

J. A. SMITH.  
COMBINED TYPE WRITING AND CALCULATING MACHINE.

1,001,698.

APPLICATION FILED AUG. 27, 1907.

Patented Aug. 29, 1911.

5 SHEETS—SHEET 1.

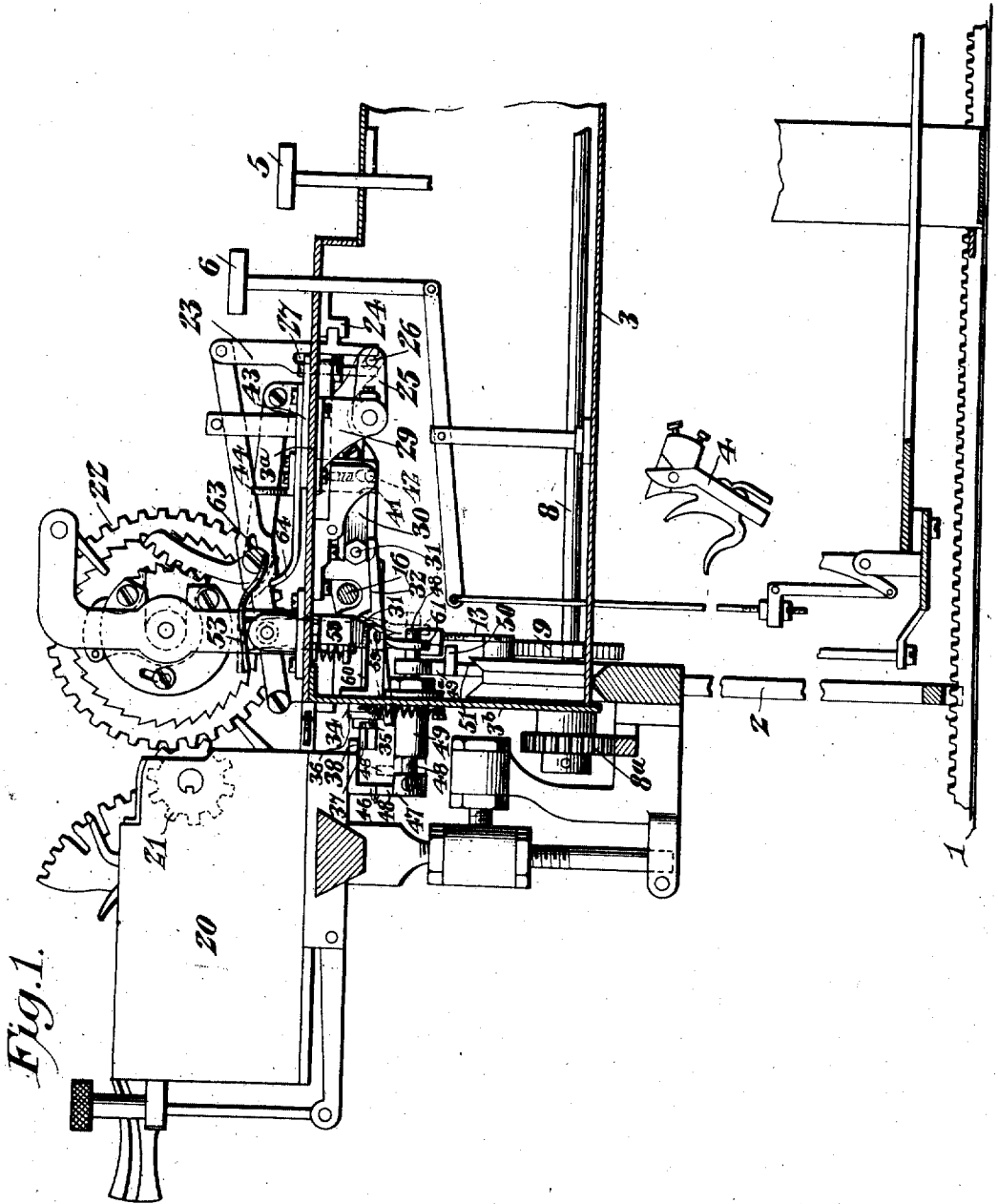


Fig. 1.

