April 6, 1937. A. G. F. KUROWSKI 2,076,152

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed April 11, 1932 3 Sheets-Sheet 1

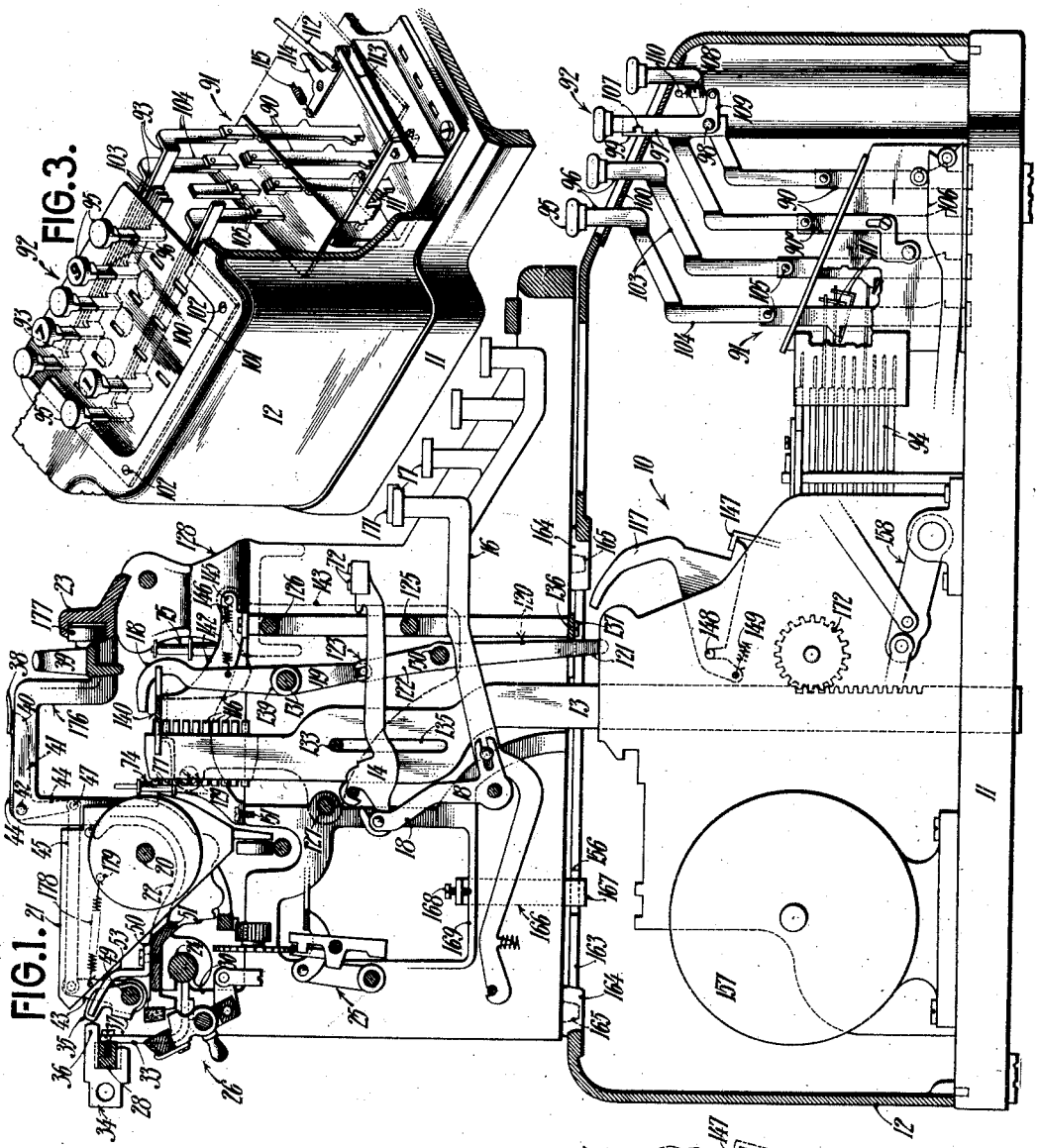

FIG. 1.

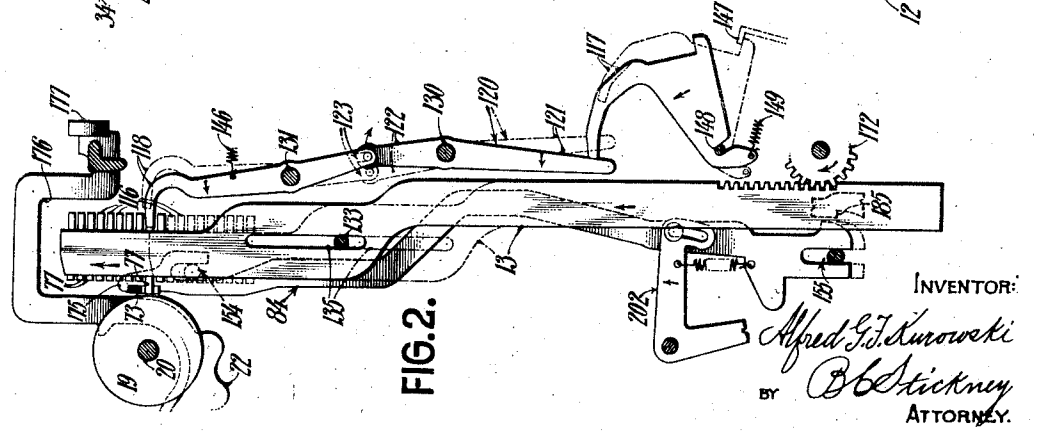

FIG. 2.

FIG. 3.

INVENTOR:
Alfred G. F. Kurowski
BY B. B. Stickney
ATTORNEY.

April 6, 1937. A. G. F. KUROWSKI 2,076,152

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed April 11, 1932 3 Sheets-Sheet 2

