

Feb. 27, 1934.

A. G. F. KUROWSKI

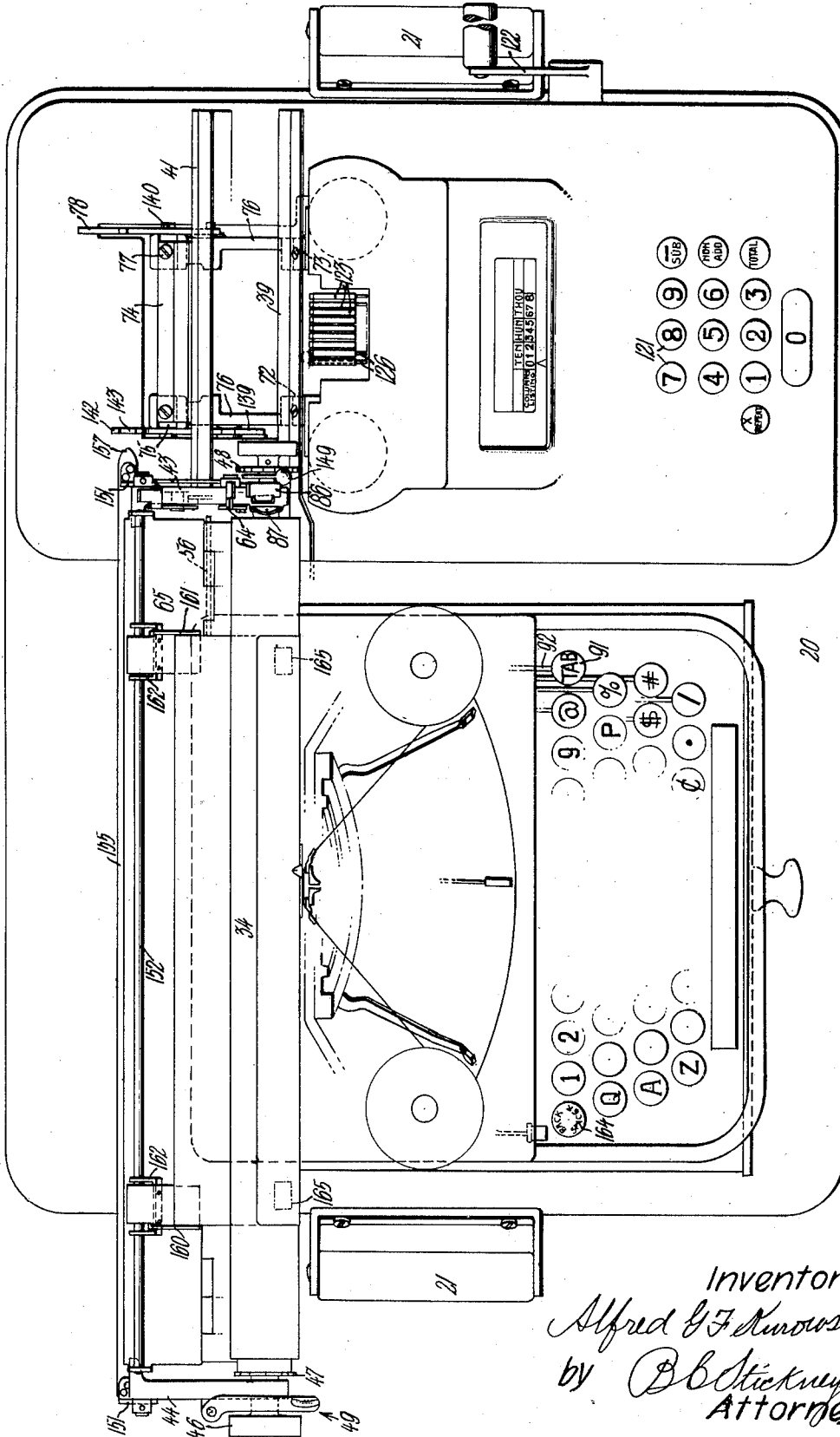
1,948,722

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed March 5, 1929

4 Sheets-Sheet 1

Fig. 1.



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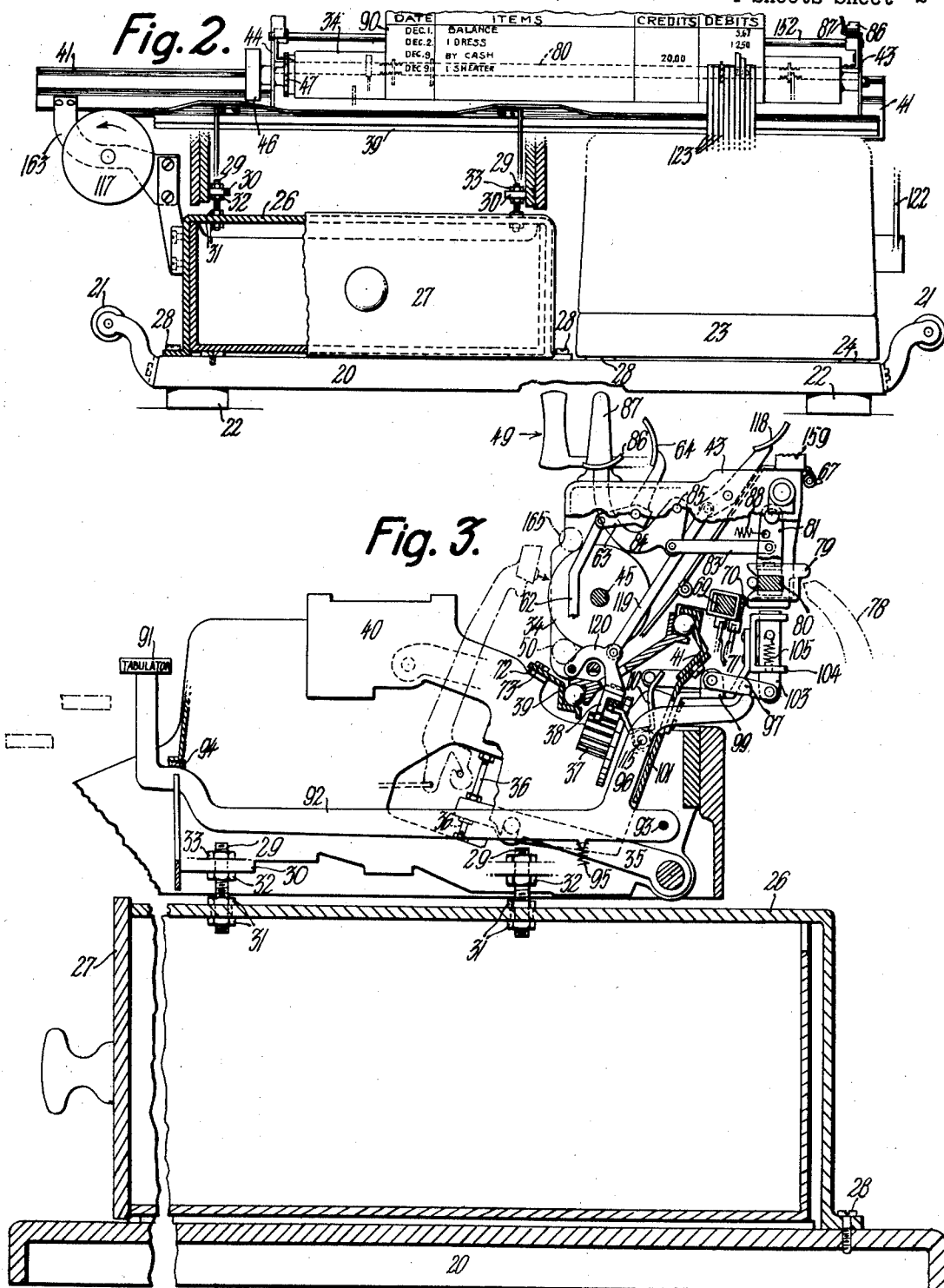
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4 Sheets-Sheet 2



