger-lever 141 is pivoted at 142 against the outer side of the left flange 133 of the statement-sheet holder or plate 131.

The finger-lever 141 is provided with an arm carrying a stud or roller 143. By rearward movement of the upper end of the finger-lever 141 to the position seen in Figure 1 or 4, the roller 143 is forced against an edge 144, Figure 4, of the arm 140. The statement-sheet-clamp arms 136 are thereby swung toward the front face of the plate 131, for clamping the statement-sheet against said front face. When the finger-lever 141 is thus swung rearwardly, its roll 143 slightly passes a perpendicular to the edge 144 through the pivot-point.

It will be seen, therefore, that the finger-lever 141 and the statement-sheet-clamp arm 136 are thereby yieldably locked in position to clamp the statement-sheet. The clamping arms 136 have enough resiliency so that they may be slightly flexed, the flexure of said arms insuring a firm gripping of the statement-sheet even though the finger-lever roll has slightly passed said perpendicular.

The finger-lever 141 has another arm 145 connected by a spring 146, Figure 1, to the arm 140 that is fastened to the clamp-shaft 135. When the upper part of the finger-lever 141 is pulled forwardly, its roller 143 recedes from the edge 144 of the arm 140, and the spring 146 is enabled to rotate the cross-shaft 135 to withdraw the clamp-arms 136 and their pads 139 from the front face of the statement-sheet holder or plate 131, as indicated in Figure 5.

It will be seen now that by means of the truck 131 mounted upon the inclined rail 130, the bill 35 may be shifted laterally of the record-sheet, and that said sheet will also be raised or lowered relatively to the printing-line as it is so shifted.

As already explained, the lateral shift of the bill is for the purpose of bringing its single vertical item-amount column into register or collation with successive columns on the record-sheet. The degree of slope of the rail 130 is such that as the bill is shifted from column to column of the record-sheet, the line or block 147, Figure 9, on the bill, corresponding to the record-sheet column to which the bill is shifted, is elevated into proper position with respect to the printing-line. For securing stiffness, the upper edge of the truck 131 may be bent or flanged as at 148. It may also be provided with a side gage 149 for positioning the bill.

The bill or statement-sheet 35, it will be noted, is positioned around the bottom of the platen 29. The bottom feed-rolls 74 which hold the record-sheet 36 are therefore so disposed lengthwise of the platen as not to interfere with the shift of the statement-sheet lengthwise of the platen. In other words, said bottom feed-rolls are disposed to grip the record-sheet only at its sides and are therefore beyond the range within which the statement-sheet is shifted. The portion of the feed-roll rod 75 which lies within said range is therefore not provided with lower feed-rolls.

Key-operated tabulating stops which co-operate for tabulating the bill truck or holder rightward are preferably arranged in a line parallel to the travel of the main carriage. A tongue 157 is provided for shifting the truck rightward, since said tongue may be made to move parallel to the line of travel of the typing-machine carriage, and hence parallel to said line of tabulating stops irrespective of the oblique movement of the truck. Said tabulating keys and stops when mounted on the typing-machine carriage may also serve to operate column-stops for the latter carriage.

A spring-motor mounted upon the typing-machine carriage urges the truck rightward against one or another of the tabulating stops. The carriage is urged leftward in letter-feeding direction by means of its aforesaid spring-motor 20 and is provided with the usual letter-feeding devices for letter-feeding.

The bill-truck is connected to its tongue by means of a sliding connection which permits the truck to move up or down as it travels along the sloping guide.

The bill-truck is driven by the tongue which coacts with novel tabulating stops, to be described. The tongue is guided by the typewriter-carriage, and is movable relatively thereto, so as to shift the bill truck or holder 131 on its oblique rail-plate 130, the truck being movable relatively to the tongue. The latter may work within the corner formed by the legs of the angle-bar 126.

At the rear of the leg of said angle-bar 126 is a pair of blocks 152, secured to said leg by screws 153. The blocks 152 support a guide-rod 154, along which the tongue 157 travels, Figures 1 and 7, the tongue extending forwardly under said leg of the angle-bar 126.

Fastened to the ends of the tongue 157 are blocks 158 and 159, which slidably fit the guide-rod 154. The tongue thus guided along said rod 154 is further guided by means of its longitudinal slot 161; and a roller 162 fitting said slot extends downwardly from the other angle-bar leg.

A spring-drum 163 is pivoted by means of a bracket 164 which enables a spring-drum pivot 165 to be disposed beyond the rear edge of the angle-bar. The spring-drum 163, connected to the tongue by a draw-strap 166, Figures 1, 7 and 8, urges the tongue and truck towards the right.

The block 159 has a forwardly-extending arm 167 having an upturned ear 168. By means of said ear 168 and a headed collar-stud 169 thereon, connection is made to the right flange 134 of the bill-truck.

For accommodating the up-and-down movement of said bill-truck, the headed collar-stud 169 passes through a slot 170 formed in the flange 134, said slot extending in the direction in which the truck 131 moves up and down relatively to the collar-stud 169.

At its forward end, the arm or tongue 167 carries a pivoted counter-stop 173 which coacts with one or another of relatively stationary truck-holding stops 174 operative as will be described.

