

Aug. 21, 1934.

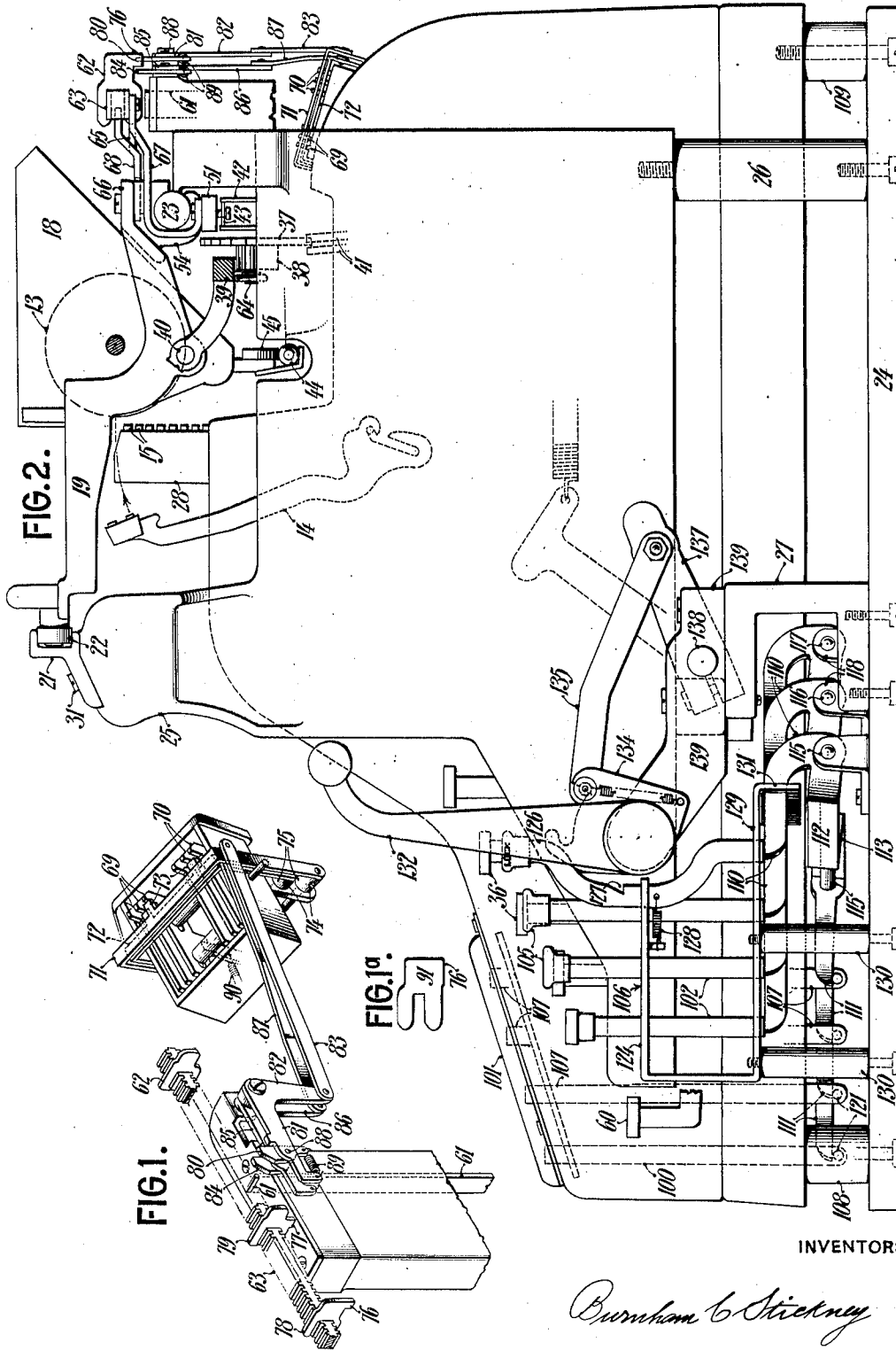
B. C. STICKNEY

1,971,239

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed Sept. 15, 1930

4 Sheets-Sheet 1



INVENTOR:

Burnham C. Stickney

Aug. 21, 1934.

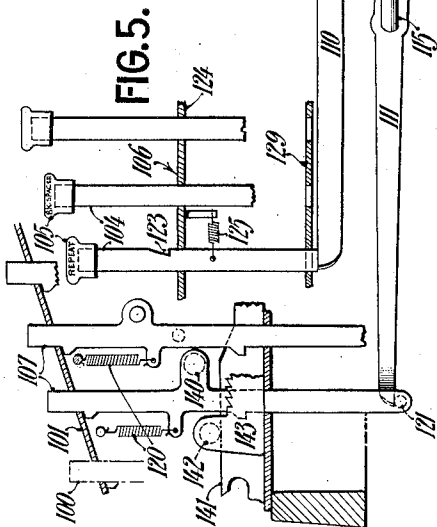
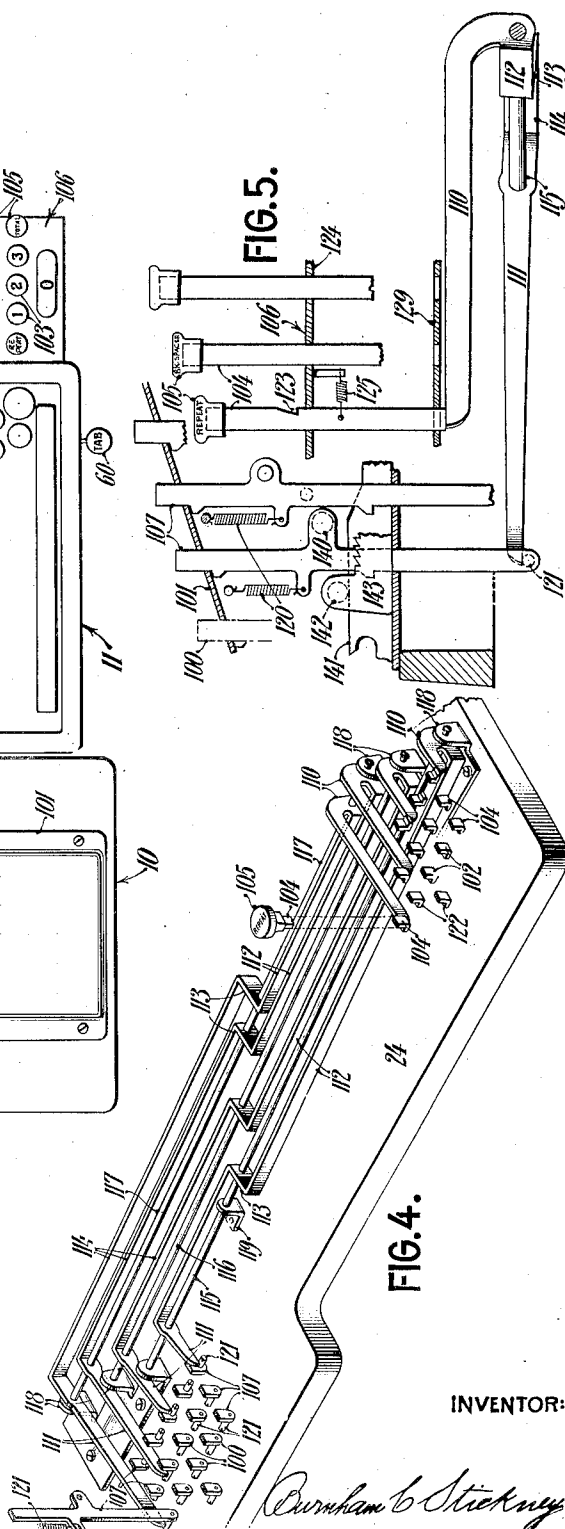
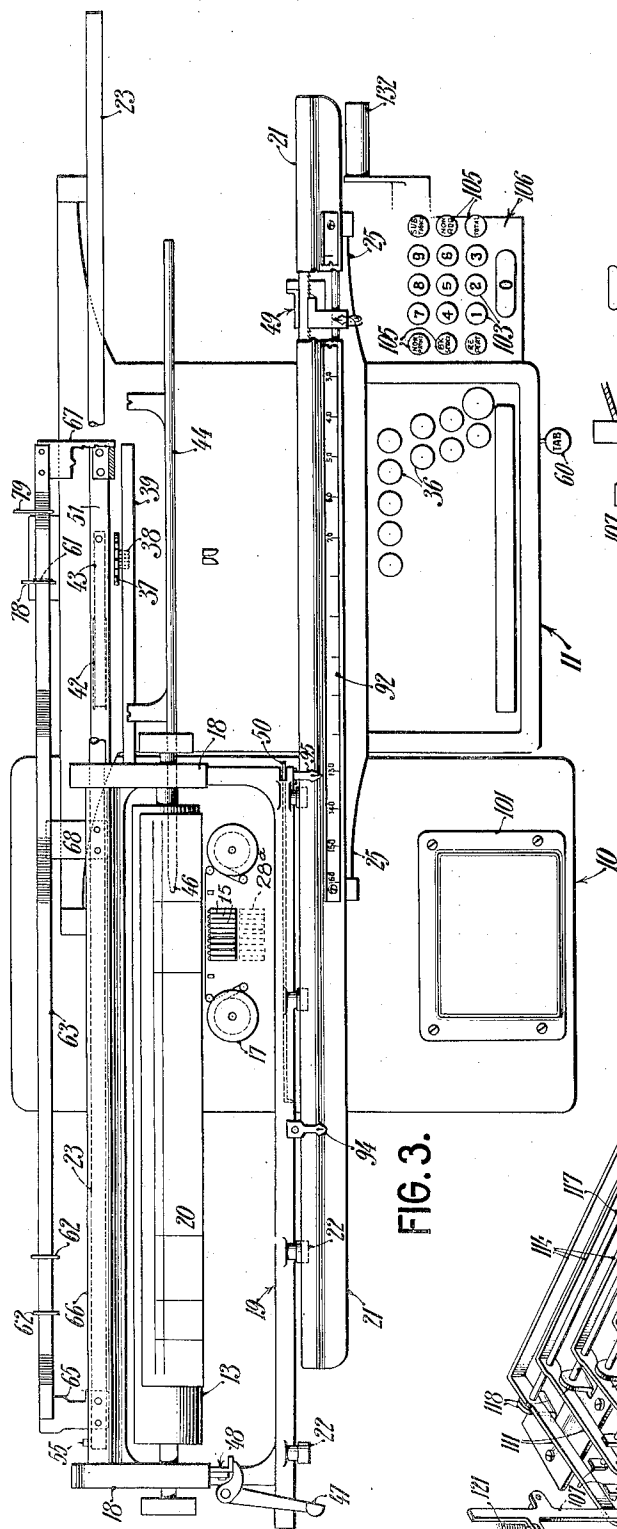
B. C. STICKNEY