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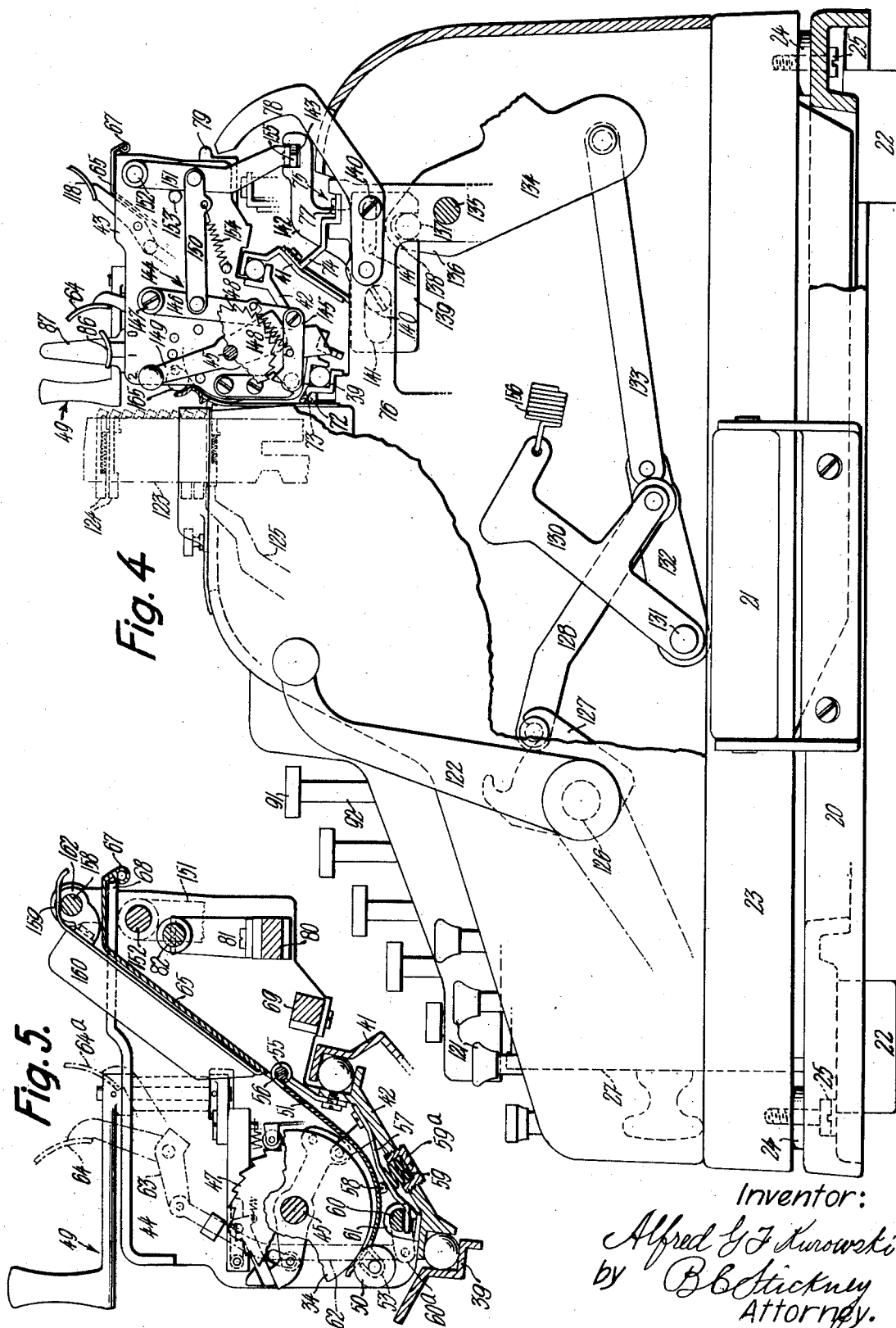
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COMBINED TYPEWRITING AND COMPUTING MACHINE

