

B. C. STICKNEY.  
COMBINED TYPE WRITING AND COMPUTING MACHINE.  
APPLICATION FILED DEC. 30, 1913.

1,167,128.

Patented Jan. 4, 1916.  
3 SHEETS—SHEET 1.

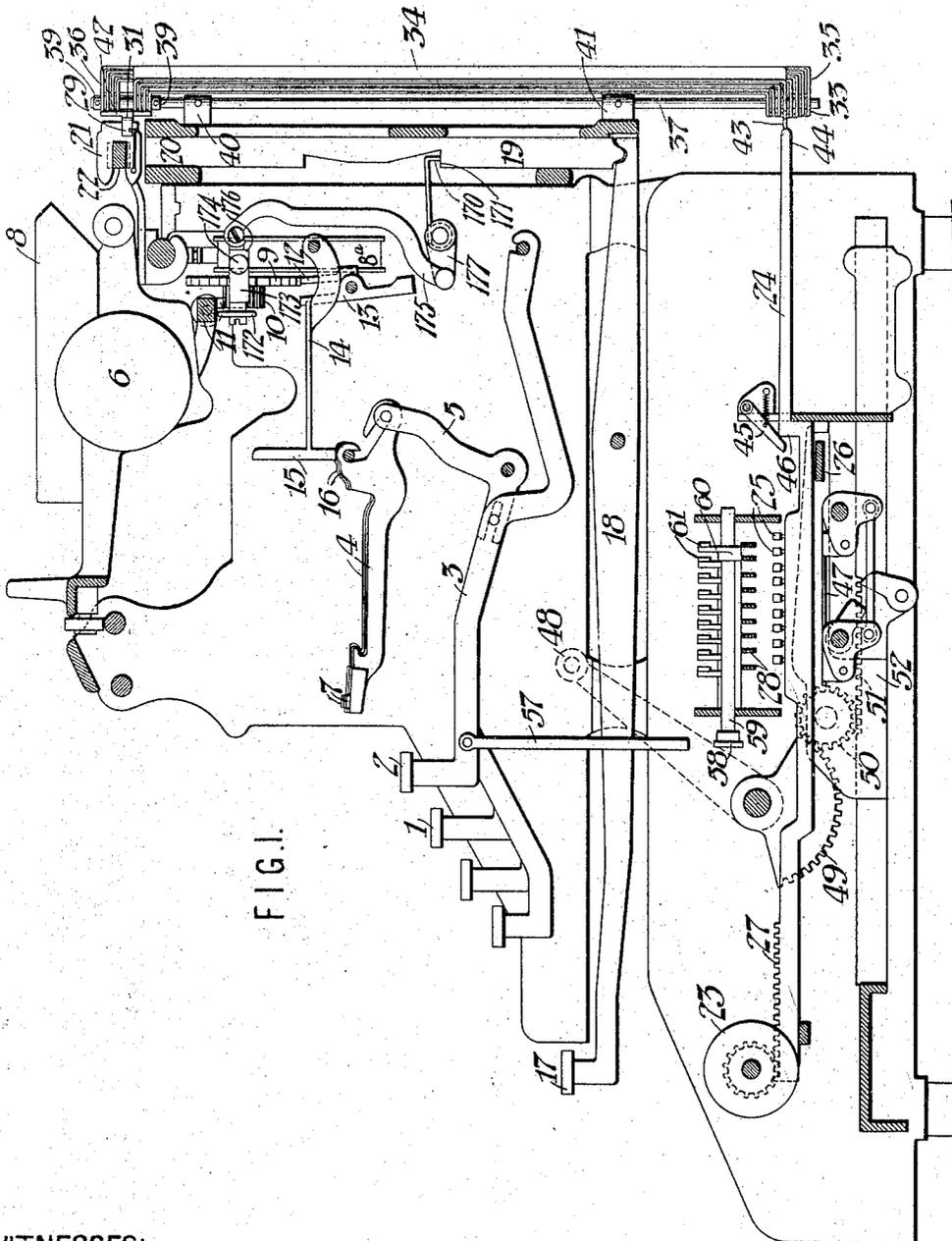


FIG. 1.

