

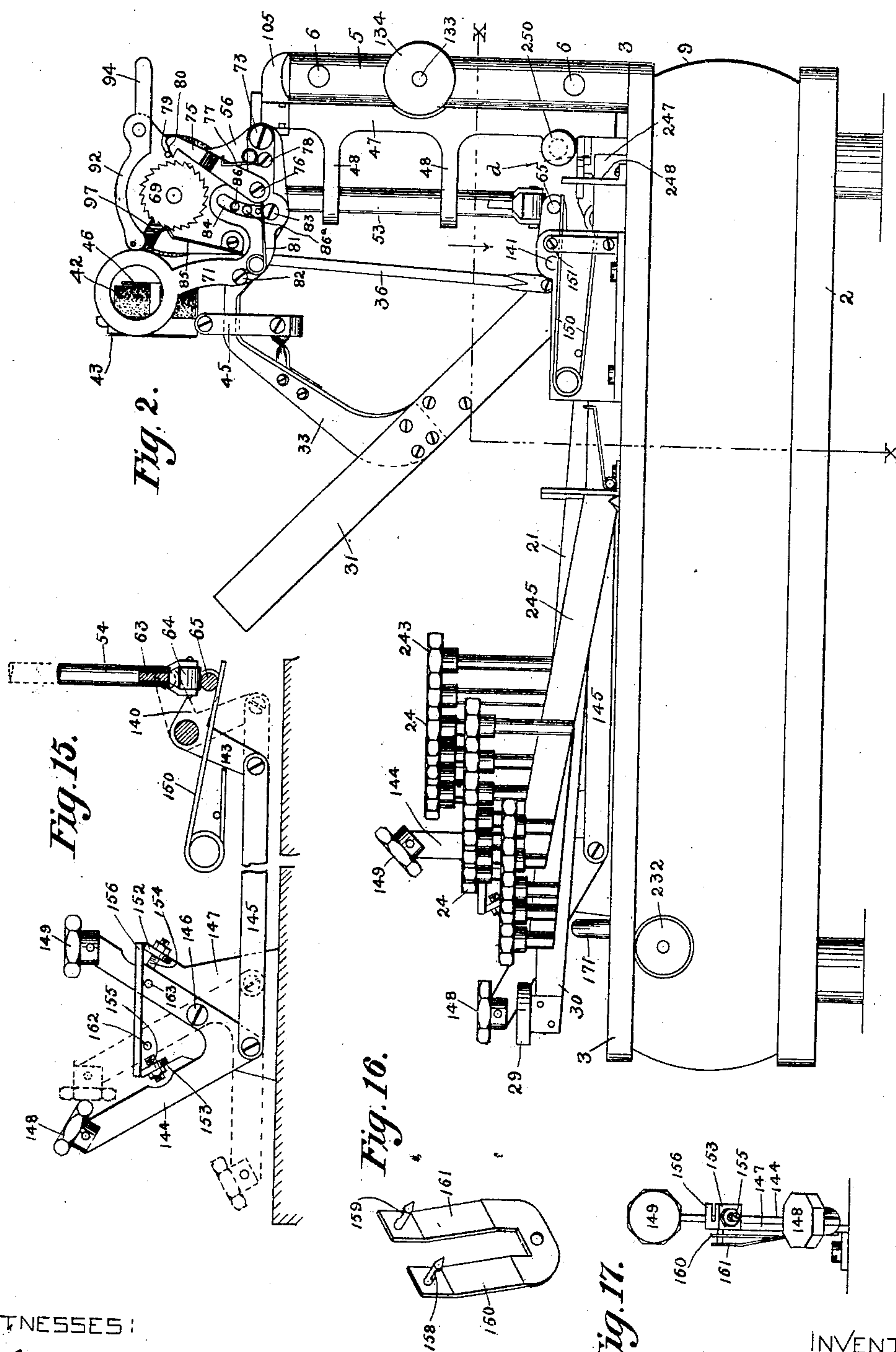
E. FITCH.

ADDING MACHINE.

(Application filed Nov. 26, 1898.)

(No Model.)

6 Sheets—Sheet 2.



WITNESSES:

H. H. Steele.

K. V. Donovan.

INVENTOR

Eugene Fitch

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No. 709,477.

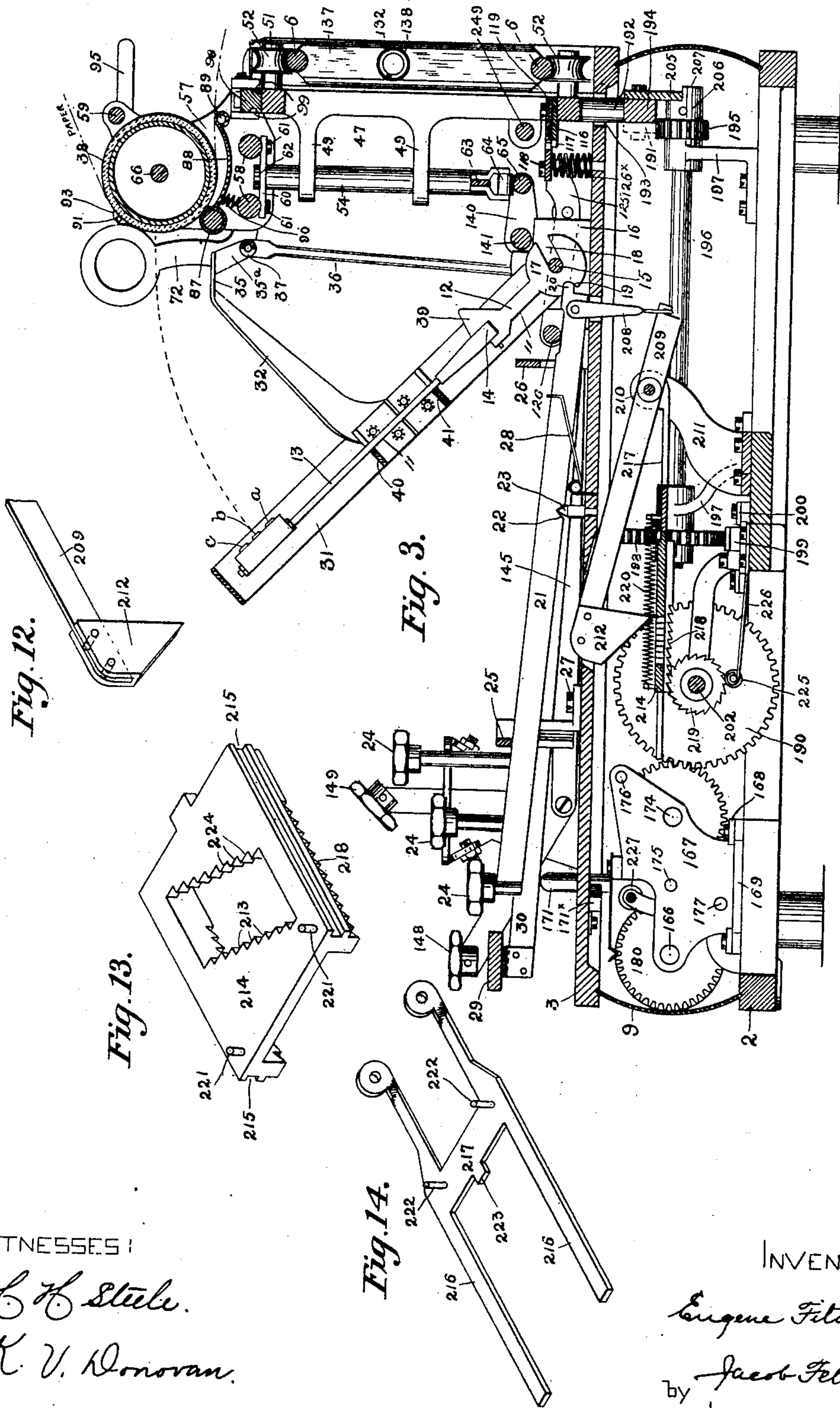
Patented Sept. 23, 1902.

E. FITCH.
ADDING MACHINE.

(Application filed Nov. 26, 1898.)

(No Model.)

6 Sheets—Sheet 3.



WITNESSES:

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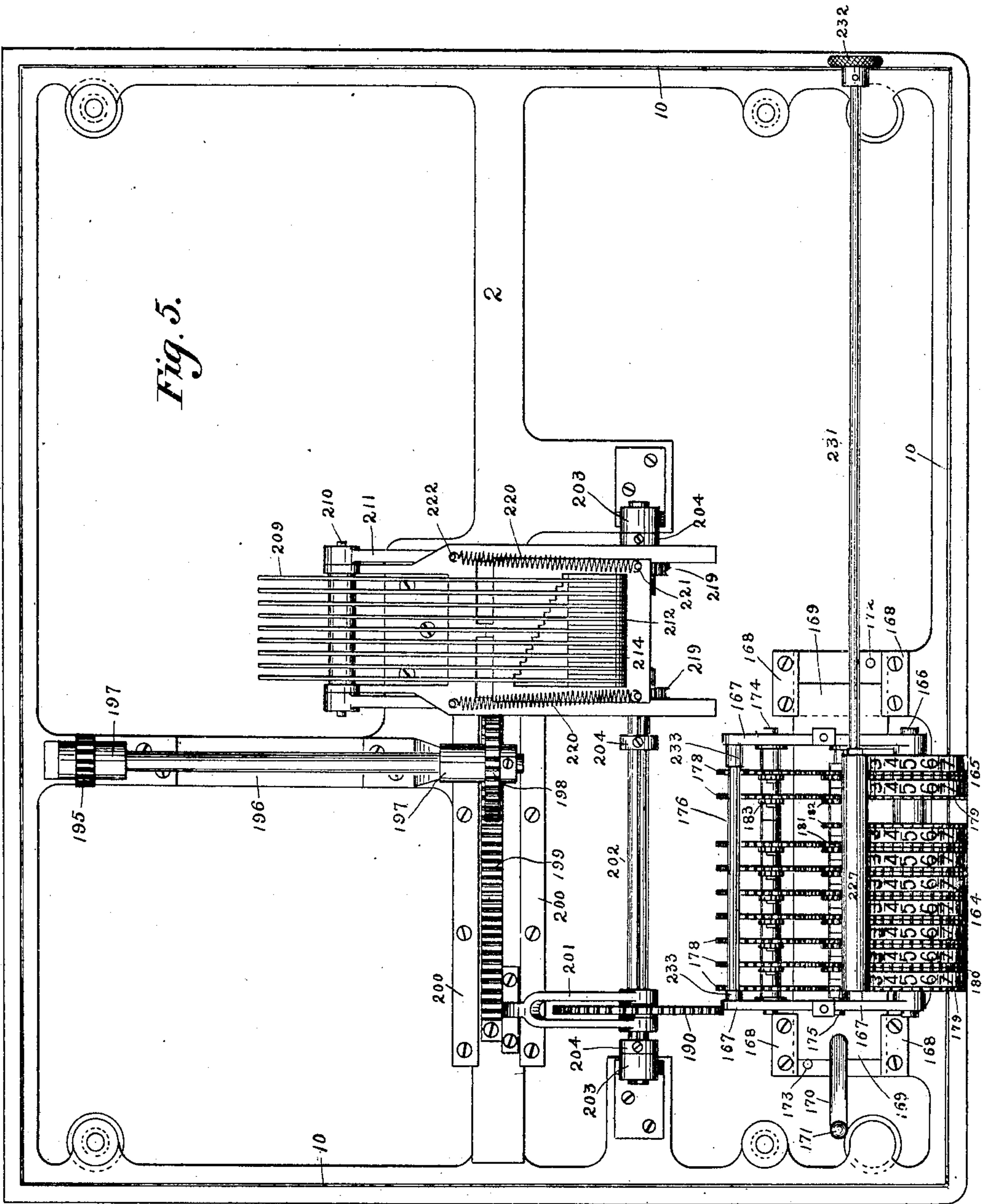
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E. FITCH.
ADDING MACHINE.