Novel means for tabulating the typewriter-carriage 16 leftward include a rack 175 spanning the forwardly-projecting brackets 64 that are part of the structure for advancing the vertical totalizers 39 with the typewriter-carriage. Said tabulating rack 175 is in the form of a channel-bar having upper and lower legs, the lower legs being extended beyond the ends of the bar proper, as at 176, Figure 1, to rest upon said brackets 64 and be secured to the latter by screws 177. The channel of the rack-bar 175 faces forwardly, and the upper and lower legs of the rack-bar have spaced slots 178 for receiving vertically slidable stops 179, Figures 1, 3 and 8. For retaining the stops 179 against forward displacement, since the slots 178 themselves are open at their forward ends, a plate 180 faces the fronts of the stops 179 and is secured to the rack-bar by screws 182. Said plate is seated in corners 183 milled in the front edges of the upper and lower legs of the rack-bar 175.

The upper end of each stop 179 has a lateral projection 184 carrying a downwardly-extending pin 185 which retains a coiled compression spring 186 disposed between said lateral projection 184 and the upper side of the rack-bar 175. The pin 185 is so spaced from the body of the stop 179 that when said body is inserted in one of the slots 178, the pin enters an adjacent slot, as seen in Figure 3.

Each column-stop 179 is thus in the form of a depressible self-returning plunger settable in any one of the slots 178. The upward-and-downward movement of the stops 179 may be limited by means of shoulders 187, 188, formed on the rear edges of stops 179 and stopping against the bottom and top of the rack-bar 175. In the upper or retracted positions of the stops 179, the lower ends of the latter clear a counter-stop 189 carried by the framework of the typewriting machine. Said counter-stop is in the form of a roller pivoted in a bracket 190 adjustable to different positions along the front typewriter-carriage rail 14 which is part of said framework. For obtaining said adjustment, screws 191, which secure the bracket 190 to said front rail 14, may be threaded into different ones of a series of holes 192 with which said front rail may be provided.

Each column-selecting stop 179 is provided with an individual key-lever 193, whereby it may be depressed, the key-lever being loosely fulcrumed upon a shaft 194 extending along the rear side of the tabulating rack 175. For supporting said shaft 194 at its ends and at an intermediate point, there extend, from the rear side of the tabulating rack, brackets 195 fastened to said tabulating rack by screws 196. By means of the screws 196 that fasten the bracket 195 which supports the middle portion of the shaft, a rearwardly-extending arm 198 is also fastened to the rear side of the tabulating rack 175.

Said arm 198, fastened to the carriage-frame 17 by a screw 199, serves to brace the tabulating rack 175 in the middle.

Each tabulating key-lever 193 is formed with an upper and lower nose 200, 201, engaging respectively the upper and lower sides of the lateral projection 184 of the corresponding column-stop 179. Said noses are part of a forwardly-projecting arm 202 formed on each key-lever 193, each arm carrying a finger piece or key 203 curved as seen in the drawings to form a concave rest for the operator's finger. Depression of the finger-piece 203 will project the lower end of the stop 179 into line with the counter-stop 189.

Since the typewriter-carriage must be released, upon depression of any key 203 and its stop 179 the shaft 194 is utilized as part of mechanism to effect such release. Said mechanism includes an arm 205 extending rearwardly from shaft 194. A cross-lever 206, pivoted at 207 to the typewriter-carriage, has on one side of the pivot-stud 207 an arm 208 connected by a link 209 to the shaft-arm 205. Extending to the opposite side of the pivot-stud 207, another arm 210 of the cross-lever 206 has a tab 211 overlying the usual and previously described depressible finger-piece 32, whereby the letter-feed rack 22 is released from its pinion 24.

In order that the operation of any key-lever 193 by depressing its key 203 may actuate the shaft 194 for releasing the typewriter-carriage, said shaft has fastened thereto a number of arms 212 extending forwardly of the shaft 194. There is one of said arms 212 for each key-lever 193. Each arm is operatively connected to its key-lever by having the top of its forward end in abutment with the under side of the lateral projection 184 of the tabulating stop 179, it being remembered that said lateral projection 184 is connected to the key-lever 193. By reason of the one-way abutting connection of the arm 212 to the tabulating stop 179 operation of the latter by means of its key-lever 193 will rotate the universal shaft 194, but will not affect any of the other tabulating stops 179 and their respective key-levers 193.

It will be seen now that operation of any tabulating-key lever 193 is attended by depression of its corresponding stop 179 and is also attended by a release of the typewriter-carriage through the medium of the universal shaft 194 and the aforementioned connections extending therefrom to the depressible finger-piece 32. Upon such release of the typewriter-carriage the latter is urged leftward by its spring-motor 20 and is arrested by the striking of the depressed stop 179 against the counter-stop 189.

When the depressed tabulating key 203 is released the depressed stop 179 is retracted upwardly by its spring 186 and at the same time the typewriter-carriage is caused to be restored to the control of its escapement-mechanism by self-restoration of the universal shaft 194 and its

connections to the carriage-release finger-piece 32. Said self-restoration is effected by a torsion spring 213, Figures 1 and 2, having one end anchored to a collar 214, fastened to said shaft 194, the other end of the spring reacting upon the shaft-bracket 195.

It will be remembered that the tongue of the bill-truck normally abuts one or another of the previously mentioned holding stops 174. For effecting rightward tabulating movement, the holding stop 174, against which the counter-stop 173 normally abuts, is withdrawn. Also all the other holding stops 174 to the right are withdrawn from the line of travel of said auxiliary stop 173 and, to this end, all the holding stops 174 may be withdrawn.