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4 Sheets-Sheet 3



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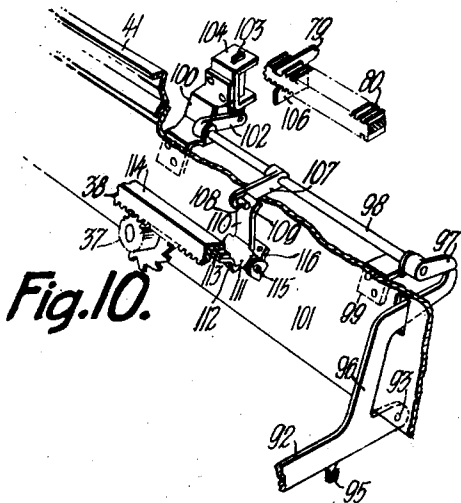
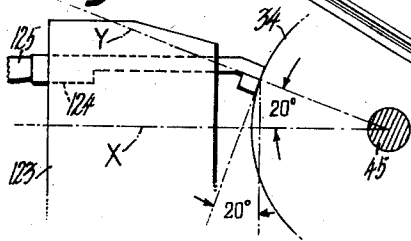
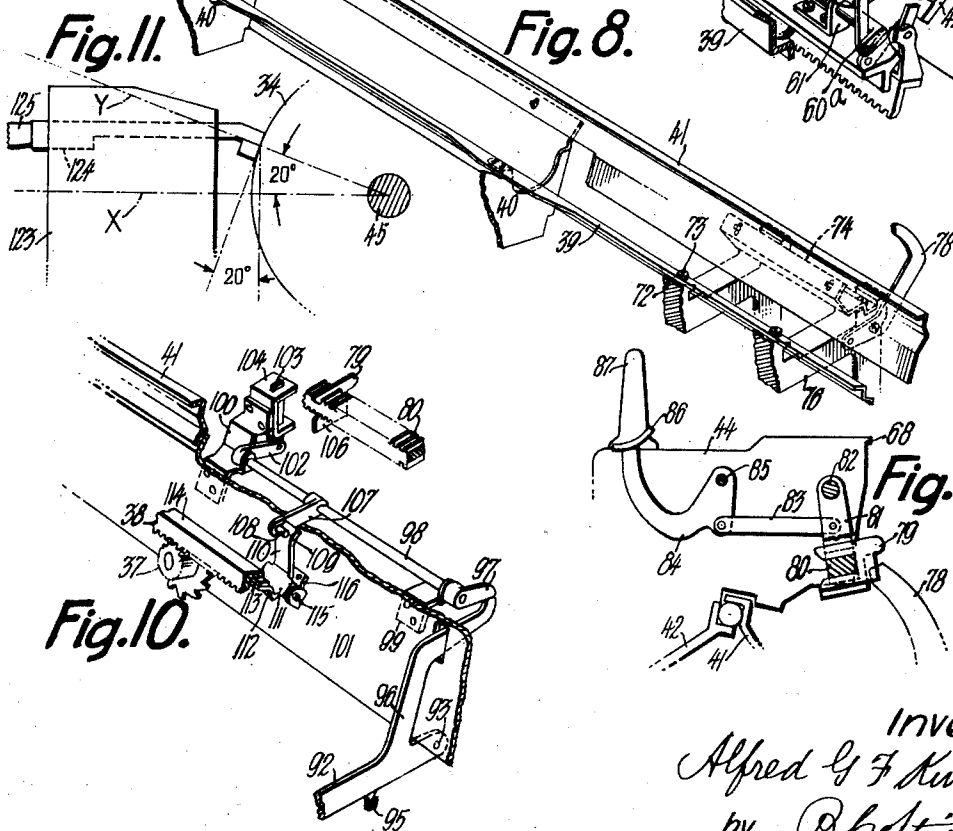
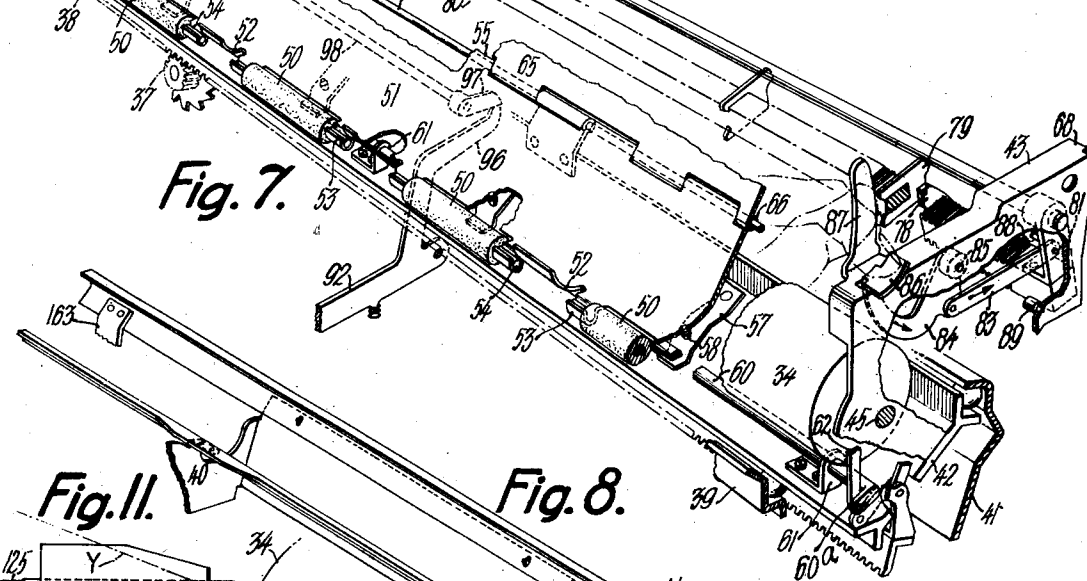
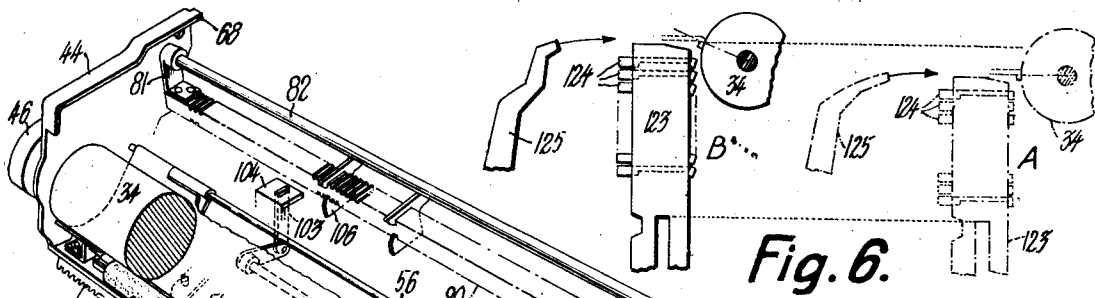
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COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed March 5, 1929

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,948,722

COMBINED TYPEWRITING AND
COMPUTING MACHINE

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Application March 5, 1929. Serial No. 344,200

5 Claims. (Cl. 197—176)

This invention relates to an accounting machine for use in typewriting items and in adding amounts which are carried out in a column in the usual place on the right-hand side of the bill or work-sheet. Such results have been secured heretofore by combining computing mechanism with the numeral keys of a typewriter.

One of the objects of the present invention is to avoid the complication of structure and operation due to so connecting adding mechanism to the typewriter numeral keys.

Another object of the invention is to enable the manufacturer to market a machine of this class without the necessity of making the usual enormous investment for a plant to produce the parts. A feature of the improvement is the use of stock parts throughout the machine, except in a very few instances.

This invention is in the nature of an organization of the key-operated type-actions or mechanisms such as are used in typewriting machines, in connection with an adding mechanism of the ten-key class, together with its printing types, such as commonly form parts of ten-key adding machines. Upon this foundation of typewriter key-mechanism and adding machine key-mechanism, the invention develops a machine in which a single carriage is used for the work-sheet, but which is differently constructed in some respects from an ordinary typewriter-carriage, especially in that it can run off from the typewriting field and over on to the adding field, so that at one part of the line of billing the typewriter-keys can be used for typing words and numerals, while thereupon the carriage may be shifted over to the adding mechanism for the purpose of printing upon the same line of the work-sheet a number, with the aid of the ten keys of the adding mechanism, while the entire typewriter-keyboard remains silent. It is not common practice in the simple ten-key class of adding machines to provide a carriage, but the work-sheet is usually in the nature of a strip which is fed around a non-traveling platen.