WITNESSES:

*Julius W. Duckett*  
*L. J. Pittiger*

INVENTOR:

*Burnham B. Stickney*

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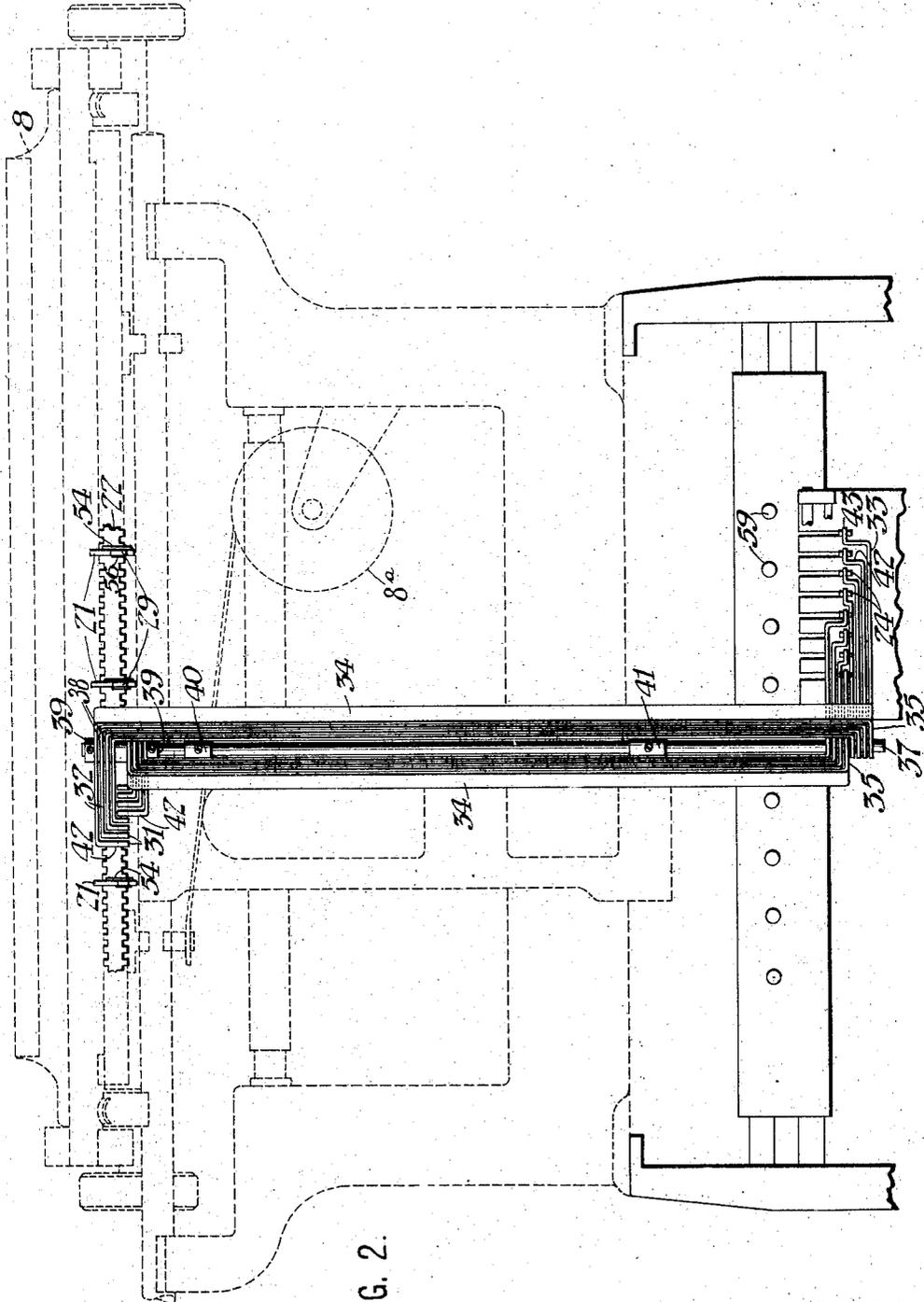


FIG. 2.