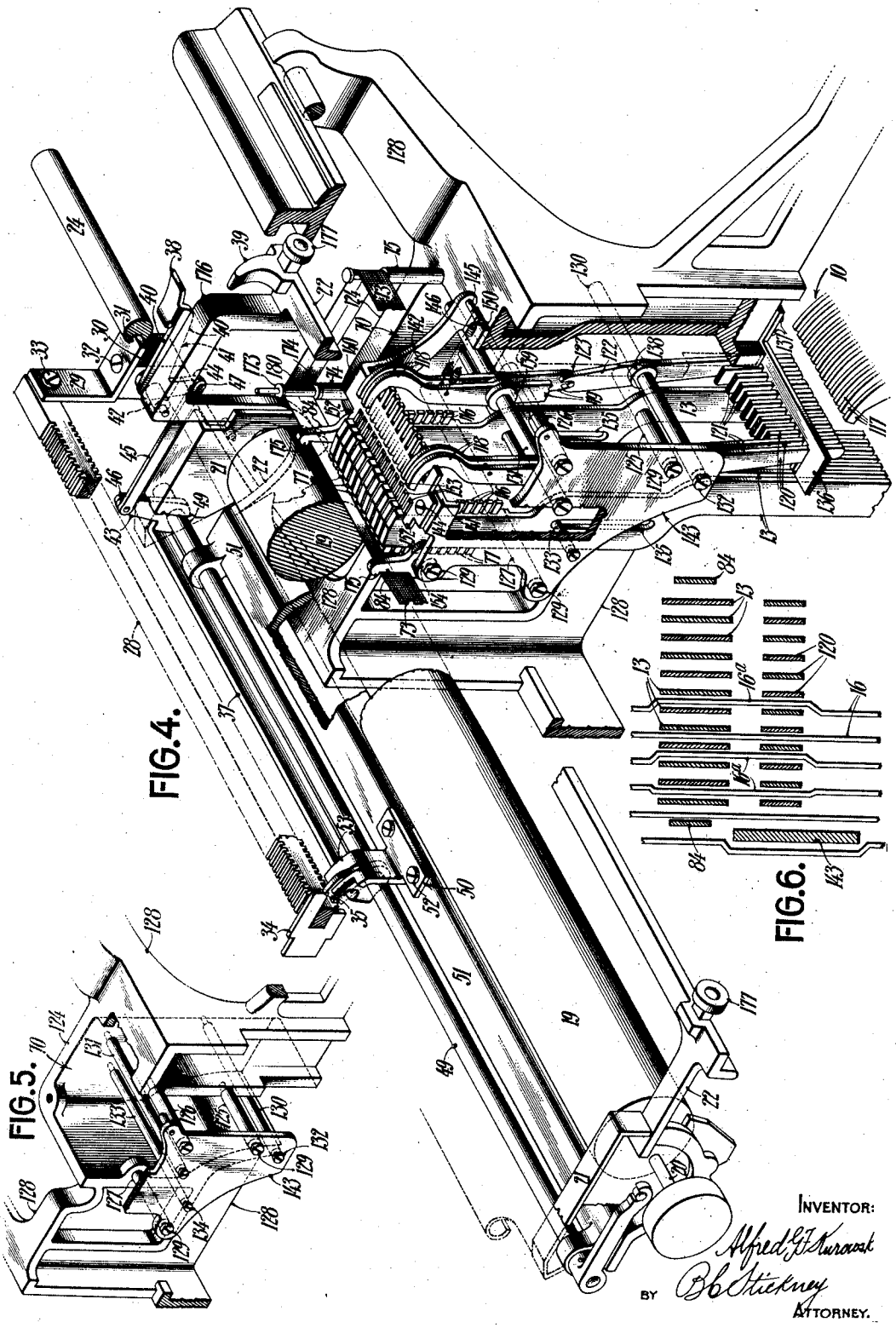

FIG. 4.

FIG. 6.

FIG. 5.

INVENTOR:
Alfred G. F. Kurowski
BY B. B. Stickney
ATTORNEY.

April 6, 1937. A. G. F. KUROWSKI 2,076,152

COMBINED TYPEWRITING AND COMPUTING MACHINE

Filed April 11, 1932 3 Sheets-Sheet 3

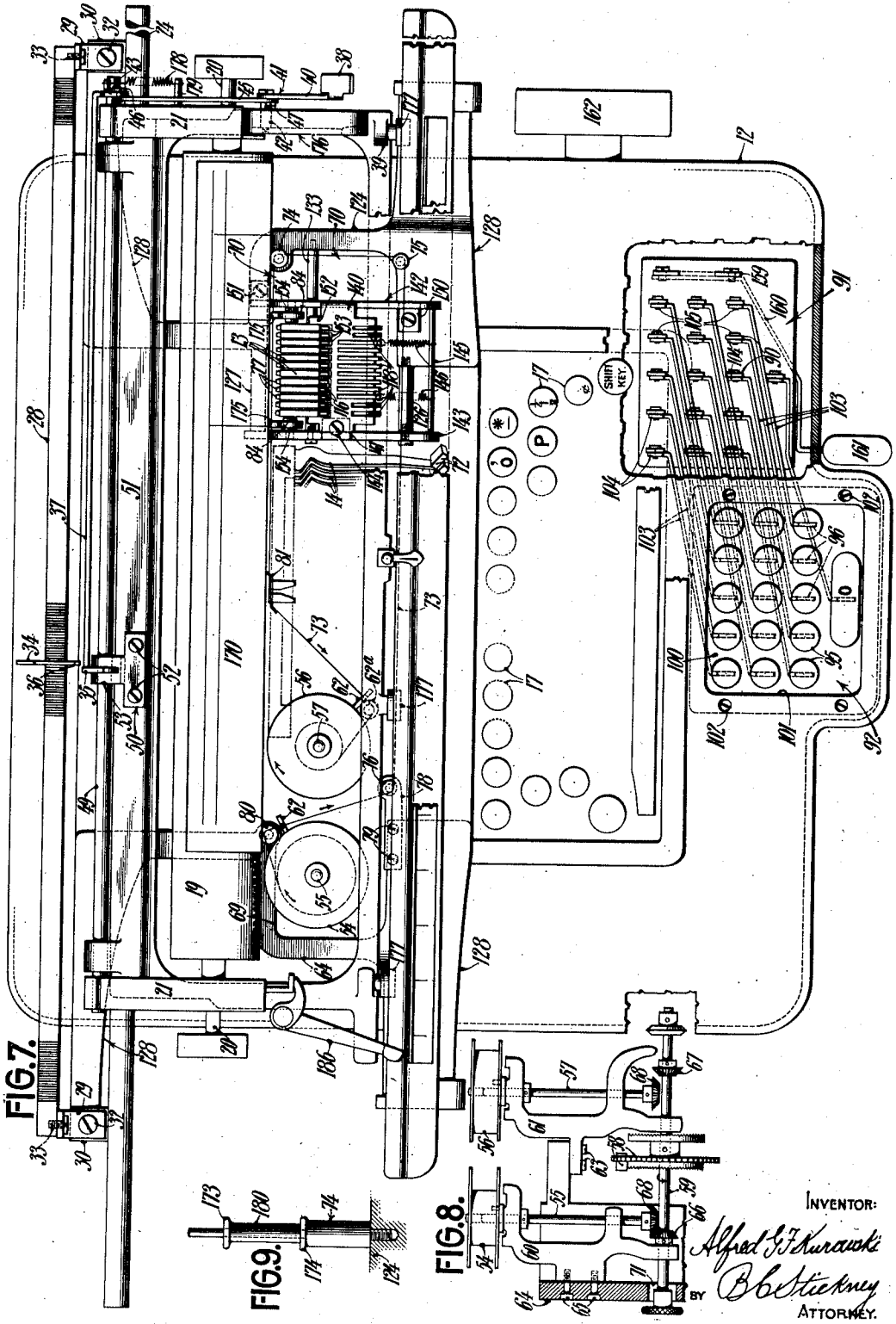

FIG.7.

FIG.9.

FIG.8.

INVENTOR:
Alfred G. F. Kurowski
BY B. B. Stickney
ATTORNEY.

Patented Apr. 6, 1937 2,076,152

UNITED STATES PATENT OFFICE

2,076,152

COMBINED TYPEWRITING AND COMPUTING MACHINE

Alfred G. F. Kurowski, Brooklyn, N. Y., assignor, by mesne assignments, to Underwood Elliott Fisher Company, New York, N. Y., a corporation of Delaware

Application April 11, 1932, Serial No. 604,514

25 Claims. (Cl. 235—60)

This invention relates to typewriting machines (such as the Underwood) combined with ten-key adding machines, such as the Sundstrand, and the general object is to produce an improved, simplified combined typewriting and adding machine of this class.

The present application discloses certain improvements over my pending application Serial No. 449,430, filed May 3, 1930.

The Sundstrand machine has been mounted directly along the side of the Underwood machine to print on the same work-sheet carried by a single platen mounted upon the carriage, having a lengthened range of travel to permit the work-sheet to be operated upon either by the typewriter-types or by the adding-machine types. The typewriter printing-point in such combined machine has been a great distance from the printing-point of the adding-machine types, and one of the objects of the present improvements is to mount the adding-machine types closer to the printing-point of the typewriter. The adding-machine types are mounted upon bars, which are shiftable upwardly to bring different types into use, these bars being arranged in a group, so as to type an entire number at one stroke.

A feature of the present invention is to mount these bars within the typewriting-machine frame, where they occupy space that has heretofore been occupied by the right-hand ribbon-spool of the Underwood machine. The bars may be extended up between the key-levers of the typewriter and at their lower ends may be connected to the Sundstrand mechanism. The bars are lengthened to enable them to be mounted in this manner.

Both ribbon-spools are placed at the left-hand side of the typewriting machine and arranged side by side, a loop of the ribbon being carried from one spool past the typewriter printing-point and also past the adding type printing-point and around the adding type-bars, and back to the other spool mounted at the left-hand side of the machine. The ribbon is threaded through the usual vibrator of the typewriter and is carried up and down thereby; and thence, from the vibrator, across the adding types.

This arrangement brings the adding types sufficiently close to the printing-point of the typewriter as to render the machine useful for many kinds of work without making it necessary to tabulate the carriage back and forth between points on the same line of typing and printing, as has been the case where the Underwood and Sundstrand machines have been set side by side.

Provision is made, however, for tabulating the carriage back and forth for such work as requires those operations.

The carriage at its right-hand end is arched to clear the adding type-bars in their topmost positions, so as to avoid any possibility of an adding type-bar, when raised, being injured by reason of accidental movement of the typewriter-carriage.

In the Sundstrand machine the keyboard is directly in front of the system of number-types, but, according to the present improvements, the keyboard may be placed at one side of the number-types, either to the right or to the left, as desired, and it is illustrated as placed at the left of the adding type-system, and preferably in the front of the typewriter-keyboard at about the middle thereof.