The novel organization may preferably include the keys and the typing trains operated thereby, and the ribbon-mechanism, and the base and carriage-shifting mechanism, and other parts of an Underwood portable typewriting machine, for example, thus expanding the usefulness of such parts to a field outside of portable typewriters. There may be used for adding purposes, for example, the ten keys and the key-trains operated thereby, together with the printing types and hammer, etc., of a Sunstrand adding machine.

These two mechanism portions may be organized side by side in a particular position, one with reference to the other, and then a novel carriage-track may be built in about the place where a track is usually built in a typewriting machine, but the track may be extended over to the right sufficiently to enable the work-sheet to be carried over to position to be printed upon by the numeral-types of the adding mechanism. The organization therefore may employ a new carriage in place of a typewriter-carriage of the dimensions usually employed upon a portable typewriter, and the tracks may be of corresponding length and position, and other features of carriage-feeding mechanism, etc., may be worked into the general organization in order to carry out the purposes of the invention. The typewriter-carriage, although it is movable over into the field of the adding types, does not letter-space when in the adding field, but all the digits in an added number are printed at one printing. The carriage letter-feeds only when it is in position for typing, that is, at the left-hand portion of the new organization.

In order to provide for typing of the adding types substantially in the same line on the work-sheet with the typing that is effected by the typewriter-keys, the platen, which is common both to the typewriter-types and to the adding machine types, may occupy about the same position in the machine as the platen usually occupies in a portable typewriter, in which the types usually strike upon the front of the platen at a point a little above the horizontal plane of the platen-axle. In organizing the machine for the purpose of having the adding types print upon substantially the same line as the typewriter-types, the adding types may be modified and mounted to strike rearwardly upon the platen a little above its center, and the faces of the adding types for this purpose may be inclined a little downwardly and rearwardly, so that they will strike squarely upon the platen at such an elevated point. But the adding types may be operated by hammers substantially as common in the Sunstrand adding machine, although the hammer itself may also be modified in order to permit the placing of the types at the required elevation and position with respect to the platen, as aforesaid. The invention, however, includes other arrangements of typewriter type-bars and printing point and adding machine types.

Thus a complete typewriting and adding machine may be organized and marketed, at low cost, without the necessity of building machinery

or a plant for the purpose of manufacturing any except a few parts of the new organization, since nearly all of the parts may be stock-parts, that is, they may be produced by machinery in plants that are already in existence. These advantages are gained without sacrificing the advantage of using the machine for correspondence or other ordinary typing whenever desired without adding and also for using the machine for adding whenever desired without typewriting upon the work-sheet.

The typewriting mechanism of the organization may include a standard keyboard for typing in caps and numerals, an extended non-shiftable carriage having a single platen for a wide work-sheet that is divided into typing zones and computative zones. The carriage may have a feeding mechanism that is effective during the typing of the capitals and numerals to letter-space the work-sheet, but it is not needed during the computative printing of a group of numerals simultaneously upon the work-sheet within a computative zone. The carriage-rails may be lengthened to extend from the typing mechanism across the computing machine, and the carriage is shiftable to a marginal-stop position where a predetermined computing zone of the work-sheet is aligned to the line-printing position of the types of the computing machine.

While the novel organization primarily provides for typing items and printing a computation upon the same work-sheet, the typewriting mechanism may, if desired, be used to type upon the whole width of the work-sheet, when not employing the computing mechanism for recording amounts. If desired, a tape may be fed around the platen of the carriage, and the computing mechanism may be employed for listing thereon within one or more columns, determined by column-stops, without employing the typewriting elements of the organization.

A long platen may be used, with a line-spacing mechanism at each end thereof, one line-spacing mechanism operative in typing and the other line-spacing mechanism controlled by the operating handle of the computing machine after the line-printing of each computation is recorded.

The carriage may have a tabulator-rack-bar with stops adjustable thereon to co-operate with two forms of the carriage-positioning devices, one device taking the form of a key-actuated tabulator-stop to release or arrest the carriage in a carriage-feeding direction at a column-position, and the other device permanently fixed to the computing machine frame and aligned to the fixed position of the line-printing computing types, and co-operative with the stops on the carriage-rack-bar, to predetermine a column-position on the work-sheet for the computative column-zone entry. The rack-bar and stops are normally in ineffective positions, to engage the fixed stop of the computing machine, but are swingable as a unit to bring the stops in position to be arrested by said fixed stop when the carriage is manually shifted rightward against the tension of the carriage-driving motor and without releasing the carriage-feed-rack. In this zone-shifted position, by restoring the tabulator-rack and stops, the carriage is held stationary by the interlocking engagement of the carriage-feed-rack and escapement-devices, and the platen may be line-spaced and a plurality of line-computations may be consecutively printed within the computing zone of the work-sheet without readjusting the carriage after each entry.

Heretofore computing machines have printed at the horizontal axis of the platen, but the typewriting mechanism has a typing line approximately twenty degrees above a front-strike typing position on the platen, for greater visibility. To secure visibility and alignment, the computing type-bars may be bodily raised above their former typing positions, and their type-ends are inclined to accord with the position of the typing line of the platen. The computing type-bars rise and the types are projected horizontally to type under the impact of the hammer, but the inclined or offset type-faces provide for printed impressions at the typing-line position on the platen that is established by the typewriting mechanism, and the computing mechanism has the advantage of increased visibility.

Other features and advantages will hereinafter appear.

In the accompanying drawings,
Figure 1 is a top or plan view of the machine whose bases are mounted side by side upon a general base, with the long carriage in operative position to travel in and out of the printing zone of the computing types.

Figure 2 is a front elevation of Figure 1 with portions of the frame broken away.

Figure 3 is a vertical cross-section through the typewriting mechanism and its base to particularly illustrate the carriage-tabulating and carriage-releasing mechanisms, and the novel manner of adjustably suspending the typewriting mechanism as a unit above its supporting base.

Figure 4 is an elevation of the right-hand end of the combination machine with portions of the frame broken away to expose the operative parts between the operating handle of the adding element and the line-spacing mechanism of the carriage.

Figure 5 is a vertical cross-section through the carriage, platen and the paper-holding devices, showing particularly the manner of controlling the paper-feeding devices and the usual line-spacing mechanism.

Figure 6 is diagrammatic, including one view in dotted lines which illustrates the usual assemblage of the computing type-bar plungers and their type-bars, and showing in full lines the new type-plungers to render the type-faces of the plungers operative to type at the raised typing line established by the typewriter-types.