WITNESSES:  
*Julius Ruckstine*  
*Leffinger*

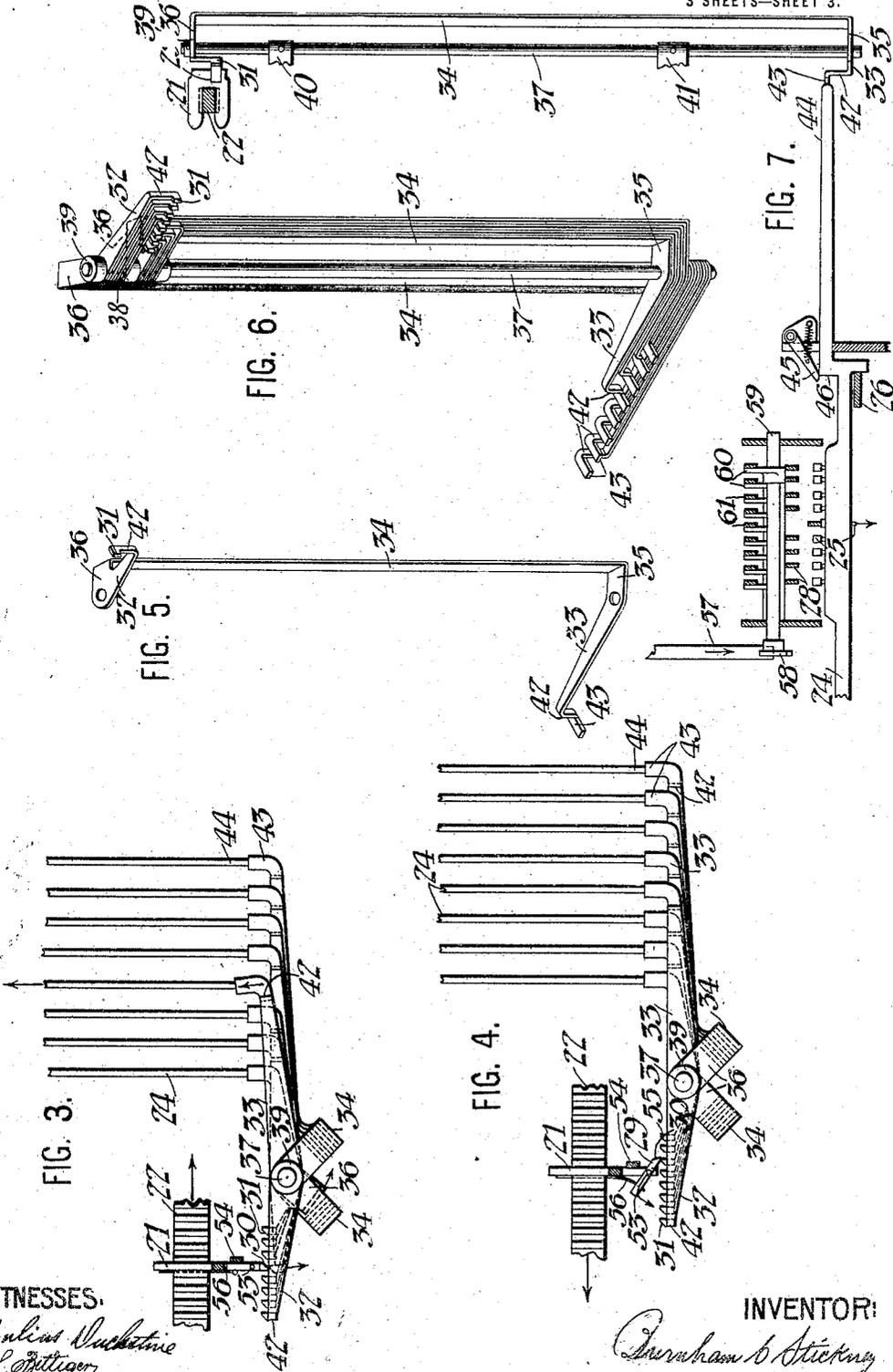
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WITNESSES:

*Julius Duckertine*  
*L. Wittiger*

INVENTOR:

*Burham B. Stickney*

# UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO JOHN T. UNDERWOOD, OF BROOKLYN, NEW YORK.

COMBINED TYPE-WRITING AND COMPUTING MACHINE.