Witnesses  
Jas. K. McLaughlin  
Raris G. Juhn

John A. Smith, Inventor

By *E. J. Figgess*

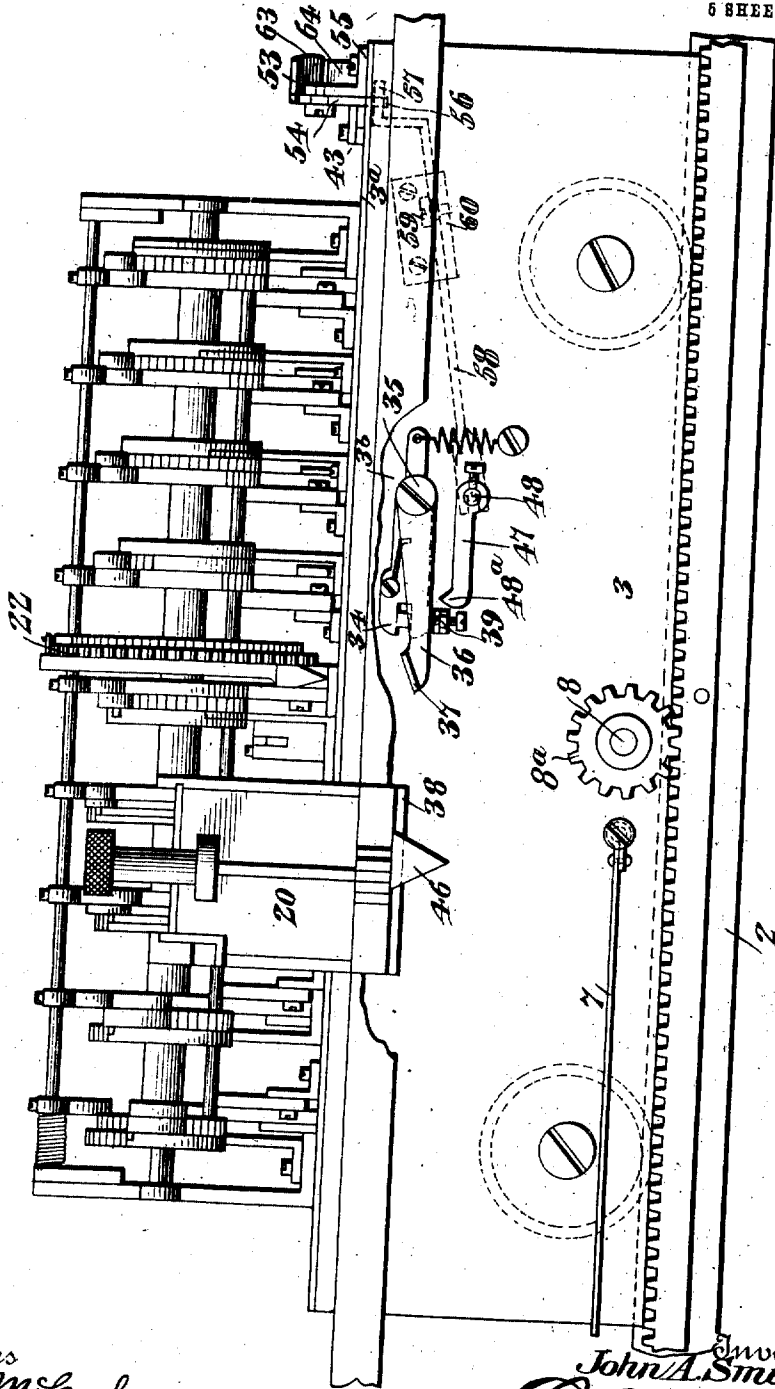
Attorney

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6 SHEETS—SHEET 2.

Fig. 2.



Witnesses  
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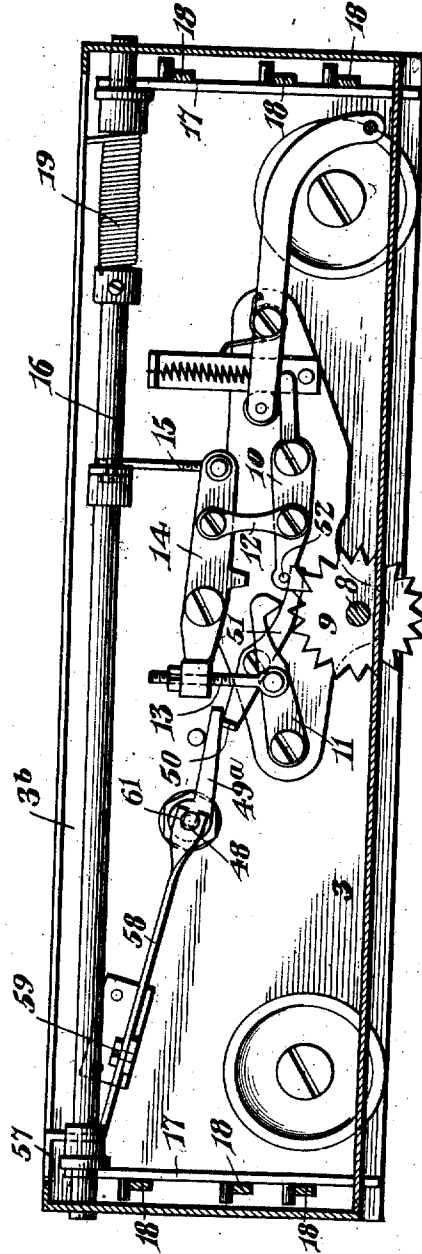
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6 SHEETS—SHEET 3.

Fig. 3.