The bulk of the Sundstrand mechanism is enclosed in a casing of ordinary height, but this casing is broadened to equal or exceed the width of the typewriting machine, and the latter surmounts said Sundstrand casing. The Sundstrand mechanism which operates the type-bars is placed directly under said bars in the same manner as the standard Sundstrand machine. The keys are connected, preferably by oblique levers to the keyboard, either at the right or the left, preferably at the left. Said casing affords suitable space beneath the typewriter, at the left of the Sundstrand mechanism, so that, if desired, an electric motor may be placed in this space for cycling the Sundstrand machine by power instead of placing the same underneath the Sundstrand machine, as heretofore.

The drawings, however, show the usual handle for cycling the adding and printing mechanism. This arrangement produces an effective and unitary design for the combined machine.

The typewriter-platen is located considerably above the position which is occupied by the platen of the Sundstrand machine, but the Sundstrand platen is omitted, and a single paper-carriage acts for both mechanisms, and the adding type-bars are lengthened upwardly considerably, so as to bring the types to positions to print on the front of the platen. The lengthening of the adding type-bars makes it practicable to mount the adding mechanism under the typewriting machine, and operate the adding types upon the platen which is at the top of the typewriter.

The mechanism of the Sundstrand machine which operates the adding types is modified, this being a necessity, because of the increased height of the adding type-bars. The hammers are made to actuate plungers which force the adding types

against the platen, said hammers being operated by a novel system of levers.

The side walls of the typewriter-frame may be modified, or provided with extensions in order to accommodate the ribbon-mechanism at one side of the machine, and the adding type-bars at the other side of the machine.

Two tabulator-racks are shown, one being the regular type, as is usually used for tabulation towards the left, and the other being stationary with inserted stops to cooperate with a finger-operated stop carried by the carriage for tabulation towards the right, this being used when the operator moves the carriage towards the right by the usual handle.

Other features and advantages will hereinafter appear in the accompanying drawings,

Figure 1 is a side elevation of the Underwood typewriter superposed on the Sundstrand adding machine, showing the arrangement of the parts that co-operate for printing upon the typewriter-platen.

Figure 2 is a side elevation, showing the lengthened Sundstrand type-bar and the means for operating it by the regular Sundstrand printing hammers.

Figure 3 is a perspective view, bringing out details of the connections from the adding keyboard at the front of the typewriter to the regular key-stems of the Sundstrand mechanism.

Figure 4 is a view showing, in perspective, the arrangement of the elongated Sundstrand type-bars and how they may be nested within the typewriter-frame; Figure 4 also bringing out details of the auxiliary tabulating means, and also showing how the typing ribbon is guided past the Sundstrand type-bars.

Figure 5 is a view showing how supports for the upper ends of the Sundstrand type-bars and associated mechanism may be secured to the typewriter-frame.

Figure 6 is a plan view of a portion of the Underwood key-levers, and shows how the Sundstrand type-bar mechanism may be interspaced with said key-levers.

Figure 7 is a top plan, showing the novel organization of Underwood typewriter and Sundstrand adding mechanism; said view also bringing out the disposal of the two ribbon-spools at the left of the typewriter, and how a loop may be formed in the ribbon to carry past both the typewriting and adding printing points.

Figure 8 is a diagrammatic view, indicating how the regular Underwood ribbon feeding and reversing mechanisms may be operated from the left side of the machine.

Figure 9 is a detail view of a ribbon-guide.

The Sundstrand adding machine 10 is mounted on a bed 11, which is of larger extent than the regular Sundstrand bed in order to support a casing 12 which will afford a sufficiently large base for the Underwood typewriter, which, as shown in Figure 1, rests upon said casing, the Underwood typewriter being thus superposed bodily above the Sundstrand adding mechanism. Within said casing 12 the Sundstrand mechanism is disposed just far enough to the right of the typewriter so that the group of Sundstrand printing bars or rods 13 will just clear the right side of the system of Underwood type-bars 14, disposed in the usual arcuate array.

Underwood key-levers 16 have the usual keys 17 and actuate the Underwood type-bars 14 through the usual bell-cranks 18 to print against a typewriter-platen 19, mounted on a platen-axle 20 journaled in a case-shifting frame 21 carried by the letter-feeding carriage 22, which is guided on a front track 23 and a rear track 24.

For bringing the group of Sundstrand printing bars 13 closely to the nest of Underwood type-bars 14, it is contrived to interspace said printing bars 13 between some of the key-levers 16 at the right of the key-lever group, as indicated in Figure 6. The key-levers 16 may have variously offset portions 16^a, Figure 6, bent, as shown, to clear differently spaced printing bars 13.

An important advantage results from spacing the Sundstrand printing bars 13 thus closely to the typewriter printing-point, said advantage residing in the shortened lengths of the carriage-platen 19 and guide-tracks 23, 24, as compared with the lengths of the platen and tracks necessary, whereas heretofore the Sundstrand mechanism was disposed entirely beyond the side of the typewriter-frame. A reduction of said lengths amounting to at least six inches is thus afforded by the new improvements.

The typewriter-carriage advances under the pull of the usual spring-motor, not shown, in letter-feeding steps controlled by the well-known Underwood escapement-mechanism 25, generally indicated in Figure 1. The usual Underwood column-tabulating mechanism 26 of the type described in the patent to L. A. Wernery, No. 1,182,437, dated May 9, 1916, is employed, and is generally indicated in Figure 1.

By reducing the distance between the typewriter printing-point and the adding machine printing-zone to the small compass indicated in Figure 7, another advantage results as will be evident from said Figure 7, from which it will be seen that where the printing of an item by the adding machine type-bars 13 is to follow a line of writing effected by the typewriter-mechanism, the former printing operation may in many cases take place without any preparatory positioning of the typewriter-carriage, inasmuch as in such cases the resulting relatively small space between the typewritten portion of the line and the adding machine printed item would not be objectionable. Should it be desirable, however, to reduce this space between the typewritten portion of a line and the portion printed by the adding machine, the carriage may, after the typewritten portion of the line is finished, be shifted toward the right, such shifting being facilitated according to the present improvements by the provision of an auxiliary tabulating rack 28, which may be stationarily mounted behind the paper-carriage upon brackets 29 extending upwardly from posts 30 of the typewriter-frame that support the rear typewriter-carriage track 24. As indicated in Figure 7, said track 24 may be secured to said posts 30 by means of the usual tongues 31 which extend rearwardly from the track 24 to rest upon and be secured by screws 32. As shown in Figure 7, the auxiliary rack supporting brackets would rest on said tongues 31, and would also be secured by said screws 32.

As shown in Figure 4, the tongues 31 may alternatively be formed to include the brackets 29, that is, the upward extension of said brackets. In either case the auxiliary rack 28 is fastened to said brackets 29 by screws 33. The auxiliary rack 28 may have letter-spaced slots to receive one or more stops 34, which may be selectively set in different positions along the slotted rack 28 to co-operate with a stop 35 carried by the carriage and normally retracted, so that in ordi-

nary carriage-travel, it clears a forwardly-projecting tongue **36** of the stop **34**.

For projecting the carriage carried stop **35** rearwardly, so that it may engage the projection **36**, and for conveniently effecting such projection by a finger of the right hand while the typewriter-carriage is being grasped by the right hand to position it toward the right, said stop **35** may be at one end of a swingable bail **37** extending from a point somewhat to the left of the center of the typewriter-carriage to a point slightly beyond the right end of said carriage for connection with a finger-piece **38** disposed close to the usual finger-piece **39**, which is at the right end of the Underwood typewriter-carriage.