1,167,128.

Specification of Letters Patent.

Patented Jan. 4, 1916.

Application filed December 30, 1913. Serial No. 809,475.

*To all whom it may concern:*

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Combined Type-Writing and Computing Machines, of which the following is a specification.

My invention relates to computing machines and is especially directed to computing machines having a traveling carriage and a set of dial or computing wheels in which numbers are registered in a manner determined by said traveling carriage, said wheels being fixed relatively to the travel of said carriage. In said machines, which are best represented by combined typewriting and computing machines, the carriage normally travels to the left so that the numbers when written will be written beginning with the left-hand digit, and then the right-hand digits will be written one after another, while the numbers so written are registered on the computing or dial wheels, beginning with the left-hand dial wheel, and later on those to the right. It is necessary therefore to provide means whereby a carriage which travels to the left may cause numbers first to be registered in a left-hand dial wheel and then seriatim in the dial wheels to the right of said left-hand wheel. Devices for accomplishing this are called transposition devices, and my invention is disclosed as a transposition device adapted to be used in an Underwood-Hanson combined typewriting and computing machine. In such machines, the carriage of the ordinary Underwood typewriter travels to the left and carries a tappet which, as the carriage travels along, moves into effective position seriatim one after another computation members beginning with the left-hand computation member, so that a digit is set up on each computation member corresponding to the number written at the moment on the typewriter carriage. After a number has thus been set up so that all its digits are registered on the computation members, said number may be carried into the dial or computing wheels by means of a general operator which drives said computation members to turn the dial wheels each to an extent determined by the digit set up thereon. The digits are set up by depressing pins which are normally in ineffective

position, but when in effective position are adapted to be caught by the general operator which through said pins moves the computation members.

To enable the tappet on the typewriter carriage to first move the left-hand computation member to effective position, I have provided a transposition device comprising arms adjacent the path of said tappet and arms adjacent the computation members, which arms are so connected that when the right-hand tappet-engaging arm is actuated by the tappet, the left-hand computation member is correspondingly moved by the left-hand arm. Said arms may be mounted at the extremities of a single shaft which serves as a bearing for all of said arms, and said arms may swing in horizontal planes and be connected by bails, said bails being of varying sizes so that a set of bails forms a compact nest adjacent the frame of the typewriting machine. Said transposition device forms a compact, easily constructed and easily assembled device which is adapted to be readily attached to existing types of machines, and said bails may be formed of integral stamped metal shaped in such a way that each bail forms a girder in effect, thus giving each member of the transposition device a light but extremely rigid structure.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a sectional side view of an Underwood-Hanson combined typewriting and computing machine, showing so much thereof as is convenient for the illustration of my invention. Fig. 2 is a rear view of the same. Fig. 3 is a plan view on a larger scale showing the tappet effective on one transposition arm. Fig. 4 is a similar view showing the tappet ineffective during the return movement of the typewriter carriage. Fig. 5 is a view of a single transposition member of my device. Fig. 6 is a perspective view of my device assembled, in which the member shown in Fig. 5 appears with one arm at the top of the arms appearing in the bottom of said Fig. 6. Fig. 7 is a fragmentary side view of Fig. 1, showing the tappet holding a computation member in effective position.

