No. 698,614. Patented Apr. 29, 1902.

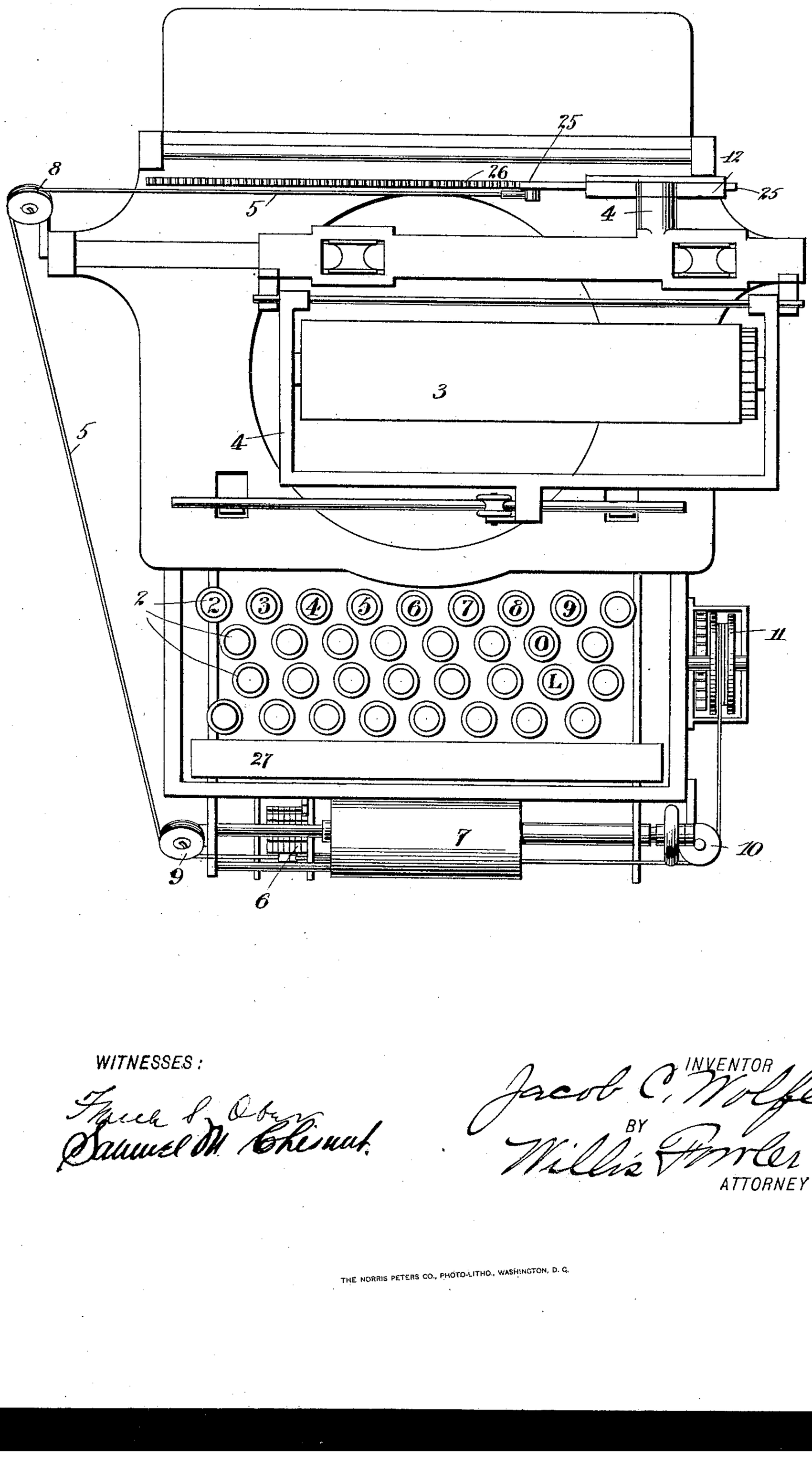
J. C. WOLFE.