Witnesses  
*James M. Cathran*  
*Louis G. Julihn*

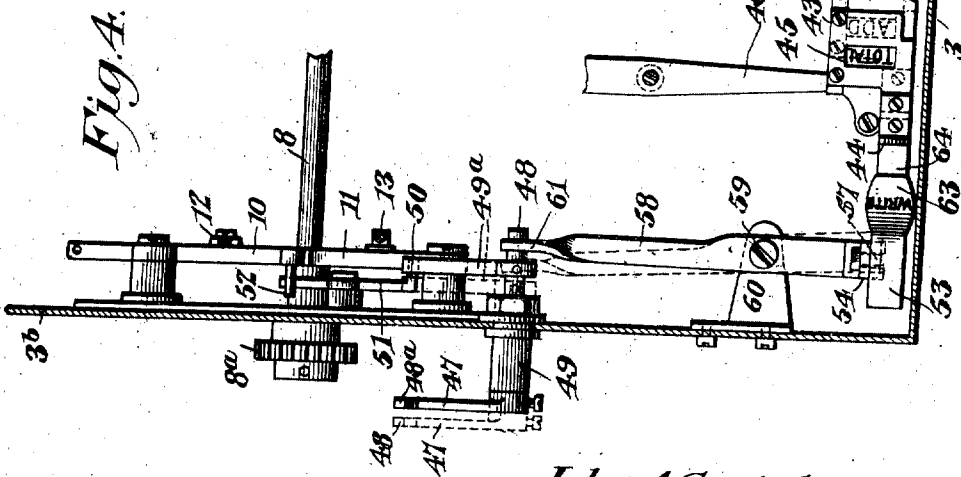
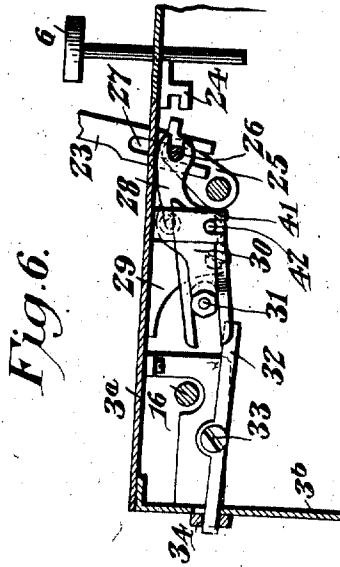
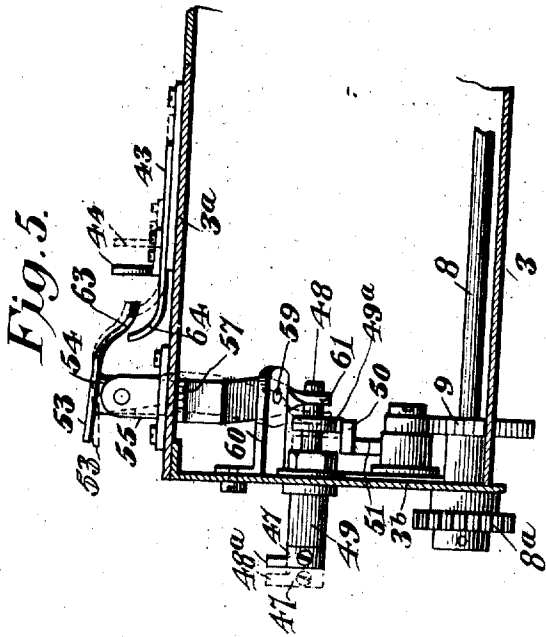
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6 SHEETS—SHEET 4.



Witnesses  
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5 SHEETS—SHEET 5.