Alphabet keys 1 and numeral keys 2 depress key levers 3 of the ordinary Underwood typewriting machine to swing type-

bars 4 by means of bell cranks 5 upwardly and rearwardly against a platen 6 causing type 7 to print on said platen. Said platen is rotatable and forms part of a carriage 8 which is normally tensioned to the left by means of the usual spring-barrel 8<sup>a</sup>, and is fed along under the tension of said spring-barrel at every key stroke by means of an escapement wheel 9, said escapement wheel being attached to a pinion 10 which meshes with a rack bar 11 on said carriage. Said escapement wheel 9 is given a letter-feeding movement by dogs 12 and 13 which alternately engage it, and are connected to a frame 14 which comprises a universal bar 15, said bar being struck and vibrated by a heel 16 on each type-bar as the type-bar approaches the platen. Said carriage may be rapidly positioned by means of tabulating keys 17 which may form part of a decimal tabulator. Whenever a tabulating key 17 is depressed, it swings down its lever 18 to raise to effective position a plunger 19, said plunger when so raised carrying its upper end 20 into the path of a stop 21 settable on the usual rack bar 22 on the typewriter carriage. Whenever a key 17 is depressed, it releases the typewriter carriage from the escapement mechanism by the usual connections, and thus permits said carriage to be drawn along by its spring-barrel until arrested by the column stop 21, which is intercepted by the upper end 20 of the plunger 19, which upper end forms a counter-stop. The connections for releasing said carriage include a short universal bar 170, which overlies heels 171 on the plungers 19, so that every time a plunger 19 is raised said universal bar 170 is lifted. This lifting of said universal bar 170 frees the typewriter carriage from the escapement wheel 9 by lifting the rack 11 out of mesh with the pinion 10. The connections for doing this include an idle roll 172 which is journaled on a stub shaft 173, said stub shaft being swung upwardly around its pivot 174 by a link 175 which is connected to an extension 176 of said shaft and to an extension 177 of the universal bar 170. Said combined machine also includes dial or computing wheels 23 for computing the numbers printed in an adding column by the numeral keys 2 of the typewriter. To provide for such computing, said wheels 23 are adapted to be turned by computation members 24 to an extent determined by the numeral keys of the typewriter. The numbers while being written are set up on the computation members 24 by depressing pins 25 thereon from their normal ineffective position to effective position, and then a general operator comprising a cross-bar 26 comes forward and intercepts any depressed pins 25 so that said operator drives the computation bars 24 by the depressed pins to an extent determined

in each case by the pin depressed, and turns the computing wheels 23 by means of racks 27, said racks being formed at the front ends of the computation members 24.

The pins 25 on the computation members 24 or bars 24 are depressed into their effective positions where they will be intercepted by the cross bar 26, by pin-setting linkages 28 under the control of the numeral keys of the typewriter. Said pins 25 normally stand in such staggered position to the linkages 28 that said linkages will be ineffective thereon, as best shown in Fig. 1, where the pins are seen out of alinement with the linkages 28. In the adding zone, however, the computation members 24 are shifted seriatim to bring their pins 25 into alinement with the pin-setting linkages 28, where, as best shown in Fig. 7, the pins are directly under the linkages 28 so that when any linkage is depressed, as is shown for one linkage in said Fig. 7, it depresses the pin beneath it on the particular computation member which has been shifted so that the lower end of the depressed pin is in the path of the cross-bar 26. The connections for thus moving the computation members 24 to bring their pins under the linkages 28 include my transposition device, which device is operated by a tappet or dog 29 mounted on the column stop 21. Said dog is provided with a cam face 30 which as the dog travels along with the typewriter carriage in letter-feeding direction, strikes corresponding cams 31 on setting or transposition arms 32, camming said arms outwardly seriatim, and thus causing corresponding arms 33 adjacent the computation members 24 to be effective seriatim on said members, the latter being moved forward from the normal staggered or ineffective position seen in Fig. 1 to the effective or pin-setting position seen in Fig. 7.