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COMBINED TYPEWRITING AND COMPUTING MACHINE

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4 Sheets-Sheet 2



INVENTOR:

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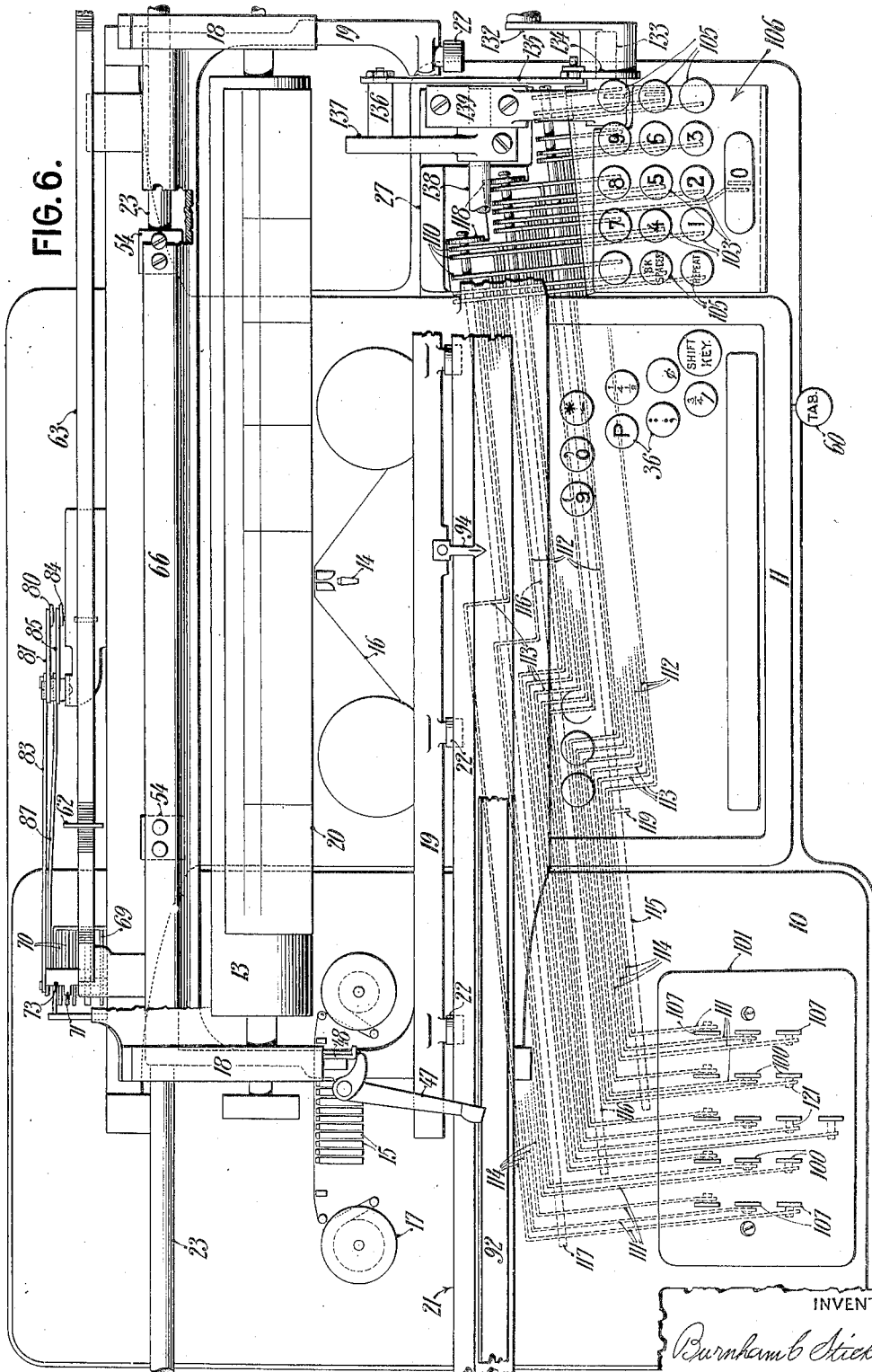
1,971,239

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed Sept. 15, 1930

4 Sheets-Sheet 3

FIG. 6.



Aug. 21, 1934.