Since it is desired to tabulate the auxiliary carriage or truck jointly with the tabulation of the typewriter-carriage, but in the opposite direction, by operation of any one of the key-levers 193, the universal shaft 194 operable by any one of said key-levers is utilized. Each truck-holding stop 174 is therefore formed at the end of an arm 215 extending rearwardly from the universal shaft 194 and combined with the forwardly-extending typewriter-carriage-release arm 212 in a single lever 216 having a hub 217, through which passes a screw 218, by means of which the lever 216 is fastened to the universal shaft 194. There is one of these levers 216 for each of the key-levers 193.

Operation of any one of the key-levers 193 by depression of its key 203 causes all the stops 174 to be withdrawn from the path of the counter-stop 173 in concomitance with the downward projection of the corresponding stop 179 for the released typewriter-carriage.

Each key-lever 193 being related to a certain column-position for the typewriter-carriage, and it being desired that it shall also be related to a corresponding position for the truck, it is contrived to make the operation of any key-lever 193 temporarily interpose in the path of the counter-stop 173 a stop ahead of the truck-holding stop 174, which determines the desired column-position for the bill-sheet. To this end, each key-lever 193 has a rearwardly-extending arm 219, whose rear end forms a column-selecting stop 220. All the stops 220 on the several key-levers 193 are normally in ineffective positions below the counter-stop 173.

All the holding stops 174, however, are, as seen in Figure 4, in the line of said counter-stop 173. The series of holding stops 174 is in such staggered relation relative to the series of column-selecting stops 220 that before a holding stop 174 escapes from the counter-stop 173 when a key-lever 193 is operated, the column-selecting stop 220 corresponding to the operated key-lever 193 will have been interposed in the path of said counter-stop 173. Thus, upon the escape of the auxiliary carriage from the particular holding stop 174 which has been holding the truck, the latter will move rightward to be temporarily arrested by the elevated column-selecting stop 220 corresponding to the operated key-lever 193.

Upon the restoration of the released key-lever 193, the corresponding column-selecting stop 220 will return to its lowered position, and the truck will escape therefrom to jump toward and be arrested by the next holding stop 174; it being understood that all the holding stops 174 are restored to the Figure 4 position by release of the operated key-lever 193.

It will also be understood that while the bill-truck is thus tabulated rightward by the operation of a key-lever 193, the typewriter-carriage will also be tabulated leftward in co-operation with stop 179 which is depressed by the operated key-lever 193.

It is feasible to tabulate the bill-truck alone, in which case the operator, instead of permitting the typewriter-carriage to advance under the pull of its spring-drum 20, holds the typewriter-carriage back by means of the key 203, the latter being made of concave form, as an aid to the operator's finger in holding back said typewriter-carriage.

In order that the truck may be returned after having been tabulated rightward, the counter-stop 173 is made so as to override the holding stops 174 in such return of the auxiliary carriage. The counter-stop 173 is therefore formed as an arm of a lever 223, pivoted to the forwardly-projecting arm 167 of the truck at 224.

A spring 227 yieldably holds the lever 223 so that a rear arm 225 of the latter normally abuts a pin 226 projecting from the auxiliary carriage-arm 167, said pin thus forming an abutment against which the lever 223 reacts while co-operating to hold the auxiliary carriage against one or another of the holding stops 174.

Each key-lever 193 has a hub 228, whereby it is spaced from the corresponding lever 216, and whereby the key-lever is mounted for free rotation upon the universal shaft 194. Each key-lever 193 is retained laterally upon the universal shaft 194 by abutment of its hub 228 with the side of the adjacent lever 216 and by a collar 229, fastened to the universal shaft 194. For economy in machining the tabulating rack 175 and for securing structural strength, the slots 178 in said rack are spaced in multiples of a letter-space of the typewriter-carriage. Thus, as indicated in the drawings, said multiple may be twice a letter-space.

Where the distance between two successive tabulating stops 179 is an even number of letter-spaces, the stopping ends of said successive stops which co-operate with the counter-stop 109 may be in line with or equally offset from those parts of the stop which are received in the slot 178. Where the distance between adjacent stops is an uneven number of letter-spaces, the lower end of one of the successive stops may be offset by one letter-space as by a block 231, Figure 3, fastened to the lower end of the stop.

The stops 179 may be variously set along the tabulating rack-bar 175 when the front plate 180 covering the channel of said rack-bar is removed. The levers 216 and 193 may be correspondingly set by shifting them along the universal shaft 194 by loosening the screws 218 and also by loosening screws 232, which fasten the collars 229 to the universal shaft. Depending on the spacing of the tabulating stops 179 and on the desired spacing of the pairs of stops 174, 220 for the bill-truck, one or more of said pairs of stops may be offset from the bodies of the levers on which they are formed, as indicated in Figures 1 and 3, the offsets being effected by bends 234 in said levers.

In order to provide for column-skipping while back-tabulating the bill-truck, the series of normally retracted column-selecting stops 220 is provided. These are individually shiftable to effective position relative to the counter-stop 173 for the truck, according to that record-sheet column with respect to which it is desired to position the truck. Since the column-selecting stops are

normally retracted with respect to said counter-stop, means are provided for holding the truck in the position selected relative to the typing-machine carriage, said holding means including for each record-sheet column (excepting possibly the last column) the aforesaid stop **174** which may be set in the direction in which the truck travels and which is movable transversely of said direction for withdrawal from a normal, effective position wherein it engages the counter-stop for the truck.