(Application filed Nov. 26, 1898.)

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6 Sheets—Sheet 5.

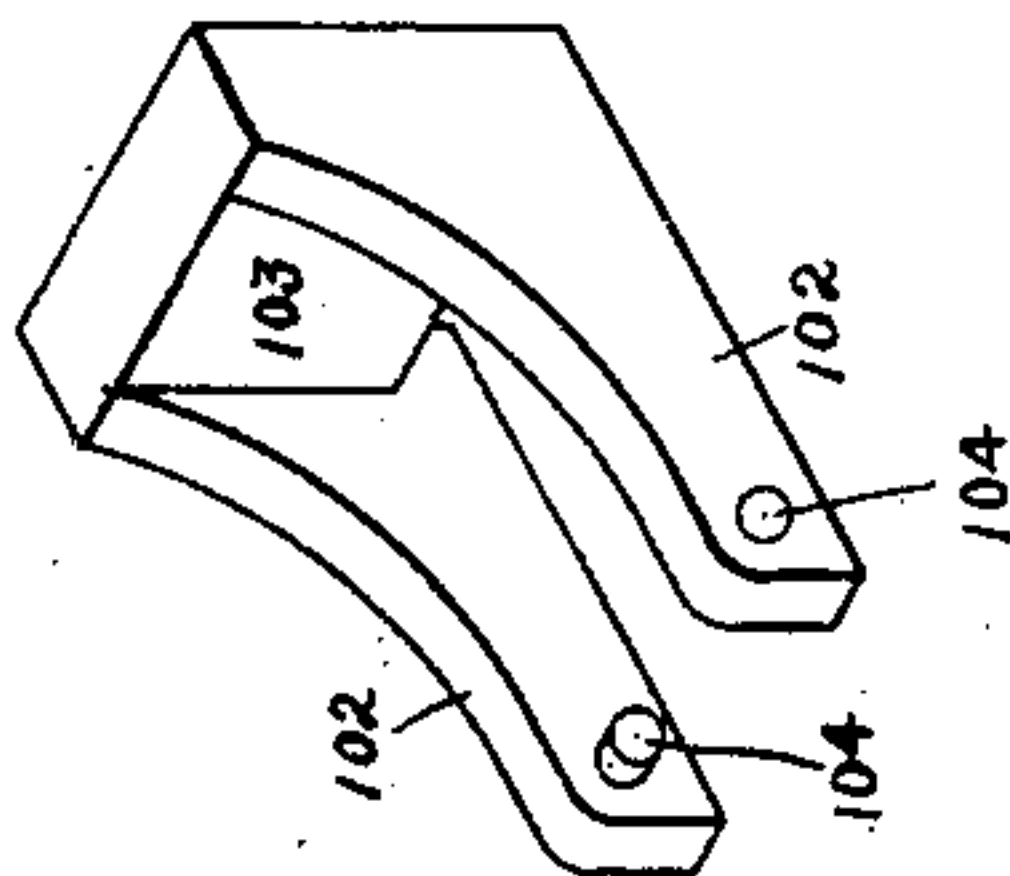


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Fig. 18.



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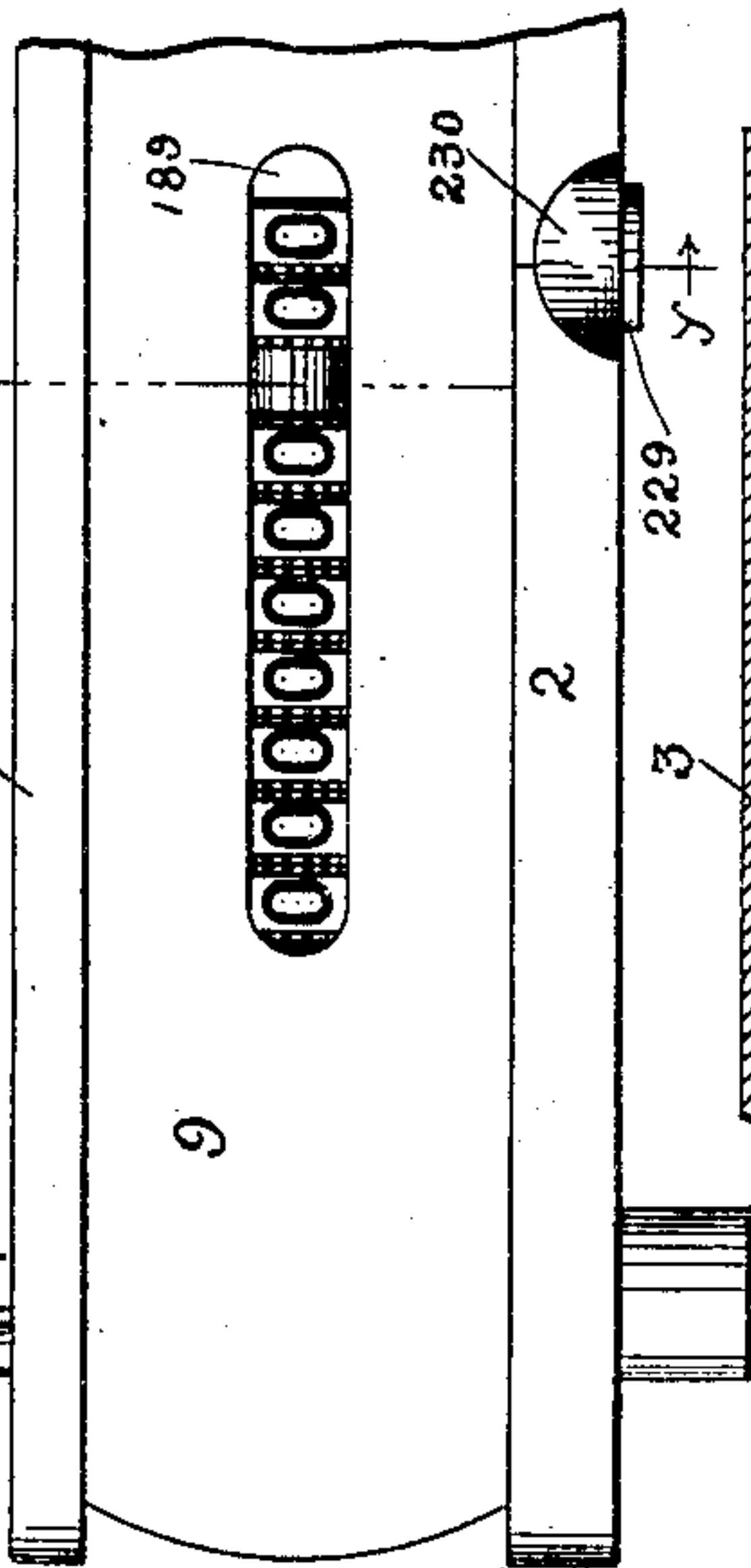
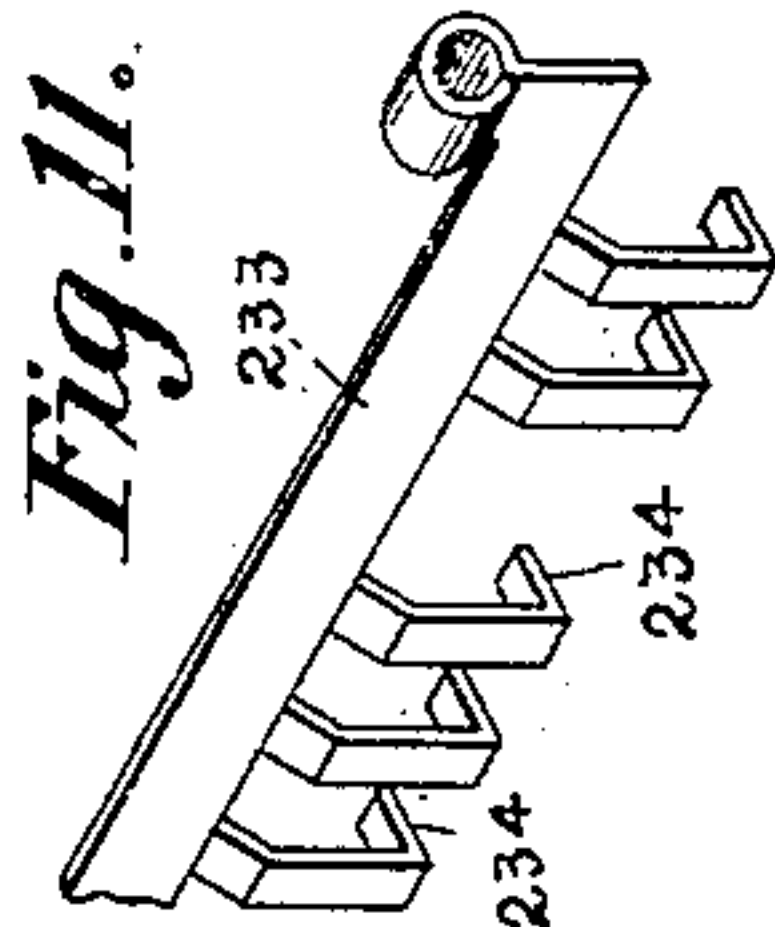
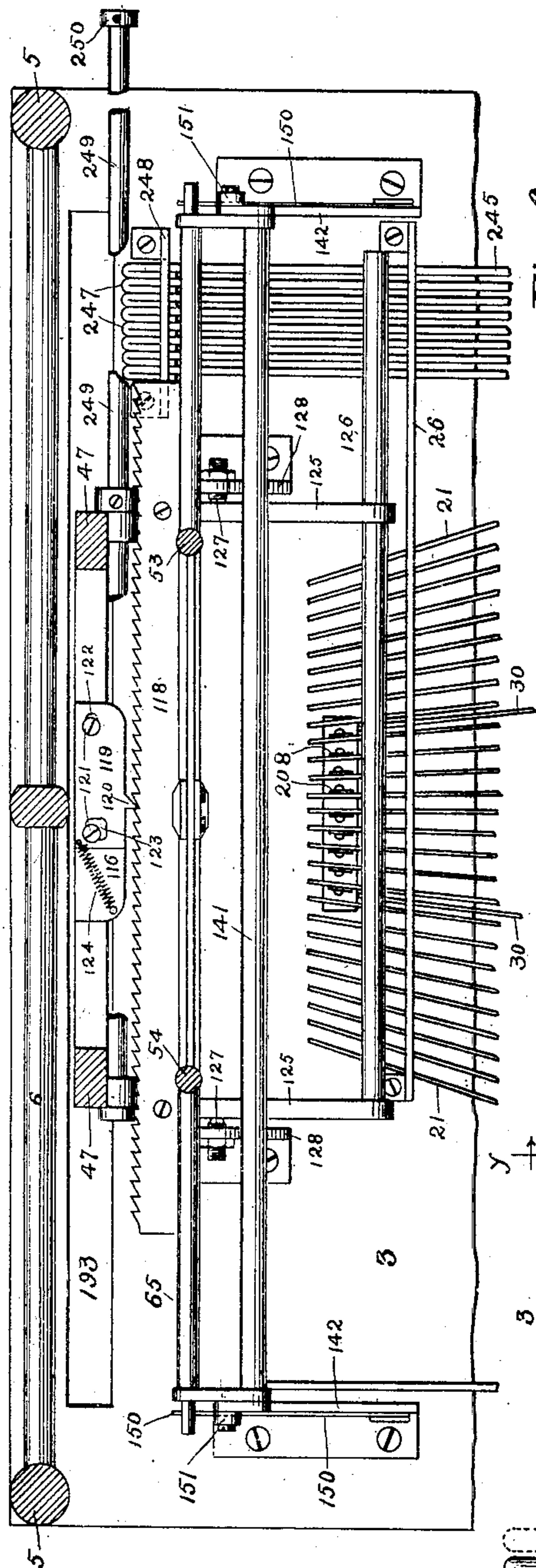
E. FITCH.