The finger-piece **38** is formed on the end of a forwardly-extending arm **40** of a bell-crank **41**, which is pivoted to the right end of the carriage-frame by a pivot-stud **42**. Said bell-crank **41** is for swinging the bail **37**, which has at the right end an upwardly-extending arm **43**, and the bell-crank **41** has a downwardly-extending arm **44**, the two arms **43**, **44** being connected by a link **45** through pivotal connections **46**, **47**. As best seen in Figures 1 and 4, the stop **35** is formed by an upwardly and rearwardly extending arm at the left end of the bail **37** which may rock freely upon the usual Underwood case-shifting rock-shaft **49**, which, as best seen in Figure 4, may be extended toward the right to afford a journal for the right end of said bail. In shifting the paper-carriage toward the right for registering certain work-sheet zones with the Sundstrand type-bars **13**, the operator may engage the carriage-finger-piece **38** with the thumb of his right hand, and, at the same time, with another finger of said hand may depress the finger-piece **38**. Such depression of the finger-piece **38** will, through the described connections, project the stop **35** rearwardly, to co-operate with the projection **36** of the fixed stop **34** in gaging the position of the carriage relatively to the Sundstrand type-bars **13**. The stop **35** may be buttressed by a bracket **50**, which may be secured to the rear cross-member **51** of the carriage-frame by screws **52**. Said bracket **50** has an upwardly and rearwardly extending portion **53** slotted, as indicated, so that said portion may embrace the stop **35**, and thus support said stop **35** against undue lateral strain.

In order that the Sundstrand type-bars **13** may be disposed closely to the typewriter printing-point, as herein shown, it is contrived to shift the regular right-hand Underwood ribbon-spool **54** and its shaft **55** toward the left of the typewriter printing-point, so as to make room for said Sundstrand type-bars **13**. A regular typewriter-ribbon **73** may be employed and the ribbon-spool **54** and its shaft **55**, together with the associate ribbon reversing and feeding mechanism that were formerly in their usual position at the right of the typewriter, are now disposed to the left of the usual left ribbon-spool **56** and shaft **57**, said left spool, left shaft and associate ribbon reversing and feeding mechanism remaining in their usual location. Figure 8 shows the arrangement of ribbon feeding and reversing mechanism which may include the usual Underwood parts (not shown) for reversing the ribbon automatically and described in the patent to W. F. Helmond, No. 931,303, dated August 17, 1909. Figure 8 indicates how the Underwood ribbon-feeding ratchet-wheel and pawl **58** may be placed on the usual Underwood ribbon-feeding shaft **59**, said shaft not extending to the right side of the machine as heretofore, but being shortened and journaled in brackets **60**, **61**, which support the ribbon feeding and reversing mechanism, which, it may be noted, includes the automatically-operated ribbon-reversing arm **62**, through which the ribbon is threaded. The bracket **61** may be attached to the typewriter-framework in the usual manner, by screws **63**. The transposed bracket **60** that was formerly at the right side of the typewriter may be modified for attachment to a wall **64** of the typewriter-framework, said bracket **60** being secured to said wall, by screws **65**, Figure 8. The ribbon-feeding shaft **59**, when rotated in the direction indicated by the arrow, Figure 8, may rotate either the left ribbon-spool shaft **55** or the right ribbon-spool shaft **57**, through pinions **66** or **67** respectively, depending on the endwise position of said shaft **59**. For meshing with said pinions **66** and **67**, the shafts **55**, **57** are provided, at their lower ends, with pinions **68**. As seen in Figure 8, rotation of the shaft **59**, in the direction of the arrow, will rotate the shaft **55** in such direction that the spool **54** connected to said shaft **57** takes up the ribbon, the pinion **68** of shaft **55** being in mesh with the pinion **66**. When the direction of rotation of the shafts **55**, **57** is to be reversed, the shaft **59** is shifted endwise toward the left, thereby disengaging the pinion **66** from the pinion **68** of the shaft **55** and concomitantly bringing the pinion **67** into engagement with the pinion **68** of the shaft **57**. In this case the spool **56** is driven to take up the ribbon.

To afford room for the transposed ribbon-spool **54** and associated parts, which are now at the left side of the typewriter, the left side member of the typewriter-framework may be formed to include a channel-portion **69**, which may be symmetrical generally with a similar channel-portion **70** formed in the right side member **128** of the typewriter-framework, the channel-portion **70** affording room for the Sundstrand print-bars **13** and associated parts. The channel-portion **69** at the left of the typewriter-framework includes the wall **64**, to which the ribbon-spool bracket **60** is attached, as aforesaid, said wall terminating at its lower portion to form an opening **71** for clearance of the parts, as indicated in Figure 8.

The ribbon **73** performs its usual function for the typewriter-mechanism; with both ribbon-spools at the left, as shown, and by means to be described, it is contrived to make said ribbon serve also the Sundstrand print-bars **13**. To co-operate with the typewriter-types **72**, the ribbon **73**, coming from what is now the right-hand spool **56**, may be threaded through the usual Underwood ribbon-vibrator **81**, which, through parts not shown herein, but described in Patent No. 926,050, to F. A. Cook, dated June 22, 1909, normally keeps the ribbon withdrawn from the printing-point and only elevates said ribbon to the printing-point when a typewriter-type **72** strikes the platen **19**. The ribbon does not extend straight from the ribbon-spool **56** to the ribbon-vibrator **81**, but it is first turned around the usual guide **62a** for direction through the adjacent arm **62**, and thence to said vibrator **81**, said guide and arm being arranged as usual with respect to the spool **56**, which, it will be remembered, has not been transposed. Said ribbon **73** is extended from the ribbon-vibrator **81** to the right, to cross and pass beyond the field of the Sundstrand print-bars **13**. After passing said field, the ribbon is returned to what is now the

left-hand ribbon-spool **54**, and, to this end, it is looped by passing around guides **74**, **75** and **76**. The guides **74**, **75** project upwardly from and are secured to the right side member of the typewriter-framework, as indicated in Figures 4 and 7, the guide **74** keeping the ribbon parallel with the platen and so that it may pass in the space between the Sundstrand types **77** and said platen. The guide **75** is spaced from the guide **74**, so that the ribbon is guided around the front of the Sundstrand type-bar mechanism toward the guide **76**. Said latter guide **76** projects upwardly from a plate **78**, Figure 7, secured to the left member of the typewriter-framework by screws **79**. From the guide **76**, the ribbon, for direction through an arm **62** associated with the ribbon-spool **54**, passes around another guide **80**, and thence back to said ribbon-spool **54**, as shown in Figure 7. Said guide **80** projects upwardly from the left side member of the typewriter-framework.

In the Sundstrand type-mechanism herein shown, the print-bars **13** are normally lowered, so that the zero-types are about one space below the printing-line. The ribbon **73**, usually a bi-color ribbon, may have its regular dark field normally covering the printing-line at the Sundstrand type-field. The ribbon may also be shifted upwardly during a printing operation to bring its other printing-field to the printing-line in said type-field. To this end, the ribbon **73** is threaded through the usual Sundstrand ribbon-vibrator formed by a pair of vertically-movable slides **84**, one at each side of the system of Sundstrand print-bars. Each time the Sundstrand print-bars are operated to print through the lower ribbon-field, the slides **84** are shifted upwardly to bring said lower field to the printing-line and then are retracted. The slides **84** may be operated in the manner disclosed in reissued Patent No. 14,237, to G. D. Sundstrand, dated December 26, 1916. To this end, said slides extend downwardly to be actuated by the levers **202** which have the same reference numerals in said patent as herein given.

The Sundstrand adding mechanism, as described in the aforesaid reissued Patent No. 14,237, includes a keyboard of the "ten-key" type. According to the present improvements, the keys or tops of the key-stems **90** of the Sundstrand keyboard, generally indicated as **91**, are removed, so that connections may be made between said key-stems **90** and a keyboard **92**, located immediately in front of the typewriter-keyboard, and centrally thereof, as best shown in Figures 1 and 7. For each key or control **90** of the Sundstrand keyboard **91**, there may be a corresponding key or control in the new keyboard **92**. The Sundstrand keyboard **91** includes a central column of four keys and two columns on each side of said central column, each of the side columns having three keys. Two of the key-columns, one on the extreme left and one on the extreme right of the keyboard, are for various control keys, such as repeat, clear, error, etc., six keys being thus apportioned as control keys. The ten keys in the three middle columns are the ten digit-keys from "0" to "9", the lower key in the central column being the "0" key. The thirteen keys just enumerated as constituting the Sundstrand keyboard **91** are duplicated in the new keyboard **92**, which includes a plurality of keys **95**, one for each of the Sundstrand keys. Said keys are either directly mounted upon key-stems **96** or, as in the case of a repeat key, for example, the key is mounted upon a latchable stem **97**, which, as shown in Figure 1, may be pivoted at **98** to the key **99**, which constitutes the repeat key of the new keyboard **92**. All the key-stems **96** and **99** are guided, for up-and-down movement, in a perforated plate **100**, which forms part of the casing **12**, said casing having an opening **101** to form a frame for said plate **100**, which is secured to the margin of said frame by screws **102**, Figure 7. Each key-stem **96** or **99** of the new keyboard **92** is connected to a corresponding stem **90** or **90a** of the Sundstrand keyboard, and, to this end, each key-stem **96** or **99** has formed integrally therewith a lateral branch **103**, which extends toward the right, rearwardly and downwardly to terminate in a vertically extended portion **104**, the lower end of which may be fastened to a Sundstrand key-stem **90** or **90a**, as at **105**.