TYPE WRITING AND ADDING MACHINE.

(Application filed Aug. 16, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

Francis L. Obry
Samuel M. Chenault

INVENTOR
Jacob C. Wolfe.
BY
Willis Fowler.
ATTORNEY

No. 698,614. Patented Apr. 29, 1902.

J. C. WOLFE.

TYPE WRITING AND ADDING MACHINE.

(Application filed Aug. 16, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

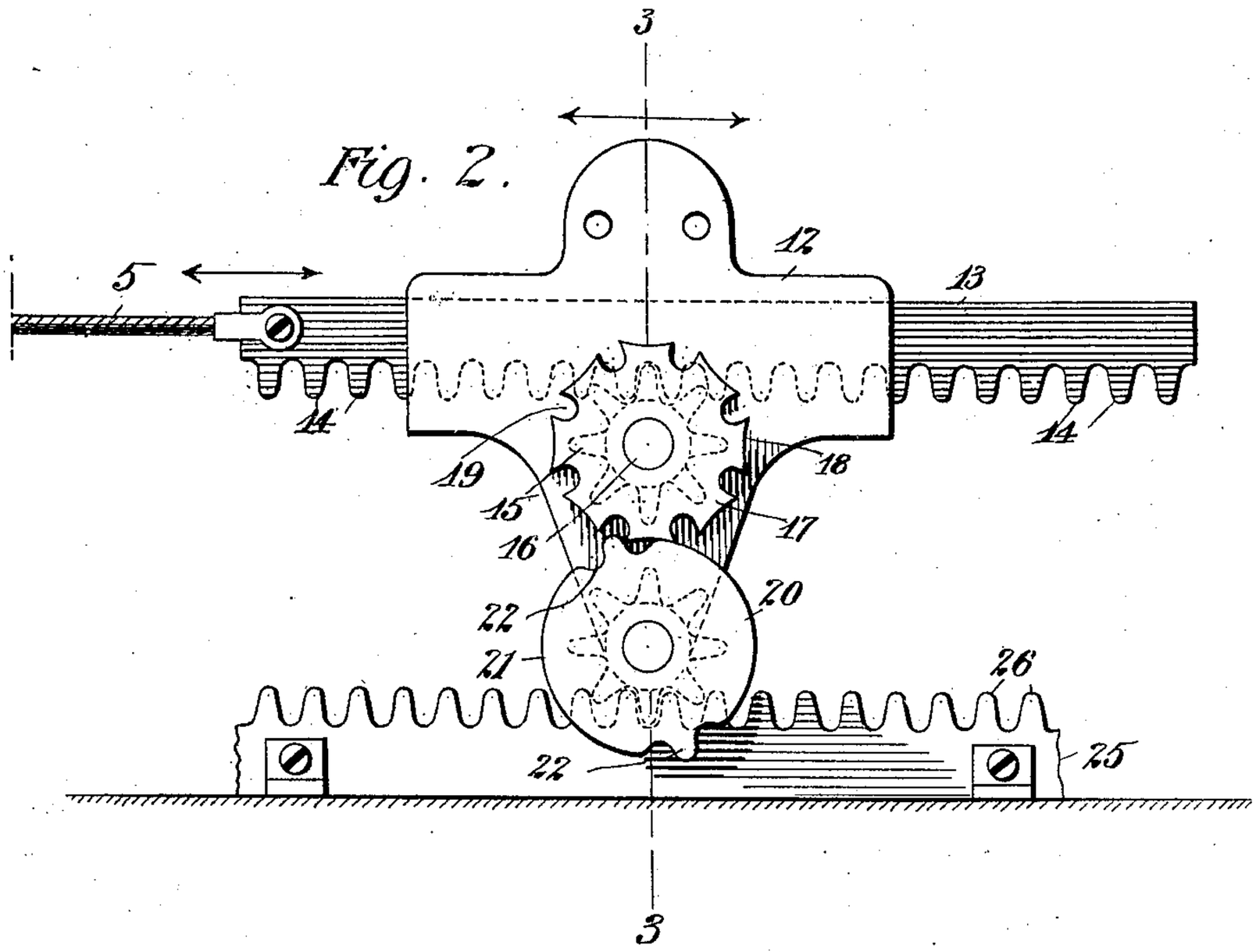
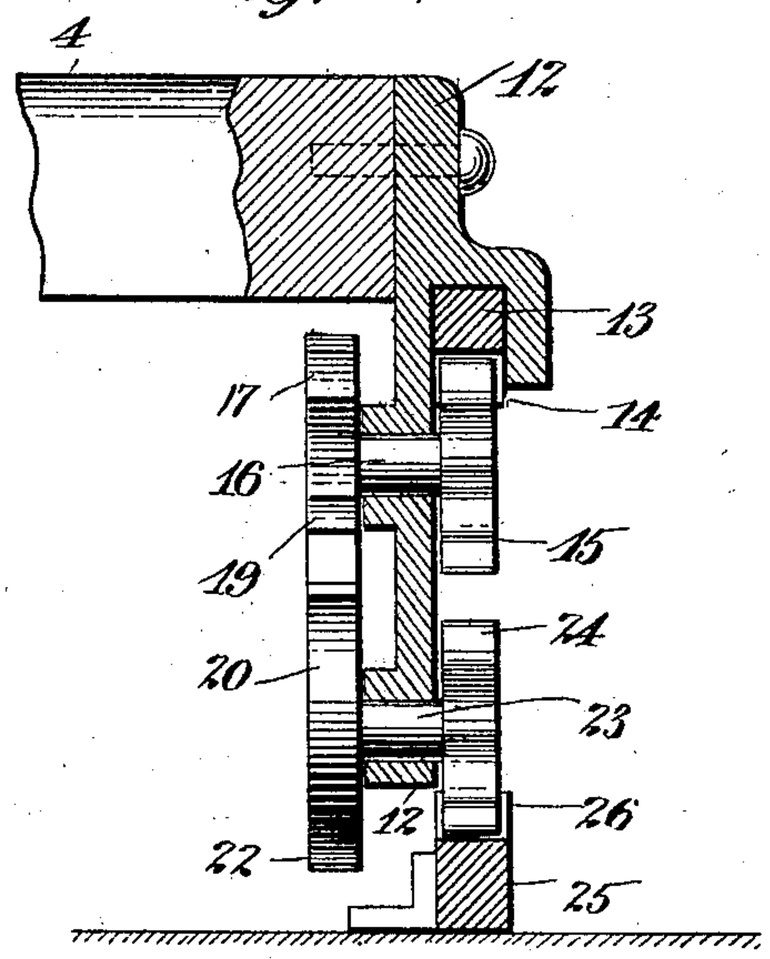