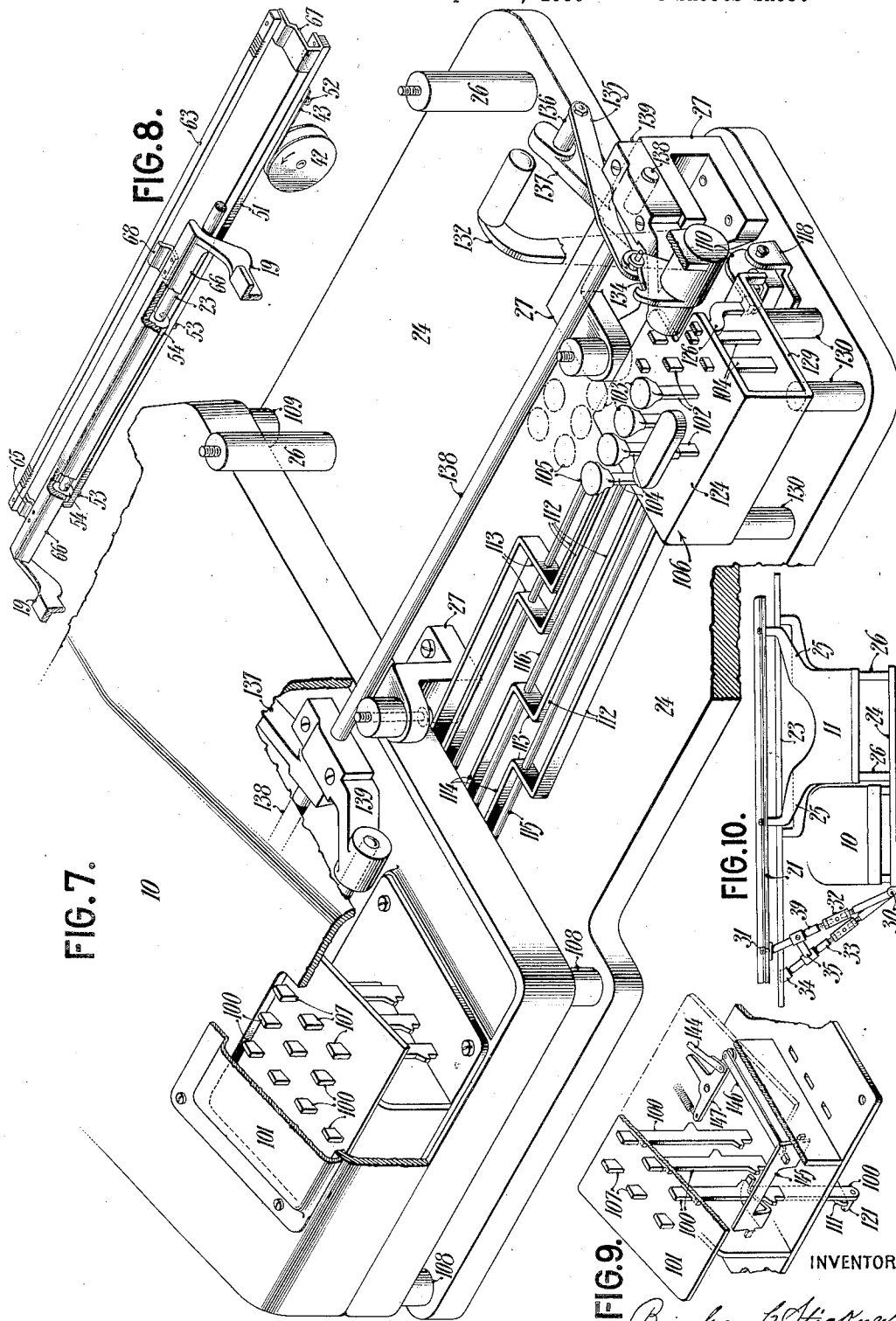
B. C. STICKNEY

1,971,239

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed Sept. 15, 1930

4 Sheets-Sheet 4



INVENTOR:

FIG. 9.

Brimham Stickney

UNITED STATES PATENT OFFICE

1,971,239

COMBINED TYPEWRITING AND COMPUTING MACHINE

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Elliott-Fisher Company, New York, N. Y., a
corporation of Delaware

Application September 15, 1930, Serial No. 481,829

28 Claims. (Cl. 235—60)

This invention relates to typewriting machines combined with adding machines of the kind in which the machines are placed side by side, and a single paper-carriage has a lengthened range of travel to enable it to co-operate either with the typewriting mechanism or with the adding machine. A machine for this purpose is shown in the patent to Newman, No. 1,015,630 of January 23, 1912. The invention is in the nature of an improvement upon the machines disclosed in applications of A. G. F. Kurowski, No. 344,200, filed March 5, 1929, and No. 449,430, filed May 3, 1930. In said applications, a Sundstrand adding machine is mounted at the right of an Underwood typewriting machine and close thereto, so that the operator may operate the keyboard of either machine, and the typewriter-paper-carriage runs upon tracks which are extended over the adding machine. In typing an entry at the left-hand portion of the sheet in said Kurowski machine, the carriage travels away from the adding machine, and the operator then finds it necessary to push the carriage to the right until it reaches a position where the figure-types of the adding machine may be impressed on the right-hand portion of the work-sheet, for the same line of typing. The carriage-release-key may be operated to free the carriage from the escapement-mechanism, and concomitantly the carriage may be pressed back by means of the usual finger-piece, until a back-tabulating stop mounted upon the carriage engages a fixed stop, at which point the work-sheet is in position to have the computed amount printed thereon. After the adding machine has printed the item, the carriage is returned to the right to begin a new line, and the platen is rotated for line-spacing.

Unless the carriage is thus re-set to the right, to position for printing the figure-types, on every line, it becomes necessary to use a very wide sheet, so that its right-hand border may be in printing position in the amount-type field, as soon as the typing is completed upon the left-hand portion of the sheet. In using such a wide sheet, considerable blank space must be left thereon between the typewriting and the number-printing column, in every line.

In said applications, the adding keys in the middle of the Sundstrand machine are separated considerably from the typewriter-keyboard.

It is an object of this invention to permit the use of as narrow a work-sheet as may be desired, and to avoid the backward re-setting of the carriage preparatory to printing the amount thereon by the figure-types of the adding mechanism.

It is a further object to simplify, reorganize and improve the tabulating and other controlling devices. It is also an object to place the adding keyboard in a more convenient position for use relatively to the typewriter-keyboard, and otherwise improve the machine.

It is a feature of the invention to simplify the tabulating mechanism and employ it both for the purpose of typewriting, and also for the purpose of locating the carriage for having the computed amount printed in the proper column.

According to the present improvements, the carriage may be controlled by tabulating keys while typing the entries in various columns upon a line of writing, and the same tabulating mechanism may be used for advancing the carriage farther, to bring it to position to have the computed amount printed thereon, thus simplifying the tabulating operation, inasmuch as one tabulating method may be followed for all purposes, making it unnecessary for the operator to devote his attention to setting the carriage back preparatory to printing the computed amount upon the work-sheet.

This result is accomplished by mounting the printing mechanism of the adding machine in such position that the carriage, by advancing towards the left from the typewriting machine, will bring the right-hand portion of the work-sheet into position for receiving the impressions of the amount-types, the latter being for this purpose mounted, together with practically the entire adding machine, at the left of the typewriting machine.

The typewriter-carriage-tracks are extended to the left over the body of the Sundstrand machine. Typewriter-tabulating mechanism is used, but is given extended range of movement, to comport with the lengthened travel of the carriage. The typewriter-carriage-tracks are also extended to the left accordingly.

As a further feature of the invention, the keyboard of the adding machine is placed at the right of the typewriter-keyboard, and the adding-key-stems may be connected at their lower ends to horizontal rock-shafts, which range crosswise under the keyboard of the typewriter, and at their left-hand ends are connected to operate the key stems and levers of the Sundstrand adding machine. Said adding keyboard, including digit-keys and various control-keys, as well as the motor-key, may be placed immediately alongside of the typewriter-keyboard, at the right-hand side thereof, with the front row of one keyboard about in register with the front row of the

other keyboard; and the rock-shafts of the adding keys may extend across beneath the typewriter-keyboard, to connect with the corresponding parts in the Sundstrand mechanism.

- 5 The operating or cycling handle or key of the Sundstrand mechanism may be placed at the right of the typewriting machine, and to the right of the adding keyboard, and the handle may be mounted upon a horizontal shaft extending
10 across beneath the typewriting machine, and connected at its left-hand end to the cycling mechanism of the Sundstrand machine. The cycling handle for the adding mechanism may be lengthened, to extend down more than in the Sundstrand, and may be fastened directly upon a shaft
15 that extends under the typewriter-keyboard and across to the Sundstrand mechanism, and is there provided with an upwardly-extending arm of sufficient length to do the work of the usual arm in
20 cycling the machine.

- The carriage must run leftward from its position over the type-bars of the typewriting machine, so as to bring the work-sheet to position for printing the computed amount thereon. An
25 arm may be built out from the right of the carriage, extending from 5 to 8 inches therefrom, and at its extreme end it may carry a catch to which is attached a strap or band that connects the carriage to a driving-spring barrel. The carriage-rack may be extended to the right about 8
30 inches, so that its pinion may be always in mesh therewith. The column-stop rack, mounted on the carriage, may be suitably extended six or eight inches to the right from the carriage. The front and back carriage-way-rods may be suitably extended to the left. The computed amounts
35 may be printed in various columns. When the adding mechanism is not being used, the work-sheet may be typed for its whole width.

- 40 For making the combined machine, there may be used an Underwood No. 3-18 machine, which takes in a sheet of paper 18 inches wide, and writes a line 16 inches long. This machine does not need to be altered on its right side, except
45 for lengthening the carriage-feeding rack and the column-stop rack to the right and making a new release-arm for the feeding rack, and also with the exception of extending the carriage-propelling arm from the right-hand end of the carriage. On the left-hand side, the carriage-way-rods may be extended about 8 or 9 inches,
50 using way-rods, scale, margin-gage, rack, etc., of No. 3-26 Underwood machine. Accordingly, the main frame-arms of the 3-18 machine may be lengthened 6 or 7 inches, and the same length may if desired be added to the front carriage-scale for use with both typewriting and amount-printing. However by using a double index, the scale need not be lengthened, as will be shown.
60 The margin-gage rods may be lengthened 6 or 8 inches, or the same may be taken from a 3-26 machine. The shift-rail may be lengthened or its left-hand end may be tapered, so that it will re-engage the platen-shift wheel upon the return
65 of the carriage to the right from the amount-printing position. Decimal-tabulating stops may be used, if desired, such as are generally used for 26-inch wide carriages in Underwood machines.

- In order to enable the use of the lengthened
70 front and back rails, front margin-gage rods, and platen-shift rail, the typewriter may be mounted upon a base in the form of a horizontal open frame, and this frame may extend to the left beyond the Sundstrand machine. Upon the left-
75 hand side of the base may be erected front and

back posts, and the left-hand ends of the extended front and rear carriage-tracks may be fixed to the tops of said posts. A tie-rod may connect the top of the back post to the top of the front one, conducing to stiffness. These front and back rails may be similar to those furnished for 24-inch typewriters, and can be fastened in place upon the 18-inch machine, and extend towards the left therefrom, to fasten upon the tops of said posts.