The stops are spaced alternately with the column-selecting stops in the direction of travel of the truck. That is to say, each column-selecting stop 220 may have to the right thereof a position-determining stop **174** except for the last column as will be explained. Column-skipping is therefore effected by withdrawing all the position-determining stops which are to be skipped at the operation of the tabulating key corresponding to the selected column and temporarily interposing, by the operation of said key, the column-selecting stop 220 ahead of that position-determining stop by which the truck is to be arrested and held. The truck urged by its spring-motor will therefore jump against the temporarily interposed stop and will remain thereagainst until the tabulating key is released, whereupon it will jump toward and be arrested by the succeeding position-determining stop, the latter being restored to its normal position by the release of said key.

The depression of the key-end of any tabulating-key lever **193** will have the following results. The corresponding stop **179** that serves as a column-stop for the typing-machine carriage will be depressed; all of the position-determining stops **174** for the bill-truck will be elevated clear of the truck-counter stop **173** since they are all fastened to the universal shaft; the column-selecting stop **220** for the truck corresponding to said depressed key-lever will be elevated into the path of the truck-counter stop; and as soon as the position-determining stops are clear of said latter counter-stop the truck will move rightward under the pull of its spring-motor until it is arrested by the elevated column-selecting stop **220**.

The rocking of the universal shaft **194**, which results from depressing the key-lever **193**, operates to release the typing-machine carriage from its escapement-devices, so that said typing-machine carriage may be shifted leftward until the plunger or stop **179** that has been depressed by the depressed key-lever abuts the typing-machine carriage counter-stop. The depressed tabulating key may now be released, thereby causing the retraction of the elevated column-selecting stop **220** and the restoration to normal position of the position-determining stops **174**. This retraction of the column-selecting stop **220** from the auxiliary carriage or truck counter-stop **173** permits the bill-truck to escape under the pull of its spring-motor and move rightward until it is arrested by the next position-determining stop toward the right. The release of the depressed tabulating key also causes the universal shaft **194** to rotate back to its normal position and in consequence the depressed plunger is withdrawn from the counter-stop for the typing-machine carriage, and at the same time the typing-machine carriage is restored to the control of its escapement-device and is thereby held to the position to which it has been tabulated by means of said depressed plunger **179**.

For gaging the depth of the front-insertion of a statement-sheet in the throat existing between the inner apron **97** and outer apron **83** of the respective paper-tables **93** and **82**, a gage **230**, Figures 4 and 6, is carried by the outer table **82**. For attaching said gage, screws **233**, which like the screws **91** pass through a pair of the slots **89** for slidably retaining said paper-table **82** on the cross-bar **86**, have hexagon heads surmounted by threaded studs **235**. The heads of said screws **233** support in close proximity to the upper surface of said paper-table **82** a plate **236** perforated to receive the studs **235** and to be fastened by nuts **238**. Said plate **236** may have arms **240** reaching to the gaging point where their ends are bent as in Figure 4 to form the gage **230**.

The operation of the machine for writing upon the statement-sheet or bill **35** and record-sheet **36** is as follows: The record-sheet **36** is introduced between the platen **29** and the intermediate paper-table **93** and its top brought under the upper feed-rolls **98**. A suitable side gage **243**, Figure 2, positions the record-sheet along the platen. The vertical totalizers **39** corresponding to the several record-sheet columns have been set upon the typewriter-carriage in such position by means of usual indexing devices **237** that when an amount is entered in any record-sheet column, it is also entered in a corresponding totalizer **39**. The tappets **46**, by means of which cross-totalization is effected in the cross-totalizer **41**, will also have been set in reference to the record-sheet columns. The tabulating-zone stops **50** will also have been set in reference to said columns, and, incidentally, in reference to the tappets **46**. With the statement-sheet **35** resting against its lateral guide **149** on the truck and the single vertical column of said statement-sheet collated with the first column on the record-sheet, the first pair of stops **174**, **220**, from the left, will have been set, the stop **174** of said first pair holding the bill-truck, so that the vertical column of the bill or statement-sheet is thus collated with the record-sheet. The other pairs of stops **174**, **220** are likewise set for collating the single column of the statement-sheet with the several columns of the record-sheet. With the setting of the several pairs of stops **174**, **220**, the novel typewriter-tabulating stops **179** are also set.

Except for the last or total column the several stops **174**, **220** and their associated tabulating stops **179** may be so located that both the typewriter-carriage and the bill-truck are tabulated for beginning the typing in the tens of dollars denominational place. When it is desired to begin the typing in a higher denomination, the typewriter-back-space key **239** may be used to back-space the typewriter-carriage, and consequently the bill-truck. The stops **174**, **179** and **220** may also be set so that by operation of any key **203**, the carriage and truck are tabulated for the highest denomination in a column. In such case, the regular tabulating keys **52** may be used to tabulate to a lower denomination after operation of any key **203**. For writing the item in the last or total column of the record-sheet and the lowermost or total line of the statement-sheet, both carriage and truck are tabulated to the hundreds of dollars denominational place. For such total-entry the corresponding typewriter-carriage stop **179** is accordingly positioned, but the truck-holding stop **174** may be dispensed with by permitting the left end of the longitudinal slot **161** in the truck to abut the roller **162** which engages said slot. Similarly, the leftward or return movement of the truck relative to the typewriter-carriage may be

limited by abutment of the right end of said slot 161 with said roller 162. The range of leftward movement of the truck must, however, be sufficient to permit the counter-stop 173 to fully pass the first holding stop 174, the truck thereupon settling back, under the pull of its spring-drum 163, against the first holding stop 174.