ADDING MACHINE.

(Application filed Nov. 26, 1898.)

(No Model.)

6 Sheets—Sheet 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EUGENE FITCH, OF ASTORIA, NEW YORK, ASSIGNOR TO THE UNION TYPE-WRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,477, dated September 23, 1902.

Application filed November 26, 1898. Serial No. 697,505. (No model)

To all whom it may concern:

Be it known that I, EUGENE FITCH, a citizen of the United States; and a resident of Astoria, in the borough of Queens, city of New York, county of Queens, and State of New York, have invented certain new and useful Improvements in Type-Writing and Adding Machines, of which the following is a specification.

10 The present invention relates primarily to combined type-writing and adding machines, and has for one object the provision of a comparatively simple, practical, and effective combined type-writing and adding machine
15 capable of writing words and sentences as well as columns of figures and of automatically adding the same.

Another object is to record the sum of the column without disturbing or actuating the
20 adding mechanism.

Another object is to correct an error in the record or to repeat a number or digit to print it more legibly without operating or actuating the adding mechanism.

25 Another object is to return the number-carriers of the adding mechanism to an initial position, as that in which the naughts are in line, and so to have the mechanism in readiness for reuse.

30 Another object is to provide a combined type-writing, tabulating, and adding machine (having a power-driven escapement-controlled carriage) in which the adding mechanism is inactive until the carriage has
35 reached a given point in its forward traverse, at which point the adding mechanism is brought into operative relation with the carriage and with type-operating mechanism to release the carriage from its controlling mechanism in its forward traverse and to arrest or
40 stop the carriage at any one of a number of different points uniformly spaced apart and to reengage the same with its controlling mechanism at or after the time the adding
45 mechanism is brought into operative relation with the type mechanism and the carriage.

Another object is to operate a series of number-wheels or other forms of number-carriers one at a time or in succession from a

single set of finger-keys which preferably 50 control a set of type for recording the numbers selected.

Another object is to disconnect the adding mechanism from the type-writing mechanism to allow of the use of the type-writer part of 55 the machine as an independent mechanism, and other objects, as will hereinafter more fully appear.

To these ends the invention includes features of construction and combinations of 60 devices hereinafter described, and more particularly set forth in the appended claims.

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which— 65

Figure 1 is a plan view showing a carriage, a platen, a series of character-keys, a series of type-bars, carriage-release and column-stop keys, shift-keys, &c. Fig. 2 is a right hand side elevation of the machine. Fig. 3 70 is a central vertical sectional view from front to back, showing the type-writing and adding mechanisms. Fig. 4 is a rear elevation of the machine, some parts being omitted and others broken away for the sake of clearness. 75 Fig. 5 is a plan view of the adding mechanism and connections to the key-levers and the carriage. Fig. 6 is a plan view, some parts omitted, of that part of the machine below and to the rear of the planes indicated by the 80 line X X in Fig. 2. Fig. 7 is a front view of part of the casing or frame, showing the number-wheels of the adding mechanism through a slot in the frame. Fig. 8 is a detail plan view of part of the adding mechanism. Fig. 9 is a front-to-rear sectional view of the same on lines Y Y of Fig. 7. Fig. 10 is a view showing the action of the adding and carrying devices as they are being returned to their initial positions. Fig. 11 is a 90 perspective view of the wheel-stops shown in Figs. 9 and 10. Figs. 12, 13, and 14 are detail views in perspective of certain parts of the operating mechanism for the adding-machine. Fig. 15 is a side elevation showing 95 the platen-shift mechanism. Fig. 16 is a perspective view of the spring-catches for locking the platen in its shifted positions. Fig.

17 is a front view of the platen-shift keys and locks, and Fig. 18 is a perspective view of a margin-stop.

In the various views the same part will be referred to by the same reference character.

The framework comprises two parallel horizontal frames or plates 2 3, connected by uprights 4, and two standards 5, rising at the rear of the upper frame 3 and connected by parallel horizontal rods 6. Also the framework includes various brackets or studs, as will appear more fully hereinafter. The lower frame 2 is provided with downwardly-projecting feet 7, over which rubber sleeves are placed, said sleeves projecting below the feet, as shown. The uprights 4 are cast in one with the frame 3 and are connected with the frame 2 by means of screws 8, which pass through the feet 7 and whose threaded ends engage with threaded holes in the uprights 4, as shown in Fig. 4. Sheet-metal or hard-rubber plates 9 are sprung into grooves 10 in the upper side of frame 2 and the under side of frame 3, thus inclosing the space between these two frames.

The type-bars 11 are formed in two parts 12 13, which are hinged together at 14 in a direction at right angles to the axis 15, on which the type-bar is pivoted. The axis 15 is a straight shaft or bar pivoted or otherwise secured in brackets 16, secured to the top of frame or plate 3. Each piece 12 is provided with an enlarged circular end 17, which is formed with an open slot 18, whose bottom is formed to fit the round shaft 15. Each end 17 is also provided with a notch 19, which fits and receives the end 20 of the corresponding key-lever 21. The preferred method of pivoting the type-bars is to fit each end 17 between lugs or brackets 16, forming part of or attached to the plate or frame 3, as shown in Fig. 1. The open slot 18 permits of the removal of any type-bar without disturbing any other type-bar. The key-levers 21 are made of flat metal bars provided with notches 22 in their under edges, which rest on knife-edges 23, secured to and projecting upwardly from the top of plate 3. The keys 21 are provided at their forward ends with suitable finger-pieces 24. The key-levers 21 are guided at each side of their pivots, as by the slotted guide-plates 25 26, secured to the top of plate 3, as by screws 27, and are thus prevented from displacement relatively to their pivot-pins 23. Each key-lever 21 is returned to its down or normal position by a spring 28, one end of each spring being inserted in a hole therefor in the top plate 3 and the other end thereof hooking over its lever 21. The space-key 29 is carried by levers 30, which are or may be pivoted and be held down at their rear ends in the same manner as the key-levers 21.

The type-bars 11 are provided with three several type-faces *a b c*, of which the middle

type *b* constitutes the "lower case" and such other characters as may be provided for. The upper type characters *c* are the "upper-case" letters and other characters as may be provided for. The lower type *a* on the type-blocks are the numerals and the punctuation and other marks. The type are secured to their respective bars in any suitable or known way, and hence this requires no specific description here. A guard or protective bar or frame 31 extends around the ends of the type-bars and also down the sides of the row of type-bars. At a point intermediate the pivots 14 and the type-blocks the type-bar guard 31 is secured to the bars 32 33, which form guides for the type-bars when moving to the printing-point. These guides 32 33 have rearwardly-projecting arms, which are parallel to each other and which form a center guide 35 at the printing-point for the type-bars. Depending from the inner or rear ends of the guide-arms 35 are arms 35^a, which are connected by oblique arms 36 with the frame of the machine, as two outer lugs 16 of the row of lugs at the type-bar pivots. The head of the tie-rods 36 is notched at 37 to form a further guide or centering device for the type-bars. The flat or square bars 12, forming part of the type-bars, are provided with cams or inclines 39 adjacent or opposite the pivots 14. The function of these cams 39 is to guide the adjoining type-bar during its return to normal position, so that it will fall into its proper position within the inclosing guard or bar 31. It will be observed that those cams or wedges 39 to the right in Fig. 1 of the central front-to-back line incline outwardly and downwardly, while those to the left of that line incline outwardly and downwardly or in the opposite direction, (the white or non-shaded triangular spaces in Fig. 1 representing the cam-faces.) Hence each incline 39 to the right of said line acts upon the type-bar to its right to move it outwardly while it is returning to normal position, and each incline to the left of said line acts upon the type-bar to its left to return it to normal position as it swings away from the platen after being operated. A couple of combs 40 41 extend across from guide 32 to guide 33 and provide rests and separators for the parts 13 of the type-bars 11. The type are inked as they move toward the platen by means of a roller 42, journaled on a vertical axis in arms of a holder 43, which is in turn journaled at 44 in arms or brackets 45 from the guide-arm 33. The holder 43 is provided with a shield or guard 46 for preventing contact between the ink-roller and the platen or the substance on the platen. The construction of the inking-roller mechanism may be the same as that shown and described in either of my United States Letters Patent, dated July 20, 1886, No. 345,836, and July 12, 1887, No. 366,577, and is immaterial to my present improve-

ments, which are applicable as well to type-writing machines having ribbons, pads, or other inking devices.

The paper-carriage comprises a rectangular frame 47, which is provided with two pairs of forwardly-projecting arms 48 49 and with one member of the escapement mechanism, as the dogs or pawls. The carriage 47 is also provided with rearwardly-extending studs or shafts 51, on which rollers 52 are journaled, said rollers being shaped to fit the rods 6, shown as round rods in this instance. By reference to Figs. 3 and 4 it will be seen that one pair of rollers 52 rides on the upper rod 6 and that another pair runs underneath the lower rod 6, and thus act as guide-rollers only. The pairs of arms 48 49 are perforated vertically to receive and guide the vertical rods 53 54, forming part of the platen-carrier. The platen-carrier includes end pieces 56 57 and tie-rods 58. The upright rods 53 54 are attached to the rods 58, as by plates 60 and screws 61 62, the screws 61 passing through the plates and engaging with threaded holes in the rods 58 and the screws 62 passing through the plates and engaging threaded holes in the rods 53 54. The rods 53 54 are connected at their lower ends by a tie-bar 63, which is provided with an antifriction-roller 64, running on top of a rod 65 of the platen-shifting mechanism. The platen 38 is fast to a shaft 66, which is journaled in the end pieces 56 57 of the platen-carrier. The ends of the shaft 66 are provided with hand-wheels 67 68, by means of which the platen may be turned in either direction. The shaft 66 is provided just outside the end pieces 56 57 of the platen-carrier with ratchet-wheels 69 70, and the end pieces 56 57 are provided with levers 71 72, pivoted thereto at 73 74. The lever 71 is provided with a pawl 75, pivoted thereto at 76 and adapted to engage with and rotate the ratchet 69 and platen 38. Normally the pawl 75 is pressed toward the ratchet by a spring 77, secured to the end piece 56 by a screw 78 and bearing against the rear side of the pawl, and is normally held out of engagement with the ratchet 69 by means of the pin 79, projecting outwardly from the end piece 56 and engaging with the beveled face 80 of the pawl-piece, since the spring 81, which holds the lever 71 in its upper or normal position, is of a strength sufficient to overcome the resistance offered by the other parts to such action. The spring 81 has one end secured to the lever 71 by a screw 82 and has its other end bearing on the top of a screw 83, which projects from the end piece 56 through a curved slot 84 in the lever 71. The reaction of spring 81 against the screw or stop 83 tends to lift the lever 71. The center of the arc of slot 84 is the pivot 73, as will be understood. A spring-detent 85, secured at one end to the end piece 56, acts to prevent accidental rotation of the ratchet 69 and platen 38, while it permits of