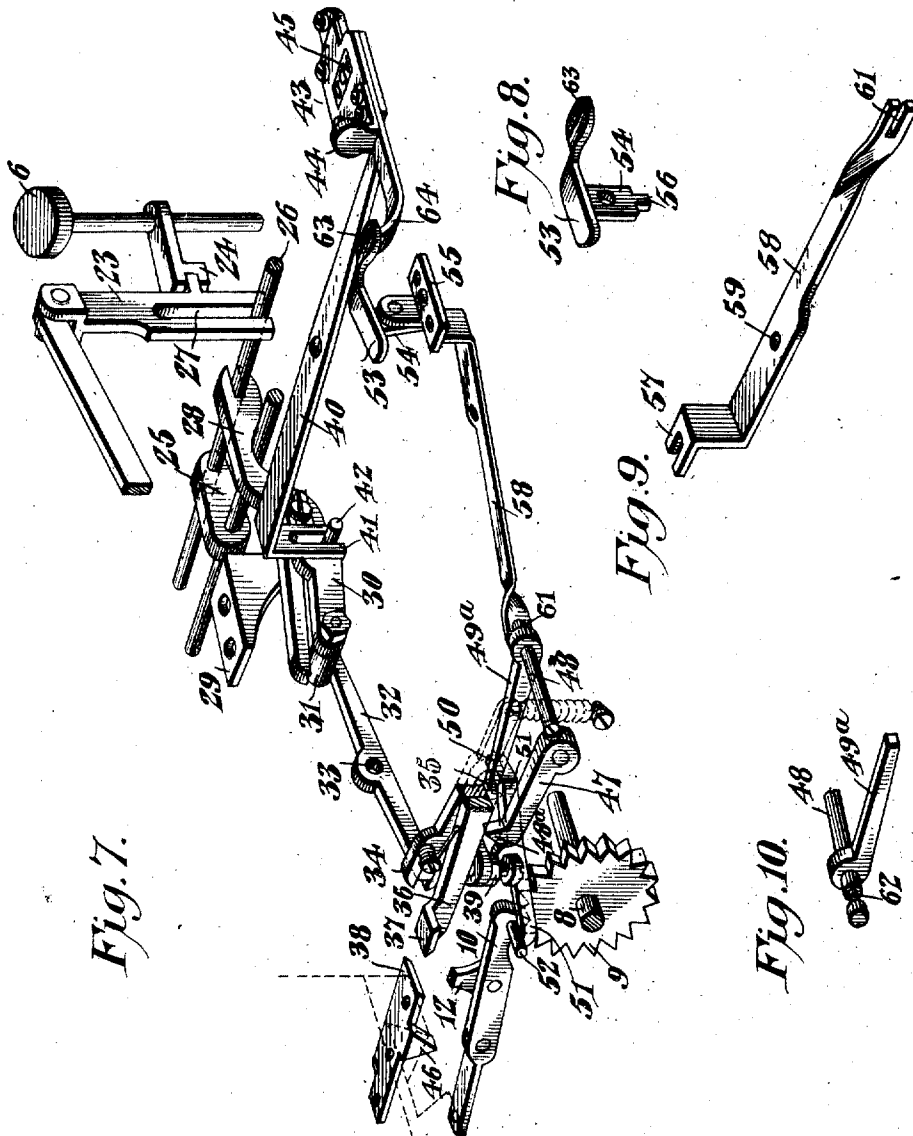


Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Witnesses  
*James M. Cochran*  
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*John A. Smith*, Inventor  
 By *E. G. Sigler*  
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# UNITED STATES PATENT OFFICE.

JOHN A. SMITH, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

COMBINED TYPE-WRITING AND CALCULATING MACHINE.

1,001,698.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed August 27, 1907. Serial No. 390,360.

To all whom it may concern:

Be it known that I, JOHN A. SMITH, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and useful Combined Type-Writing and Calculating Machine, of which the following is a specification.

This invention relates to a combined typewriting and calculating machine, and more particularly to mechanism for controlling the automatic connection of the typewriter keys with the adding mechanism and the automatic spacing of the carriage over the decimal point.

In Patent No. 922,559 to Herbert D. Bolton is disclosed a controlling or setting mechanism common to both the automatic key connecting mechanism and the automatic decimal spacing mechanism and operated by a single key which is movable to any one of three positions; to render both of said mechanisms effective, or both ineffective, or one effective and the other ineffective, accordingly as it is desired to add, write, or print a total. The Bolton mechanism was designed for the equipment of what is known to commerce as the Elliott-Fisher billing machine, but necessitated more or less modification of the automatic key connecting mechanism as well as of the decimal spacing mechanism commonly employed. Furthermore, the movement of the Bolton controlling key in the same direction to a plurality of positions is undesirable in practice because of the liability of the key to be thrown beyond the intended position in the rapid manipulation of the machine.

The object of my invention is to produce means for controlling the automatic key connecting mechanism and the automatic decimal spacing mechanism without requiring material modification of the standard equipment of the machine, particularly the automatic key connecting mechanism, and to avoid the use of a key requiring special care for its manipulation.

A further object is to provide separate keys for controlling the key connecting mechanism and the decimal spacing mechanism and to arrange such keys in such cooperative relation, that while under certain condition either key may be operated independently of the other, their operation

under other conditions will be interdependent, the last mentioned characteristic insuring the setting of the decimal spacing mechanism for action whenever the key connecting mechanism is set to automatically connect the keys for addition.

To the accomplishment of the objects stated, and others subordinate thereto, as will more fully appear, the preferred embodiment of the invention resides in that construction and arrangement of parts to be hereinafter described, illustrated in the accompanying drawings, and defined in the appended claims.

In said drawings:—Figure 1 is a vertical sectional view of so much of an Elliott-Fisher billing machine as is necessary to show the application of my invention. Fig. 2 is a rear elevation of a portion of said machine designed more particularly to show the cooperating parts exposed in rear of the carriage casing and also showing in dotted lines certain elements of the setting or controlling means for the decimal spacing mechanism. Fig. 3 is a longitudinal section through the carriage casing designed more particularly to show the typewriter escapement and the relation of the decimal spacing mechanism thereto. Fig. 4 is a horizontal sectional view, through a portion of the carriage casing, showing the decimal spacing mechanism in plan and in ineffective position, the effective or operative positions of the parts being indicated in dotted lines. Fig. 5 is a vertical transverse section through the rear portion of the carriage casing, showing in side elevation the mechanism illustrated in Fig. 4. Fig. 6 is a transverse sectional view through the middle portion of the carriage casing designed to show more particularly the automatic key connecting mechanism, with the parts thereof in ineffective or non-operative position. Fig. 7 is a detail perspective view of those parts of the mechanism with which my invention is most directly concerned and is designed to show the general relation of the complete organization of the key connecting mechanism, the decimal spacing mechanism, and the means for controlling the operation of said mechanisms. Fig. 8 is a detail view of the decimal space key. Fig. 9 is a detail view of the decimal space setting lever, and Fig. 10 is a detail view

of the rear end of the decimal space rock shaft.