Each transposition arm 32 is connected to its corresponding arm 33 by a bail 34 formed of a flat plate of thin metal, which is bent over at each end to form horizontal extensions 35 and 36, said extensions forming integral parts of the arms 32 and 33. Each bail 34 is pivoted on the fixed shaft 37 by means of its aforesaid extensions, the latter having journals formed therein. To prevent friction, the adjacent extensions of the bails are slightly separated from each other, and for this purpose the upper extensions 36 have washers 38 placed between them, and the whole group of extensions 36 is held in position by collars 39 fast on said shaft one on each side of the group of extensions 36. Said shaft 37 is firmly mounted in fixed brackets 40 and 41 fast in the tabulator stop casing.

The bails 34 are divided into two groups whereof the outer group has its upper arms 32 nearly straight, while the lower arms 33

thereof form a sharp angle at the journals so that the extensions proper 35 and 36 of a single bail occupy approximately the same vertical plane. The other group of bails is arranged with its extensions reversed, so that in said second group the lower arms 33 are nearly straight.

To make up for the vertical spacing apart of the extensions 35 and 36, the arms forming the ends of said extensions are (except for the arms of the central bail) provided with offset, vertical lugs 42, so as to bring the cams 31 thereon into substantially a straight line, and also to bring the setting points 43 of the arms 33 into a straight line where they will lie against the rearward extensions 44 of the computation members 24.

The result of the above described structure is that, if the shaft 37 is located properly, the setting of a column stop 21 will automatically cause the transposition arms 32 and 33 to bring the computation members 24 into effective positions at points corresponding to the columns in which writing is being done, thereby causing computation to be performed in the proper wheels.

The computation members 24 are normally held in their rearward ineffective position by spring arms 45 which bear against shoulders 46 on the computation members, but the arms 45 are of such length that when the computation members 24 are moved forward by the cross-bar 26, the arms 45 will ride up on the flat rearward extensions 44 of said members, and thus have no retarding effect on the operation of the machine.

The returning of the cross-bar 26 brings back with it the computation members 24 so they will stand at their normal ineffective positions, and at the same time automatically causes a pin-restoring plate 47 to restore to ineffective position all the set pins 25. The general operator is moved forward and backward by the usual handle 48 which is fixed to the usual segment 49, said segment meshing with an idle pinion 50, which pinion meshes with a rack 51 on the side bar 52 of the general operator.

Means are provided whereby the tappet 29 of the tabulating stop 21 will swing idly during the return movement of the typewriter carriage. For this purpose said tappet is pivoted at 53 on the stop 21, and during the letter-feeding movement of the carriage is held in effective position by a lug 54 against which it is normally pressed by a spring 56, said lug bearing against the side of said tappet and keeping it from swinging out of effective position. During the return movement of the carriage, said tappet is swung on its pivot 53, as seen best in Fig. 4, by the flat sides 55 of the cams 31, and so passes idly by them.

The pin-setting linkages 28 are connected

to be operated by the numeral keys by the usual pendants 57 of which there is one for each numeral key, which pendant, as its key descends, strikes a wrist 58 fast on a shaft 59. This shaft 59 carries a rock arm 60, said rock arm having fast thereon another member 61 of the linkage 28, the result being that when any numeral key descends, it swings its linkage from the position shown in Fig. 1 to the position shown in Fig. 7, just above the arrow therein, thus depressing the pin 25 on any computation member 24 which is at the moment holding its pins alined with the linkages 28.

In my pending application 685,652 are contained relatively broad claims to the construction of the bail-like or one-piece transposition members, each engaging at one end the carriage or carriage-dog, and at the other end engaging its associated indexing member. The claims in this application are restricted to features not disclosed in said application 685,652.

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 computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order and extending down to the corresponding computation members to move them into effective position in the reverse order, each transposition member having an upper bearing adjacent the said tappet and a lower bearing adjacent the companion computation member.

2. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and provided, each, with a bearing adjacent the said tappet and a bearing adjacent the companion computation member, each transposition member including a horizontally-swinging arm extending to said tappet and a horizontally-swinging arm extending to its companion computation member.

3. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transpo-

- sition members operable seriatim by said tappet in one order and extending down to the corresponding computation members to move them into effective position in the reverse order and including, each, a vertical bail having upper and lower bearings therefor at opposite ends, said bails being nested.
4. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, a vertical bail which is integral therewith and forms the body thereof, the top and bottom members of each bail being provided with bearings therefor.
5. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a nest of vertically pivoted transposition members operable seriatim by said tappet in one order and extending down to the corresponding computation members to move them into effective position in the reverse order and including, each, a vertical bail, each bail having an upper extension which co-acts with said tappet and a lower extension which co-acts with the companion computation member.
6. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a nest of vertical transposition members operable seriatim by said tappet in one order and extending down to the corresponding computation members to move them into effective position in the reverse order and including, each, a vertical bail having an upper extension which co-acts with said tappet and a lower extension which co-acts with the companion computation member; and a vertical shaft whereon all of said bails are journaled at opposite ends.
7. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order extending down to the corresponding computation members to move them into effective position in the reverse order and including, each, a vertical bail having an upper extension which co-acts with said tappet and a lower extension which co-acts with the companion computation member, said bails and extensions lying close to each other to form a compact nest, and each bail having a bearing therefor adjacent each extension.
8. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, a bail, said bails being nested in two distinct groups; and a shaft whereon all of said bails are journaled.
9. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, a bail, said bails being nested in two distinct groups and provided, each, with bearings at opposite ends.
10. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted rocking transposition members operable seriatim by said tappet in one order and extending down to the corresponding computation members to move them into effective position in the reverse order and including, each, an upper swinging arm extending to said tappet and a lower swinging arm extending to the companion computation member.
11. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, an upper arm extending to said tappet and a lower arm extending to the companion computation member, each of said arms being provided with a bearing for the corresponding transposition member.
12. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the ma-

chine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, a horizontally-swinging arm extending to said tappet and a horizontally-swinging arm extending to the companion computation member, each of said arms being provided with a bearing for the corresponding transposition member.

13. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; vertical transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order and including, each, a vertical bail, said bails being nested in two distinct groups; and a vertical shaft whereon all of said bails are journaled.

14. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset horizontally at opposite ends to form a pair of arms, one of which co-acts with said tappet and the other with the companion computation member, and each of which is provided with a bearing.

15. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; vertical transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset horizontally at opposite ends to form a pair of arms, one of which co-acts with said tappet and the other with the companion computation member; and a vertical shaft whereon all of said transposition members are mounted to swing.

16. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; vertical transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset horizon-

tally at opposite ends to form a pair of arms, one of which co-acts with said tappet and the other with the companion computation member; and a vertical shaft whereon all of said transposition members are mounted to swing; said arms being provided with vertically-aligning bearings through which said shaft loosely passes.

17. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed in the base of the machine; a set of vertically pivoted transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset horizontally at opposite ends to form a pair of arms, one of which co-acts with said tappet and the other with the companion computation member, said arms being provided with offset working ends to directly engage said tappet and said computation members.

18. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; vertical transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset horizontally at opposite ends to form a pair of arms, one of which co-acts with said tappet and the other with the companion computation member, said arms having vertically-offset, terminal lugs to directly engage said tappet and said computation members.

19. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; a nest of rocking transposition members operable seriatim by said tappet in one order to move the corresponding computation members into effective position in the reverse order, each transposition member being offset at opposite ends to form a pair of arms, one of which is straight and the other angular, said arms being provided with aligning bearings, the bearings of the angular arms located at the apices of the angles.

20. In a combined typewriting and computing machine, embodying a traveling carriage, a tappet on said carriage, and computation members normally in ineffective position and disposed at a point remote from said carriage; a series of rocking transposition members operable seriatim by said tap-

pet in one order to move the corresponding computation members into effective position in the reverse order and nested in two distinct groups, each transposition member being offset at opposite ends to form a pair of arms, one of which is straight and the other angular, the arrangement of the arms of one group being the reverse of that of the other group; and a shaft whereon said transposition members are journaled passing through openings in all of said arms.

BURNHAM C. STICKNEY.

Witnesses:

W. O. WESTPHAL,  
TITUS H. IRONS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."