The Sundstrand key-stem **90a** is the Sundstrand repeat key which operates when depressed and locked, as shown in the aforesaid Reissue Patent No. 14,237, to lock a restoring member **106** of the Sundstrand mechanism in inoperative position, it being understood that said member **106** when so locked prevents restoration of the Sundstrand digit-indexing elements, and so provides for repetition of registering an item without operating the keys. To hold the Sundstrand key **90a** in its depressed position, said key **90a** is not itself locked as heretofore, but, instead, the corresponding key-stem **99** of the new keyboard **92** is provided with the aforesaid latchable stem **97**, which has a notch **107**. Said notch **107**, when the latchable key **97** is depressed, may be caught by the under side of the plate **100** by pushing said key **97** rearwardly, and is held in engagement with said plate by a spring **108** attached at one end to an arm **109** of the latchable member **97**, the other end of said spring **108** being attached to a fixed stud **110**. Conversely, the key **97** may be released by pushing it forwardly.

Of the six control keys of the Sundstrand keyboard, there has been described only the extension of one of said control keys to the new keyboard **92**, namely, the repeat key, it being evident that where a control key must be held down, as just described for the repeat key, the connections from the Sundstrand keyboard **91** to the new keyboard **92** may be made in a manner similar to the described connections for said repeat key. If a control key is not held down, that is, if it is merely given a momentary depression, the connection from such control key of the Sundstrand keyboard to the corresponding key of the new keyboard, need not include a latchable key-stem **97**.

Each of the keys of the new keyboard **92** includes the lateral branch **103** terminating in the vertically-extended portion **104**. As shown in Figure 1, the new keyboard **92** slopes downwardly from the rear, the lateral branches **103** of the key-stems, as a group, being similarly sloped. This sloping arrangement of the branches **103** together with the nested arrangement of said branches indicated in Figure 3 provides adequate clearance for the connections thus made between the two keyboards **91**, **92**. The ends of the branches **103** are joined to their respective key-stems at the bends **93**, Figure 3, which bring said key-stems into parallelism. Figure 3 indicates generally the formation of the blanks from which the key-stems **96**, **99**, and their extensions are made, it being understood that the proportions of said blanks may be made sufficient to secure the requisite stiffness.

As described in Patent No. 1,583,102, to O. J. Sundstrand, dated May 4, 1926, a digit-key when depressed swings a corresponding bell-crank 111, to operate a pin-setting plunger 112 through the usual connections, as shown in Figure 3, which include a link 113 connecting the bell-crank 111 to a bell-crank 114 to which the pin-setting plunger 112 is connected. A spring 115 pulling on said bell-crank 114 operates to restore the described key-train, including a key-stem 96 of the new keyboard 92, to its normal position.

The pin-setting plungers 112 operate upon different denominational columns of type-bar stops 94 seriatim to set said stops through the usual mechanism described in said Sundstrand Patent No. 1,583,102, it being understood that the Sundstrand type-bars 13 will be elevated to different extents determined by said stops to print the numbers of an item corresponding to the numbers indexed on the new keyboard 92. Said numbers are printed by the types 77, which are formed on the ends of plungers 116. Said plungers 116 are retained in the usual casings at the upper ends of the Sundstrand type-bars 13, said casings, the construction of the plungers, and the manner of retaining the latter being shown in the Sundstrand Reissue Patent No. 14,237. Each plunger 116 is normally held back by a spring, not shown, so that its type 77 is spaced forwardly of the platen 19.

After an item has been set up by operation of the keys 95 of the new keyboard, the Sundstrand mechanism is cycled. In this cycling operation, the different type-bars 13 rise to positions corresponding to the item that has been set up, and after reaching said positions, the regular Sundstrand printing hammers 117 are caused to be fired. Said hammers and their operating means are fully described in Patent No. 1,747,743, to O. J. Sundstrand, dated February 18, 1930. The type-bars 13 having been elongated beyond the length of the usual Sundstrand type-bars to reach to the typewriter-platen 19, which, according to the new arrangement, is considerably above the position of the discarded Sundstrand platen, it is obvious that the Sundstrand printing hammers 117 will not reach the type-plungers 116. It is contrived nevertheless to utilize said hammers 117 without extending the hammers themselves, as such extension would objectionably increase the inertia of the hammers and the stroke of the hammer-head.

There is provided accordingly a system of auxiliary hammers 118, which are in the form of levers having upwardly and downwardly extending arms, the upwardly-extending arm constituting the hammer 118, and a downwardly-extending arm 119 of each lever serving to move the hammer in the right direction when acted upon by an intermediate lever 120, said intermediate lever having a lower arm 121, the lower end of which may be struck by the head of the Sundstrand hammer 117. An upper arm 122 of said lever 120 has a pin-and-slot connection 123, as indicated in Figures 1 and 4, to the arm 119 of the auxiliary hammer 118.

As already stated, the Sundstrand upper print-bar mechanism is disposed within a channel-portion 70 of the right-hand member 128 of the typewriter-framework, Figure 5 indicating in detail the formation of said channel-portion. Supporting means for the various parts of the upper print-bar mechanism include a plate 143 spaced from the side wall 124 of said channel-portion 70. For thus spacing said plate 143 and securing it, there are provided principally three studs 125, 126 and 127, extending from the inner side of the right-hand member 128, Figure 5, of the typewriter-framework, said studs being threaded at one end into said side member 128. Said studs are of a length to space the plate 143 as desired when the latter abuts the outer ends of said studs, said outer ends being threaded to receive screws 129 for securing said plate 143. In addition to the plate-supporting studs just mentioned, there is a stud 130, upon which the intermediate levers 120 may be fulcrumed, and a stud 131, upon which the auxiliary hammers 118 may be fulcrumed, said studs 130, 131 being threaded into the wall 124 of the typewriter side member 128 and extending outwardly therefrom to abut the plate 143, so as to be secured by said plate through screws 132 passing through said plate and threaded into the outer ends of said latter studs 130, 131. Similarly, another stud 133, also threaded into the wall 124, and having its outer end abutting and secured to the plate 143 by a screw 134, serves to guide the upper ends of the type-bars 13, said type-bars having vertically-elongated slots 135, which have a sliding fit over said stud 133. The intermediate levers may be spaced at their lower ends by a slotted comb-plate 136 extending from and secured to the bottom edge of the right typewriter-frame member 128 by screws 137. Said comb-plate 136, besides spacing the intermediate levers 120, also aligns the lower ends of the arms 121 of said levers with the Sundstrand printing hammers 117. Said intermediate levers 120 may be spaced at their fulcrum-rod 130, by collars or hubs 138. Similarly, the auxiliary hammers 118 may be spaced at their fulcrum-rod 131 by collars or hubs 139. The upper ends of the auxiliary hammers 118, formed as best shown in Figures 1, 2 and 4, may be spaced by a comb-plate 140, which also aligns said hammers with the columns of type-plungers 116. The left end of the comb-plate 140 may rest upon a tab 141, bent inwardly from the plate 143, and may be secured thereto by a screw 144. The right end of said comb-plate may be formed as best indicated in Figure 1 to form a downwardly-extending double leg 142.

Said leg 142 is bent at right angles from the comb-plate 140, and is further bent to form feet 150, which may rest upon the top of the right frame-member 128, as indicated in Figures 1, 4 and 7, and be secured thereto by screws 151. The plate 143 and the leg 142 are formed, as best shown in Figures 1 and 7, to support a cross-rod 145 to which ends a series of hammer-springs 146 may be attached, the other ends of said springs being attached to the auxiliary hammers 118, as indicated in Figures 1, 4 and 7. Said springs 146 pull the hammers 118 rearwardly until the arms 121 of the intermediate levers 120, connected to said hammers 118, abut the bottoms of the slots in the comb-plate 136, thereby normally spacing the striking ends of the hammers 118 from the forward ends of the type-plungers 116. Said lower arms 121 of the intermediate lever 120 are positioned a considerable distance from the striking ends of the Sundstrand hammers 117, so that said latter hammers when released may have developed considerable inertia before striking the intermediate levers 120, it being understood that the Sundstrand hammers 117 are released by withdrawal of a latch 147, whereupon they swing about a fulcrum 148 under the pull of springs 149.