Each part is indicated by its proper reference character wherever shown.

*The general organization of the Elliott-Fisher billing machine.*—The Elliott-Fisher combined typewriter and adder or billing machine includes in its organization a flat platen typewriter and adding mechanism operated from the typewriter keys, whereby the machine is adapted to simultaneously print and add a column of numbers. The typewriter includes a flat platen 1 over which travels longitudinally for line spacing a machine frame 2 traveling on which, transversely of the platen, to effect letter spacing of the characters printed, is a carriage 3. Carried by and movable with the carriage is suitable downwardly acting printing mechanism including type-bars 4 operated through suitable intermediate connections by letter and numeral keys 5 and 6.

The carriage 3 is propelled to the right by carriage propelling mechanism including spring drums, not shown, connected to the carriage by flexible tapes 7, one of which is indicated in Fig. 2. The step-by-step movement of the carriage for letter spacing is controlled by carriage feeding mechanism operated from the typewriter keys in a manner well understood in the art and including a carriage feed spindle 8 geared to the frame 2, as indicated at 8<sup>a</sup>, and controlled by an escapement which includes a ratchet wheel 9 fixed to the spindle 8 and cooperating with two dogs 10 and 11 connected by links 12 and 13 to a vibrator 14, which is in turn connected by a link 15 to an arm of a rock shaft 16 arranged to be rocked by slides 17, which are in turn operated by key yokes 18 mounted in the carriage of the typewriter and operated, as any given key reaches the downward limit of its movement, to effect the rocking of the shaft 16 and thus swing the vibrator 14, all as fully described and shown in Patent No. 765,361 to John A. Smith.

It will be noted that the dog 10 normally engages the escapement wheel 9 and thus holds the carriage against movement. Upon the depression of a key, the dogs are simultaneously moved in opposite directions, the dog 11 reaching its engaging position before the carriage is released and permitting only sufficient movement of the wheel 9 to insure the engagement of the dog 10 with the next succeeding tooth of the wheel when the dogs are again reversed by the action of a retracting spring 19 upon the release of the key. Therefore, as the key is depressed, there is no appreciable movement of the carriage, but upon the release of the key the dog 11 moves out of engagement with the wheel 9 thus permitting the latter to rotate the distance of one letter space or one tooth

of the ratchet 9 before the carriage is arrested by the reengagement of the dog 10 with the ratchet.

*The adding mechanism.*—The adding mechanism, which is combined with the typewriter machine, includes a totalizer, register, or computing device 20 adjustably mounted on the frame 2 and located in rear of the upper portion of the carriage 3. The register 20 is of well known construction and includes a series of denominational members or number wheels 21 arranged in line and equipped with suitable carrying mechanism whereby the value accumulated upon any wheel will be transferred or carried to the wheel of next higher order. The register constitutes the relatively fixed unit of the adding mechanism, which latter also embraces a relatively movable unit in the form of actuating mechanism which travels with the typewriter carriage 3 and is presented by the movement of such carriage to successive number wheels. Thus upon the depression of any numeral key of the typewriter to print a digit in a given denominational position of the adding field or column, the number wheel of corresponding denomination will be moved a number of increments corresponding to the value of the printed digit, thereby accumulating the value of the digit in the register simultaneously with the printing thereof.

The actuating mechanism embraces a master wheel 22 and suitable differential connections between the master wheel and the several numeral keys 6, the connections being so proportioned that each numeral key will move the master wheel a distance proportionate to the value of said key.

It is thought to be unnecessary to specifically describe either the register or its operating connections, but for a more complete disclosure of these mechanisms, attention is directed to Patents Nos. 825,469 and 829,971 to Laganke and Smith. It is only necessary to direct attention to the fact that the numeral keys 6 of the typewriter are separately connected to the actuating mechanism of the adder, the actuating mechanism including a series of links 23 having a detachable connection 24 with the stems of the numeral keys and arranged to be swung into or out of connection with said keys by a yoke 25 which includes a bar 26 disposed within longitudinal slots 27 in the links.

*The automatic key connecting mechanism.*—Normally the adding mechanism is entirely disconnected from the keys of the typewriter so that the latter may be operated independently of the adding mechanism while the printing point of the machine is located outside of the adding field or column to be computed. The Elliott-Fisher machine includes, however, what is known as automatic key connecting mechanism

which, when set in effective or operative condition, automatically effects a connection of the keys 6 with the adding mechanism when the printing point of the machine moves into the adding field, and maintains such connection as long as the printing point remains in such field.