their rotation in either direction at will by means of force applied to either hand-wheel 67 68. A similar detent may be used at the other end of the platen. The end piece 56 is provided with one or more holes 86 opposite the slot 84 for the reception of a pin or stop 86^a for engagement with the upper end of the slot 84 for the purpose of limiting the rotation of the platen to one or more spaces corresponding to the distance between the teeth of ratchet-wheel 69, according to the number of holes 86 and that one of them in which the pin may be placed. The end of lever 71 is formed into a ring for convenience of getting a hold upon it to depress it for line-spacing. The lever 72 is or may be connected with its ratchet 70 in precisely the same way to rotate it and the platen for line-spacing. If the slots 84 be of sufficient length to permit of at least two different widths of line-spacing, the line-space lever at one end may be set to give, say, one width, and the line-space-lever regulator at the other end of the platen may be set to give a different width of line-spacing, whence it results that an operator may write matter of either or both of such widths of spacing without having to set or reset a line-space regulator. This feature is of great convenience in writing briefs and the like where many quotations are made and are put in half-space or solid, while the remainder is put in with wider spacing between the lines. The paper is held against the platen by means of a roller 87. I prefer to journal the roller 87 in lugs or projections on the paper-guide 88, which is pivoted to the ends 56 57 at 89. One or more springs 90 between said guide 88 and one of the rods 58 serve to press the roller yieldingly against the platen. A paper-holder is provided for coaction with the platen above the line of printing or writing, said holder consisting of a small rod 91, borne by pivoted arms 92 93 at the ends of the platen or platen-carrier. The arms 92 93 are provided with extensions or handles 94 95, whereby the frame formed by said arms, journaled shaft 59, and rod 91 may be rocked to move the rod away from the surface of the platen, as in inserting paper. A spring 96, coiled about the rod 59, has one end connected with the rod 59 and the other secured to some fixed part of the platen-carrier, as end 56, and tends to keep the said shaft or rod 59, arms 92 93, and rod 91 in the positions shown in Figs. 1, 2, and 3. The end pieces 56 57 of the platen-carrier may be provided with open-ended oblique slots 97 for the reception of the pivot rod or shaft 66, thus allowing of the ready removal of the platen from the carrier. It will be noted that detent 85 tends to prevent removal of the platen, being between the bearing in slot 97 and the open end of the slot. The carriage is provided with a toothed bar 98, fast to the top of frame 47, which bar is provided with longitudinal grooves 99 at its front and rear

sides. Upon this bar 98 are mounted two margin-regulators or carriage-stops 100 101, the stop 100 being shown in perspective in Fig. 18. These stops are each formed of two
 5 parallel arms 102, united at one end by a cross-tie 103, which is adapted to enter or fit in between the teeth of the bar 98, as indicated in dotted lines in Fig. 4. The arms 102 are provided with inwardly-projecting pins
 10 104 for engagement with the grooves 99, thus providing pivots about which the stops 100 101 are swung to engage and disengage them from the teeth of the bar 98 when adjusting them along the same. The stops 100 101 re-
 15 spectively coact with fixed abutments 105 106, respectively affixed to the tops of the end standards 5. (Shown in Fig. 4.) The stop 101 also carries the bell-trip 107, which is pivoted at 108 to an arm 109, rigidly at-
 20 tached to the stop 101. A pin 110 on the arm 109 acts as a stop to limit the motion of the trip 107 in one direction. The bell 111 is carried by an arm or bracket 112 on one of the uprights 5, and the bell-hammer 113 is piv-
 25 oted at 114 to an arm or branch of bracket 112 and is provided with an arm 115 for co-action with the trip 107, as will be understood.

The letter-feed mechanism will now be de-
 scribed.

30 The carriage has fixed thereto a plate 116, which is provided with a tooth 117, adapted to engage with the teeth of a rack 118. Lying on top of plate 116 is a second plate 119, which is provided with a tooth 120, also adapt-
 35 ed to engage with the teeth of the rack 118. The plate 119 has a limited movement relatively to the plate 116, as by means of the screws 121 and slots 122 123. The screws 121 pass loosely through the slots 122 123 and en-
 40 gage with threaded holes in plate 116, (and lower bar of the carriage 47.) Preferably the slot 123 is larger in every direction than the body of the screw which passes through it, thus permitting of the retraction of the car-
 45 riage toward the right without having to disengage the rack from the escapement-pawls, or vice versa. A spring 124, fast at one end to the plate 116 and at the other end to a pin on the plate 119, acts to draw the tooth 120
 50 toward the rack 118 and also to slide the plate 119 toward the left-hand side of the machine whenever the tooth 120 is released from en-
 55 gagement with the rack 118. The rack-bar 118 is borne by arms 125, which also carry the universal bar 126, and is normally lifted by a spring 126^x. The levers or arms 125 are
 60 pivoted at 127 in brackets 128, fast to the top of plate 3. The carriage is drawn to the left by means of the cord or strap 129, which is
 65 secured thereto at one end, as 130, and to the grooved periphery of a wheel 131, which is journaled to the bracket 112, and by means of the coiled or spiral spring 132, which has one end connected to the fixed framework, as
 a standard 5, and the other end connected to a lever or cam on the wheel 131. By prefer-
 ence the spring 132 is adjustably connected

to the standard 5, as by the threaded rod 133, passing loosely through the standard, and the adjusting-nuts 134 on said rod 133 at each
 70 side of the standard 5. Also the other end of spring 132 is preferably connected with the lever or cam 135 on wheel 131 by means of a cord or strap 136. A strut or brace 137 is
 75 shown between the rods 6, the function of which is to prevent bending or distortion of the same. This strut is perforated at 138 to allow the spring 132 to pass freely through it.

The platen-shifting mechanism will next be described.

80 The platen-carrier is supported independently of the carriage by means of the rods 53 54 and bar 63 and roller 64, as above described, and the rod 65, on which the roller 64 trav-
 85 erses during the operation of the machine. The rod 65 is borne by arms 139 140, fast on a shaft 141, which is journaled in brackets 142, rising from the top of frame 3. An extension
 90 143 of the arm 140 is connected with the V-shaped lever 144 by a pitman or link 145, Fig. 15, which is pivoted to the end of the arm 143 and at or near the point of the V of lever 144.
 95 The lever 144 is pivoted at 146 to a bracket 147, rising from the top frame or plate 3. One branch of the lever 144 is provided with the "Cap." key 148, and the other branch is pro-
 100 vided with the "Fig." key 149. The arms 139 140 are normally held in a central position by the weight of the platen-carrier, platen, and appurtenances and the springs 150 and
 105 stops 151 for the springs. The strength of the springs 150 is such that they lift the platen-carrier and the parts supported thereby until the springs 150 are stopped by the stops
 110 151. This brings the platen in such relation to the type on the type-bars that the middle types *b* thereof coact with the platen. When the key 149 is depressed, the rod 65 is moved
 115 downward and carries with it the springs 150, as in Fig. 15. This allows the platen-carrier and parts carried thereby to fall or move downward, and thus brings the platen in such
 120 position that the lower types *a* on the type-bars coact with the platen to print the figures and other characters shown at the front of the keys 24. When the key 148 is depressed, the
 125 parts take the positions shown in Fig. 15 in dotted lines (except that springs 150 rest against stops 151) and the platen-carrier and parts supported thereby are raised into posi-
 130 tion to coact with the upper types *c* on the type-bars, thus printing capital letters and such other characters as may be employed in addition thereto on such upper ends of the
 type-blocks. The bracket 147 is provided with two lugs or ears 152 153, and these are provided with adjustable stops 154 155 for the lever 144. These stops may be conveniently
 made by screws which engage threaded perforations in the lugs and lie in the path of the lever, as of that arm thereof which carries the key 149. The upper part of the bracket 147
 may be bent over to form a flange 156, and this flange may be provided with a guide-slot

157 for the lever 144. It is sometimes desirable that the "Cap." or "Fig." key be held down while the writing progresses. For the purpose of automatically holding the lever 144 in either of its extreme limits of motion there are provided two catches 158 159, which are carried, respectively, by spring-arms 160 161. The catches are in the form of notch-pins secured to the spring-arms and adapted to pass through a perforation in that branch of lever 144 carrying the key 149 and to engage with the side of the flat lever. Preferably the arms 160 161 are secured to the bracket 147 on the side thereof opposite that on which the lever 144 is placed, and the tension of the spring-arms 160 161 is such that they stand away from the bracket, with their pins 158 159 opposite or entering perforations 162 in the bracket. The perforations in the bracket 147 are so placed that the perforation 163 in the lever 144 will register or be in line with one or the other of the perforations 162 whenever that lever is in its extreme positions or against the stops 154 155. Whenever it is desired to hold the platen in either of its extreme upper or lower positions, the corresponding one of keys 148 149 is depressed until stopped by one or the other of the stops 154 155, whereupon the corresponding catch 158 or 159 is pushed in until its side notch has passed through the perforation 163 so far that it will catch against the side of the lever 144 when that lever is released, whereupon the lever is let go and is caught. In order to release the lever 144 when it has been locked as above described, it is only necessary to push down the depressed key, 148 or 149, whereupon the spring-arm carrying the corresponding catch will be freed from the lever 144 and will spring out and carry its catch out of the path of the lever 144, which can then be returned when released to normal position through the power of springs 150 or the weight of the platen-carrier and parts supported thereby.

The operation of the foregoing devices has been given in substance during the description of the parts and need not be repeated here.

For the purpose of adapting the type-writer to the use of bookkeepers or others who have to make out statements or bills there is provided adding mechanism, which can be thrown out of and into operation at will.

At the left front of the machine and between the frames 2 3 are a series of adding-wheels in two sets 164 165, there being seven of the former and two of the latter shown, or nine all told; but I do not limit myself to nine, since I may use a greater or lesser number. The adding-wheels are loosely mounted upon a shaft 166, journaled in brackets 167, mounted on the frame 2 to have a motion relatively thereto in the direction of the length of the shaft 166. Such motion is conveniently obtained by means of guides 168, which overhang a plate 169, to which the brackets 167

are fast. The plate 169 is provided with an arm 170, terminating in a handpiece or knob 171, by means of which the plate 169 and parts supported thereby may be shifted back and forth for a purpose presently to appear. The to-and-fro motion of the plate or adding-wheel carriage 169 is limited by the fixed stops 172 173 in the path of the plate. The brackets are also provided with two shafts 174 175, parallel to shaft 166, and are tied together by the tie-rods 176 177. The brackets 167, plate 169, and tie-rods 176 177 form a rigid frame or carriage. The shaft 174 has a series of toothed wheels or gears 178 journaled thereon, there being one such gear 178 for each wheel of the adding-wheels and each gear 178 being independent of all the other gears 178. The adding-wheels 164 165 are each provided with a gear 179 fast thereto, and the gears 178 179 are in the same planes. The adding-wheels, except the right-hand wheel 165, are also provided with gears 180, fast thereto on their other sides, whence it comes that the gear 179 of one adding-wheel is next or adjacent to the gear 180 of the adding-wheel next or adjacent to it. The shaft 175 has a series of pinions 181, independently journaled thereon, said pinions 181 acting to transmit motion from the gears 178 to the gears 179, and so to the number-wheels 164 165. The pinions 181 have alongside them independent pinions 182, likewise journaled on the shaft 175 and meshing with the gears 180 on the number-wheels. Each gear 178, excepting the extreme left-hand one, is provided with two pinions 183, independently pivoted thereto on pins 184 at opposite sides of its center of motion and in the plane of the adjacent pinion 182, the said pinions 183 being adapted to mesh with the said pinion 182 during the rotation of the gears 178. The pinions 183 are adapted to yield or turn freely in one direction only. This is obtained by means of springs 185, secured to the gears 178 at one end and of a length sufficient to act as detents in conjunction with the teeth of the pinions 183. The manner in which said springs act as detents is indicated in Fig. 9 and the manner in which the pinions 183 are permitted to have motion in one direction is indicated in Fig. 10, where the spring 185 bears upon a tooth of a pinion 183, which rotates toward the left hand, thus flexing the spring aside until the tooth passes the end of the spring, when the latter snaps in behind the tooth ready to act as a detent. The relative positions of the number-wheels, the gears fast thereto, the gears 178, pinions 181 182 183, and springs 185 are such that the "carrying" is from the number-wheel of lower denomination to the wheel of higher denomination—that is to say, the rotation of the "units-wheel," for example, to or past the zero is transmitted, by means of the gear 179, pinions 181, gear 178, pinions 183, 182, and 180, to the "tens-wheel;" but the movement of the tens-wheel to or beyond the zero is not transmitted to the units-wheel, since

the pinion 183, which at that time may be in mesh with the corresponding pinion 182, turns idly on its pivot—that is, does not rotate the gear 178—which carries it. I have shown two pinions 183, for the reason that I have provided the number-wheels each with a duplicate set of numbers, each occupying a semicircumference of the wheel. It is obvious that I could place but one set of digits upon each number-wheel, in which case I would dispense with one of the pinions 183 on each gear 178 and also that I might place more than two sets of digits upon the circumference of the number-wheels, in which case I would employ a corresponding number of pinions 183. It is obvious that I may operate number-bearers of other forms in lieu of the number-wheels 164 165 without change in the mechanism shown. For the purpose of preventing accidental displacement of the number-wheels a series of detents 186 187, formed integrally with or attached to a bar 188, which is secured to the top of the brackets 167, is provided. The said detents 186 187 respectively engage the gears 179 and 180, as shown in Fig. 8, or they may engage one or the other of these sets of gears. The plate 9 in front of the number-wheels is provided with an elongated slot 189, through which the numbers giving the summation of the addition are visible.