The upper ends of the Sundstrand print-bars 13 are spaced one from another by slots 153 formed

in the rear edge of the comb-plate 140 which includes rearward extensions 152 embracing the sides of the type-casings at the ends of the group. The slots 153 clear the forward ends of the type-plungers 116.

The Sundstrand ribbon-vibrator slides 84 may have at their upper ends sliding connections 154 with the plate 143 and the leg 142.

Figure 2 best indicates the form of the upwardly-extended Sundstrand ribbon-vibrator slides 84, which, besides being guided at their upper ends by means of the sliding connections 154, are also guided at their lower ends in sliding connections 155.

For symmetry of appearance the casing 12 extends to the left of the typewriter-frame as much as it extends to the right. In the excess room thus afforded within said casing, there may be placed a cycling motor 157 for the Sundstrand mechanism, and connected in any suitable manner to the Sundstrand cycling mechanism partly shown at 158, Figure 1. Operation of said cycling mechanism 158, as effected by the motor 157, may be initiated by operation of the usual Sundstrand cycling key 159, Figure 7. By a suitable extension 160, said key 159 may be projected to terminate in a finger-piece 161, which may be disposed adjacent the new keyboard 92, as indicated in Figure 7, for convenient operation.

The usual handle or wheel 162 may extend, from the Sundstrand machine, through the right side of the casing 12 for operation of the Sundstrand cycling mechanism 158 by hand. The top of the casing 12 may have a suitable opening 163, to clear the parts that extend from the Sundstrand mechanism to the Underwood typewriter. As indicated in Figure 1, said opening may be considerably larger than is needed for such clearance, the enlargement serving to minimize the weight of the casing 12. The top of the casing may have bosses 164 recessed to receive the feet 165 of the typewriter. The typewriter may be secured upon said casing by suitable clamps 166, which may have lugs 167 at their lower ends to overlap a recess 168 in the edge of the opening 163 and tightening screws 169, the upper ends of said clamps 166 being so formed that said screws 169 bear upon the edges 169 of the typewriter-frame side members.

A work-sheet 170 is positioned around the typewriter-platen in the usual manner. Operation of a column-tabulating key 171 positions the carriage for beginning a line of typing, said key 171, when operated, calling into action the Underwood carriage-stopping mechanism 26. Where a line includes descriptive matter the typewriter-keys are now operated to write said matter. If said line is also to include a printed item which is to be accumulated in the Sundstrand mechanism, the new keyboard 92 is operated to set up said item after the typing operation by the typewriter-keys is finished. The finger-piece 161 (cycling key) is then pressed to cycle the Sundstrand mechanism, thereby printing the item through the types 77, and at the same time accumulating it in the Sundstrand mechanism. If the item printed by the types 77 is a total, the keyboard 92 is of course not operated except to set the usual total-key, whereupon the cycling key 161 is operated, and the types 77 print according to the total that is accumulated in the Sundstrand register 172 conventionally shown in Figure 1.

The printing of an item by the Sundstrand types 77 may follow upon the typing operations of the typewriter without a preparatory positioning of the typewriter-carriage, inasmuch as, hereinbefore explained, the space between the typewritten portion of the line and a portion printed by the adding types 77 is comparatively small, and is in many cases not objectionable. Should it be desired to reduce the space, however, the carriage is positioned to the right after the typewritten portion of the line is completed, and its exact position may be determined by means of the auxiliary tabulating gage, hereinbefore described.

The Underwood line-space lever 186 is operated in the usual way to line-space the platen.

Should the ribbon-vibrating slides 84 be so arranged that the "black" portion of the ribbon normally covers the printing-field, the ribbon will slope downwardly somewhat from the left-hand slide toward the typewriter-ribbon-vibrator 81. In this case the slides 84 are only operated when the "red" field of the ribbon is to be presented to the printing line.

It may be noted that it is also feasible to have the "black" field of the ribbon normally below the printing-line, the Sundstrand ribbon-vibrating mechanism described in the hereinbefore-mentioned Sundstrand Reissue Patent 14,237 being modified by raising the "red" controlling hook 185 so that the slides 84 are operated when the "black" ribbon field is used.

It will also be noted that the construction of the guides 74, 75 depends on the extent to which the ribbon-portion in the Sundstrand printing-field is shifted. If the guide 75 be spaced enough from the guide 74, provision for movement of the guide 74 only will suffice; in such case the portion of the guide immediately in contact with the ribbon may be in the form of a roll 180, Figure 9, slidable up and down axially upon the main portion of the guide 74. Alternatively, an upper flange 173, Figure 4, of the guide may be extended from the upper edge of the ribbon sufficiently to permit whatever upward displacement of the ribbon is arranged for. Similarly, the lower flange 174 of the guide 74 may be spaced from the lower edge of the ribbon, so as not to interfere with said edge when the ribbon is in its lowest position. The slides 84 may be provided with suitable projections 175 to engage the top and bottom edges of the ribbon.

The regular Underwood carriage-frame 22 may be modified at its right-hand end portion to clear the tops of the Sundstrand print-bars 13 when the latter are in their uppermost positions. For this reason said end portion may be arched, as indicated at 176, Figures 1 and 4. The front of the carriage-frame is guided in the front track 23 by rolls 177, which bear in said track, as indicated. The finger-lever 40, 44 for the auxiliary tabulating gage may be pivoted near the top of the arched portion 176 of the carriage, as indicated in Figures 1 and 4.

A spring 178 pulling upon the arm 43 of the bail 37 keeps the dog 35 in normally retracted position, and yields when the finger-piece 38 is depressed to project said dog into effective position. The other end of said spring 178 may be anchored to a stud 179 projecting from the side of the platen-shift frame 21, the up-and-down movement of said frame 21 in case-shifting being of no consequence to the function of said spring 178. Rearward displacement of the parts by the spring 178 may be limited by abutment of the stop 35 against the bottom of the slot in the buttressing bracket 50.

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

Having thus described my invention, I claim:

1. In a combined typewriting and adding machine, the combination of a system of elongate reciprocatory adding printing bars, ribbon-feeding mechanism, and a framework for said machine including a pair of spaced side members supporting typewriting mechanism, one of said side members having a channel-portion within which the adding printing bars are arranged, the other side member having a similar channel-portion within which the ribbon-feeding mechanism is arranged.

2. The combination of an adding machine, a typewriting machine having a platen, said machines being of the character described, a casing for the adding machine and supporting the typewriting machine, a series of adding machine printing bars extending upwardly through said casing for printing against the typewriter-platen, a ribbon-spool mounted on a vertical shaft, and a bracket in which said shaft is journaled, said typewriting machine including a framework having right and left side wall members, one of said side walls having a channel-portion within which the adding printing bars are arranged, the other side wall member having a similar channel-portion within which the ribbon-spool shaft and bracket are arranged.

3. The combination of an adding machine, a typewriting machine having a platen, said machines being of the character described, the typewriting machine being disposed above and to one side of the adding machine, so that upwardly-extended printing bars of the adding machine may print against said platen, the typewriting machine having a side wall member forming part of its framework, said member having a channel-portion, a plate, and means spacing said plate from said channel-portion to form a housing within which the upper ends of said printing bars are retained.

4. In a combined typewriting and adding machine of the character described having a typewriter paper-platen, the combination with a side wall member of a framework for the typewriting mechanism, of a series of reciprocatory adding mechanism printing bars extending upwardly and having types at their upper ends to print against said platen, a series of hammers and connections for actuating said types to print, said side wall member including a channel-portion, a plate, and means spacing said plate from said wall and forming a housing within which the upper ends of the printing bars are guided and retained and within which said hammers and connections are guided and retained.

5. A combined typewriting and computing machine including an adding-machine unit, a front-strike typewriter-unit disposed above the adding-machine unit, said adding-machine unit having normally cocked printing-hammers, adding-printing members controlled by said adding-machine unit and ranging above said hammers, in order to present their types to the typewriter-platen, said types being therefore out of reach of said hammers, a set of levers having type-striking heads for coaction with the active types, said levers ranging downwardly, and intermediate levers arranged to receive the blows of the released hammers and to transmit said blows to said striker-levers, whereby the strokes of the heads of the latter are in the same direction as the strokes of the hammers, said striker-levers and said intermediate levers being mounted on fulcrum-rods supported between a side-member of the typewriter-unit frame and a plate spaced inwardly from said side-member, said adding-machine-printing members rising in the space between said plate and typewriter-unit side-member.