Fig. 3.



WITNESSES:

Frank L. Ober.

Samuel M. Chernak.

INVENTOR

Jacob C. Wolfe,

BY

Willis Fowler.

ATTORNEY

UNITED STATES PATENT OFFICE.

JACOB C. WOLFE, OF NEW YORK, N. Y.

TYPE-WRITING AND ADDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,614, dated April 29, 1902.

Application filed August 16, 1901. Serial No. 72,232. (No model.)

To all whom it may concern:

Be it known that I, JACOB C. WOLFE, a citizen of the United States, residing in the borough of Manhattan, New York city, county and State of New York, have invented certain new and useful Improvements in Type-Writing and Adding Machines, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to adding-machines; and it is especially well adapted for use with an adding-machine attachment for an ordinary type-writing machine. In some forms of adding-machines, in which the numbers to be added are printed on a sheet of paper in a vertical column and the total sum is printed at the foot of the column, no provision is made for spacing the figures which constitute the printed numbers according to their numerical values—that is to say, the space or point of the decimal, thousands, and millions, and so on are not indicated by a suitable space—and in order to make the figures more readily readable it has been the custom to use with such machine a paper ruled with vertical lines, which gives a cramped appearance to tabulated work. Such an adding-machine prints a number thus: "18246987.73"—that is, the number is printed without value-spaces. In a number thus printed the various numerical orders are not spaced or suitably pointed off, except as to the decimal-point, which is crowded in without suitable or extra space for it. I overcome this drawback by providing means by which a number, such as the above number, may be written in this manner: "18 246 987.73," or in the following manner: "18,246,987.73." Where a column of figures are printed with my apparatus, as in tabulated work, the space or punctuating-marks for pointing off the various numerical values fall in vertical columns—that is to say, the decimal space or point of each number in the column falls in the same vertical line, likewise the thousands, millions, and so on. In some of the machines where numeral-keys are operated to print columns of numbers for addition and in which there is a register for automatically adding the numbers as they are printed, so that the total number may be read from the register and then printed by the keys at the foot of the column, the numbers cannot be pointed off in their numerical orders by an extra space, for the reason that the operation of the mechanism to produce the space disarranges the register-operating mechanism, and thereby throws the register out of its proper working. In the specific form of apparatus which I herewith show and in which there is used a shifting platen of the ordinary type-writing-machine form, I prevent the register from being disarranged by compensating for the movement of the platen in making the space or punctuation so as to in no wise affect the operation of the register.

To these ends my invention consists in the various novel and peculiar arrangements and combinations of the several parts of the apparatus, all as hereinafter fully described and then pointed out in the claims.

I have illustrated a type of my invention in the accompanying drawings, wherein—

Figure 1 is a plan view of a well-known form of type-writing machine with my improved adding mechanism attached thereto. Fig. 2 is an enlarged view in elevation of the mechanism for preventing the operation of the register-operating means each time the platen is shifted forward to effect the spacing of the figures to indicate the numerical order. Fig. 3 is a vertical sectional view of the parts indicated in Fig. 2, the plane of the section being indicated on line 3 3, Fig. 2.

Referring to the drawings, in which like numbers of reference indicate like parts throughout, 2 designates the keys of an ordinary type-writing machine, the upper line of which keys bearing the figures from "2" to "9," inclusive, being the numeral-keys, while the key bearing the character "O" and that bearing the character "L" are also used as the numeral-keys for the "0" and for the figure "1," respectively. Various type controlled by these keys act against the platen or printing roller 3, which is mounted in the laterally-moving paper-carriage 4, which, upon the operation of each character-key, as well as the spacing-key, is shifted by means of a suitable spring one step toward the left-hand side and which is returned to

the right hand against the action of the spring to the starting-point to print a new line or to any point along the line in a manner well known. This shifting platen, or, rather, the carriage, is connected by means of a suitable cord 5 with driving mechanism 6 for actuating a register or adding device 7, which may contain as many separate adding-heads as desired in order to print several columns of numbers in tabulated work. This register 7 is not shown in detail herein, and for further description and illustration of such mechanism, as well as the mechanism for operating the number-wheels of each adding-head by the numeral-keys, I refer to my United States Letters Patent No. 578,303, granted March 2, 1897, for type-writing and adding machines. In the said Letters Patent the carriage may be adjusted in such position as to permit of any one of the numeral-keys acting upon any certain number-wheel of any one of the several adding-heads of the register, and there are shown six different adding-heads, so that six separate vertical columns of numbers may be printed. In the said patent, however, no provision is made for preventing the operation of the register-driving mechanism when the carriage is shifted to space or punctuate the figures or the numbers in accordance with their numerical values, so that the numbers are printed with uniform spaces between them.

In my present invention I overcome the above-noted drawback by providing means whereby when the spacing-key or a punctuating-key is operated at a certain time to point off numerically the order of the printed number the register is not actuated, so that such spacing or punctuating of the number is effected independently of the action of the register.