The truck being thus positioned against the first stop 174, it is to be noted that there is no need for providing a key-lever 193 ahead of, that is, to the left of, said first stop. Nor is there need for a corresponding stop 179 for the typewriter-carriage, since the latter may be positioned for bringing the first column of the record-sheet into use by means of the usual adjustable carriage-stop 221 mounted on the rods 222, Figure 4, and co-operating with the usual counter-stop 242 carried by the typewriter-carriage.

With the various stops and totalizers thus set and the record-sheet 36 in position around the typewriter-platen 29, the finger-lever 141 is displaced forwardly, the plate 108 is lowered, and the bill 35 is front-inserted over the record-sheet until its bottom edge strikes the gage 230, as shown in Figure 5, the bill also being positioned laterally against the gage 149 that is provided on the statement-holder 131. It will be understood that a manifolding carbon, not shown, is between the statement and record sheets.

For proper gaging of the bill with the gage 230, the truck rests against the first holding stop 174, and, when the bill is so gaged, its topmost line or block 147 representing the tax-item, Flat Rate Water, will register with the printing-line of the typewriter.

If lines of entry have been made previously on the record-sheet, the typewriter-platen will have been so line-spaced, by means of the line-space devices 122, 123, that the next blank line on the record-sheet registers with said topmost block 147 on the statement-sheet. The finger-lever 141 is now restored, causing the bill to be gripped against the plate 131 and the plate 108 is also restored as in Figure 4.

The first item-amount is now typed, and, during its typing, both the typewriter-carriage and the bill-truck proceed in letter-feed direction and the amount is registered in the corresponding kind totalizer 39 and is indexed for entry in the cross-totalizer 41.

Upon writing the last digit of said amount, the following letter-spacing step of the carriage causes the mechanism in the computing base 10 to be cycled for entering the amount in the cross-totalizer 41.

The first tabulating key 203 from the left and representing the State Tax amount is now depressed, causing depression of the corresponding tabulating stop 179 and withdrawal of all the holding stops 174 and elevation into effective position of the column-selecting stop 220 which is at the end of the operated key-lever 193.

The bill-truck thereupon escapes rightward under the pull of its spring-drum 163 and settles against the elevated column-selecting stop 220.

While the key 203 is depressed, the typewriter-carriage is permitted to move leftward until its depressed stop 179 strikes the counter-stop 189.

During such leftward tabulating movement of the typewriter-carriage, the truck, temporarily held by the elevated column-selecting stop 220, also moves leftward.

Upon release of the key 203 by the operator's finger, the elevated column-selecting stop 220 is lowered again, and all the holding stops 174 are restored. The bill-truck thereupon moves rightward under the pull of its spring-drum 163 until its counter-stop 173 strikes the next holding stop 174.

At the end of said latter rightward movement of the truck the single vertical column of the statement-sheet will have been collated to the State Tax column of the record-sheet. By reason of the inclination of the rail-plate 130 the second or State Tax block of the statement-sheet will also have been brought to the printing-line.

Upon the restoration of the depressed stop 179 which ensues upon release of the depressed key 203, the typewriter-carriage has the usual slight leftward drop, due to the stepping dog 204 when the typewriter-carriage is restored to the control of its escapement-mechanism.

In this way the successive vertically-spaced blocks 147 of the statement-sheet receive the typed item-amounts, and, incidentally, said amounts are entered by means of the aforesaid carbon-sheet in corresponding columns across the record-sheet. Said amounts are also entered in the corresponding vertical totalizers 39 and in the cross-totalizer 41.

The movement of the typewriter-carriage which attends the tabulation of both carriage and truck preparatory to typing the Total Tax Due, causes the mechanism in the computing base 10 to be set for subtraction.

As the total displayed by the cross-totalizer 41 is now copied and typed in the Total block 147 of the statement-sheet and is transferred to the record-sheet, said total is also additively transferred to the corresponding totalizer 39 and is subtractively set up for the cross-totalizer 41 during the typing operation.

Upon typing the last digit of the total, the mechanism in the computing base 10 is caused to be cycled in the same manner as it was cycled for each preceding tax-item. Due to the subtractive set up, the cross-totalizer 41 is cleared to zero during the cycling operation.

As a check to indicate the correctness of copying the total displayed by the cross-totalizer 41, a star 241, Figure 9, is printed after the total-amount by one of the typewriter-keys, the usual mechanism being provided whereby the printing of such star is prevented if the cross-totalizer 41 is not clear.

The finished statement-sheet may now be removed from the machine upon swinging the finger-lever 141 forwardly to withdraw the clamp-arms 136, which have been holding said statement-sheet against the plate 131.

Preparatory to front-insertion of another statement-sheet, its truck is returned to rest against the first stop 174 from the left. During such return of the truck, its counter-stop 173 will override the several holding stops 174, said counter-stop 173 swinging upon its pivot at 224 as it overrides each stop 174. During such return, the truck 131 is caused to drop by reason of the inclination of the rail-plate 130.

Thus, after such return of the truck, the new statement-sheet, presented against the gage 230 and clamped with the carbon-sheet upon said plate 131, will have its topmost block at the printing-line.

The return of the truck leftward relatively to the typewriter-carriage, to bring said topmost block to the printing-line, also requires that the typewriter-carriage be returned rightward against its stop 221 to bring the first column on the record-sheet to the printing-point. The record-

sheet is also line-spaced by the lever 123 which is operated during the carriage return.