Figure 7 is a perspective fragmentary view of parts of the carriage, platen, paper-feeding, line-spacing and tabulating mechanisms.

Figure 8 is a perspective view of the long carriage-rails, and the manner of securing them to the typewriting and computing mechanism frames.

Figure 9 is a detail view of the finger-key connections to the swingable rack-bar carrying the computing-zone stops.

Figure 10 is a perspective fragmentary view of the connections between the tabulator-key and the tabulator-stop, and also the connection to raise the carriage-feed-rack out of the escapement-pinion to release the carriage.

Figure 11 is an enlarged diagram to illustrate the typing angle of the computing-machine plungers relative to the typing line on the platen.

Certain mechanism may be employed which pro tanto is identical with that which is used in the well-known Sundstrand adding and listing machine, and certain parts may be the same as those that are regularly used in the Underwood portable typewriting machine. The typing and

adding parts may be assembled as a unit upon a base, and may be organized to co-operate with a minimum of structural changes. There may be a discarding of the carriage of the typewriting machine and the platen of the Sundstrand machine, and a substitution of an extended carriage.

A base 20 for the combined machine may be cast in a light suitable metal, such as duralumin, with lifting or carrying handles 21 secured to the right and left hand edges of the base, and suitable rubber feet 22 secured to the under side of the base, one foot adjacent each corner thereof for the base to rest upon.

A base-plate 23 of the computing mechanism has metal feet 24 to rest upon the base 20 and each foot may be secured to said base, as by screws 25 threaded into each foot. The computing mechanism thus assembled upon the base 20 establishes a fixed working distance from the face of the base to the center of the platen. Hence to align the platen to the types of the computing mechanism the typewriter-platen is elevated above the base 20. For this purpose a sub-base 26 may be secured by screws 28 to the base 20, and this base 26 may be box-like and opened at the front so that a drawer 27 may be arranged to be housed by said base.

Owing to the variations that enter into the manufacture of every machine, it is desirable to provide adjustment for one mechanism so that one may be adjusted relatively to the other mechanism. As the computing parts are permanently secured to the base 20, the adjustment of the typewriting mechanism to the listing computing element, it is desired to align the typing line of the platen to the typing position of the adding mechanism without throwing the adjusted type-faces of one machine or the other off their feet, which would result in imperfect type-impressions. To this end, the feet of the typewriting mechanism do not rest directly upon the base 26, but are suspended therefrom upon machine-supporting elements, each element having adjustable features for shifting and then securing the typewriting mechanism as a unit in its adjusted position. These machine-suspending elements may consist of four threaded studs 29, one stud for each foot 30 of the typewriting mechanism frame. Each stud 29 may pass through clearance holes in the base 26, so that the studs can adapt themselves to the holes in the feet and be rigidly secured to said base by stud-holding nuts 31 threaded upon the studs to bind against the top and under face of the base 26, thus leaving four threaded studs rising vertically from the face of said base.

A machine-supporting nut 32 may be threaded down the exposed end of each stud to an approximately proper elevation, and the four studs 29 will pass through holes in the four feet 30, with each foot resting upon a nut 32. From this approximate setting of the typewriting mechanism, the machine as a unit may be raised, tilted or shifted, so that the typing position on the platen 34 may be micrometrically adjusted to the printing elements of the listing computing mechanism, when check-nuts 33 on each stud 29 may be permanently set to bear upon the upper face of the feet 30, and each foot rigidly held in the machine-adjusted position with the typewriter-element suspended above the base 26.

The typewriting mechanism may include a four-bank standard keyboard, each key operative to project its type-bar upwardly, rearwardly and downwardly to type upon the platen 34 at a printing-line position raised twenty degrees above the

usual front-strike position on the platen. Further details of the type-bar actions are shown in my patent dated June 12, 1928, No. 1,673,289.

For the purpose of the present invention, it is preferred to type only in capitals, numerals and punctuation-marks, against a non-shiftable platen. Hence the type-bars may be so arranged that the carriage may be permanently locked in lower-shift or normal position. By referring to the constructions shown in application of W. A. Dobson, filed July 21, 1927, Serial No. 207,363, (now Patent No. 1,767,278, of June 24, 1930) it will be understood how the case-shift-key and connections may be made inoperative by locking an arm 35 between two case-shift stop-screws 36 on the frame of the machine to prevent displacement of the arm.

The carriage-feeding mechanism may include an escapement-controlled pinion 37 in train with a carriage-rack 38 and operative through a type-bar-actuated universal bar, not shown, but may be similar to that disclosed in my patent dated August 30, 1927, No. 1,640,841, and the machine may further have a ribbon-mechanism similar to that disclosed in my patent of August 7, 1928, No. 1,680,153.

As already stated, one feature of the invention includes the use of an extended carriage and platen. An extended front rail 39 and an extended back rail 41 may both be secured, in the usual manner, to the typewriter-frame 40, each rail formed with ball-bearing faces to co-operate with similar faces along each edge of a carriage-base-plate 42 to form a ball-raceway for the carriage.

The base-plate 42 at each end may have secured thereto, right and left hand platen end plates 43 and 44, respectively, between which the platen 34 is mounted upon a platen-shaft 45 having bearings in each end plate 43 and 44, and the free ends of said shaft outside the end plates are provided with the usual finger-wheel 46.

The platen at each end may be provided with separate line-space wheels 47 and 48, the wheel 47 having the usually manually-operated line-space lever and connections 49 for line-spacing the platen and work-sheet in typing items, and the other line-space wheel 48 co-operative with the computing mechanism to line-space the platen after the printing of each computative item and during the return of the operating handle, as will be hereinafter more fully described. The line-space position of the platen may be held by the usual spring-pressed detent-roll engageable with the line-space wheel 47, and both line-space wheels 47 and 48 may have similarly-spaced teeth relatively timed to each other. The detent-roll is equally effective to hold a platen line-space position after the line-spacing of the platen by the computing mechanism.

The extended platen 34 may be provided for a plurality of paper-feeding rollers 50 aligned longitudinally in a uniform plane to bear against the lower forward face of the platen directly at the rear of the paper-scale. To provide bearings for each end of each roller 50, a paper-deflector 51 has its forward edge slotted for roll-receiving apertures 52 and formed with tongues 53 bent into open pin-receiving seats for the ends of pins 54 that support each roller 50. The deflector may be a single piece of sheet-metal curved around the under side of the platen, and the rear edge formed with spaced-apart hinge-ears 55 mountable upon a rod 56 supported by the two

carriage-ends, and from which the deflector is hung to drop by gravity.