The cable or cord 5, which is attached by its upper end to the paper-carriage and passes thence around the frame of the machine over a set of guide-pulleys 8, 9, and 10 to a spring-actuated drum 11, located at the lower right-hand side of the machine and upon which it is wound up each time the carriage is released a step by one of the keys. This is substantially the same arrangement as is found in my said Patent No. 578,303, and when the carriage is returned to the right to the starting-point the cable 5 is unwound from the spring-drum to permit the carriage to be returned. This cable 5 is attached to and controls the laterally-shifting movement of the driving mechanism 6 of the register, and this register-actuating mechanism may be positioned relatively to any one of the number-wheels of the several adding-heads of the register by means of a suitable scale, as shown in Fig. 13 of my Patent No. 578,303, such positioning being brought about in the usual way by releasing and moving the paper-carriage or by the spacing-key, so that the driving mechanism responds to each movement of the carriage either step by step in the advance movement of the carriage or by a longer movement with the return of the carriage, except at particular times when my present invention is brought into play. Instead of attaching the cable 5 directly to the paper-carriage itself, as in said patent, I attach it indirectly thereto through the intermediary of the following mechanism: Upon the paper-carriage 4 is fixed a depending bracket 12, in which is loosely mounted a horizontally-reciprocating toothed rack 13, having upon its lower edge a set of teeth 14, which, as shown, are twenty-one in number, though of course this number may be varied in accordance with the size of the machine—that is to say, some machines have the capacity of printing a longer line than others, and this rack is varied in its length and number of teeth accordingly.

The teeth of the rack 13 mesh with the teeth of a pinion 15, which are eight in number and which pinion is mounted fast upon an arbor 16, which has a suitable bearing in the bracket 12 and carries a fixed toothed wheel 17, so that the pinion and the toothed wheel move in fixed relation to each other. The toothed wheel 17 is provided with the same number of teeth—eight—as its pinion, and the teeth are of a peculiar formation, in that the periphery of each tooth is formed with a concavity 18 of the same curvature and the spaces 19 between the teeth are rounded. The peripheries 18 of the teeth of this wheel 17 are engaged by the periphery of a disk 20, which at two diametrically opposite points is indented and provided at such indentations 21 with a rounded projection 22. This disk 20 is mounted in such position that its periphery, which has the same curvature as the curvature 18 of the teeth of the wheel 17, engages closely the peripheries of such teeth, and thereby locks the wheel 17 against rotation. At the same time the disk 20 may be rotated in either direction, and its periphery may slide over the teeth until the tripping projection 22 thereof is presented to a space 19 of the wheel 17, whereupon the wheel 17 is turned in an opposite direction the space of one tooth, and this serves to turn the pinion 15 one tooth, so as to advance the rack 13 a distance of one tooth in one direction or the other, depending on the direction of rotation of the disk 20, the rack 13 being locked in fixed position in its bearing in the bracket 12 whenever the disk 20 locks the wheel 17. The disk 20 thus gives a positive movement to the wheel 17 at predetermined intervals, and it is itself actuated by means of an arbor 23, to which it is affixed and which carries a fast pinion 24, having eight teeth of the same size as the pinion 15. This driving-pinion 24 is maintained in mesh with a fixed rack 25, which has as many teeth 26 as the number of characters which the machine has capacity for printing in a line—for example, sixty or seventy-two. This rack is made fast to a suitable part of the machine, and as the carriage is advanced step by step the pinion 24 moves tooth by tooth over the rack, be-