The Sundstrand keyboard, which is mounted at the right hand of the typewriter-keyboard and close thereto, is connected by bails across under the typewriter-keyboard and extending to the adding mechanism. Each key operates an arm at the right-hand end of its bail. At the left-hand end of the same bail an arm thereon performs the same operation that is required of the key in the Sundstrand machine. The bail-arms at the left may operate the regular Sundstrand key-stems, from which the keys may be removed.

An Underwood typewriting machine is illustrated in the patent to Kurowski, No. 1,425,390, of August 8, 1922.

Other features and advantages will herein-after appear.

In the accompanying drawings,

Figure 1 is a perspective view showing column-stops on the carriage, with means for actuating the control-jacks of the adding machine.

Figure 1^a is a view of a column-stop adapted to actuate simultaneously a plurality of tumblers that operate the control-jacks.

Figure 2 is a part-sectional side elevation, showing the typewriting machine and a Sundstrand mounted at the left thereof.

Figure 3 is a plan of the combined machine seen at Figure 2.

Figure 4 is a perspective of the cross-connections from the adding machine keyboard at the right of the combined machine, to the adding stems at the left.

Figure 5 is a sectional side elevation, showing the connections from the adding machine keyboard across and beneath the typewriter to the stems of the adding machine.

Figure 6 is a plan of the combined machine, showing the arrangement of the cross-connections between the adding machine keyboard at the right and the adding machine at the left.

Figure 7 is a front perspective, showing an adding machine keyboard, the cross-connections, etc.

Figure 8 is a front perspective, showing the right-hand extension frame on the paper-carriage.

Figure 9 is a perspective sectional view of the stem-system of the adding machine.

Figure 10 is a front elevation of the typewriter and adding machine assembled side by side, with means for supporting the leftwardly extended carriage-tracks.

The Sundstrand adding machine 10 is mounted closely at the left of the Underwood typewriting machine 11. A platen 13 is common to the two machines, being placed at such a height that it may be typed upon by the typewriter-types 14 and the adding-machine types 15; the typewriter having the usual ribbon-mechanism 16, and the adding machine having the usual ribbon-mechanism 17. Many details of the typewriting and Sundstrand mechanisms are not deemed necessary to illustrate, as they are well known.

The revoluble platen 13 is mounted upon a

frame 18, the latter being shiftable up and down upon a carriage 19, which is preferably a standard Underwood carriage taking a work-sheet 20 which has a width of 18 inches. A line 16 inches long may be imprinted upon the work-sheet, a part of the line being imprinted by the typewriter-types 14 and a part by the adding-machine types 15.

A standard carriage of the length described is usually mounted upon tracks which permit a 16-inch travel of the carriage; but according to the present invention there are employed tracks of sufficient length to permit a 24-inch travel of the carriage, so as to enable it to work in conjunction with the typewriting machine on a part of a line, and on the remainder of the line to work in conjunction with the adding mechanism. The lengthened front carriage-rail is of standard construction, being formed with a longitudinal groove, in which run the usual front carriage-rolls 22. The rear carriage-track 23 has a corresponding extra length. These front and rear tracks overhang the adding machine at the left of the typewriting machine, as seen at Figures 3 and 10, and they may be made of standard 26-inch construction, and at the right-hand portions may be mounted in the standard way. At the left-hand overhanging portions of these tracks, there is provided a special supporting frame, seen at Figure 10, hereinafter described.

From the foregoing it will be seen that the first part of each line may be typed upon the work-sheet by means of the typewriter, including the date and also items in one or more vertical columns on the work-sheet, the carriage being provided with letter-feeding mechanism for typewriting purposes, and also being provided with a tabulating mechanism for jumping from column to column, which will presently be described. After as much of the line has been typed as is desired, the tabulating mechanism may be brought into use, to release the leftward traveling carriage and arrest it in position for the imprinting of the computed amount by means of the types of the adding machine. This is done at the right-hand portion of the work-sheet, necessitating that the jump of the carriage at this time shall be of considerable length, since the carriage moves many inches in proceeding from the typewriting center to the amount-printing field. It will be seen that no back-and-forth shifting of the carriage is called for when transferring the work-sheet from typing position to amount-printing position, but the operation of the tabulator is continued in the same manner as at the typewritten part of the line. The typewriting machine, substantially of standard construction, is thus adapted to co-operate with an adding machine, also substantially of standard construction, placed at the left side thereof, while the work-sheet travels only to the left whether typewriting or tabulating, making it necessary for the operator to give attention only to the ordinary manipulation of tabulator-keys, even when transferring the carriage from the typing center to the amount-printing field.

After the carriage has reached the amount-printing position and the computed amount has been printed in the next to the last column, the tabulator-key mechanism may be again operated to locate the carriage for printing the amount in the final column at the right-hand side of the work-sheet.

The two machines are mounted upon a common base 24. The typewriting machine is mounted at such a height that the leftward extending

rail-carrying arm 25 just clears the adding machine 10, as at Figure 10. The front and rear rails may be removed from the 3-18 Underwood machine, and long rails 21 and 23 substituted, which are standard for writing a line 24 inches long on a 3-26 model. The typewriter 11 sits upon rear pedestals 26 rising from the baseboard 24. The front of the typewriter is supported upon bases or brackets 27 secured to the board 24.

In elevating the typewriting machine to the extent seen in Figure 10, the typewriter-platen is carried to an elevation higher than the point at which the platen is usually placed on the Sundstrand machine; but this difference is compensated for by correspondingly lengthening upwardly the amount-printing typebars 28, as set forth in said applications of Alfred G. F. Kurowski. The usual Sundstrand register or totalizer 28^a, Figure 3, co-operates with the type-bars 28 in item-registering and total-taking. See patent to Sundstrand No. 1,198,487.

The front rail 21 may be supported by means of a strut 39, Figure 10, which is in the form of a rod fastened at its lower end at 30 to the side of the baseboard 24 and fastened at its upper end at 31 to the left-hand end of the rail 21. This strut may be lengthened by means of a turn buckle 32. A similar strut 33 may support the left-hand end of the rear carriage-rail 23 at 34. The two struts may be connected by means of a tie-rod 35, thus making a rigid framework including the carriage-rails.

The type-bars 14 are operated by the usual keys 36 by well-known means, which it is not deemed necessary to illustrate. The keys operate also a carriage-escapement mechanism, which includes an escapement-wheel 37 having the usual pinion 38 meshing with the usual releasable rack 39 hinged at 40 upon the paper-carriage. The rack 39 is extended to the right, so as to remain in mesh with the pinion 38 throughout the range of travel of the carriage. The escapement-mechanism is of little use when the work-sheet is in the amount-printing field, except that it retains control of the carriage at all times, by co-operating with the usual feed-dogs 41. The carriage is propelled by a spring-drum 42 and a band 43.

The platen-frame may be shifted up and down by means of a shift-rail 44, upon which runs a roll 45 pivoted upon the shift-frame. This shift-rail 44 is of somewhat over standard length for Underwood model 3-18, but at its left-hand end it may be tapered at 46 to form a guide to guide the shift-roll 45 onto the rail 44, when the carriage is being returned from the adding machine to the typewriting machine. The return is effected by the usual handle 47, operating the usual line-space mechanism 48. The return is limited by the usual margin-gage 49, in connection with which there may be provided the usual margin-release key 50.

The spring-drum 42 is of usual construction and location; and in order to enable it to drive the carriage over the amount-printing field, an extension is provided in the form of a bar 51, which projects from the right-hand end of carriage 19; and the strap 43 is fastened to said bar at 52 at a point sufficiently to the right of the carriage to enable the spring to drive the carriage after the latter has passed the spring, as at Figure 8. The bar is fastened to the carriage by means of screws 53, these screws threaded into collars 54 which form the usual rear guides and supports for the carriage. A stop 55, Figure 3, may be provided upon the left-hand end of the

rail 23 to prevent the carriage from accidentally running off therefrom.

Column-tabulating for the combined machine is under the control of a tabulating key 60, which operates a counter-stop 61 of the plunger type, Figure 2, raising the same in the usual manner to intercept a column-stop 62, which is adjustable along a rack 63 on carriage 19. The tabulating train has the usual construction and operation, and is therefore not fully illustrated. This train also elevates the usual roll 64 to lift the carriage-rack 39 out of the pinion 38, allowing the carriage to be jumped by its spring 42 until arrested by the usual engagement of column-stop 62 with counter-stop 61. By this means the carriage and work-sheet may be tabulated to the proper columns within the typewriting field.