To hold the deflector 51 in a paper-feeding, raised position to exert a roller-engaging pressure against the platen, there are provided two flexible arms 57 spaced apart and secured at one end to the upper face of the carriage-base 42, with the free ends passing under the deflector 51, the deflector having round-nose studs 58 on the under face thereof to engage each arm 57. Each arm 57 may be further provided with auxiliary means to increase the resiliency of the arms, such as a compressible spring 59 housed within a cup 59^a threaded through the base 42, to compress each spring against the under face of each arm 57, and determine the work-sheet feeding tension for the series of rollers 50. To release the feed-rollers 50 by permitting the rollers and deflector to drop away from the platen, a rock-shaft 60 is mounted in end brackets 61 secured to the carriage-base 42. One end of said shaft 60 may have a crank-arm 60^a connected by a link 62 to an arm 63, forming a part of a release-lever 64 pivotally mounted upon one carriage-end, as 43. The rock-shaft 60 adjacent the free-end position of each arm 57 may be flattened to form camming corners that ride upon the free ends of the arms 57 to compress the spring 59 and release the feed-rollers 50 when the lever 64 is shifted to the dotted position of 64^a, Figure 5, to rock the shaft 60.

A paper-table 65 is formed with hinge-ears 66 that dovetail with the ears 55 of the deflector upon the rod 56. This construction provides for independently swinging the deflector upwardly and downwardly to control the paper-feeding rollers, and swinging the paper-table forwardly and rearwardly to give access to the marginal and tabulator stops. The paper-table 65 may be formed with a beaded edge 67 to snap over the adjacent rear corner 68 of each carriage-end 43 and 44 to hold the paper-table in operative paper-inserting position.

To limit the traveling movement of the carriage, the usual margin-stop-bar 69 is secured at each carriage-end, and the usual stops 70 adjustable thereon to co-operate with stop and tripping levers 71 on the frame of the machine in a manner similar to the disclosure of W. A. Dobson in Patent No. 1,643,654, dated September 27, 1927.

The computing framework has certain frame-faces, where the right-hand ends of both rails 39 and 41 may be permanently secured thereto. One of these faces, as 72, supports the front rail 39, which may be secured thereto by a screw 73, and the rear rail 41 secured to a bracket 74, in turn secured within a slot 75 in the computing side frame 76 by a screw 77. In this manner the two extended rails 39 and 41 are permanently secured to both the typewriting-mechanism frame and to the computing-mechanism frame, insuring a continuous travel of the carriage through the typing position, and also through approximately six column-spaces at the right-hand section of the work-sheet, each column-position selectively brought into the printing zone of the line-printing type-plungers of the computing mechanism by carriage-arresting mechanism that is distinctly appropriate for the typing of a whole line of figures at a single operation upon a non-shiftable and non-feedable work-sheet and carriage within any column-area, and record either a debit or a credit computation.

The column-tabulation of the carriage work-sheet is effected by manually shifting the carriage rightward against a fixed stop 78 secured to the side frame 76 of the computing machine. To co-operate with this fixed stop 78, a normally-inoperative stop 79, hereinafter termed a zone-determining stop, is adjustably secured to a rack-bar 80. Departing from the usual tabulating method, the rack-bar 80 and stop 79 are swingable from an inoperative position into the path of the stationary stop 78. To this end, the rack-bar 80 at each end is supported by arms 81, which, in turn, are secured to a rock-shaft 82 having bearings in both carriage-ends 43 and 44 to form a rockable frame.

At the normal position of the bar 80, the zone-stop 79 will clear the stop 78, as shown at Figures 3 and 4, but when the frame is swung to the position of Figure 9, the stop 78 will arrest the zone-stop in either direction of carriage-travel.

To control the swing of the rack and stop at will, Figure 3 shows a link 83 connecting one arm 81 of the swingable frame with the short arm of a bell-crank release-lever 84 pivoted at 85 to the carriage-end 43 and provided with a finger-piece 86.

When the finger-piece 86 is depressed to contact with the upper face of the carriage-end 43, the rack and stop will be swung to the position of Figure 9, and, while so depressed, the thumb of the same hand will bear against an upright arm 87 secured to the carriage-end, and, with the rightward movement of the hand, the zone-stop 79 will strike the fixed stop 78 and arrest the carriage and present the column-space of the work-sheet, predetermined by the setting of said stop 79 on the rack, to the line-typing plungers of the computing mechanism. Upon the release of the lever 84 a spring 88 will restore the bar 80 to normal position against a stop-pin 89 on the carriage-end.

As shown at Figure 2, a work-sheet 90 may have a typing zone of several columns at the left-hand side of the sheet, and one or more computative recording zones at the right-hand side of the work-sheet. The carriage and work-sheet are positioned at the initial letter-space position for the typing of the line by a rightward movement against a margin-stop, and subsequently tabulated to the succeeding columns for typing the detail items. The typing of items on the work-sheet naturally letter-feeds the work-sheet to the left of the computative zone, hence the carriage must be shifted rightward to bring the computative column into the computative zone of the computing types.

To tabulate the carriage leftward in the usual manner in typewriting, a tabulator-key 91 may be positioned at the right-hand end of the upper bank of character-keys, as shown, and provided with a lever 92 pivoted at 93, and resiliently held against a stop-pad 94 by a spring 95. The lever 92 may be formed with an arm 96 extending upwardly and rearwardly with the free end thereof in abutting engagement with a crank-arm 97, secured to the outer end of a horizontal shaft 98, rockably mounted in two brackets 99 and 100 secured at the rearward face to a back plate 101 forming part of the carriage-frame.

As the key 91 is at the side of the keyboard, and it is desired to position the tabulator-stop at a central position aligned with the common typing position of the type-bars, the shaft 98 extends to this central-machine position, and the inner free end thereof is provided with an

other crank-arm 102, having the free end connected to a counter-stop 103 slidable vertically within guiding slots in an extension 104 of the bracket 100. The stop 103 may have a spring 105 tensioned to draw the stop downwardly to a normal carriage-stop clearing position determined by the abutment of the arm 97 against the end of the key-lever arm 96. To co-operate with the tabulator-stop 103, carriage-stops 106 may be adjustably assembled upon the left-hand portion of the rack-bar 80, each carriage-stop being engaged by the tabulator-stop 103 when the latter is lifted by key 91 and the carriage is released from the escapement-devices.

To release the carriage during the lifting of the tabulator-stop 103, the rock-shaft 98 is provided with a forwardly-extending crank-arm 107 between the two arms 97 and 102. The arm 107 has a side protecting pin 108 at the free end thereof to bear against the cam-face 109 of an arm 110 forming a bell-crank 111 having a second arm 112 provided with a face-pad 113 to engage the under face of a long rib 114 forming a part of the carriage-feed rack 38 that is in mesh with the escapement-pinion 37. The bell-crank 111 is also formed with suitable ears to vibrate upon a pivot-wire 115 carried by a bracket 116, and may be secured to the front face of the plate 101.