6. A combined typewriting adding and listing machine having a platen-carriage common to typewriter-types and denominational printing-members, said carriage moving in letter-feed direction at the operation of said types, and being movable in opposite direction for bringing the typed matter into certain proximity to an amount printed by said denominational members, a stationary rack extending in the direction of carriage travel, a stop settable along said rack, and a bail pivoted to said carriage, so that one end of said bail is disposed for connection to a finger-piece provided upon one end of the carriage, said bail extending inwardly from said carriage-end, lengthwise of the carriage, and thereby presenting, at a point disposed inwardly from said carriage-end, a counter-stop, formed on said bail, for engaging the stop on said rack, whereby the extent of the rack is minimized, said bail being rockable by said finger-piece to project said counter-stop from a normally retracted position into position for co-operation with the stop on said rack for gaging said opposite carriage movement.

7. A combined typewriting and computing machine including a front-strike typewriter having types printing at a common printing-point, and an adding-unit combined with said typewriter and having vertically-adjustable denominational printing-members disposed to print in a field offset laterally from said typewriter printing-point, the typewriter-platen being common to said typewriter-types and denominational printing-members, the typewriter including a traveling platen-carriage, and a trackway for said platen-carriage disposed forwardly of said platen, said printing-members playing between said platen and trackway, and extending substantially above the latter in their uppermost positions, said platen-carriage including a frame having end-members reaching forwardly of the platen, so that said frame may engage said trackway, one of said carriage-frame end-members being formed with an inverted U-shaped arch under which said printing-members may stand in their uppermost positions without interfering with said carriage-end-member, said arch including a front leg extending downwardly in front of the printing-members toward said trackway, whereby collision of said carriage-end member and said denominational printing-members is avoided.

8. A combined typewriting, adding and listing machine including a front-strike typewriter-unit with its frame, platen and letter-feeding carriage; a key-set, cycling adding-unit connected to co-operate with said typewriter-platen; the typewriter-unit including a system of key-controlled type-bars striking at a common point at the front of the platen; said adding-unit forming a base which is surmounted by said typewriter-unit; a nested denominational system of digit-printing types for the adding-unit, disposed for printing on the printing line of said typewriter-platen and confined within the typewriter-frame in proximity to the typewriter-printing point; and denominational rods by which said digit-types are carried, said rods extending down from the platen alongside of the

system of typewriter-type-bars and through the bottom of the front-strike typewriter-unit and into the adding-unit-base, said digit-type-carrying rods being connected at their lower ends to the adding-unit in the base, to co-operate therewith for printing on a work-sheet, in the same printing-line with the typewriter-types, the amount which is computed by the adding-unit.

9. A combined typewriting and computing machine including a front-strike typewriter-mechanism having a platen and letter-feeding carriage therefor, an adding mechanism, said typewriter and adding mechanisms being combined so that the typewriter-platen is common thereto, said adding mechanism having denominational printing-members standing in front of the platen and which carry digit-types for printing in a field on the platen disposed to one side of the typewriter-printing point, a ribbon-vibrator for the typewriter-mechanism, two ribbon-spool spindles disposed on the other side of the typewriter-printing point, the ribbon extending from one spindle to said ribbon-vibrator, and ribbon-guiding means for directing the ribbon from said vibrator to pass between the platen and the adding-printing-member-digit-types to serve the latter, and for then forming a loop to pass the ribbon around the front of said printing-members for returning the ribbon to the other ribbon-spool spindle, whereby the leg of said loop which returns the ribbon to said other spool clears the other leg of said loop and the typewriter-ribbon-vibrator coacting therewith, to prevent fouling, and whereby said ribbon-returning leg does not obstruct visibility of the printing-line, said adding-mechanism printing-members playing within said loop.

10. A combined typewriting and computing machine including a front-strike typewriter-mechanism having a traveling platen and key-operated types movable to a common printing-point, an adding-listing mechanism having front-strike printing-members upstanding in front of said platen and carrying digit-types which print in a field on said typewriter-platen disposed to one side of the typewriter-printing point, a ribbon-vibrator for the typewriter-mechanism, two ribbon-spool spindles disposed on the other side of the typewriter-printing point, the ribbon extending from one spindle to said ribbon-vibrator, and means for directing the ribbon from said vibrator to pass between the platen and the adding-digit-types to serve the latter, and for then forming a loop around the digit-types for returning the ribbon to the other spindle, said ribbon-directing means including provision whereby one leg of said loop includes the portion extending from the ribbon-vibrator past said adding-digit-types, and the other leg of said loop which returns the ribbon to said other spindle is disposed sufficiently forward of the platen to pass in front of said adding-printing members and the path of the typewriter-types.

11. A combined typewriting and computing machine including a front-strike typewriter-mechanism having a traveling platen and key-operated types movable to a common printing-point, an adding-listing mechanism having front-strike printing-members standing in front of said platen and carrying digit-types which print in a field on said platen disposed to one side of the typewriter-printing point, a ribbon-vibrator for the typewriter-mechanism, a ribbon-vibrator for the adding-printing field, two ribbon-spool spindles disposed on the other side of the typewriter-printing point, the ribbon extending from one spindle to the typewriter-ribbon vibrator, and thence to the vibrator for the adding-printing field, a guide disposed to turn the ribbon forwardly from the platen after it has passed the adding-printing field, and a second guide spaced forwardly from said first guide to turn the forwardly-turned ribbon back toward the other ribbon-spindle, said guides forming a loop in the ribbon, one leg of the loop including the ribbon-portion passing the typewriter-printing point and adding-printing field, the other leg of the loop being spaced forwardly from said portion by means of said second guide, so that said other leg passes in front of said adding-printing members and the typewriter-types.

12. A combined typewriting and computing machine including a front-strike typewriter-mechanism having a traveling platen and key-operable types movable to a common printing-point, an adding-listing mechanism having front-strike printing-members standing in front of said platen and carrying digit-types which print in a field on the platen disposed to one side of the typewriter-printing point, a ribbon-vibrator for the typewriter-mechanism, and a ribbon-vibrator for the adding-printing field, two ribbon-spool spindles disposed on the other side of the typewriter-printing point, the ribbon extending from one spindle to the typewriter-ribbon vibrator, and thence to the vibrator for the adding-printing field, a guide disposed to turn the ribbon forwardly from the platen after it has passed the adding-printing field, and a second guide spaced forwardly from said first guide to turn the forwardly-turned ribbon back toward the other ribbon-spindle, said guides forming a loop in the ribbon, one leg of the loop including the ribbon-portion passing the typewriter-printing point and adding-printing field, the other leg of the loop being spaced forwardly from said portion by means of said second guide, so that said other leg passes in front of said adding-printing members and the typewriter-types, said first guide being mounted in proximity to said adding-printing-field vibrator, and being movable in correspondence with the vibration of the vibrator at the adding-printing field.

13. A combined typewriting, adding and listing machine, including a front-strike typewriter-unit with its frame, platen and letter-feeding carriage; a key-set, cycling adding-unit forming a base which is surmounted by said typewriter-unit; denominational type-rods, each carrying a set of digit-types, for the adding mechanism, said rods extending down from the typewriter-platen alongside of the system of typewriter-type bars and through the bottom of the front-strike typewriter-unit and into the adding-unit-base, said digit-types being confined within the typewriter-frame in proximity to the typewriter-printing point, said digit-type-carrying rods being connected to the adding-unit for printing on a work-sheet in the same printing-line with the typewriter-types the amount which is computed by the adding-unit, said typewriter-unit having the usual keyboard, said keyboard also surmounting said adding-unit-base; and a complement of adding-unit indexing and control keys operatively connected to said adding-unit and incorporated in said adding-unit base so as to form an adding-unit keyboard at the top of the adding-unit base and in front of said typewriter-keyboard.