ing thus rotated thereby so as to drive it, and this in turn turns the disk 20. The rack 25 being stationary, the pinion 24 is turned in a direction contrary to that in which the hands of a clock move as the carriage carries the bracket 12 toward the left-hand side of Figs. 1 and 2. The rotation of the pinion 24 turns in the same direction the trip-disk 20, which moves in fixed relation with the pinion. As the disk 20 rotates in the direction specified, the periphery thereof slides in the concavity 18 of the toothed wheel 17 with which it happens to then be in engagement. The sliding of the disk over the tooth of the wheel 17 maintains such wheel in locked position, and this serves to lock the pinion 15, (which moves in fixed relation with the toothed wheel 17,) thereby holding the rack 13 in fixed relation with the bracket 12, and thus the rack 13 responds to the forward movement of the carriage. This operation continues until the trip-piece 22 of the disk 20 engages the back of the tooth over which the periphery of the disk has been sliding and pushes it forward, thereby rotating the toothed wheel 17 one step in the direction in which the hands of a clock move. After this movement of the toothed wheel 17 the periphery of the disk 20 is brought into engagement with the concavity 18 of the next succeeding tooth of the wheel 17, and the periphery of the disk continues to slide over the tooth until the other trip-piece 22 of the disk is brought into engagement with the back of the tooth thus engaged, and the operation thus described is repeated. The teeth of the pinions and the toothed wheel 17, likewise the trip projections 22 of the disk 20, are of such number and so positioned that when the driving-pinion 24 has moved over three teeth to the right, so that it has been turned three teeth on its axis, one of the trip devices 22 comes into play and upon the operation of the spacing-key 27 or a punctuating-key turns the toothed wheel 17 one tooth in the opposite direction and through means of the pinion 15 shifts the rack 13 either to the right or the left, as the case may be, a distance of one tooth, thereby shortening or lengthening the cable 5 a distance of one tooth, depending upon the direction in which the rack is shifted. Considering the relative positions of the parts shown in Fig. 2 and in which the carriage may be supposed to be traveling step by step toward the left-hand side, the trip 22 of the disk 20, which is now moving on its axis in the opposite direction to the hands of a clock, has just tripped the wheel 17 and turned it one tooth in the direction in which the hands of a clock move. The next three step-by-step movements of the carriage to the left serve to carry the rack 13 in fixed relation therewith toward the left for a corresponding distance, and thereby allows the cable 5 to be wound up on the drum 11 a corresponding distance, and this acts to shift the register-driving mechanism 6 three steps in its lateral movement for operating three different wheels of the register. During this movement of the carriage and the turning of the disk 20 the periphery of the latter slides over the periphery 18 of the tooth which it then lies against, and thereby holds the wheel 17 locked to prevent the rack 13 from moving on its support on the carriage. Upon the next and fourth step-by-step movement of the carriage to the left by the action of the spacing or punctuating key the pinion 24 is turned by the rack 25 another tooth, and this brings into play the trip 22 upon the wheel 17, so as to turn it in the direction in which the hands of a clock move, and the rack 13 is thereby drawn to the right a distance of one tooth, and the disk 20 is thus locked against the periphery of the next tooth of the wheel 17. Thus while the carriage 4 has advanced four steps to the left during the printing of three figures side by side the rack 13 has shifted only three steps to the left, so that the register-driving mechanism 6 has moved up three steps to the right, thus causing a space to be produced in the printing between the third and fourth figure when the spacing-key is actuated or a punctuating-key, such as the comma or period. For example, in printing the number eighteen million two hundred and forty-six thousand nine hundred and eighty-seven, decimal seventy-three, the carriage is adjusted in reference to the register so that the first figure one falls in the tens of millions place, and when the one and the eight are printed the trip 22 of the disk 20 is brought into position to actuate the toothed wheel 17 upon the next movement of the carriage to the left, which movement may be effected by the spacing-key or the comma-key, and this turning of the toothed wheel one tooth by the trip-disk holds back the register-driving mechanism 6, so that it will be in position to operate the next adjacent number-wheel of the register so that the two, four, and six of the hundreds of thousands may be properly registered, after which the spacing or punctuating key may be operated without any effect upon the register, and then the nine, eight, and seven of the hundreds may be registered, and finally the decimal may be printed likewise without affecting the operation of the register, and the seven and three of the tenths and hundredths may be registered. When the carriage is returned to start another line or to run it back to any particular point toward the right, the pinion 24 travels backwardly over the fixed rack 25, and thus carries the tripping-disk 20 around in the reverse direction, so as to turn the wheel 17 one tooth at each half-revolution of said disk, and thereby turn the pinion 15 in the reverse direction from its normal movement and shift the rack 13 one tooth to the left in order to compensate for its having been shifted one tooth to the right in the forward movement of the carriage.