It will be understood that in such return movements of the truck and typewriter-carriage, the return movement of either may precede the return movement of the other, it being essential, however, that both be returned to bring the single vertical column on the statement-sheet into register with the first column on the record-sheet and both into register with the printing-point, so that the sheets are properly presented to the manifolding types.

Upon the front face of the plate 180 that covers the channel in the tabulating rack 175, there may be fastened by screws 245 a strip 246 having turned edges forming upper and lower grooves in which may be inserted and retained a strip 247 having inscribed thereon, so as to be disposed under corresponding tabulating keys 203, the designations of the kind of tax corresponding to each key 203, see Figure 3.

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. An apparatus for typing amounts in a single vertical column on a bill-sheet and at the same time manifolding said amounts in a single horizontal line across a record-sheet, including a record-sheet carriage advanceable in letter-feeding direction, a holder or truck for the bill-sheet movable jointly with said carriage for letter-feeding, said carriage including a guide on which the truck may be shifted for collating the vertical bill-sheet column with different columns spaced across the record-sheet, said guide being inclined to the direction in which the truck is shifted, so that the truck also has a movement transverse of the column-collating shift, said transverse movement being effective to line-space the bill-sheet incidentally to said shift, a motor for shifting said truck on said guide in a direction opposite to the direction of carriage advance, and key-operated tabulating means, including a manually-operable key-device and truck-positioning stops directly controlled by said key-device, cooperating with said motor for tabulating said truck to positions corresponding to the record-sheet columns.

2. An apparatus for typing amounts in a single vertical column on a bill-sheet and at the same time manifolding said amounts in a single horizontal line across a record-sheet, including a record-sheet carriage advanceable in letter-feeding direction, a holder or truck for the bill-sheet movable jointly with said carriage for letter-feeding, said carriage including a guide on which the truck may be shifted for collating the vertical bill-sheet column with different columns spaced across the record-sheet, said guide being inclined to the direction in which the truck is shifted, so that the truck also has a movement transverse of the column-collating shift, said transverse movement being effective to line-space the bill-sheet incidentally to said shift, a motor for shifting said truck on said guide in a direction opposite to the direction of carriage advance, and key-operated tabulating means, including a manually-operable key-device and truck-positioning stops directly controlled by said key-device, co-operating with said motor for tabulating said truck relatively to said carriage to positions corresponding to the record-sheet columns, said tabulating means including devices directly controlled by said key-device and effective for tabulating the record-sheet carriage jointly with said truck but in the opposite direction.

3. In a typewriting machine having numeral-type keys and a carriage traveling under the control of said keys for writing in different columns across a record-sheet, the combination of a truck for presenting a bill-sheet at the printing-point so that a plurality of amounts typed across said record-sheet may be typed in a single vertical column on said bill-sheet, a guide carried by said carriage on which said truck may be shifted relatively to the carriage, so that as said carriage advances to different columns, the bill-sheet carried by the truck may be correspondingly returned to keep its column at the printing-point, said guide being inclined to the direction of shift of said truck, so that the latter also has a transverse movement effective to line-space the bill-sheet incidentally to said shift, a stop-mechanism for limiting successive returns of the truck relatively to successive advances of the carriage, a motor for returning the truck, and keys, controlling said stop-mechanism, operable successively for effecting the successive returns of the truck.

4. In a typewriting machine having numeral-type keys and a carriage traveling under the control of said keys for writing in different columns across a record-sheet, the combination of a truck for presenting a bill-sheet at the printing-point so that a plurality of amounts typed across said record-sheet may be typed in a single vertical column on said bill-sheet, a guide carried by said carriage on which said truck may be shifted relatively to the carriage, so that as said carriage advances to different columns, the bill-sheet carried by the truck may be correspondingly-returned to keep its column at the printing-point, said guide being inclined to the direction of shift of said truck, so that the latter also has a transverse movement effective to line-space the bill sheet incidentally to said shift, a motor for shifting said truck on said guide, and manual-key-operated tabulating stop-means individual to said truck and co-operating with said motor for tabulating said truck in return direction commensurately with the advances of the carriage.

5. In a typewriting machine having numeral-type keys and a carriage traveling under the control of said keys for writing in different columns across a record-sheet, the combination of a truck for presenting a bill-sheet at the printing-point so that a plurality of amounts typed across said record-sheet may be typed in a single vertical column on said bill-sheet, a guide carried by said carriage on which said truck may be shifted relatively to the carriage, so that as said carriage advances to different columns, the bill-sheet carried by the truck may be correspondingly returned to keep its column at the printing-point, said guide being inclined to the direction of shift of said truck, so that the latter also has a transverse movement effective to line-space the bill-sheet incidentally to said shift, a motor for shifting said truck on said guide, and key-operated tabulating means co-operating with said motor for tabulating said truck in return direction to selected positions, said tabulating means including a plurality of tabulating keys, one for each of successive return shifts of the truck, and also including devices co-operative with said tabulating keys to also tabulate said carriage to col-

umn-positions jointly with the tabulation of said truck but in the opposite direction.

6. In a typewriting machine having a printing-point, the combination of a carriage movable in one direction for tabulating for columns across a record-sheet, a truck movable in the opposite direction relatively to said carriage for collating a bill-sheet with said columns, and column-tabulating mechanism including a manual-key device, and also including carriage-stops and truck-stops co-operating jointly with said key-device and directly controlled thereby, whereby, upon operation of the latter, the carriage and truck are jointly tabulated in their respective directions to predetermined positions in respect to said printing-point.