The key connecting mechanism here shown is that, described and claimed in my copending application for Letters Patent, Serial No. 366,189. This mechanism includes a yoke operating lever 28 suitably fulcrumed on a bracket 29 suspended from the cover-plate 3<sup>a</sup> of the carriage. The front end of the lever 28 is bifurcated to engage the bar 26 of the yoke 25, as shown in Fig. 7, and by swinging this lever in the proper direction, the yoke 25 may be swung to shift the links 23 into or out of engagement with the keys 6.

Longitudinally shiftable at one side of the lever 28 and arranged to rock therewith, in one position, is a setting plate 30 provided with an abutment in the form of a roller 31, which, in the set or effective position of the mechanism, overlies what is termed an intermediate lever 32 fulcrumed intermediate of its ends, as indicated at 33, and engaged at its rear end with the bifurcated extremity of an arm 34 mounted to swing from a boss 35 extending rearwardly from the rear wall 3<sup>b</sup> of the carriage casing. Also mounted to swing from the boss 35 is a cam arm 36 provided at its free end with a cam 37 arranged to be brought into engagement with a cam plate 38 by the movement of the carriage in the direction of letter spacing.

As the printing point of the machine reaches the left hand margin of the adding field or column, the cam 37 rides under the cam plate 38, thus depressing the arm 36 and causing the latter, through a suitable connection 39, to depress the free end of the arm 34. This in turn effects the depression of the rear end of the lever 32 and causes the front end of said lever, by engagement with the abutment roller 31, to rock the lever 28 in the proper direction to swing the yoke 25 for the purpose of shifting the links 27 into connection with the keys, the parts being returned to their normal disconnected positions by a retracting spring, not shown, when the cam 37 moves beyond the plate 38. It will of course be understood that the cam plate 38 is relatively stationary, the casing of the register 29 usually serving as an adjustable support therefor.

It is sometimes desirable to avoid the automatic connection of the keys when the printing point of the machine moves across that area of the work sheet which would otherwise constitute the adding field, as for instance in writing the total at the foot of the column or in printing digits above or below a column or between two vertically

aligned columns when said digits are not designed to be included in the computation. For this reason the automatic key connecting mechanism is equipped with controlling or setting means whereby such mechanism may be set in effective or ineffective condition to cause it to operate automatically or to remain inoperative, as desired. This setting mechanism includes the setting plate 30, which, as before stated, is longitudinally movable. This movement is designed to present the abutment 31 in set or operative position, as shown in Fig. 7, to-wit, in position to be engaged by the lever 32, or in the unset, inoperative or ineffective position indicated in Fig. 6, where the roller is shown moved out of cooperative relation with the lever 32 by the shifting of the plate 30. This plate 30 is shifted to its set or unset positions by a setting lever 40 fulcrumed intermediate of its ends and provided at its right hand end with an angular bifurcated extremity 41 which engages a pin 42 projecting from the plate 30. The opposite end of the lever 40 is connected to a slide 43 in the form of a plate equipped with a controlling key 44 and an opening 45 through which latter suitable indications, as for instance "add", and "total" are exhibited alternately to indicate the position of the slide and the condition of the mechanism. These indications are equivalent to set or unset, operative or inoperative, since when the slide is in position to exhibit the word "add" the abutment 31 is in its set position, and the key connecting mechanism is therefore in condition to operate automatically to connect the keys and adding mechanism when the adding field is reached. Similarly, when the slide is in position to exhibit the word "total" the abutment 31 will be in its unset, ineffective or non-operative position so that the automatic key connecting mechanism will not operate to connect the keys and adding mechanism, but will allow the keys to remain disconnected while the total or other matter is being printed in the area appropriated to the register, without in any way affecting the adding mechanism.

The arrangement and movement of the controlling key 44 and related parts will be understood by reference to Figs. 4, 5 and 7.

*The automatic spacing mechanism.*—The Elliott-Fisher machine is largely used for the computation of money values. It therefore includes what is known as automatic decimal spacing mechanism arranged to cause the carriage to skip over the decimal point from the units to the tenths position upon the release of a key after printing a digit in the units order of the column. One form of such mechanism is disclosed in Patent No. 820,879 to Laganke and Smith, but the form here shown involves the Smith escapement disclosed in the patent to Smith,

No. 765,861, before mentioned, and is shown and described in the application of Herbert D. Bolton already referred to.

Depending from the casing of the register 20 is a decimal spacing trip 46 in the form of a pointed tooth disposed in the path of a trip arm 47 having a pointed tooth 48<sup>a</sup> which, when the decimal space is reached by the carriage, engages and passes under the trip 46. The trip arm 47 is secured to the outer end of a rock shaft 48, which is rotatable and longitudinally movable in a bearing sleeve 49 projecting through the back wall 3<sup>b</sup> of the carriage casing, see Figs. 1, 2, 4, 5 and 7.