It will be understood that the described tabulating mechanism is illustrative of any desired mechanism, such as decimal-tabulating, column-skipping, etc., which are not illustrated, because they are well known. The stop 61 may be one of the usual Underwood set of decimal-stops.

It has already been explained that the letter-spacing rack 39 is lengthened to correspond with the extra length of the carriage-tracks 21, 23, whereby tabulating and typewriting can proceed for the entire width of the work-sheet. It is desired, however, to use the last column or columns on the work-sheet for printing the amount by use of the Sundstrand adding mechanism, and for this purpose the carriage is tabulated into the field of the adding or printing types 15.

The extent of this jump of the carriage, it will be understood, is much in excess of the space on the work-sheet intervening between the last typing and the printing of the first amount. This extra distance is covered by the carriage in jumping the sheet to the left from the printing center of the typewriter to reach the printing field of the adding machine; a distance of say nine inches. It will be perceived that the objection is avoided of leaving a nine-inch gap between the typewritten items and the amount printed in the same line on the work-sheet. It will also be perceived that the tabulating may proceed by the usual manipulation of tabulator-key, without back-spacing or back-tabulating the carriage, as has been found necessary where the adding machine has been placed at the right of the typewriting machine. In some instances, the back-tabulation of the carriage in each line has been great, owing to the great length of line that has been typed before manipulating the adding and printing keys; but, according to the present improvements, the longer the line of typing the more closely the carriage approaches to the amount-printing field. Thus long forward tabulating runs of the carriage are generally avoided, while back-tabulating is rendered unnecessary.

The tabulating key 60 and the counter-stop 61 are made to serve the adding machine 10; the standard carriage of the Sundstrand machine being omitted, and the types printing upon the same typewriter-platen 13 as the types 14.

After tabulating for typing the items, using, for example, the two column-stops 62 seen at Figure 3, the same tabulating key 60 is again depressed to jump the carriage from the typewriter to the adding machine, as at Figure 3, and arrest it in position to print an amount in say the next to the last column on the work-sheet. While the carriage is detained in this position by the co-operation of the carriage-spring 42, the escape-

ment-dogs 41 and the escapement-wheel 37, the adding-machine keys are manipulated, and then the adding machine is cycled, driving up the printing type-bars 28 and printing the added amount upon the work-sheet, and returning all parts to normal positions; this feature of operation being common in the Sundstrand machine. See patent to Sundstrand No. 1,747,743.

Then the tabulator-key 60 may be depressed, and the carriage again tabulated, to be arrested by the last column-stop at the right at Figure 3, whereupon another manipulation of the adding-machine keys may proceed, and another cycling operation, and then the carriage may be returned by the line-spacing handle 47 to the right, to begin a new line of typing.

The column-stop rack 63 is extended to the right, as seen at Figure 3, to permit adjustment of the column-stops to positions thereon for controlling the carriage in amount-printing position. The left-hand end of the column-stop bar is secured by means of a bracket 65 of ordinary construction to the rear bar 66 of the carriage 19. The right-hand end of the column-stop rack 63 is secured by a bracket 67 to the right-hand end of extension-bar 51 upon the carriage. Thus it will be seen that a rigid frame is made up of the column-stop rack 63 and the parts 65, 63, 67, 51 fastened to the carriage. There is also provided a midway stiffening bracket 68, similar to 65, and similarly fastened.

It may be explained at this point that in the Sundstrand machine there is usually provided a row of jacks for controlling various operations of the machine selectively, see Sundstrand patent No. 1,779,717. These jacks are shown in two groups, one group designated generally as 69, and the other as 70 (Figure 1). Jacks of group 69 are assigned to non-printing, subtraction, non-adding and totalizing, and those included in 70 are assigned to date-controlling, second register operating, and repeating. The operation of these devices is controlled by certain keys at the adding keyboard. In the Sundstrand machine it is usual for the carriage to advance certain of these jacks selectively as the carriage stops in different columns. A corresponding result is effected in the present invention by pivoting upon the Sundstrand machine novel jack-operators, preferably in the form of upper and lower bails 71, 72; said bails being provided with similar or dissimilar tappets 73, to operate any desired jacks. These bails may be removably secured by set-screws 74 provided in their hubs 75, so that they may be taken out and replaced by other bails having other tappets, as desired for different classes of work.

The typewriter-carriage 19 operates the jacks 69, 70 selectively by means of these bails. To effect this result, the carriage is provided with instrumentalities in the shape of tappets 76, 77, formed upon column-tabulating stops, which are designated at 78, 79 for arresting the carriage in position for amount-printing seriatim in the last columns on the work-sheet, Figure 3. Tappet 76 strikes a cam 80 pivoted upon an arm 81 of a bell-crank lever, having a pendent arm 82, connected by horizontal link 83 to jack-operating bail 71. Tappet 77 on the other decimal column-stop 79 strikes cam 84 upon arm 85 of bell-crank 86, connected by a link 87 to the inner jack-operating bail 72. Upper jacks 69, 70 or other jacks may thus be selected and operated at each of the last two column-stop positions on the work-sheet.

Upon the return of the carriage by means of the handle 47, tappets or lugs 76, 77 ride idly over the cams 80, 84, which are pivoted as at 88 to their respective arms 81, 85, to enable the tappets to return idly thereover and thus permit the free return movement of the tappets 76, 77 with the carriage 19. Each of the cams 80, 84 is provided with a returning spring 89. The jacks are provided with a returning spring 90, Figure 1, as usual, and this may hold the bails, links and bell-cranks 82, 85 in normal positions.

In the Sundstrand machine, the control jacks are usually moved by means of studs or pins that are fastened upon a leaf, attached to the carriage, and having a vibrating movement to enable the pins to clear the jacks when necessary; but the present invention avoids the necessity of using such a leaf. There is free movement of the carriage for the extent of its travel. The full length of the line may be used for typewriting, or the last column of several columns may be reserved for printing the added amounts.

The number of cams 80, 84 is not limited to two; and in some cases one may be omitted.

In some columns, where the amount is to be added and printed, an ordinary stop 62 may be used in place of 78, 79, so that jacks will not be operated as the carriage reaches the amount-printing position.

It will also be seen that the stops 78, 79 may be interchanged, so that 78 may be used for the first column, and 79 for the second, with corresponding changes in the operation of the jacks 69, 70.

The control mechanism that is operated by the jacks is not herein specifically disclosed, as it is well known.

At Figure 1^a is shown stop 91, similar to 78, but having an extra wide tappet or lug 76, so as to operate both cams 80 and 84, affecting the corresponding jacks, preparatory to adding and printing in any column. This feature of the invention is not limited to use with combined typewriting and adding machines.

It will be perceived that the plunger-stop 61 is so placed that when the carriage is arrested by stop 78, the lug 76 upon the latter holds down the arm 81 of the bell-crank or tumbler; said lug 76 at this time resting upon a broadened top of the cam 80. The latter cannot arrest the carriage when the latter is either advancing or returning. It will be observed that when the tabulator-key 60 is released, the carriage is restored to the control of its dog 41 and remains stationary; but the lug 76 continues to hold down the arm 81 so long as the carriage remains in that position, that is, throughout the adding and printing operation. However, upon the succeeding tabulating operation, lug 76 passes off from the top of the cam 80. Thus it will be seen that cams 80 and 84 do not arrest the carriage at any time, but the lugs 76, 77 pass readily thereover, pressing them down out of the way, so that there is no interruption of the tabulating or letter-feeding movements at any time.

Suitable carriage-scales may be provided for the column-stops, and also for the front of the carriage, as, for example, the scale marked 92. This scale is sufficiently long to co-operate with a carriage-pointer at 94 for typing a line at least twelve inches long. The carriage also may be provided with a pointer 95 to co-operate with said scale 92 when the carriage is in the amount-printing position at Figure 3. However, it will be seen

that the scale 92 may be made of any length for co-operation at all times with the single pointer 94.

In organizing the adding machine at the left of the typewriting machine, in order to gain the advantages already noted, the difficulty has been met that the keyboard of the adding machine would accordingly need to be manipulated by the left hand of the operator, which would nearly always be a disadvantage. The consequent considerable separation between the two keyboards would be a further disadvantage, as well as the location of the adding-machine keys considerably forward of the typewriter-keys, due to the use of the same platen for both machines. Another difficulty is the elevation to which the adding-machine keys are brought, which is considerably above that of the typewriter-keys, which is a detriment. It is further desired to employ the adding machine with but few alterations therein. To overcome the aforesaid difficulties, and to keep the adding mechanism practically intact, the present improvements provide for the use of the digit-key actions, and also of the non-print, non-add, repeat, total, subtraction and other control-key actions of the Sundstrand machine practically as an entirety, with the exception that the keys (see Sundstrand Patent No. 1,198,487) are removed from the tops of the stems 100, and over these stems is secured a cover 101 upon the casing of the Sundstrand machine 10; while from said stems 100, including both the digit-stems and the control stems, there extend cross-trains to a companion novel set of similar digit-key stems 102, bearing keys 103, and similar controlling or condition key-stems 104, bearing keys 105, which have the effect of locating the Sundstrand keyboard upon a new keyboard 106 of the combined machine, with the keys at the right of the typewriter-keyboard 36. The front row of adding keys is in line with the front row of typewriter-keys. The operation of the adding machine may be effected entirely by the right hand and with great convenience, owing to the juxtaposition of the keyboards.