By preference the adding device is not intended to be used or brought into operation until near the end of a line of writing across a page, and not even then unless it is so desired and a suitable adjustment of parts made. There is therefore provided a mechanism under the control of the carriage which comes into operation at a predetermined point during the traverse of the carriage to the left, which mechanism is adapted to engage the gears 178 in succession or one by one, beginning at the left-hand side in Fig. 5, and to rotate the same should any one of the keys carrying the numerals "1" to "9" be struck and provided that the gears 178 are in position during the step-by-step movement of said driving mechanism to be turned thereby. The said driving mechanism is provided with a gear 190 for engagement with the said gears 178 when the latter are in the positions shown at Fig. 5; but should the slide or carriage 169 be moved against the stop-pin 172 the gear 190 would in its step-by-step movements from left to right come opposite the intervals between the said gears 178, and so fail to turn the same even if any of the said keys should be operated, thus rendering the adding mechanism inoperative for the time being. The mechanism whereby the said gear 190 is rotated to a greater or lesser extent will now be described.

A rack 191 is attached to the carriage beneath the frame or plate 3, as by means of downwardly-extending arms 192, which pass through a slot 193 in the said plate or frame 3, and the bar 194, carried by said arms 192.

The rack 191 is adapted to engage with a pinion 195, fast upon a shaft 196, extending longitudinally of the machine and journaled in brackets 197, attached to the bottom plate or frame 2. The shaft 196 is provided at its front end with a pinion 198, which meshes with a rack 199, movable transversely of the machine in guides 200. The bar carrying the rack 199 has a forked bracket 201 fast thereon, and the ends of the bracket 201 are perforated to receive a round shaft 202, which is journaled in brackets 203, affixed to the bottom frame 2 of the machine. The pinion 190 lies between the forks of the bracket 201 and is splined or otherwise secured to the shaft 202, so as to turn therewith and to slide lengthwise thereof. The shaft 202 is provided with three adjustable collars 204, two of which prevent its own motion endwise and the third or middle one of which limits the motion of the bracket 201 toward the right. From the described construction it will be seen that whenever the rack 191 meshes with pinion 195 during the motion of the rack and carriage to and fro the rack 199 and driver pinion or gear 190 are moving in directions the reverse of the directions of motion of the paper-carriage, inasmuch as the rack 191 engages the top of the pinion 195 and the rack 199 engages underneath the pinion 198—that is to say, the driver 190 moves from left to right as the paper-carriage moves from right to left, and vice versa. The purpose of this arrangement of parts, which is the preferred arrangement merely, is to add from left to right and to have the numbers shown in the slot 189 arranged in their natural order—that is to say, to have the higher denominations at the left hand, so that the numbers will be read from left to right. Obviously the printing takes place from left to right, during which time the paper-carriage moves from right to left. It will be observed also that the pinion 198 is larger in diameter than the pinion 195. It results from this that the rack 199 and the pinion 190, carried thereby, move at a higher rate of speed than does the paper-carriage, or, to state it differently, the motion of the paper-carriage as communicated to the driver 190 is multiplied or increased. I prefer to multiply the motion or increase the speed between the paper-carriage and that element of the adding mechanism which has a motion of translation, (the axial motion of the gear 190 in the instance shown in the drawings and herein described,) for the reason that I prefer to arrange the numbers or digits upon the peripheries of independently-rotatable wheels or number-carriers and to arrange these wheels side by side in line and to provide each wheel with suitable independent means, as a gear, whereby it may be rotated (except in the operation of carrying) independently of all the other wheels. In order that the numbers may be read off at a glance, it is necessary to make the number-wheels of a width or thickness (exclusive of their at-

tached gears) greater than the uniform letter-space feed commonly employed in type-writing machines. The distances from center to center of the adding-wheels (or of their independent operating-gears) is therefore greater than the uniform letter-space feed of the paper-carriage, and the driver is moved axially step by step a distance equal to the uniform distance from center to center of the gears 179. It is pointed out that in this instance the number-wheels 165 are separated from the number-wheels 164 by a space to provide for the decimal-point and that this fact does not form an exception to or invalidate the statements just made, inasmuch as the driver moves from the units-wheel to the tenth wheel in two equal steps instead of one and without being rotated while so moving.

It will be observed that as between the driver 190 and the adding mechanism operated thereby one of these elements is stationary upon the framework of the machine, while the other element is movable on said frame relatively to the first-named element. In the instance shown the driver is the element which has such relative motion or motion of translation.

For the purpose of securing that the pinion 195 and the parts operated thereby shall always be in a given initial position for engagement with the rack 191 the bar 194 is provided with a long locking-bar 205, whose lower surface or edge is in line with the center of shaft 196, (extended,) and the shaft 196 is provided with a collar 206, fastened thereto and having a semicylindrical block or lug 207 lying beneath the rod or bar 205, with its flat face adapted to lie closely against or near the lower edge of the bar 205—that is to say, the lug 207 is eccentrically mounted upon the shaft 196, and the lug and shaft are held against motion as long as bar 205 is over and against the lug. The bar 205 ends at a point adjacent to the rack 191, so as to allow said rack to rotate the pinion 195.

The means whereby the shaft 202 and pinion 190 are rotated will now be described.

Each of the key-levers 21, whose keys carry the digits "1" to "9," is provided with a link 208, pivoted thereto at one end. The other ends of the links are pivotally connected with levers 209, pivoted on a shaft 210, which is secured in brackets 211, rising from the frame 2. Each lever 209 is provided at its front end with a cam or inclined plate 212, secured thereto. Each of the cams 212 is designed to coact with a corresponding one of a series of steps 213 on a sliding frame 214. The frame 214 is provided with side grooves 215, which engage with the arms 216 of a frame 217, which is journaled upon a shaft 210 and extends forward over the shaft 202 toward the front of the machine. The frame 214 is provided on its under side with two ratchet-bars 218, which mesh with the top side of ratchet-wheels 219, which are secured to the shaft 202. A pair of springs 220, engaging pins

221 on frame 214 and pins 222 on the frame 217, draw the said frame 214 toward the rear of the machine and against stop 223 on the frame 217. The steps 213 are preferably arranged obliquely to the line of motion of the frame 214 and have a series of stops 224 placed opposite them for engagement with the vertical rear edges of the cam-plates 212, while the cams 212 are preferably arranged with their working faces in line.

The operation of the foregoing adding devices is as follows: At a predetermined point in the traverse of the carriage the bar 205 passes beyond the lug 207, and so releases the shaft 196, and the pinion 191 is moved to a position in which its first tooth has meshed with the pinion 195 and has turned the shaft 196 and moved the rack 199 and pinion 190 from the position shown in Fig. 5 to bring the pinion 190 into mesh with the first gear 178 from the left in Fig. 5. On the downward stroke of any key the corresponding type-block is thrown against the platen and a character imprinted upon the paper thereon, the universal bar is lifted, and the rack-bar is rocked from the movable to the fixed dog on the carriage. On the release of the key the type-bar and key-lever are returned to normal positions, and so also the rack-bar 118. The carriage now moves forward one letter-space and the rack 191 rotates the pinion 195, shaft 196, and pinion 198 correspondingly, and the rack 199, bracket 201, and pinion 190 are moved from the first to the second of the pinions 178, counting from the left-hand side of Fig. 5. Upon the depression of any key on the keyboard and its subsequent release the pinion 190 will, through the described mechanism, move from the second to the third of the gears 178 in Fig. 5, counting from the left-hand side, and so on upon the depression of the keys on the keyboard thereafter; but in none of these operations of keys will the pinion 190 be rotated by the shaft 202, thus rotating the corresponding gear 178 and number-wheel, unless the key operated carries one of the digits "1" to "9," inclusive. It will thus be seen that the pinion 190 may be moved from the position shown in Fig. 5 to the limit of its right-hand movement and back again without rotating any of the gears 178 and number-wheels. If, however, during the traverse of the pinion 190 from left to right and while it is in engagement with any one of the gears 178 one should depress any of the keys carrying the digits, the corresponding lever 209 is operated, and the cam 212 of that lever 209 engages with the step 213 opposite it and pushes the frame 214 forward until the step reaches the straight portion or dwell at the forward end of the cam, after which the further motion of the lever 209 does not cause motion of the plate 214 toward the front. During this forward motion of the plate 214 the wheels 219 are rotated as described, and with them the shaft 202 and pinion 190. The amount of the for-

ward motion of the plate 214 and the rotation of shaft 202 and pinion 190 depends upon the particular key depressed, inasmuch as the cams 212 each give a throw to the plate 214 different from the throw given to said plate by each and all of the other of said cams 212. This difference of throw is secured by arranging the cams 212 in a straight line at right angles to the direction of motion of plate 214, and by arranging the faces or steps 213 obliquely to the line of motion of the plate in such way that the cam 212 corresponding to the key carrying the numeral "1" moves the plate 214 a given distance, (unit,) and the cam 212 corresponding to the numeral "2" moves the said plate 214 twice as far as the "1" key. In like manner the "3" key causes the plate 214 to be moved a distance of three units, or three times as far as by the "1" key, and so on for the remainder of the keys carrying numerals. These variable throws of the plate 214 are transmitted through the described gearing to that particular gear 178 with which the pinion 190 may be in mesh, and from said gear 178 the motion is transmitted, through a pinion 181, to a pinion 179, and so to the corresponding number-wheel. Assuming that the wheels are all at zero and that we wish to write "1499915.96," the pinion 190 is brought into mesh with the extreme left-hand pinion 178, since the first digit is to be shown upon the extreme left-hand number-wheel, and the keys carrying the digits are now operated. On the depression of the "1" key its corresponding cam 212 moves the plate 214 forward one space or unit and rotates the shaft 202, pinion 190, left-hand pinions 178, 181, and 179 and brings the digit "1" in view at the extreme left of slot 189 in Fig. 7. On the release of the "1" key the paper-carriage moves forward one letter-space, the rack 191 rotates the pinion 195, and the motion thereof is transmitted to the pinion 190 in the manner before described, causing it to move from the first gear 178 at the left in Fig. 5 to the second gear 178 and to mesh therewith, and the springs 220 return the plate 214 to normal position, and the ratchet-teeth 218 ride or slip over the ratchet-teeth 219, the plate 217 lifting at such time. Possible reverse rotation of the shaft 202 at such times may be prevented by suitable means, as by a roller-detent 225 engaging one or both the ratchet-wheels 219, the said detent being carried by spring 226, secured to the bottom plate 2. Also any possible overthrow by the plate 214 is prevented by the locking of the plate by means of the parallel front and rear edges of the cam-piece 212 locking between the forward step 213 and the rear step 224 opposite it. The "4" key is next depressed, and its cam 212 causes the plate 214 to move forward four times as far as before, thus imparting four times as great a motion to the parts operated by the plate 214 as in the previous case, and brings the numeral "4" up alongside the nu-