Adjacent to the inner end of the rock shaft 48 is secured an arm 49<sup>a</sup> the free end of which is disposed over the laterally disposed end or lug 50 of a dog retarding lever 51. The lever 51 is fulcrumed intermediate of its ends to the back wall of the carriage casing and is extended under the pin 52 projecting laterally from the free end of the dog 10.

We have already seen that the letter space advance of the carriage is effected while the dog 10 is moving back to engage the next succeeding tooth of the ratchet, and it will therefore be obvious that if this movement of the dog to its engaging position is momentarily retarded, the ratchet will be permitted to move the distance of two teeth instead of one before it is engaged and the carriage arrested by the dog. The parts just described are designed to effect this momentary retardation of the dog 10 so that as the carriage moves from the units position it will advance a double space or the distance of two normal letter space movements, so as to cause the printing point to pass directly from the units to the tenths position and skip over the decimal space. It will be seen that when the trip arm 47 engages the decimal spacing trip 46, said arm will be slightly depressed, thus rocking the shaft 48 and depressing the arm 49<sup>a</sup>, which in turn depresses the left hand end of a lever 51 and causes the right hand end of said lever to rise and thus, by engagement with the pin 52 on the dog 10, to retard the movement of the dog 10 toward its engaging position, the retardation being obviously momentary because of the very brief or momentary engagement of the trip 46 with the pointed tooth 48 of the trip arm.

It is sometimes desirable to render the decimal spacing mechanism inoperative, particularly in writing ordinary matter across that area which may be used as the adding field, for instance when the computing device is entirely out of use or when it is desired to write matter across the sheet above or below a column of numbers which are to be or have been added. In order to render the decimal spacing mechanism op-

erative or inoperative, the shaft 48 is made longitudinally movable, as stated, in order to permit the same to be shifted back to bring the trip arm 47 into cooperative relation with the trip 46 or forward to present the trip arm out of cooperative relation with said trip, the two positions being indicated in Fig. 1, the operative position of the mechanism being shown in full lines, and the trip arm being shown in dotted lines shifted to its inoperative position in which it will pass idly by the trip 46 instead of engaging the same as the carriage advances.

In accordance with my invention, the position of the trip arm is controlled by a decimal space key 53 distinct from the key 44 which controls the key connecting mechanism, attention being directed to the fact that this employment of separate keys for controlling the key connecting and decimal spacing mechanisms is one characteristic which distinguishes my invention from that disclosed in the application of Herbert D. Bolton before mentioned. The key 53 is in the form of a plate having a shank 54 pivotally mounted on a bearing bracket 55 secured to the cover-plate of the carriage. The lower end of the shank 54 is provided with a tongue 56 which engages the angular forked extremity 57 of a decimal space setting lever 58 fulcrumed intermediate of its ends, as indicated at 59, to a bracket 60 secured to the wall 3<sup>b</sup> of the carriage. The opposite end of the lever 58 is turned to vertical position and provided with a fork 61 engaging a reduced portion 62 of the rock shaft 48. It will thus be seen that by tilting the decimal space key 53 in one direction the lever 58 will be swung to shift the shaft 48 longitudinally and thus present the trip arm 47 in operative position. Similarly, by tilting the key 53 in the opposite direction, the arm 48 will be withdrawn to its ineffective or inoperative position. Therefore, by manipulating the key 53, the operator may determine whether or not the decimal spacing mechanism will operate when the tooth 48 of the arm 47 reaches the automatic exaggerated spacing trip 46.

*The means for securing limited interdependence of the two controlling keys.*— Under certain conditions of use, as for instance when there is no necessity for addition, and the keys are disconnected from the adding mechanism, it is desirable to eliminate decimal spacing during the writing of ordinary matter across the sheet, or to set said mechanism for automatic decimal spacing, to facilitate the printing of money values in tabulated form. Obviously, either of these conditions may be established by the manipulation of the key 53 independently of the key 44. It is also desirable to utilize the decimal spacing mechanism with the keys connected with the add-

ing mechanism, and also with the keys disconnected therefrom. Assuming the decimal spacing mechanism to be in operative condition, therefore, the controlling key 44 of the key connecting mechanism may be manipulated independently of the key 53 to connect the keys and adding mechanism for addition or to allow the keys to remain disconnected as for instance for the printing of the total at the foot of the column with the adding mechanism out of action and with the decimal spacing mechanism in action.