I wish to be understood as not limiting my invention to the specific construction herewith shown, as it is obvious that modifications

may be made in various parts of the apparatus, without, however, departing from the spirit of the invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a type-writing machine provided with a set of keys and type bearing the usual characters and a spacing-key, a traveling platen adapted to be moved step by step in its forward movement by the operation of each of said keys, a register or adding device adapted to be actuated by the numeral-keys of said set, traveling driving mechanism for said register connected with and operated by the mechanism for shifting the said platen and moving in response therewith, and means for preventing the shifting of the register-driving mechanism in response to the shifting platen when the punctuating or spacing key is operated to punctuate or space a printed number in its numerical order, substantially as and for the purpose set forth.

2. The combination of a register, driving mechanism for actuating said register and adapted to be shifted from one wheel to the other thereof, a series of numeral-keys for positioning and actuating said register-driving mechanism, means for printing the numerical character of each of the said keys as it is operated, spacing or punctuating mechanism for spacing or punctuating a line of printed figures in certain numerical order, and mechanism for holding at rest the register-driving mechanism when the said spacing or punctuating mechanism is actuated, substantially as and for the purpose set forth.

3. The combination of a register, driving mechanism for actuating any one of the register-number wheels and adapted to be shifted from one of said wheels to the other to actuate it, a series of numeral-keys for actuating said register and each connected with and controlling a type bearing its corresponding numeral character, a traveling platen against which said type print, connections between said numeral-keys and said platen for shifting the latter as each character is printed, connections between said shifting platen and said register-driving mechanism so that they are shifted together upon the operation of each key, spacing or punctuating mechanism for spacing or punctuating the line of printed figures in certain numerical order, and means for preventing the register-driving mechanism from shifting with the platen when the spacing or punctuating mechanism is actuated, substantially as and for the purpose set forth.

4. The combination of a register, a suitably-mounted shifting drive-wheel for actuating each of the register-number wheels and adapted to be shifted from one to the other of said wheels, a carriage for said drive-wheel, a series of numeral-keys and a series of corresponding type operated by said respective keys, a shifting platen against which the type act, connections between said platen and the drive-wheel carriage whereby the two may be shifted together upon the operation of each of said numeral-keys, spacing or punctuating mechanism for spacing or punctuating in certain numerical order the figures constituting a printed number and acting to shift the platen at each operation, and means for preventing the shifting of the said carriage by the movement of the platen when the latter is shifted by the spacing or punctuating mechanism, substantially as and for the purpose set forth.

5. The combination of a number-register, shifting driving mechanism for actuating the different members of said register, a series of numeral-keys for positioning and actuating said register-driving mechanism, a type for each of said numeral-keys bearing the character corresponding thereto and actuated by said key, a shifting platen against which the type act and means for shifting the platen one step upon the operation of each of said numeral-keys, connections between the shifting platen and the shifting register-driving mechanism whereby the latter is advanced a step each time the platen is shifted a step by a numeral-key, spacing or punctuating mechanism for shifting the platen one step at each operation, and means for shortening the connection between said platen and register-driving mechanism a distance equal to one step of advance movement of said platen each time said spacing or punctuating mechanism is actuated, substantially as and for the purpose set forth.