This keyboard 106 is placed at such an elevation that the front row of the adding keys may be at substantially the same level as the front row of typewriter-keys, which is one of the advantages of the new organization.

Novel individual trains extend from the stems 100, 107 on the adding machine 10, across the typewriting machine to the key-stems upon the new keyboard 106; said trains ranging under the adding machine 10 and under the typewriter 11, and under the keyboard 106, but above the base 24. Pedestals or supports 108, 109 for the adding machine leave sufficient space above the base 24 to accommodate these cross-connections. The novel key-supporting stems 102, 104 are similar to the keyless stems 100, 107, and are manipulated by the operator in the same manner as the keyboard of a standard Sundstrand machine.

The cross-connections are placed sufficiently far below the typewriting machine to afford space or clearance for the usual downward movements of the typewriter-levers and other parts.

It will thus be seen that one of the novel features of the invention is the system of cross-connections, whereby the depressions of the key-stems 102, 104 at the right of the combined machine, cause similar depressions of the keyless stems 107 at the left. The cross-connections may be in the form of bails, each bail having two depressible arms 110, 111, one at each end, the

left-hand arm being connected to stem 100 or 107, and the right-hand arm to stem 102 or 104. The arms on each bail move similarly at their front ends, so that the action of each stem 100, 107 is the same as if it were operated by a key placed directly thereon; the extent of depression of the keys of keyboard 106 being substantially the same as the practice in a Sundstrand machine.

The bails are nested for compactness. It is desired for each file of stems at one side of the combined machine to be operated by keys in the corresponding file at the other side of the machine, which requirement precludes ordinary nesting of bails of ordinary shape. The novel bails include the forwardly-extending arms 110 forming a set at the right-hand part of the combined machine, and the forwardly-extending arms 111 forming a set at the left-hand side of the combined machine, Figures 4 and 6, these arms being connected at their rear ends, each pair by an integral connection. Each connection includes a transverse horizontal bar 112, which between its ends is provided with a bent or jog portion 113, from which extends the remaining portion 114 of the bar, the latter bent forwardly to form arm 111. These S-shaped bails may be grouped upon a number of stationary shafts or bearing rods 115, 116, 117 extending across the combined machine, several bails being hinged upon each rod. The arms 110 and 111 on each bail are hinged upon the rod, and this is also true of the jog 113, so that each bail is supported at three points upon its rod or shaft 115. The latter may be provided with end bearings 118, also with one or more intermediate bearings 119, Figure 6. These firm supports for the bail conduce to ease and reliability of action.

It will be seen that the jogs 113 lie side by side facewise at Figure 6 and constitute compound bail-arms, each set of members 111, 114 and 113 being nested within the next set of similar members throughout the system, while the same is also the case with each set consisting of 113, 112, 110. There is therefore shown a double nest of cross-bails.

The arm 110 at the extreme right of Figure 6 is integral with the opposite arm 111. The first key 105 in the rear row operates the first stem 107 in the rear row. The next key 105 operates the next stem 107. The digit-key marked "9" operates the second stem 100 from the right in the rear row of the system seen at the left of Figure 6, and so on; the keys at the right of Figure 6 being manipulated the same as if they were mounted upon the stems 100 and 107 at the left of Figure 6, so that it is unnecessary for the operator to learn a reversed keyboard.

It is desired for the depression of the keys at the keyboard 106 to be substantially equal to the depression of the stems 100, 107 at the left of Figure 6. For this purpose, the arms 111 are made respectively of the same length as the arms 110, to the end that the forward ends of the arms 110 shall have a uniform depression substantially equal to the depression of the keys in any Sundstrand machine.

Since the keyboard 106 is placed so that its front row is in line with the front row of the typewriter keys, it results that the stems at the right side of Figure 6 are considerably in rear of the key-stems at the left of Figure 6, and in order for the arms 110 to equal respectively to 111, the connections are set obliquely, as

shown in Figure 6, to permit the use of the desired length of arms at the right hand of said Figure 6, so that the keys 103, 105 shall have the same dip as the stems 100, 107, notwithstanding the latter are placed forwardly.

There may be retained the usual springs 120, Figure 5, for returning the stems 100, 107, and these springs may be made somewhat stronger. Said stems have at their lower ends pins 121 to be operated by arms 111, together with the remainder of the bails, including the arms 110, the latter lifting the stems 102, 104, which at their lower ends terminate in toes 122 (Figure 4), resting upon the arms 110. Each spring 120 may return its entire train including the key.

It will be understood that all of the stems 100, 107 have been lengthened downwardly, so as to underlie the arms 111, which are arranged at a level below the typewriting and adding machines. The left-hand stem 107 in the bottom row at Figure 6 is connected to the repeat key of keyboard 106, and the novel repeat-key stem 104 is provided with a notch 123 (Figure 5), so that when the key is depressed the stem is caught in the guide-plate 124 by means of a spring 125, so as to hold down said key for the usual purpose set forth, it being understood that the repeat stem 107 is unprovided with any notch, but is controlled entirely by the key-stem 104.

The upper right-hand key of keyboard 106 is used for a lock, and its stem 126 is provided with a notch 127 (Figure 2) to catch under the key-stem guide-plate 124, so as to hold the lock-key down for the purpose usual in the Sundstrand machine; the corresponding stem 107 being unprovided with any notch. The usual spring 128 holds the stem 126 forwardly when it is not desired to hold the key mechanically depressed. Below the key-guiding plate 124 is a corresponding guide-plate 129 for the lower ends of the key-stems, the same being supported by pedestals 130, Figure 2. The old stems 100, 107 are guided in the usual plates.

Upon depression of the repeat-key stem 104 and its corresponding stem 107, the usual pin 140, mounted on the stem 107, Figure 5, will engage the regular Sundstrand index-restoring slide-bar 141, and prevent the restoring slide-bar, during its operating movement, from being swung upwardly to become effective and engage a roller 142 on a pin-setting index-member 143 for returning the index-member and its mechanism to normal position. In this manner, the restoring slide-bar 141 will move idly forward and backward as long as the pin 140 on the key-stem 107 is held down in operated position. See Sundstrand Patent No. 1,198,487.

The arms 110 of the bails have a slotted guide-comb 131 bent down from the rear end of the stem-guiding plate 129, Figure 2. This keeps the bails from lateral displacement.

Another difficulty in providing for the described tabulating of the carriage to the left from the typewriting machine to the adding machine, presented itself in the cycling handle of the adding machine, which it was not desired to place between the two machines, where it would have to be operated by the left hand of the operator, and where it would not be easily accessible and where it would objectionally separate the two machines. It is contrived in view of these difficulties to place the general-operator handle 132 in position where it may be operated by the right hand, by placing the handle at the right side of the adding-machine keyboard 106. Thus both the keyboard and the

general-operator handle are removed from the usual positions upon the Sundstrand machine, and placed at the right of the typewriter-keyboard in the combined machine. This general operating handle, which is usually pivoted upon a fixed stud in the Sundstrand machine, is, according to the present improvements, mounted on a stud 133 (Figure 6) fixed upon the right-hand portion of the keyboard 106, or upon the right-hand bracket 27, said general operator handle having an arm 134 connected by a link 135 to a stud 136 on an arm 137, which extends forwardly and rearwardly from a rock-shaft 138. Hence, when the general operator handle 132 is driven by the operator in the usual manner, the shaft 138 is rocked. This shaft extends across from the keyboard 106 beneath the typewriting machine, and its left end passes through a bearing 139, and extends therefrom to the left under the mechanism of the adding machine, which is operated thereby as usual. The shaft 138 thus comprises two portions, one of which is the left-hand or rear portion, and the other of which is the extension from the general-operator handle 132 at the right-hand side of the combined machine. It will be understood that the connection with the general-operator train 132, 135, 136, 137 is similar to that which is common on the Sundstrand machine, so that the operation of the shaft 138 in the combined machine proceeds in like manner and with the same effect as in a Sundstrand machine.