The feed-rack 38 being spring-pressed into engagement with the pinion 37 and the pin 108 being spring-held in its normal position, the bell-crank 111 is maintained loosely between these two spring-pressed members, and the rocking of the shaft 98 swings the pin 108 to cam the arm 110 rearwardly and the arm 112 upwardly, to raise the rack 38 out of engagement with the pinion 37 and release the carriage to the tension of its spring-motor 117, until arrested by the tabulator-stop 103.

The manual carriage-release includes a release-lever 118 pivotally hung upon a carriage-end and connected by a link 119 to one pair of feed-rack arms 120, each arm being pivotally secured to each carriage-end 43 and 44.

The Sundstrand computing and listing mechanism usually includes a series of nine keys 121, designated as 1 to 9, operative to selectively set up mechanism for a line-printing computation by the actuation of an operating lever 122. The selecting mechanism includes stops that denominationally arrest the vertically-raised type-bars 123 to bring the selected type-plungers 124 to the typing line of the platen 34, and each type-plunger struck by a released hammer 125, to provide momentum for a printing impact against the work-sheet.

As the mode of operation of the Sundstrand machine is recited and illustrated in the patent to G. D. Sundstrand, dated September 19, 1916, No. 1,198,487, to which reference is made for such parts of the mechanism as are essential to understand the mode of operation of the novel organization of the combined typewriting and computing machine herein disclosed.

The type-plungers 124 are normally driven horizontally through the vertical type-bars 123 to print at the horizontal axis of the platen 34, as shown at A, Figure 6 on what is termed the front-strike position. To provide for a greater visibility for the typewriting line, the typing position of said platen is raised to approximately twenty degrees above this front-strike position.

As the typing line of the platen travels through both typing and adding parts, either the typing

position of the typewriting mechanism must be restored to a front-strike position, or the computing type-plungers must be raised and pitched downwardly to the corresponding typing angle on the platen. A novel means is herein employed, whereby the type-plungers 124 may retain the horizontal movement of the Sundstrand mechanism under the hammer impact, and still present a type-face at the proper twenty-degree elevation of the typing line on the platen, and thus provide greater visibility for the computing machine unit.

At Figure 6, the dotted position A is diagrammatic of the front-strike position of the type-plungers 124, and the full-line position B indicates the new position for the type-plungers relatively to the new typewriting line position on the platen. A comparison of the A and B diagrams shows that the type-bars 123 may be raised vertically a higher dimension at each computing operation, or that the type-bars may be made longer, as shown at B, where the regular type-bars 123 are elongated to raise the normal positions of the plungers 124. The enlarged diagram of Figure 11 shows the regular typing position at "X" and the new typing position at "Y", and the type-face end of the plunger 124 is offset for a type-face angle of twenty degrees to align to the twenty-degree angle of the typing line on the platen.

It will be understood that when the position of the type-plungers 124 is elevated to meet the typing line on the platen, the series of hammers 125 will also be lengthened to reach these new typing positions of the plungers.

The operating lever 122 of the Sundstrand machine rocks a shaft 126, to vibrate a crank-arm 127, pivotally connected by a link 128 to a spring-arm 130 secured to a shaft 131 carrying an arm 132, with the free end thereof connected by a link 133 to the long end of a lever 134 fulcrumed at 135, the several connections being effective to vibrate the lever 134 at each operation of the lever 122 of the machine. The short arm 136 carries a stud 137 positioned within a vertical slot 138 in the lower edge of a slide 139 mounted upon screws or studs 140, on the machine-frame, that pass through slots 141 in the slide to direct the slide horizontally when driven by the stud 137. The slide 139 may be formed with an upward and rearward projecting arm 142 having an open slot 143, adjacent the end of said arm, arranged to convey motion to the line-spacing mechanism 144 that is co-operative with the line-space wheel 48 at the right-hand end of the platen.

This line-spacing mechanism 144 may be the reassembly of standard Sundstrand parts that include a line-space pawl 145, pivotally suspended at the lower end of a link 146 pivoted at 147 to the right-hand carriage-end 43, the pawl 145 being lifted by a spring 148 against a lever 149 pivoted upon the platen-shaft, and operative to normally hold said lever free of the toothed wheel 48 and also predetermine the line-spacing engagement of said lever for one, two or more line-space distances in line-spacing the platen.

The link 146 is connected by a link 150 to an arm 151 secured to the end of a shaft 152, projecting through the carriage-end 43, and spring-pressed against a stop-pin 153 by a spring 154, for a normal position of the pawl 145. The shaft 152 crosses the length of the carriage, where the opposite end projects through the carriage-end 44, and to which a second arm 151 is secured, to form an inverted U-shaped swingable frame. Each arm 151 may be formed with a foot-termi-

nal, to each of which may be secured a horizontally-disposed bar 155 longitudinally aligned to the slot 143 of the slide 139. When the slide 139 is shifted rearwardly by the forward swing of the lever 122, the line-space pawl 145 will be shifted rearwardly to idly drag over the teeth of the ratchet-wheel 48 until the lever 122 is released at the end of its forward stroke. A spring 156, in restoring the lever 122, will drive the pawl 145 forwardly and rotate the wheel 48 to line-space the platen.

As shown at Figure 1, the bar 155 is approximately the length of the carriage, and if the item-typed line equals or exceeds one-half of the width of the work-sheet, it will be apparent that the letter-feeding leftward movement of the carriage will withdraw the bar 155 from the slot 143, and disconnect the line-space mechanism from the computing unit, and to assure re-engagement of the bar and slot when the carriage is shifted rightward to the computative zone, the end of the bar 155 may be pointed, as shown at 157, to readily enter the slot 143.

To provide sheet-edge guides to accurately position the inserted work-sheet to the set-up carriage-tabulating means, there may be a shaft 158, Figure 5, supported at each carriage-end by ears 159 upon said shaft, and there may be assembled a pair of sheet-edge guides 160 and 161. Each guide may be secured to a yoke 162 slidably mounted upon the shaft 158, so that each guide will be adjustably positioned along the shaft according to the width of the work-sheet and the position of the work-sheet relatively to the length of the platen.

Referring to Figure 2, the work-sheet has a date and an item column, both typewritten in a well-known manner, and should the typed items require one or more line-spacing movements before a computative record is desired in the credit or debit columns, the platen may be line-spaced by the usual mechanism 49. After the typing of the line-item, the carriage is shifted rightward by the manipulation of the finger-piece 86 and the arm 87, to arrest the zone-determining carriage-stop 79 at the stop 78 position. This rightward movement is made without lifting the carriage-rack 38 out of engagement with the pinion 37; hence, when the carriage is released by the finger, the carriage is held in the zone-stop position by the carriage-feeding elements.