meral "1" at the slot 189. In similar manner the remainder of the digits before the decimal-point are written, it being observed that there shall be no punctuation - marks written at all. When the number in the units place has been written, the pinion 190 does not in the instance shown move from the gear 178 corresponding thereto into mesh with another gear 178, but moves into a space between the gear 178 corresponding to the "units" and the gear 178 corresponding to the tenths, or the first digit to the right of the decimal-point. For this reason the number-wheels corresponding to tenths and to units and their corresponding operating-pinions are twice as far apart as are the number-wheels and the operating-pinions at the left of such decimal-point, as shown in Fig. 5. Either the space-key or the key carrying the period (decimal-point) may be struck at this place, whereupon the pinion 190 will be moved forward into mesh with gear 178 corresponding to the tenths position, and the remaining digits ("96") may be imprinted and shown in the slot 189. The paper-carriage is now returned to the right, and the pinion 190, through the described connections, is moved to the left of the machine. As the rack 191 moves out of mesh with the pinion 195 the locking-bar 205 comes over the flat portion of the stop 207 and so prevents any further motion of pinion 195 and the parts operated thereby, and pinion 190 comes to rest, as in Fig. 5. It will be observed from the foregoing operation that four of the number-wheels in the actual machine would have their "9's" showing opposite the slot 189—to wit, the "9" in the tens of thousands, the thousands, the hundreds, and the tenths. With these number-wheels in these positions one of the pinions 183 184 on each of the corresponding gears 178 is in mesh with the corresponding pinion 182, ready to "carry" to the next higher denomination upon the further turning forward (adding) of either of these four number-wheels. Let us assume that the number next to be written is "1000." The paper-carriage is moved forward or toward the left until it is in position for writing the numeral "1" in its proper position. In so moving the carriage forward the shaft 196 is unlocked and is rotated by the rack 191, thus moving forward the pinion 190 until in engagement with the gear 178 corresponding to the thousands number-wheel. Upon operating the "1" key the following operations occur: The plate 214 is moved forward one unit or space, and this motion is transmitted to the thousands-wheel, turning it so that it shows the zero in the slot 189. At the same time the pinion 183 or 184 on the thousands-gear 178 rotates the pinion 182 in mesh therewith, and this pinion 182 rotates the tens-of-thousands number-wheel to bring the "0" into view in the slot 189, and the pinion 179 on the tens-of-thousands number-wheel 164 rotates its driving-pinion 181, and said driving-pinion

181 rotates the tens-of-thousands pinion 178 forwardly one space, and the carrying-pinion 183 or 184 on said tens-of-thousands pinion 178 rotates the carrying-pinion 182 with which it is in mesh, and the last-named pinion 182 rotates the hundreds-of-thousands wheel 164 to bring the numeral "5" into position opposite the slot 189; but the forward-turning or adding motion of the thousands number-wheel 164 does not cause the hundreds-wheel to turn forward from the position in which it shows the digit "9" at the slot 189 to the position in which it would show the "0" at said slot, although the pinion 180 on the thousands number-wheel 164 rotates its corresponding pinion 182 in the direction in which the latter is moved when carrying, yet nevertheless there is no motion of the hundreds-wheel 164, because the pinion 183 or 184, which is in mesh at this time with the last-named pinion 182, rotates freely in the direction in which it must slip past its spring 185, (the spring 187, engaging with the hundreds-wheel 164, being stronger than the spring 185 the latter yields.) At the completion of this operation the number-wheels show "1500915.96" at the slot 189. For the purpose of returning the number-wheels to an initial position or zero, or that in which the naughts of all the wheels are opposite the slot 189, I provide a roller 227, the shaft of which is journaled in arms 228, pivoted upon the shaft 177 aforesaid. One of the arms 228 is provided with an extension 229 downward and forward to the front edge of the machine, and the frame or plate 2 is cut away at 230 to permit the finger to reach the finger-piece on the arm 229. The shaft 231 of the roller 227 is extended beyond the supports 228 to the right-hand side of the machine, where it is provided with a knurled knob 232, whereby it may be turned. In order to stop the number-wheels in their initial position when they are returned thereto, the tie-rod 176 has pivoted thereto a plate 233, and this plate is provided with a series of extensions, fingers, or stops 234, there being one such stop for each of the pinions 178. The pinions 178 are each provided with two pins 235 and 236 at opposite sides of the center thereof and in position to coact with the ends of the stops 234. The plate 233 hangs loosely from the shaft 176 in such wise that the ends of the stops 234 are normally in position to coact with the stop-pins 235 236 as the wheels 178 are rotated in the direction of the arrow at Fig. 10. The roller 227 normally bears upon the number-wheels with so light a pressure that it does not interfere with the proper rotation thereof in the operation of the machine. When it is desired to return the number-wheels to their initial position, a finger is placed upon the finger-piece of arm 229 and the arm is pushed rearwardly, thus pushing the roller 227 against the peripheries of the number-wheels, and at the same time the knob or handle 232 is rotated

to cause the roller 227 to rotate in the direction of the arrow at Fig. 10. The number-wheels are thus rotated by friction against the resistance of the retaining-springs 186 and 187, and the number-wheels of course rotate their driving gears or pinions 181, 182, and 178. The wheels 178 are rotated in the direction of the arrow thereon at Fig. 10, and the carrying-wheels 183 thereon pass the pinions 182, the springs 185 being flexed aside by the teeth of pinions 183, as indicated in Fig. 10, where the pinion 183 in mesh with pinion 182 is rotated toward the left thereby, and when the teeth which flex the springs 185 each pass the corresponding spring end the spring snaps in behind the tooth ready to act as a detent. The rotation of the shaft 231 is continued until all the wheels show the "0" at the slot 189, each wheel being stopped when a "0" thereon comes opposite said slot by the contact of pin 235 or pin 236 on its driving-pinion 178 with the end of the corresponding stop 234. The lever 229 and the knob 232 are now released and the machine is ready for reuse. Care must be observed, however, in returning the number-wheels to zero to have the gear 190 out of mesh with all of the gears 178. This may be secured by returning the paper-carriage so far to the right as will move the said pinion 190 to the position shown at Fig. 5.

It sometimes occurs in type-writing that the impression made is indistinct and it is necessary to again strike the key whose corresponding type made the indistinct impression in order to obtain an impression of sufficient distinctness; or it may happen that the wrong key has been struck and it is necessary to erase the imprint erroneously made and to strike the proper key. In the first case the type-writer carriage is moved backward one step or until the scales and pointers show that the faintly-impressed letter or character is at the printing-point, and then the proper key is struck. In the second case the erroneous impression is first erased, and then the carriage is so moved as to bring that portion of the paper to the printing-point, and the proper key is then struck. In the use of the combined type-writer and adding mechanism other steps in addition to the erasure and proper positioning of the carriage (or the latter alone) are required before the proper key is to be struck if the machine is in position to be adding and a digit-bearing key has been struck erroneously. In the last-named case the striking of a digit-bearing key erroneously will operate the corresponding number-wheel and turn it a distance corresponding to the digit struck erroneously and will imprint the digit upon the paper in the type-writing machine. If a digit is but faintly impressed upon the paper and it is desired to deepen the impression, or if the wrong key has been struck, the corrections required are those already pointed out and also a correction in the adding mechanism. It ordinarily hap-

pens that the type-writer operator is aware of having struck the wrong key as soon as the erroneous stroke is made, and the errors are commonly noted for subsequent correction; but in the case of the adding-machine and type-writer it is preferable to make the correction at once, and this may be done as follows: For example, the numbers shown in the slot 189 may be "999," and the pinion 190 may be in engagement with the pinion 178, which operates the "units-wheel" 164, and one may strike the "7" key when intending to strike the "6" key. This would cause the number shown in the slot 189 to be "1006," whereas the number should be "1005," and the impression upon the paper would be a "7" underneath the "9" in the units-place. In order to make the necessary correction, the "7" upon the paper is erased. Also the operator, by means of the finger-piece 171 and arm 170, moves the adding-mechanism carriage from the position shown in Fig. 5 over against stop 172, thus bringing the gears 178 in positions in which they are out of mesh with the driver 190 in all the step-by-step positions thereof. The operator now turns the thousands, hundreds, tens, and units wheels backward by hand or by a pointed instrument inserted between the teeth of the gears of these wheels to bring the "0" of the thousands-wheel and the "9's" of the other of said wheels opposite the slot 189. Also the paper-carriage is moved backward step by step until the "9" of the number "999" in the units-place is in such position that the impression made by striking any key will be immediately beneath it. The operator now moves the adding-mechanism carriage by means of the handle 171 to bring it over against stop 173 or in the position shown in Fig. 5. This will bring the driver 190 into mesh with the gear 178, which operates the units-wheel of the adding mechanism. The operator now strikes the proper key—the "6" key—thus imprinting the "6" underneath the "9" in the units-place and rotating the units-wheel from the position in which it shows the "9" in the slot 189 to the position in which it shows the "5" in said slot. Incidentally, the "carrying mechanism" rotates the tens, the hundreds, and the thousands wheels to cause the first two to show their "0" in said slot and the last to show the figure "1" in said slot, or the adding mechanism will then show "1005" in the slot 189.

For the purpose of retaining the adding-mechanism carriage 169 against the stop 172 or stop 173, as the case may be, the pin 171 coacts with a spring 171^x, having a V-shaped end, the action of the spring tending to force the handle and carriage in one direction or the other, according to which side the point of the V the finger-piece 171 may be. When the carriage 169 is against stop 172, the gears 178 are thrown out of proper relationship to pinion 190, so that as the pinion 190 moves step by step to the right it always takes po-

sition intermediate to the gears 178 and so fails to turn any of them should it be operated by the striking of the digit-bearing key in the keyboard of the machine.

When it is desired to strike a digit-bearing key a second time in order to make a previously-made imprint of a digit more clear or visible, the procedure, assuming that one is using the adding mechanism and has just struck a digit-key and obtained a faint impression, is or may be as follows: The adding mechanism is moved by means of handle 171 until arrested by stop 172, (in which position gear 190 does not rotate any of gears 178,) and then the type-writer carriage is moved to bring the faint impression to the printing-point, and the proper key is struck with sufficient force to clearly imprint the digit. Afterward the adding mechanism is moved over against stop 173, and the work may proceed. When the faint impress is that of the "0," the carriage of the type-writer is moved to bring the faint "0" to the printing-point, and the "0" key is again struck. Inasmuch as the "0" key is not connected with the driver 190 to rotate the latter, the adding mechanism requires no attention in this case, and it is noted that the same thing is true when the "0" key has been erroneously struck and an erasure is required on the paper on the platen.

In recording the sum of a column of numbers, which sum is shown in slot 189, the adding mechanism is first moved over against stop 172, in which position driver 190 does not actuate the gears 178. The carriage is then positioned to write the sum in proper relation to the decimal-point. The sum is read from the number shown in slot 189, and the proper keys are operated to record the same on the paper on the carrier.