14. A combined typewriting, adding and listing machine, including a front-strike typewriter-unit with its frame, platen and letter-feeding carriage; a key-set, cycling adding-unit forming a base which is surmounted by said typewriter-unit; denominational type-rods, each carrying a set of digit-types, for the adding mechanism, said rods extending down from the typewriter-platen alongside of the system of typewriter-type bars and through the bottom of the front-strike typewriter-unit and into the adding-unit-base, said digit-types being confined within the typewriter-frame in proximity to the typewriter-printing point, said digit-type-carrying rods being connected to the adding-unit for printing on a work-sheet in the same printing-line with the typewriter-types the amount which is computed by the adding-unit, said typewriter-unit having the usual keyboard, said keyboard also surmounting said adding-unit-base; and a complement of adding-unit indexing and control keys operatively connected to said adding-unit and incorporated in said adding-unit base so as to form an adding-unit keyboard at the top of the adding-unit-base and in front of said typewriter-keyboard, said adding-unit-base including selectively operable indexing and control trains, disposed substantially in the same lateral zone as said digit-type-carrying rods and extending forwardly from the latter to front, indexable termini, said adding-keyboard being offset laterally from said zone and forwardly from said indexable termini for location in front of the typewriter-keyboard, means being provided to operatively connect said indexable termini of the indexing and control trains to the corresponding keys of the adding-unit keyboard.

15. A combined typewriting, adding and listing machine, including a front-strike typewriter-unit; a key-set, cycling adding-unit; the typewriter-unit including a main frame, a revoluble platen and letter-feeding carriage therefor at the top of the typewriter-unit; a system of singly-operable type-bars printing at a common printing-point at the front of the platen, and working in planes radiating to the left and right of said common printing-point; means supporting said typewriter-unit bodily above the adding-unit; and a group of denominational printing-members, including denominational orders of digit-types, cycled under control of the adding-unit and extending upwardly therefrom through the bottom of the typewriter-unit for printing amounts, entered in said adding-unit, upon a work-sheet on the typewriter-platen in a field aside from and aligned with said typewriter-printing point; said typewriter-unit having provision designed to afford room for the group of denominational printing-members for the adding-unit to pass upwardly between one of the typewriter-frame side-members and said system of typewriter-type bars for reaching said typewriter-platen, and said typewriter-unit being located upon said supporting means to register said room with said denominational printing-members; whereby the spread between the adding-printing field and the typewriter-printing point is minimized.

16. Machine constructed according to claim 8, part of the typewriter-type-bar system together with said digit-type-carrying rods being disposed on one side of the typewriter-printing point, the remainder of said typewriter-type-bar system being disposed on the other side of said typewriter-printing point, the typewriter-unit including two upright ribbon-spool spindles, disposed laterally outside of the typewriter-type-bar system at said other side of the typewriter-printing point, a ribbon-vibrator for the typewriter-printing point, the ribbon extending between one spindle and said ribbon-vibrator, and from the latter along the platen past the adding-digit types, and ribbon-guiding means disposed laterally of and outside of the nest of digit-types, and about which the ribbon is reflexed into a return path which is in front of the adding-digit types and by way of which said ribbon extends toward or from the other spindle, the digit-types operating within the loop formed by the reflexed ribbon.

17. Machine constructed according to claim 8, part of the typewriter-type-bar system, together with said digit-type-carrying rods, being disposed on one side of the typewriter-printing point, the remainder of said typewriter-type-bar system being disposed on the other side of said typewriter-printing point.

18. A machine constructed according to claim 8, said typewriter-unit including a system of type-key levers disposed below and occupying room laterally beyond the typewriter-type-bar system at the region of the downwardly-extending digit-type-rods, some of the type-key levers at the side of the system being therefore interspaced with said digit-type-carrying rods.

19. A machine constructed according to claim 8, the adding-unit including spring-operated normally-latched hammers operable, for printing, under control of a cycling mechanism of said adding-unit, said hammers being mounted in the adding-base, and hammer-blow-transmitting trains extending up from said hammers to position to thrust the selected digit-types back against the work-sheet on said platen.

20. A machine constructed according to claim 8, the adding-unit including spring-operated normally-latched hammers operable, for printing, under control of a cycling mechanism of said adding-unit, said hammers being mounted in the adding-base, and hammer-blow-transmitting trains extending up from said hammers to position to thrust the selected digit-types back against the work-sheet on said platen, each hammer-train including two levers of the first order disposed upstandingly end to end, the downwardly-extending arm of the bottom lever being struck by the corresponding hammer in the adding-base, and the upstanding arm of the upper lever having a head operative to thrust the selected digit-types back against said work-sheet.

21. A machine constructed according to claim 8, said digit-types being in the form of plungers mounted by said denominational rods for rearward thrusts to print against the platen, means being provided to return each type-plunger forwardly after the printing-impact, said adding-unit including spring-operated normally-latched printing-hammers operable under control of a cycling mechanism of said adding-unit, said hammers being mounted in the adding-base, and hammer-blow-transmitting devices extending up from said hammers to position opposite the printing-line to thrust the selected digit-type-plungers back against the work-sheet on said platen.

22. Machine constructed according to claim 8, the typewriter-unit including a ribbon-mechanism for a printing ribbon common to the typewriter-types and adding-digit-types, said ribbon-mechanism having two ribbon-spool spindles, both disposed on one side of the typewriter-printing point, the adding-digit-types being dis-

posed on the other side of said typewriter-printing point, and ribbon-circuiting means having provision for directing the ribbon from one spindle to a ribbon-vibrator provided for and at the typewriter-printing point, and thence along the platen to pass between the platen and said digit-types, said provision including devices about which the ribbon, after it is past said digit-types, is reflexed forwardly of the platen to circuit the ribbon back to the other spindle along a path in front of the zone of operation of the digit-types, the latter operating within the ribbon-loop formed by said ribbon-circuiting means.

23. Machine constructed according to claim 8, the typewriter-unit including a ribbon-mechanism for a printing ribbon common to the typewriter-types and adding-digit-types, said ribbon-mechanism including a ribbon-vibrator for the typewriter-printing point, a ribbon-vibrator for the adding-type-printing field, two ribbon-spool spindles, both disposed on one side of the typewriter-printing point, the digit-types for the adding-unit being disposed on the other side of said typewriter-printing point, and ribbon-circuiting means having provision for directing the ribbon from one spindle to the typewriter-printing-point ribbon-vibrator, and thence along the platen to pass between the platen and said digit-types by way of the adding-printing-field ribbon-vibrator, said ribbon-circuiting means also having devices for reflexing the ribbon, after it is past said digit-types, forwardly of the platen to circuit the ribbon back to the other spindle along a path in front of the digit-types, the ribbon-reflexing devices being disposed in proximity to the adding-field ribbon-vibrator, and including provision for accommodating the up-and-down movement of the ribbon at the ribbon-reflexing devices at operation of said adding-field ribbon-vibrator.

24. Machine constructed according to claim 8, the typewriter-unit including a ribbon-mechanism for a printing ribbon common to the typewriter-types and adding-digit-types, said ribbon-mechanism including two upright ribbon-spool spindles, both on one side of the typewriter-printing point, the adding-digit types being disposed on the other side of said typewriter-printing point, the upper ribbon-bearing ends of said spindles being disposed substantially horizontally forward of said platen, and ribbon-circuiting means having provision for directing the ribbon from one spindle to a ribbon-vibrator provided for and at the typewriter-printing point, and thence along the platen to pass between the platen and said digit-types, said provision including devices about which the ribbon, after it is past said digit-types, is reflexed forwardly of the platen to circuit the ribbon back to the other spindle along a path in front of the zone of operation of the digit-types, the latter operating within the ribbon-loop formed by said ribbon-circuiting means.

25. Machine constructed according to claim 8, the typewriter-unit including a ribbon-mechanism for a printing ribbon common to the typewriter-types and adding-digit types, said ribbon-mechanism including two upright ribbon-spool spindles, both on one side of the typewriter-printing point, the adding-digit-types being disposed on the other side of said typewriter-printing point, the upper ribbon-bearing ends of said spindles being disposed substantially horizontally forward of said platen, a ribbon-vibrator for the typewriter-printing point, the ribbon extending between one spindle and said ribbon-vibrator, and from the latter along the platen past the adding-digit-types, and ribbon-guiding means disposed laterally of and outside of the nest of digit-types, and about which the ribbon is reflexed into a return path which is in front of the adding-digit-types and by way of which said ribbon extends toward or from the other spindle, the digit-types operating within the loop formed by the reflexed ribbon.

ALFRED G. F. KUROWSKI.