When registering a line-computation in a single computative zone on the work-sheet, the line-spacing of the carriage does not disturb the zone-setting of the carriage and work-sheet, and the successive line-space movements of the work-sheet on a continuous web of paper preserves the proper denominational position of each line-typed entry in the usual listing machine manner.

Should, however, there be two computative columns, as shown, one for credits and the other for debits, the zone-stop 79 preferably will be set upon the bar 80 for the left-hand or credit-column, and should there be no credit line entry to be entered, the carriage may be tabulated from the credit-column to the debit-column by the depression of the tabulator-key 91, and a stop 106 positioned upon the bar 80.

From this description it will be understood among other things that a work-sheet may be typed the full width of the sheet and the computing unit remaining inactive, or a continuous web may be line-spaced step by step for the listing of consecutive computation and without employing the typewriter-keys; or that both parts may be

co-operative during the typing of each full-line record; that one line-space mechanism is rendered operative or inoperative by the movement of the carriage; that each line-space mechanism may be independently adjustable to line-space the same work-sheet variable line-space distances to vary the spacing of the typewritten section from the line-spacing of the computing section of the work-sheet; and that the carriage-stops and their rack are movable between two carriage-arresting positions, one position of arrest against a tabulator-stop and another position for arrest by a fixed column-stop on the computing mechanism.

It may also be noted among other things that the carriage-rails overhang the typing unit at the left of the frame, and that the rails 39 and 41 are reinforced by a bracket 163 adjustably secured to the outer face of the machine-supporting sub-base 26; that because of the longer letter-space travel of the carriage, the spring-drum 117 may be repositioned to be supported by the bracket 163, to provide for a long tape-connection between the drum and carriage; and that the typing-unit keyboard may include a back-space key 164 having connections similar to those disclosed in my Patent 1,623,481, dated April 5, 1927, whereby the platen and work-sheet may be back-spaced for either the typing unit or for the computing unit; and that the paper-holding devices may be similar to the construction of William A. Dobson in his Patent No. 1,582,906, dated May 4, 1926, where rolls 165 engage the work-sheet above the typing line and adjacent each side edge of the sheet.

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. A key-operated typewriting machine and a key-operated adding and printing machine, mounted side by side, a letter-feeding carriage common to the two machines and having a platen and movable from right to left out of the adding field into the typewriting field for letter-feeding, a tabulating mechanism including a rack on said carriage and having column-stops adjustable thereon, a counter-stop, a carriage-release key for operating said counter-stop, and a tabulating means for the adding field, including a key independent of said carriage-release key and having means to move said stop-rack out of normal position to bring certain stops thereon into co-operative relation with a fixed stop for tabulating the carriage when moved to the right into the adding field, to permit the printing of an amount in the same line with the printing effected by the typewriting types.

2. In a machine including typewriting mechanism having a printing point and adding-printing mechanism having a printing field, said mechanism being disposed alongside one another, so that said typewriter-printing point and adding-printing field are spaced apart, the combination with a letter-feeding carriage having a revoluble platen common to both mechanisms, of tabulating means for positioning the carriage leftward as for operation with the typewriting mechanism and for positioning the carriage rightward as for operation with the adding-printing mechanism, said means including a stop-locating rack swingably mounted on the typewriter, and having column-stops settable thereon variable distances apart, a key-controlled counter-stop shiftable into the path of said column-stops, said rack being nor-

5 mally in position so that said column-stops may co-operate with said counter-stop for leftward tabulating, a second counter-stop fixed relatively to the carriage movement, said second counter-stop clearing the column-stops in either direction of the carriage travel when the rack is in normal position, means on said carriage manually engageable for moving the same rightwardly, and means also on said carriage which may be called into action during the rightward carriage movement for shifting said rack so that the column-stops thereon may co-operate with said second counter-stop to position the carriage relatively to the adding-printing field.

15 3. In a machine of the character described, the combination with a stationary frame and a traveling paper-carriage thereon, of tabulating mechanism for positioning said carriage in opposite directions, said tabulating mechanism including a rack on said carriage extending longitudinally thereof and mounted thereon for transverse shifting, column-stops variably settable along said rack, a key on said frame, a movable counter-stop on said frame normally in ineffective position, means whereby operation of said key shifts said counter-stop to effective position to co-operate with said column-stops, said rack being normally in position for engagement of the column-stops by the key-shifted counter-stop for tabulating in one direction, and a second counter-stop on said frame, clearing the column-stops in either direction of carriage travel when the rack is in said normal position, said rack being shiftable transversely, so that said column-stops may co-operate with said second counter-stop for tabulating in the opposite direction.

40 4. In a machine of the character described, the combination with a keyboard, a frame, a traveling carriage on said frame, a carriage-motor urging said carriage in letter-feed direction, and carriage-escapement mechanism controlled by the keys of said keyboard, of tabulating mechanism for positioning said carriage in opposite directions including a rack on said carriage extending longitudinally thereof and mounted thereon for transverse shifting, column-stops variably settable along said rack, a tabulating key at said

keyboard, a movable counter-stop on said frame normally in ineffective position, means whereby operation of said tabulating key shifts said counter-stop to effective position to co-operate with said column-stops and concomitantly releases the carriage from the escapement-mechanism to be tabulated in letter-feed direction by said carriage-motor, said rack being normally in position for engagement of the column-stops by the key-shifted counter-stop, and a second counter-stop on said frame, clearing the column-stops in either direction of the carriage travel when the rack is in said normal position, said rack being shiftable transversely, so that said column-stops may co-operate with said second counter-stop for tabulating in the opposite direction.

5. In a machine of the character described, the combination with a keyboard, a frame, a traveling carriage on said frame, a carriage-motor urging said carriage in letter-feed direction, and carriage-escapement mechanism controlled by the keys of said keyboard, of tabulating mechanism for positioning said carriage in opposite directions, including a rack on said carriage extending longitudinally thereof and mounted thereon for transverse shifting, column-stops variably settable along said rack, a tabulating key at said keyboard, a movable counter-stop on said frame normally in ineffective position, means whereby operation of said tabulating key shifts said counter-stop to effective position to co-operate with said column-stops and concomitantly releases the carriage from the escapement-mechanism to be tabulated in letter-feed direction by said carriage-motor, said rack being normally in position for engagement of the column-stops by the key-shifted counter-stop, a second counter-stop fixed on said frame to clear the column-stops in either direction of the carriage travel when said rack is in normal position, a lever on said carriage having a finger-piece, and connections whereby operation of said lever shifts said rack transversely, so that said column-stops may co-operate with said second counter-stop for tabulating in the opposite direction by manual movement of the carriage.

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