In making out tabular statements or bills upon a type-writer mistakes are liable to be made in commencing the writing of the number unless considerable care be exercised to avoid them. For example, one item may begin with tens of thousands and the next item with units. In order to provide for quickly and accurately positioning the paper-carriage for beginning the writing of any number or amount within the limits of the adding mechanism, I provide a series of eight keys (more or less) at the right-hand side of the keyboard, such keys being numbered 237, 238, 239, 240, 241, 242, 243, and 244 and respectively marked with the decimal-point, unit, tens, and so on to the millions. The levers 245, carrying the said keys, are pivoted at 246 to the top plate 3 and extend rearwardly to near the paper-carriage 47, where the ends are doubled back upon their levers, as at 247, and so practically fill the spaces between the said levers 245. A yoke 248 is secured to the top of plate 3 and extends over and embraces the said levers 245 or ends 247 to limit their upward movement and to prevent displacement of the levers sidewise during the operation of the machine. Normally the said ends

247 lie out of the path of the carriage, but are moved into the path of said carriage or a part secured thereto (adjustably or otherwise) upon the depression of the corresponding key. The universal bar 126 is extended over said levers 245 in position to be rocked thereby, and the throw of such bar by said keys is such as to move the rack-bar 118 to a position below the fixed tooth 117, thereby releasing the carriage from the control of the escapement and permitting it to move to the left under the influence of its driving-spring 132 until stopped as in a manner now to be described. The carriage 47 is provided with a shaft 249, fast thereto and parallel to the direction or motion thereof. The end of said shaft or rod 249 is provided with a collar or stop 250, into the path of which the ends 247 of the levers 245 are moved whenever the corresponding key is depressed, as indicated by the dotted line *d* in Fig. 2. Rod 249 or collar 250 may be adjustable to cause the arrest of the carriage at different points. The key 237 and its lever 245 are at the left of the group of carriage release and stop keys, and the other keys 238 to 244, inclusive, and their corresponding levers are disposed at the right of said key 237 and its lever in the order of units, tens, hundreds, thousands, and so on, beginning at the left with units. The stops 247, as shown, are of uniform width, and this width preferably is equal to the uniform letter-space feed of the paper-carriage—that is to say, the pitch or spacing apart of the teeth of rack-bar 118. The stops 247 and the lug or collar 250 are so arranged relatively to each other, and the rack 191 is so arranged on the carriage with relation to pinion 195, and the pinion 190 is in such relation to the gears 178 when in the position shown in Fig. 5 that the stop 247 corresponding to the “millions-key” 244 arrests the lug or stop 250 in such position that on the release of the said key 244 and the fall of the stop 247 the paper-carriage and rack 191 will move forward one letter-space feed and the rack 191 will actuate the pinion 195, and thus by the described connections will move the pinion 190 into mesh with the gear 178 corresponding to the “millions” number-wheel, or that at the left at Fig. 5. Similarly whenever the carriage is released by depressing any other of the keys on the levers 245 the corresponding stop 247 will be raised into the path of the lug 250 and will arrest the stop and carriage in such position that on the release of the release-key the carriage will move forward one step, and so, also, of the drive-pinion 190. For example, if the key 240 be depressed while the paper-carriage is in such position that the rack 191 is not in mesh with pinion 195 the paper-carriage will be released and will move forward under the influence of its driving-spring until arrested by the stop corresponding to key 240; but the rack 191 will mesh with the pinion 195 and thus move the pinion 190 axially from the time the stop

250 has passed the stop 247 on the “millions-lever” 245. In such case the teeth of pinion 190 pass between the teeth of the gears 178 corresponding to the millions, hundreds of thousands, tens of thousands, and thousands adding-wheels in the manner in which one may pass the separated or spread fingers of one hand between the separated or spread fingers of the other hand, and is arrested finally in mesh with the pinion 178 corresponding to the hundreds-wheel. From this it is evident that the stop 247 corresponding to the millions-key 244, the lug 250, the rack 191, and pinion 195 should be so related to each other that the rack will engage with the pinion at least as early as the time of stoppage of the carriage by the said millions-stop 247.

It is obvious that the mechanism for moving the pinion 190 step by step in an axial direction may be arranged to move said pinion more than one step before bringing it into mesh with the first gear 178 (at the left-hand side in Fig. 5) without in any degree departing from my invention.

It results from the described construction and arrangement of the carriage release and stop keys that the carriage may be stopped in position to begin the writing of any number in its proper position upon the paper relatively to the decimal-point or the numbers that have been properly written before. For example, if one has a number to write beginning in the hundreds of thousands and the carriage is not moved sufficiently far to the left to begin the number in the proper position the key 243 is depressed, thus releasing the carriage, as described, and allowing it to move toward the left until the stop 250 is arrested by the raised end 247 of the lever 245, carrying said key 243, whereupon the said key is released and the rack-bar 118 is re-engaged with the movable escapement-dog 120 and the carriage moves one letter-space farther to the left. The finger-key 149 is to be depressed and held down during the writing of the numerals or digits of the said number or amount beginning in the hundreds of thousands and then to be released before the beginning of writing other matter, as will be understood. If the next amount to be written in the column begins in the hundreds, the key 240 is to be depressed, as described, and the carriage will be moved forward and will be stopped and on release of key 240 will move to position to bring the hundreds to be written under the hundreds already written and in proper relation to the decimal-point. In other words, the key 240 is associated with that particular adding-wheel which is always employed for adding figures in the hundreds-column. Each of the keys 238 to 244 may be termed a “selecting-key,” since when operated it automatically determines which wheel is to be operated by any of the figure-keys when the carriage comes to rest subsequently to manipulation of the selecting-key—

that is to say, when any of the selecting-keys is depressed it operates to release the carriage and determine its stopping-point, while at the same time it brings the adding mechanism into such relationship with the figure-type keys that the particular adding-wheel represented by such depressed key will next be operated upon by any selected figure-type key when subsequently operated simultaneously to print the desired numeral and cause the quantity represented thereby to be added by the computing mechanism.

It will be observed that the present invention differs in principle from what may be termed a "combined adding and recording mechanism" in that my complete machine or combined type-writer and adder is capacitated to do the work of the ordinary type-writing machine and also to do the work of an adding-machine and also to do the work of an adding and recording machine and that it also goes beyond any of these three machines in that type-writing may be done upon one part of the lines, tabular work upon another part of such lines, and the summation of the tabular work be secured in the adding mechanism, the adding mechanism preferably not coming into operation until the paper-carriage or other carriage of the type-writing mechanism has reached a given or predetermined point in its forward motion or traverse. The class of adding or recording mechanisms referred to above is that wherein the machine is provided with type representing the nine digits and the naught and with keys and mechanism whereby the numbers added up are also recorded upon a strip or sheet of paper, but are not provided with letter-type and letter-keys. Such adding and recording mechanisms are not adapted to do type-writing work (like words and sentences) and are, furthermore, lacking in what in some aspects of my invention is an essential element of the operation—to wit, the "picking up," so to say, of an adding mechanism by the carriage of the type-writer when it has reached a predetermined point in its forward traverse or, otherwise expressed, the throwing or bringing of an adding mechanism into operative relation with the paper-carrier and printing mechanism at a predetermined point in the line of print, such adding mechanism normally being disconnected from or out of operative relation to said carrier and printing mechanism. The tabulating mechanism may likewise be referred to as "denominational mechanism," it being understood that the denomination-keys, with indices thereon, determine the denominational position of the carriage whether it be in the ordinary tabulating-work, where the figures are to be written in vertical columns and without the coöperation of the adding mechanism, or whether it be in coöperation with the adding mechanism. In the latter case the denominational mechanism not only determines the proper position of the carriage with relation to the col-

umns of figures written or to be written, but at the same time brings about the proper relative positioning of the parts of the adding mechanism and an operative connection between the particular element or adding-wheel to be operated and its actuating mechanism.

It will be noted that in so far as one feature of my invention is concerned I provide a journaled shaft intermediate the type-writer carriage and the carriage for the driver 190 and gear the shaft continuously with one carriage and discontinuously with the other carriage. In the instance shown in the drawings the type-writer carriage is the one that is discontinuously geared with the shaft 196.

The particular embodiment of my invention illustrated in the drawings and above described comprises a treble-case type-writing machine; but it is obvious that my adding mechanism and operating means therefor are applicable as well to "double" and "single" case machines, and so also of other features of my invention. It is also obvious that the number-carrying peripheries of wheels 164 165 may be wholly within or inside the teeth of gears 179 180 and that pinion 190 may then coact directly with the gears 179, leaving the carrying function alone to the devices shown as connecting pinion 190 and the number-wheels. Also many other changes in parts, features, and combinations may be made without departing from the spirit of my invention. Furthermore, the specific form of the adding mechanism shown herein may be combined with any suitable style or construction of type-writing mechanism to secure the ends sought. In some aspects of my invention as herein claimed other forms or embodiments of adding mechanism working upon different principles may be substituted for the adding mechanism of the claimed combination without departing from my invention in so far as it relates to combined adding and type-writing machines.

My improvements in the type-writing machine proper and in the adding-machine *per se* are made the subjects-matter of separate divisional applications.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of type-writing mechanism having a carriage moved step by step for letter-spacing, adding-wheels, independent operating means for said wheels, a driver for operating said means one by one, said driver and said adding-wheels and operating means being relatively movable, toothed wheels connected with said driver, a single rectilinearly-movable sliding frame having two toothed bars for engaging said toothed wheels to actuate the driver, guideways for said frame, and means actuated by the type-operating mechanism of the type-writing machine and moving said frame variable distances from an initial position, substantially as described.

2. The combination of type-writing mechan-

ism having a carriage moving step by step for letter-spacing, adding number-carriers, independent operating means for said number-carriers, a driver for operating said independent means one at a time, said driver and said adding mechanism and operating means being relatively movable, toothed wheels connected with said driver, a rectilinearly-movable frame provided with two toothed bars meshing with said toothed wheels, and cams operated by the type-operating mechanism of the type-writing machine for engaging and moving said frame variable distances from an initial position, substantially as described.

3. The combination of type-writing mechanism having a carriage moving step by step for letter-spacing, adding number-carriers provided with independent means for operating said number-carriers, a driver for operating said independent means one at a time, said driver and said number-carriers being relatively movable, toothed wheels connected with said driver, a reciprocatory frame or plate provided with a series of steps and with a toothed bar meshing with said toothed wheel, and cams for engaging said steps and operated by the type-operating mechanism of the type-writing machine for moving said frame or plate variable distances from an initial position, substantially as described.

4. The combination of type-writing mechanism having a carriage moved step by step for letter-spacing, adding number-carriers, independent means for operating said number-carriers, a driver for operating said independent means one at a time, said driver and said number-carriers being relatively movable, two toothed wheels connected with said driver, a reciprocatory frame or plate provided with two toothed bars meshing with said toothed wheels and with a series of steps, and cams for engaging said steps and operated by the type-operating mechanism of the type-writing machine, substantially as described.

5. The combination of type-writing mechanism having a step-by-step moving carriage, adding number-carriers, independent means for operating said number-carriers, a driver for operating said independent means one at a time, said driver and said number-carriers being relatively movable, a reciprocatory plate or frame, gearing connecting said plate or frame and said driver for rotating the driver, and cams for engaging said frame and moving it different distances and operated by the type-operating mechanism of the type-writing machine, substantially as described.

6. The combination of type-writing mechanism having a carriage moving step by step for letter-spacing, adding number-carriers, independent means for operating said number-carriers, a driver for operating said independent means one at a time, said driver and said number-carriers being relatively movable, a reciprocatory plate or frame provided with a series of steps, gearing intermediate said plate

or frame and said driver for rotating the driver, and cams operated by the type-operating mechanism of the type-writing machine and coacting with said steps, substantially as described.