7. In a typewriting machine having a printing-point, the combination of a carriage movable in one direction for tabulating, a truck movable in the opposite direction for tabulating, and column-tabulating mechanism including a plurality of keys, each key determining a certain column-position related to said printing-point, and also including means co-operating with any key, whereby, upon operation of the latter, the carriage and truck are jointly tabulated in their respective directions to the column-position determined by the operated key.

8. In a typewriting machine having a printing-point, the combination of a carriage movable in one direction for tabulating, a truck movable in the opposite direction for tabulating, and column-tabulating mechanism including a plurality of keys, each key determining a certain column-position related to said printing-point, and also including means co-operating with any key, whereby, upon operation of the latter, the carriage and truck are jointly tabulated in their respective directions to the column-position determined by the operated key, said means being arranged to effect column-skipping for both carriers.

9. In a typewriting machine, the combination with a column-tabulating carriage and a motor urging said carriage in tabulating direction, of a plurality of spaced carriage-holding stops, against one or another of which a counter-stop for the carriage normally abuts for determining a column-position, and a column-selecting device operable to cause the carriage to be released from whichever stop is holding it and temporarily cause all the other stops toward which said carriage is urged to be ineffective, said device including a column-selecting stop temporarily shiftable from a normally ineffective position relative to said counter-stop to an effective position ahead of a selected one of said other holding stops, said counter-stop, holding stops and column-selecting stop being arranged so that upon operation of said column-selecting device, said carriage in its resulting movement is arrested by said column-selecting stop and then settles against the selected holding stop upon withdrawal of the column-selecting stop.

10. In a typewriting machine, the combination with a column-tabulating carriage and a motor urging the carriage in tablulating direction, of a plurality of spaced carriage-holding stops determining different column-positions, means whereby said stops may be jointly moved out of and back to effective positions relative to a counter-stop for the carriage, a plurality of key-controlled column-selecting stops interspaced with the carriage-holding stops, and individually shiftable from a normally ineffective position to an effective position relative to said counter-stop, and means whereby the shift of a selected column-selecting stop to effective position by displacement of its key causes all the carriage-holding stops to be shifted to ineffective position, and whereby the restoration of the selected column-selecting stop upon release of said key causes the restoration of all the carriage-holding stops, the carriage thereby jumping first to said selected column-selecting stop, and then to the corresponding carriage-holding stop.

11. In a typewriting machine, the combination with a column-tabulating carriage and a motor urging the carriage in tabulating direction, of a plurality of spaced carriage-holding stops determining different column-positions, means whereby said stops may be jointly moved out of and back to effective positions relative to a counter-stop for the carriage, a plurality of key-controlled column-selecting stops interspaced with the carriage-holding stops, and individually shiftable from a normally ineffective position to an effective position relative to said counter-stop, and means whereby the shift of a selected column-selecting stop to effective position by displacement of its key causes all the carriage-holding stops to be shifted to ineffective position, and whereby the restoration of the selected column-selecting stop upon release of said key causes the restoration of all the carriage-holding stops, the carriage thereby jumping first to said selected column-selecting stop, and then to the corresponding carriage-holding stop, said counter-stop being arranged relatively to said carriage-holding stops so as to override the latter when the carriage is returned.

12. In a front-strike typewriting machine, the combination with a traveling carriage advanceable to different column-positions and having a platen at the printing-line, of a trackway on said carriage inclined to the printing-line, a truck in the form of a paper-table supported by and shiftable laterally of said carriage along said trackway for collation with the platen, means co-operating with said table to hold a work-sheet against the platen at the printing-line, and means, including selectively operable keys, for moving said table to a predetermined position depending on the key operated, the table movement being in a direction opposite to the direction of carriage advance, each position determining a corresponding line-space on said sheet by reason of the inclination of said trackway.

13. In a front-strike typewriting machine, the combination with a traveling carriage having a platen at the printing-line, of a trackway on said carriage inclined to the printing-line, a truck in the form of a paper-table supported by and shiftable along said trackway, means co-operating with said table to hold a work-sheet against the platen at the printing-line, a second trackway on said traveling carriage extending substantially parallel to the printing-line, an auxiliary carriage supported by and shiftable along said second trackway, means connecting said paper-table and auxiliary carriage for joint shifting movement relative to said traveling carriage, said connecting means being arranged to permit the transverse movement of the paper-table which accompanies said joint movement by reason of the inclination of the paper-table-trackway, and tabulating means carried by said traveling carriage and operative to hold said auxiliary carriage and hence said paper-table in predetermined positions to which they may be jointly

shifted along their respective trackways, said tabulating means including a device for drawing said auxiliary carriage in tabulating direction, and said tabulating means being further operative to jump said auxiliary carriage to any one of said predetermined positions.

14. In a mechanism for tabulating a letter-feeding carriage to various column-spacing extents; a tabulating rack having slots spaced at equal intervals, each interval being a multiple of a letter-space, and a plurality of column-stops settable in said slots along said rack at the nearest column-spacing intervals, each stop having a body-portion received in the slot and also having a stop-portion offset more or less from the body-portion depending on whether or not the requisite distance in letter-spaces between the stop-portions of successive stops corresponds to the distance between the slots in which said successive stops are set.