6. The combination of a number-register, shifting driving mechanism for actuating the different members of said register, a series of numeral-keys for positioning and actuating said register-driving mechanism, a type for each of said numeral-keys bearing the character corresponding thereto and actuated by its respective key, a shifting platen against which the type act and means for shifting the platen one step upon the operation of each of said numeral-keys, connections between the shifting platen and the shifting register-driving mechanism whereby the latter is advanced a step each time the platen is shifted a step by the numeral-key, spacing or punctuating mechanism for shifting the platen one step at each operation, and means for shortening the connection between said platen and register-driving mechanism a distance equal to one step of advance movement of said platen each time said spacing or punctuating mechanism is actuated and for lengthening said connection a distance of one step on the return movement of the platen for each step that such connection is shortened in the advance movement of the platen, substantially as and for the purpose set forth.

7. The combination of a number-register, shifting driving mechanism for actuating the different members of said register, a series of

numeral-keys for positioning and actuating said register-driving mechanism, a type for each of said numeral-keys having thereon the character corresponding to the key and actuated by its respective key to print, a shifting platen moved step by step in its advance movement by the operation of each of said keys and against which the type act, spacing or punctuating mechanism for spacing or punctuating in certain numerical order the figures constituting a printed number and acting to shift the platen at each operation, connections between said platen and register-driving mechanism and means for shortening said connection a distance equal to one step of advance movement of the platen each time said spacing or punctuating mechanism is actuated and for lengthening said connection correspondingly upon the return movement of the platen, such means comprising the following parts, namely, a stationary toothed rack having at least the same number of teeth as the number of character-spaces to the line, a support moving in fixed relation with the shifting platen and provided with a movable toothed rack adapted to move in either direction of its length in the direction in which the platen travels, a suitable connection between said movable rack and the said register-driving mechanism, gearing arranged between the teeth of the two said racks in such relation that upon an advance movement of the platen said movable rack may be advanced likewise in fixed relation therewith a predetermined number of teeth, say three teeth, and then upon the operation of said spacing or punctuating mechanism said movable rack may be retracted automatically the distance of one tooth and so on through the advance movement of said platen but said gearing acting upon the return movement of the platen to automatically move the movable rack in the reverse direction one tooth for every tooth which it retracted said rack in the advance movement of the platen, thereby serving to shorten the connection between said platen and driving mechanism in the advance movement and to correspondingly lengthen it in the return movement, substantially as and for the purpose set forth.

8. The combination of a number-register, shifting driving mechanism for actuating the different members of said register, a series of numeral-keys for positioning and actuating said register-driving mechanism, a type for each of said numeral-keys having thereon the character corresponding to the key and actuated by its respective key to print, a shifting platen moved step by step in its advance movement by the operation of each of said keys and against which the type act, spacing or punctuating mechanism for spacing or punctuating in certain numerical order the figures constituting a printed number and acting to shift the platen at each operation, connections between said platen and register-driving mechanism and means for shortening said connection a distance equal to one step of advance movement of the platen each time said spacing or punctuating mechanism is actuated and for lengthening said connection correspondingly upon the return movement of the platen, such means comprising the following parts, namely, a stationary toothed rack having at least the same number of teeth as the number of character-spaces to the line, a support moving in fixed relation with the shifting platen and provided with a movable toothed rack adapted to move in either direction of its length in the direction in which the platen travels, a gear-wheel mounted upon said support and in mesh with the teeth of said movable rack and a toothed wheel turning in fixed relation with the said gear, a gear-wheel mounted upon said support and in mesh with the teeth of said stationary rack and trip-disk moving in fixed relation to the said latter gear-wheel and adapted to lock with the toothed wheel and thereby hold the movable rack fixed while the gear of the stationary rack moves over a predetermined number of teeth thereof, say three teeth, and then to trip and actuate said toothed wheel and thereby move said movable rack in the reverse direction in which its support moves, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

JACOB C. WOLFE.

Witnesses:

WILLIS FOWLER,

A. R. COONS.