Operation of the keys 103 depresses their respective key-stems 102, which in turn depress key-stems 100 to operate the regular pin-setting index-plungers 144 in the Sundstrand machine (Figure 9). This mechanism includes bails 145, one for each numeral-key, adapted to be rocked by depression of a key-stem 100. The rocking of a bail 145 operates a link 146 to swing an arm 147 about its pivot and thereby thrust its pin-setting plunger 144 forward to set its corresponding pin (not shown) for selecting the adding types 15 to be printed on the work-sheet, and simultaneously determine the amount to be run into the adding register.

Certain features disclosed herewith are claimed in the applications of Alfred G. F. Kurowski, Serial No. 449,430, filed May 3, 1930, and Serial No. 604,514, filed April 11, 1932; but claims in this application are limited to features of invention not disclosed in said Kurowski applications.

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

Having thus described my invention, I claim:

1. In combination, a typewriting mechanism, an adding and printing mechanism mounted at the left of the typewriting mechanism and close thereto, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, said tracks extending from the typewriting mechanism to the left above the adding mechanism, said tracks including front and rear rails, rods, one for each rail, extending upwardly to support the overhanging ends of the rails, and a strut connecting said rods, said rods being rigidly connected to a typewriting machine support at their lower ends, and said strut being effective to brace said rods and thereby brace the overhanging rail-ends against forward or rearward displacement.

2. In combination, a typewriting mechanism having type-keys, an adding and printing mechanism mounted at the left of the typewriting

mechanism and close thereto, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, said tracks extending from the typewriting mechanism to the left above the adding mechanism, said tracks including front and rear rails, and a feeding rack and pinion for said carriage, said pinion being controlled solely by the type-keys and forming part of the typewriting mechanism, said rack being extended to the right sufficiently to remain in mesh with the pinion throughout the travel of the carriage over the adding machine.

3. In combination, a typewriting mechanism, an adding and printing mechanism mounted at the left of the typewriting mechanism and close thereto, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, said tracks extending from the typewriting mechanism to the left above the adding mechanism, said tracks including front and rear rails, a feeding rack and pinion for said carriage, said rack being extended to the right sufficiently to remain in mesh with the pinion throughout the travel of the carriage over the adding machine, a bar extended to the right from said carriage, a spring-barrel, and a band drawn by said spring-barrel and attached to said bar at a point to drive the same after the carriage has passed the spring-barrel.

4. In combination, a typewriting mechanism, an adding and printing mechanism mounted at the left of the typewriting mechanism and close thereto, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, said tracks extending from the typewriting mechanism to the left above the adding mechanism, said tracks including front and rear rails, a feeding rack and pinion for said carriage, said rack being extended to the right sufficiently to remain in mesh with the pinion throughout the travel of the carriage over the adding machine, a column-stop-rack extended to the right from said carriage, a bar also extended to the right from the carriage, the right-hand end of said rack being secured to said bar, means also securing said rack at its left-hand and midway portions to said carriage, and a carriage-driving band also secured to said bar.

5. In combination, a typewriting mechanism, an adding and printing mechanism mounted at the left of the typewriting mechanism and close thereto, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, said tracks extending from the typewriting mechanism to the left above the adding mechanism, said tracks including front and rear rails, an index and scale for the carriage graduated for typing operations, and also an index for the amount-printing operations, said indexes being spaced apart to bring them separately into use at the typewriting and amount-printing operations, and said scale being graduated for both typewriting and amount-printing operations.

6. In combination, a typewriting mechanism, an adding and printing mechanism mounted on the side of the typewriting mechanism at the left thereof, a paper-carriage common to the two mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, and mechanism to tabulate said carriage towards the left in the typewriting field and also

to tabulate the carriage further to the left to bring it out of the typewriting field and into the amount-printing field, said tabulating mechanism having stops in both of said fields.

- 5 7. A machine constructed according to claim 6, in which said tabulating mechanism includes stops and means cooperative with said latter stops whereby it may tabulate the carriage to successive column-positions in the amount-printing field.
- 10 8. In combination, a typewriting mechanism, an adding and printing mechanism mounted on the side of the typewriting mechanism at the left thereof, a paper-carriage common to the two
- 15 mechanisms, tracks upon which the paper-carriage may travel from one mechanism to the other, mechanism to tabulate said carriage towards the left in the typewriting field and also to tabulate the carriage further to the left to bring it
- 20 into the amount-printing field, and an arm extending a substantial distance from the right of said carriage and having at its end means for attachment of a driving band, the carriage having an escapement-rack which is also extended
- 25 to the right, an escapement-pinion being in mesh with said rack throughout the range of travel of the carriage, said machine having a column-stop-rack extended to the right to permit tabulation of the carriage in one direction throughout substantially its entire range of travel, and
- 30 having means for tabulating the carriage to different columns in the amount-printing field.
- 35 9. A typewriting mechanism including a keyboard, a keyboard controlled adding and printing mechanism mounted at the left side of the typewriting machine, a paper-carriage common to the two mechanisms and movable from one to the other, and a single tabulating mechanism including means to tabulate the carriage for the
- 40 typewriting operation, and also constructed to jump the carriage to the left from the typewriting machine to the adding machine and arrest it in position for printing an amount by the adding machine.
- 45 10. A typewriting mechanism including a keyboard, a keyboard controlled adding and printing mechanism mounted at the left side of the typewriting machine, a paper-carriage common to the two mechanisms and movable from one to the
- 50 other, and a single tabulating mechanism including means to tabulate the carriage for the typewriting operation, and also constructed to jump the carriage to the left from the typewriting machine to the adding machine and arrest it in
- 55 position for printing an amount by the adding machine, said carriage having a letter-spacing rack lengthened to the right, and a pinion with which the rack remains in engagement while the carriage is in the adding field, said tabulating mechanism including means to release the
- 60 rack from the pinion at any point in the travel of the carriage.
- 65 11. A typewriting mechanism including a keyboard, a keyboard controlled adding and printing mechanism mounted at the left side of the typewriting machine, a paper-carriage common to the two mechanisms and movable from one to the other, and a single tabulating mechanism including means to tabulate the carriage for the
- 70 typewriting operation, and also constructed to jump the carriage to the left from the typewriting machine to the adding machine and arrest it in position for printing an amount by the adding machine, means being included in the single
- 75 tabulating mechanism whereby the carriage is tabulatable to successive positions for printing amounts in different work-sheet columns by the adding machine.
- 80 12. A typewriting mechanism, an adding and printing mechanism mounted at the left thereof, an adding keyboard mounted at the right of the typewriter-keyboard, and connections extending from said adding keyboard across to the mechanism of the adding machine.
- 85 13. A combined machine constructed according to claim 12, in which the adding keys are mounted upon stems, and rock-shafts connecting the stems to the adding mechanism, said rock-shafts extending under the keyboard of the typewriter, and at the left-hand end connected to operate
- 90 the digit-stems and controlling devices of the adding machine; a cycling handle being provided at the right of the adding keyboard, a horizontal shaft extending from said handle to the adding machine and connected to effect the cycling
- 95 thereof.
- 100 14. A machine constructed according to claim 12, in which each key of the adding keyboard is provided with a stem, each stem being cross-connected by a bail to a corresponding stem of the adding machine; the bails being of assorted sizes and nested.
- 105 15. A keyboard-operated typewriting machine and an adding and printing mechanism combined therewith and mounted at the left thereof, and having a keyboard at the right-hand side of the typewriter-keyboard, with the front row of adding keys about in line and having about the same elevation as the front row of typewriter-keys and close thereto, said adding machine having operating stems at the left of the typewriting machine and operating key-stems at the right of the typewriting machine, with cross-trains connecting said sets of stems under the typewriting machine, said trains being in the form of nested
- 110 bails, each bail having an arm at its left end for an adding-machine stem and an arm at its right end for a key-stem.
- 115 16. A machine constructed according to claim 15, in which the order of the adding-machine stems at the left of the typewriter is the same as that of the key-stems at the right of the typewriter, the bails having forwardly-extending arms at each end, each pair of arms connected by a bar having a jog at its middle portion to form
- 120 an S-shape, and bearing-rods passing through the jog-portions and end portions of the bails, several bails being hinged upon each rod, the jogs lying side by side and forming compound ball-arms.
- 125 17. A keyboard-operated typewriting machine and an adding and printing mechanism combined therewith and mounted at the left thereof, and having a keyboard at the right-hand side of the typewriter-keyboard, said adding machine having operating stems at the left of the typewriting machine and operating key-stems at the right of the typewriting machine, with cross-trains connecting said sets of stems, said trains being in the form of nested bails, each bail having
- 130 an arm at its left end for an adding-machine stem and an arm at its right end for a key-stem, the order of the adding-machine stems at the left of the typewriter being the same as that of the key-stems at the right of the typewriter, the
- 135 bails having forwardly-extending arms at each end, each set of bail-members being nested within the next set throughout the system, forming a doubled nest, the arms at the ends of each bail being of equal length and having uniform depres-
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- 145
- 150

sions, the adding-machine keyboard being placed in a position rearwardly of the system of adding stems, and the bails having a corresponding obliquity, extending rearwardly to the right.