15. A tabulating mechanism for column-spacing a carriage, including a counter-stop on the carriage, a motor to pull said carriage in tabulating direction, a series of stops arranged at column-spacing intervals, a second series of stops interspaced with and in staggered relation to the first series of stops, said counter-stop normally abutting one or another of the first series of stops, and key-operated means for withdrawing said first series of stops relatively to said counterstop and shifting a selected stop of the other series into effective position relative to said counter-stop, said carriage thereby escaping to said stop of the other series, said means being thereupon further operative to in turn withdraw said latter stop and restore the stops of the first series, the carriage thereupon escaping to the next stop of said first series.

16. A tabulating mechanism for column-spacing a carriage, including a counter-stop on the carriage, a motor to pull said carriage in tabulating direction, a series of stops arranged at column-spacing intervals, a second series of stops interspaced with and in staggered relation to the first series of stops, said counter-stop normally abutting one or another of the first series of stops, key-operated means for withdrawing said first series of stops relatively to said counter-stop and shifting a selected stop of the other series into effective position relative to said counter-stop, said carriage thereby escaping to said stop of the other series, said means being thereupon further operative to in turn withdraw said latter stop and restore the stops of the first series, the carriage thereupon escaping to the next stop of said first series, and means mounting the two series of stops so that they may be variously adjusted in the direction of carriage travel for different column-spacings.

17. In a typing machine having a frame, a carriage, an escapement-mechanism therefor, and a truck mounted and guided on the carriage for shift relative to the latter; a tabulating mechanism for column-spacing the carriage and concomitantly shifting the truck back in the opposite direction, including a motor urging the truck in said opposite direction, a rock-shaft on the carriage extending in the direction of carriage travel and operative to release said carriage from its escapement-mechanism, a series of key-levers freely mounted on said shaft, each key-lever having an arm constituting a key and another arm forming a stop normally retracted from a counter-stop on the truck, a second series of arms interspaced with the key-lever stop-arms and having stops in staggered relation to the key-lever stops, said second series of arms being keyed to said rock-shaft and forming holding stops against one or another of which the auxiliary counter-stop normally abuts, and a one-way connection between each of the key-levers and the rock-shaft so that operation of any key-lever will rock said shaft without affecting the other key-levers, the operated key-lever being thereby effective to withdraw all the truck-holding stops and to temporarily interpose its own stop in the path of said counter-stop, the truck thereby escaping to the interposed stop, and upon withdrawal of the latter, accompanied by restoration of all the holding stops, said truck escaping to the next holding stop.

18. In a typing machine having a frame, a carriage, an escapement-mechanism therefor, and a truck mounted and guided on the carriage for shift relative to the latter; a tabulating mechanism for column-spacing the carriage and concomitantly shifting the truck back in the opposite direction, including a motor urging the truck in said opposite direction, a rock-shaft on the carriage extending in the direction of carriage travel and operative to release said carriage from its escapement-mechanism, a series of key-levers freely mounted on said shaft, each key-lever having an arm constituting a key and another arm forming a stop normally retracted from a counter-stop on the truck, a second series of arms interspaced with the key-lever stop-arms and having stops in staggered relation to the key-lever stops, said second series of arms being keyed to said rock-shaft and forming holding stops against one or another of which the auxiliary counter-stop normally abuts, and a one-way connection between each of the key-levers and the rock-shaft so that operation of any key-lever will rock said shaft without affecting the other key-levers, the operated key-lever being thereby effective to withdraw all the truck-holding stops and to temporarily interpose its own stop in the path of said counter-stop, the truck thereby escaping to the interposed stop, and upon withdrawal of the latter, accompanied by restoration of all the holding stops, said truck escaping to the next holding stop, each key-lever having an additional stop co-operative with a counter-stop on said frame to position said carriage upon operation of the key-lever.

19. In a typewriting machine, the combination with a carriage and carriage-escapement mechanism, of a tabulating-key lever mounted on said carriage and operative to release the latter from the escapement-mechanism, said lever having a finger-piece formed to enable the operator's finger to restrain the released carriage at will.

20. In a type-writing machine, the combination of a letter-feeding carriage releasable from a letter-feeding device for advancing the carriage for different-item columns of a record-sheet, a truck connected to letter-feed jointly with said carriage, and returnable independently of said carriage for collating a bill-sheet successively with the record-sheet columns, a plurality of keys on the carriage, means operable by any key to release the carriage from the letter-feeding device for advancing the carriage to a column-position corresponding with the operated key, and means acting automatically, in response to the operation of said key, to return the truck relatively to the carriage, to a position corresponding with the operated key, to thereby automatically

collate the bill-sheet with the record-sheet column for which the carriage has been advanced.

21. The invention as set forth in claim 20 inclusive of normally ineffective carriage-stop mechanism, conditioned by operation of any of said keys for locating the carriage for a record-sheet column corresponding to the operated key.

22. In a typewriter, the combination of a carriage for a record-sheet having a multiplicity of laterally distributed columns, a bill-sheet carrier mounted for lateral movement on and relatively to the carriage, to successively collate the bill-sheet with the record-sheet columns, a motor for moving the bill-carrier in collating direction, means normally effective to couple the carriage and bill-sheet carrier in their different relative collating positions, in respect of each of the multiplicity of record-sheet columns, a key-device manually operable to uncouple the bill-carrier and said carriage and cause said motor to move the bill-carrier in collating direction relatively to said carriage, and normally retracted stop-means interposed by said key-device to hold the bill-carrier preparatory to recoupling the latter to the carriage at a new position determined by said coupling means, said recoupling being effected at the retraction of said stop-means, whereby successive operations of said key-device change the relative positions of the bill-carrier and carriage for the several record-sheet columns.

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