We now come to the proposition which makes it desirable to have limited interdependence of the two controlling keys 44 and 53, which, as we have seen, are independently operative to effect the independent control of the key connecting and decimal spacing mechanism. It will be obvious that whenever the keys are connected with the adding mechanism for addition, it is desirable that the decimal spacing mechanism shall be operative. If the two controlling keys were entirely independent, it would be necessary for the operator to manipulate both keys to properly set the machine for addition, assuming both the key connecting and decimal spacing mechanisms to be in ineffective position. In any event, it would tax the attention of the operator to see that the key 53 was in its set or operative position whenever the key 44 was manipulated for addition. In order to make this unnecessary and to insure the setting of the decimal spacing mechanism automatically, whenever the key connecting mechanism is set, provided, the decimal spacing mechanism happens at such time to be unset, I extend the forward end of the key 53 to form a cam or tail-piece 63 and extend the rear end of the slide 43 to form an upturned end or cam 64 which coöperates with the cam 63. In the unset or total position of the controlling key 44 the cam 64 occupies a position sufficiently in rear of the cam 63 to permit the independent manipulation of the key 53, that is to say, assuming the key connecting mechanism to be unset, the decimal space key 53 may be independently manipulated to set or unset the decimal spacing mechanism. When, however, the key 53 is in the unset position shown in full lines in Fig. 5, the cam or tail-piece 63 will occupy a position below and in advance of the upper end of the cam 64. Therefore, if the key 44 which controls the key connecting mechanism is moved to its set position to set the key connecting mechanism, the cam 64 will engage and elevate the cam 63 and thus shift the key 53 to its set position. By this arrangement the manipulation of the key 44 alone will effect the setting of both the key connecting mechanism and the decimal spacing mechanism in case

both of said mechanisms happen to be unset. As long as the key 44 remains in its set position, the cam 64 will remain in engagement with the cam 63 and will thus lock the key 53 and the decimal spacing mechanism in set position, see dotted line position in Fig. 5. The key 44, however, may be moved back to unset or render ineffective the key connecting mechanism without disturbing the key 53, which may therefore remain set so that the decimal spacing mechanism will still operate, notwithstanding the disconnection of the keys; as for instance in printing the total at the foot of a column.

Before concluding, attention may be directed to the fact that the Elliott-Fisher billing machine sometimes includes totalizers or registers which not only have a decimal spacing trip 46, but also one or more additional trips, operating in precisely the manner of the decimal spacing trip, but so located that the automatic spacing of the carriage will occur at the comma spaces, for instance between hundreds and thousands, hundred-thousands and millions, etc. When such a register is utilized in lieu of the register herein shown, the operation of the mechanism will be precisely that which has been herein described, except that when the decimal spacing mechanism is set for subsequent automatic operation, it will operate to automatically space over the comma spaces as well as the decimal space.

It is thought that from the foregoing, the construction and operation of the described mechanism will be fully comprehended, but I wish to reserve the right to effect such changes, modifications and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, and printing mechanism, of adding mechanism adapted to be operated from the typewriter keys but normally disconnected therefrom, automatic key connecting mechanism, automatic decimal spacing mechanism operative to cause skipping over the decimal point or space, and separate controlling devices for said last named mechanisms.

2. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, and printing mechanism, of adding mechanism adapted to be operated from the typewriter keys but normally disconnected therefrom, automatic key connecting mechanism, automatic decimal spacing mechanism, and a separate controlling key for each of said last named mechanisms.



erative position or unset to prevent its operation, and separate controlling or setting keys for the key connecting and decimal spacing mechanisms, one of said keys being tiltable, and arranged to be tilted in one direction only by the other key.

13. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, and printing mechanism, of adding mechanism adapted to be operated from the typewriter keys but normally disconnected therefrom, automatic key connecting mechanism, automatic decimal spacing mechanism, both of said mechanisms being operated by the movement of the typewriter carriage, and means for controlling the operation of said mechanisms, said controlling means including a separate controlling key for each mechanism.

14. In a combined typewriting and adding machine, the combination with a typewriter including a carriage, keys, and printing mechanism, of adding mechanism adapted to be operated from the typewriter keys but normally disconnected therefrom, automatic key connecting mechanism, automatic decimal spacing mechanism, both of said mechanisms being operated by the movement of the typewriter carriage, and means for controlling the operation of said mechanisms, said controlling means including a separate controlling key for each mechanism, one of the controlling keys being operative in either position of the other and said other controlling key being independently operative in one position only of the first named key.

15. In a writing-adding machine, the combination with a register and actuating mechanism

therefor including keys normally disconnected from the actuating mechanism, a traveling carriage, movable to determine the denominational relation of the register and its actuating mechanism, key connecting mechanism capable of being set to cause the movement of the carriage to effect a cooperative relation between the keys and register, carriage feeding mechanism operative to effect normal spacing movement of the carriage, spacing mechanism capable of being set to cause exaggerated movement of the carriage, and separate controlling keys for the key connecting and exaggerated spacing mechanisms.

16. In a writing-adding machine, the combination with a register and actuating mechanism therefor including keys normally disconnected from the actuating mechanism, a traveling carriage, movable to determine the denominational relation of the register and its actuating mechanism, key connecting mechanism capable of being set to cause the movement of the carriage to effect a cooperative relation between the keys and register, carriage feeding mechanism operative to effect normal spacing movement of the carriage, spacing mechanism capable of being set to cause exaggerated movement of the carriage, and separate controlling keys for the key connecting and exaggerated spacing mechanisms, said keys being operative either independently or one by another.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN A. SMITH.

Witnesses:

EDWARD EGERT,

EDWARD M. WINTERS.