5 18. In a combined adding and printing machine having key-set numeral-types and indexing de-
vices and a register, and a cycling device for
printing an amount and running the printed
amount into said register at one operation, and
10 also having a set of control-devices including a
device to prevent printing when adding, a sub-
traction-device, a device to print the total ac-
cumulated in the register, and a repeating device,
said devices including a set of individual control-
15 jacks, the combination with said control-jacks,
of a set of trains for effecting combinative se-
lections of said jacks, each train having means for
controlling a different plurality of jacks from
the other trains, a carriage, means for setting the
20 carriage to different columns, and interchange-
able tappets operable by the carriage and con-
nected to operate said trains selectively, whereby
one interchangeable tappet may operate a plu-
rality of said jacks in one combination, and an-
25 other interchangeable tappet may operate a plu-
rality of said jacks in a different combination.

19. In a combined adding and printing ma-
chine provided with control jacks, the combina-
tion with a tabulating carriage and means for ar-
30 resting the carriage at different columns, of a
series of jack-operators, and interchangeable
means operable by the carriage for moving said
jack-operators selectively, said operators ar-
ranged one above another and having dissimilar
35 tappets to operate the desired jacks, with pro-
vision for interchanging said operators, the latter
being in the form of nested bails removably se-
cured in working position, so that they may be
replaced by other operators.

40 20. In an organization including a combined
adding and printing mechanism having key-set
numeral-keys and indexing devices, a register,
and a cycling device for printing an amount and
running the printed amount into said register at
45 one operation, and also having a set of control-
devices including a device to prevent printing
when adding, a subtraction device, a device to
print the total accumulated in the register, and
a repeating device, said control-devices including
50 a set of individual control-jacks, and a typewriting
mechanism, said combined adding and printing
mechanism being mounted at the left of said
typewriting mechanism, the combination with
said adding and printing mechanism and its con-
55 trol-jacks, and said typewriting mechanism, of
a paper-carriage common to the two mechanisms,
tracks upon which the paper-carriage may travel
from one mechanism to the other, mechanism to
tabulate said carriage towards the left in the
60 typewriting field, and also to tabulate the car-
riage further to the left to bring it out of the type-
writing field and into the amount-printing field,
and also to tabulate it to different stations in said
amount-printing field, said carriage-tabulating
65 means including column-stops, and means to en-
able said column-stops to operate different com-
binative selections of said control-jacks in differ-
ent columns.

21. In an organization including a combined
70 adding and printing mechanism having key-set
numeral-keys and indexing devices, a register,
and a cycling device for printing an amount
and running the printed amount into said regis-
ter at one operation, and also having a set of
75 control-devices including a device to prevent

printing when adding, a subtraction device, a de-
vice to print the total accumulated in the regis-
ter, and a repeating device, said control-devices
including a set of individual control-jacks, and a
80 typewriting mechanism, the combination with said
adding and printing mechanism and its control-
jacks, and said typewriting mechanism, of a
paper-carriage common to the two mechanisms,
tracks upon which the paper-carriage may travel
85 from one mechanism to the other, mechanism to
tabulate said carriage, to bring it out of the
typewriting field and into the amount-printing
field, and also to tabulate it to different stations
in said amount-printing field, said carriage-tab-
90 ulating means including column-stops, and means
to enable said column-stops to operate different
combinative selections of said control-jacks in dif-
ferent columns, and to return freely through said
columns without obstructions from the jacks.

22. In a combined adding and printing ma- 95
chine having key-set numeral-types, key-set in-
dexing devices, a register, a cycling device for
printing an amount and running the printed
amount into said register at one operation, and
also having a set of control-devices including a 100
device to prevent printing when adding, a sub-
traction device, a device to prevent adding when
printing, a device to print the total accumulated
in the register, and a repeating device, said de-
105 vices including individual control-jacks, the com-
bination with said control-jacks, of a set of trains
for effecting combinative selections of said con-
trol-jacks, each train having means for selecting
a different plurality of jacks from the other
trains, a carriage, interchangeable tappets op- 110
erable by the carriage and effective to operate
said trains selectively, whereby one tappet may
operate a predetermined combination of said
jacks, and another tappet may operate a different
predetermined combination of said jacks, and a 115
tabulating mechanism for said carriage includ-
ing carriage-arresting column-stops upon which
said tappets are provided.

23. In a combined adding and printing ma- 120
chine having key-set numeral-types, key-set in-
dexing devices, a register, a cycling device for
printing an amount and running the printed
amount into said register at one operation, and
also having a set of control-devices including a 125
device to prevent printing when adding, a sub-
traction device, a device to prevent adding when
printing, a device to print the total accumulated
in the register, and a repeating device, said de-
130 vices including individual control-jacks, the com-
bination with said control-jacks, of a set of trains
for effecting combinative selections of said con-
trol-jacks, each train having means for selecting
a different plurality of jacks from the other trains,
a carriage, and interchangeable tappets operable
135 by the carriage and effective to operate said
trains selectively, whereby one tappet may op-
erate a predetermined combination of said jacks,
and another tappet may operate a different prede-
termined combination of said jacks, each of said
140 selecting trains including a jack-setting member
capable of operating a different combination of
jacks from the other jack-setting member.

24. In a combined adding and printing ma- 145
chine having key-set numeral-types, key-set in-
dexing devices, a register, a cycling device for
printing an amount and running the printed
amount into said register at one operation, and
also having a set of control-devices including a
150 device to prevent printing when adding, a sub-
traction device, a device to prevent adding when

printing, a device to print the total accumulated in the register, and a repeating device, said devices including individual control-jacks, the combination with said control-jacks, of a set of trains for effecting combinative selections of said control-jacks, each train having means for selecting a different plurality of jacks from the other trains, a carriage, interchangeable tappets operable by the carriage and effective to operate said trains selectively, whereby one tappet may operate a predetermined combination of said jacks, and another tappet may operate a different predetermined combination of said jacks, each of said selecting trains including a jack-setting member capable of operating a different combination of jacks from the other jack-setting member, and means removably supporting said jack-setting members to permit others to be substituted therefor.

25. In a combined adding and printing machine having key-set numeral-types, key-set indexing devices, a register, a cycling device for printing an amount and running the printed amount into said register at one operation, and also having a set of control-devices including a device to prevent printing when adding, a subtraction device, a device to prevent adding when printing, a device to print the total accumulated in the register, and a repeating device, said devices including individual control-jacks, the combination with said control-jacks, of a set of trains for effecting combinative selections of said control-jacks, each train having means for selecting a different plurality of jacks from the other trains, a carriage, interchangeable tappets operable by the carriage and effective to operate said trains selectively, whereby one tappet may operate a predetermined combination of said jacks, and another tappet may operate a different predetermined combination of said jacks, and a tabulating mechanism for said carriage including carriage-arresting column-stops upon which said tappets are provided, said trains constructed to remain displaced while the

carriage remains in the position to which it is tabulated for the combined printing and adding cycle, and permitting free advance of the carriage for the succeeding tabulating operation.

26. The combination of an adding and printing mechanism, a carriage, column-stops upon the carriage, tappets upon the column-stops, tumblers in the form of bell-cranks operable independently of each other by said tappets, links extending from said bell-cranks, jack-operators movable by said links, and a set of control jacks mounted in said adding machine and operable by said jack-operators, said bell-cranks having cams which are depressible by said column-stop tappets to operate said jacks, and said jack-operators being in the form of balls connected by said links to said bell-cranks.

27. The combination of an adding and printing mechanism, a carriage, column-stops upon the carriage, tappets upon the column-stops, tumblers in the form of bell-cranks operable independently of each other by said tappets, links extending from said bell-cranks, jack-operators movable by said links, and a set of control jacks mounted in said adding machine and selectively operable by said jack-operators, said bell-cranks having cams which are depressible by said column-stop tappets to operate said jacks, said cams pivoted upon said bell-cranks to permit the tappets to ride idly over the cams while the carriage is returning; certain of said adjustable column-stops having tappets sufficiently widened to operate a plurality of said cams simultaneously.

28. The combination of a typewriting mechanism having a keyboard, an adding-printing mechanism mounted at the left of the type-writing mechanism, a paper-carriage common to the two mechanisms, and key-controlled tabulating mechanism for tabulating said carriage to the typewriting point, or to the adding-printing point, said tabulating mechanism including a control key at the typewriter-keyboard.

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