7. The combination of a type-writer carriage, adding mechanism having independent means for operating its number-carriers, a variable-throw driver for operating said independent means one at a time, said driver and said adding mechanism being relatively movable, and mechanism for connecting said moving part with the type-writer carriage at a predetermined point in the forward traverse thereof to move therewith during the further progress of the carriage, substantially as described.

8. The combination of a type-writer carriage having a step-by-step letter-feed, adding mechanism having independent means for operating its number-carriers, a rotatable driver connected to and operated by the digit-keys of the type-operating mechanism and operating said independent means one at a time, said driver and said adding mechanism being relatively movable, and mechanism for connecting such moving part with the type-writer carriage at a predetermined point in the forward traverse thereof to move step by step during the further progress of the carriage, substantially as described.

9. The combination of a type-writer carriage, adding mechanism independently-operable number-carriers, a variable-throw driver for operating said carriers one at a time, said driver and said adding mechanism being relatively movable and being disengaged during a part of the forward traverse of the type-writer carriage, mechanism for connecting said moving part with the type-writer carriage at a predetermined point in the forward traverse thereof to move step by step during the further progress of the carriage, and means for locking said driver against said step-by-step movement until said carriage reaches said point, substantially as described.

10. The combination of the carriage of a type-writer, key-actuated adding mechanism comprising toothed wheels 178, 179, 181, 182 and 183, for operating its number-carriers, a driver for operating said toothed wheels one at a time, and gearing for discontinuously but automatically connecting said driver with the type-writer carriage by a movement of said carriage to move the driver axially to engage with said toothed wheels 178 in succession, whereby said type-writer carriage may move during a portion of its travel independently of the driver, substantially as described.

11. The combination of the carriage of a type-writer, key-actuated adding mechanism comprising toothed wheels 178, 179, 181, 182 and 183, for operating its number-carriers, a rotatable driver for operating said toothed wheels 178 one at a time, and mechanism for

discontinuously connecting said driver with the type-writer carriage and thrown automatically into operation when said carriage reaches a given point in the forward traverse thereof and then moving said driver step by step from one to another of said toothed wheels 178 as the carriage progresses, whereby said type-writer carriage may move during a portion of its travel independently of the driver, substantially as described.

12. The combination of a type-writer carriage, a key-actuated adding mechanism comprising toothed wheels 178, 179, 181, 182 and 183 for operating its number-carriers, a driver for operating said toothed wheels 178 one at a time and disengaged automatically and discontinuously therefrom during a part of the forward motion of the said carriage, means for variably rotating said driver, and mechanism operated by or controlled from the said carriage for moving said driver into engagement with and from one to another of said toothed wheels 178 as the carriage progresses, substantially as described.

13. The combination of the carriage of a type-writer, key-actuated adding mechanism comprising toothed wheels 178, 179, 181, 182 and 183, for operating its number-carriers, a driver-pinion disengaged from said toothed wheels 178, and disconnected from said carriage during a part of the forward traverse of the said carriage, and mechanism for automatically connecting said carriage with the said driver at a given point in said forward traverse and moving said driver into engagement with and from one to another of said toothed wheels 178 as the carriage progresses, whereby said type-writer carriage may move during a portion of its travel independently of the driver, substantially as described.

14. The combination of the carriage of a type-writer, an adding mechanism having independent means for operating its number-carriers, a driver for operating said independent means one at a time and disengaged therefrom during a part of the forward traverse of said carriage, a to-and-fro movable rack with which said driver is connected to be moved axially, a pinion meshing with said rack, and mechanism for connecting said pinion with the type-writer carriage, substantially as described.

15. The combination of the carriage of a type-writer, an adding mechanism having independent means for operating its number-carriers, an axially-movable driver for operating said independent means one at a time and disengaged therefrom during a part of the traverse of said carriage, a reciprocatory rack connected with said driver to move it axially, a pinion meshing with said rack, and devices for connecting said pinion with the type-writer carriage at a given point in the forward traverse thereof, whereby said driver is moved into engagement with and from one to another of said independent means as the

carriage progresses, substantially as described.

16. The combination of a type-writer carriage, an adding mechanism having independent means for operating its number-carriers, a driver disengaged from said operating means during a part of the forward traverse of the type-writer carriage, a short rack connected with said carriage, a pinion with which said rack meshes at a given point in the forward traverse of said carriage, and connections between said pinion and said driver for moving the driver axially step by step, substantially as described.

17. The combination of the type-writer carriage, an adding mechanism having independent means for operating its number-carriers, a driver for operating said independent means one by one and disengaged therefrom during a part of the forward traverse of the carriage, a short rack connected with said carriage, a pinion with which said rack meshes at a given point in the forward traverse of the carriage, a shaft carrying said pinion, a second pinion on said shaft, and a rack meshing with said pinion and connected with said driver to move the same axially into engagement with and from one to another of said operating means, substantially as described.

18. The combination of a type-writer carriage, an adding mechanism having independently-operable number-carriers, a driver disengaged from said adding mechanism during a part of the forward traverse of the type-writer carriage, said driver and said adding mechanism being relatively movable, a short rack connected with said type-writer carriage, a pinion with which said rack meshes at a given point in the forward traverse of said carriage, and connections between said pinion and said movable element for moving the same step by step and causing engagement between said driver and said adding mechanism, substantially as described.

19. The combination of a type-writer carriage, adding mechanism, means for actuating the adding mechanism and disconnected from the carriage during part of the forward traverse thereof and thrown into action by the carriage at a predetermined point in the forward traverse of the carriage, and means for locking or holding the said actuating means until the carriage reaches said predetermined point, substantially as described.

20. The combination of a type-writer carriage, an adding mechanism having independent means for operating its number-carriers, a driver for operating said means one at a time and disengaged therefrom during a part of the forward motion of the carriage, mechanism intermediate said driver and said carriage for moving the driver axially into engagement with and from one to another of said operating means after the carriage has reached a certain point in its forward traverse, and locking mechanism for preventing axial

motion of said driver before said carriage reaches said point, substantially as described.

21. The combination of a type-writer carriage, adding mechanism having independent operating means for its number-carriers, a driver for operating said independent means one by one and disengaged therefrom during a part of the forward traverse of said carriage, mechanism having an element rotated by said carriage after the carriage has reached a predetermined point in its forward traverse and connected to said driver to move the same axially, a flat-faced block connected with said rotary element, and a bar connected with said carriage and coacting with said flat-faced block to prevent rotation of said element before the carriage reaches said predetermined point, substantially as described.

22. The combination of a type-writer carriage, adding mechanism, a driver for operating said adding mechanism and disengaged therefrom during a part of the forward motion of said carriage, a rack on said carriage, a pinion with which said rack is adapted to mesh at a given point in the forward motion of said carriage, mechanism intermediate said pinion and said driver for moving the driver step by step in the direction of its axis of motion, a lug or projection on and eccentric to said pinion, and a locking-bar connected with said carriage and coacting with said lug to prevent rotation of said pinion before the same meshes with said rack, substantially as described.

23. The combination of a type-writer carriage having a step-by-step letter-space feed, adding mechanism having independent operating means for its number-carriers arranged in line at distances apart greater than the uniform letter-space feed of said carriage, a driver for operating said independent means one by one, and motion-multiplying toothed gearing intermediate said driver and said carriage and including a rack upon the carriage and a pinion in mesh therewith for moving the driver from one to another of said independent means, substantially as described.

24. The combination of a type-writer carriage, adding mechanism having independent operating means for its number-carriers, said means being arranged at distances apart greater than the step-by-step feed of said carriage, a driver for operating said independent means one by one and disengaged therefrom during a part of the forward traverse of said carriage, and speed-multiplying gearing intermediate said driver and said carriage and including a rack upon said carriage and a pinion in mesh therewith for moving the driver axially into engagement with and from one to another of said independent means, substantially as described.

25. The combination of a type-writer carriage having a step-by-step letter-space feed, adding mechanism having independent operating means for its number-carriers, said

means being at distances apart greater than said step-by-step feed, a driver disengaged from said independent means during a part of the forward traverse of said carriage, a rack on said carriage, a pinion with which said rack meshes at a given point in the forward traverse of said carriage, and speed-multiplying mechanism connecting said pinion with said driver and moving said driver axially into engagement with and from one to another of said independent means, substantially as described.

26. The combination of a type-writer carriage, adding mechanism having independent operating means for its number-carriers, said means being arranged at distances apart greater than the step-by-step feed of said carriage, a driver for operating said independent means one by one and disengaged therefrom during a part of the forward traverse of said carriage, and speed-multiplying mechanism intermediate said driver and said carriage for moving the driver axially into engagement with and from one to another of said independent means, with locking mechanism for preventing motion of said speed-multiplying mechanism until the carriage reaches a predetermined point in its forward motion, substantially as described.

27. The combination of a type-writer carriage having a step-by-step letter-space feed, adding mechanism having independent operating means for its number-carriers, said means being at distances apart greater than said step-by-step feed, a driver disengaged from said independent means during a part of the forward traverse of said carriage, a rack on said carriage, a pinion with which said rack meshes at a given point in the forward traverse of said carriage, and speed-multiplying mechanism connecting said pinion with said driver and moving said driver axially into engagement with and from one to another of said independent means, with mechanism for locking said pinion and multiplying mechanism against motion until the carriage reaches said predetermined point in its forward motion, substantially as described.

28. The combination of a type-writer carriage having uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being placed at a uniform distance from center to center greater than the uniform feed of the carriage, a driving-pinion movable in the direction of its axis and engaging with said independent pinions one after another, and speed-multiplying mechanism connecting said carriage and said driving-pinion for moving the pinion axially, substantially as described.

29. The combination of a type-writer carriage having a uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being at uniform distances from center to center

greater than the uniform feed of the carriage, and an axially-movable driving-pinion for engaging said independent gears one at a time and disengaged therefrom during a part
5 of the forward traverse of said carriage, and speed-multiplying connections between said carriage and said driving-pinion for moving the said pinion axially into engagement with and from one to another of said independent
10 pinions, substantially as described.

30. The combination of a type-writer carriage having uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being
15 at a uniform distance from center to center greater than the uniform feed of the carriage, an axially-movable driving-pinion for operating said independent gears one after another and disengaged therefrom during a part of
20 the forward traverse of the said carriage, a rack on said carriage, a pinion in the path of said rack and meshing therewith when the carriage reaches a given point in its forward traverse, and speed-multiplying connections
25 between said pinion and said driver for moving the driver axially, substantially as described.

31. The combination of a type-writer carriage having uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being
30 at a uniform distance from center to center greater than the uniform feed of the carriage, an axially-movable driving-pinion for operating said independent gears one after another and disengaged therefrom during a part of
35 the forward traverse of the said carriage, and speed-multiplying mechanism for connecting said driver with said carriage when the carriage reaches a given point in its forward traverse, with mechanism locking said speed-multiplying mechanism against motion until
40 such time as the carriage reaches said given point, substantially as described.

32. The combination of a type-writer carriage having uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being
45 at a uniform distance from center to center greater than the uniform feed of the carriage, an axially-movable driving-pinion for operating said independent gears one after another and disengaged therefrom during a part of the forward traverse of the said carriage, a rack on said carriage, a pinion in the path of said rack and meshing therewith
50 when the carriage reaches a given point in its forward traverse, and speed-multiplying connections between said pinion and said driver for moving the driver axially, and mechanism for locking said pinion against motion until the carriage reaches the said
55 given point, substantially as described.

33. The combination of a type-writer carriage having uniform step-by-step letter-space feed, adding-wheels, independent gears for operating said wheels, said gears being

at a uniform distance from center to center greater than the uniform feed of the carriage, an axially-movable driving-pinion for
70 operating said independent gears one after another and disengaged therefrom during a part of the forward traverse of the said carriage, a rack on said carriage, a pinion in the path of said rack and meshing therewith
75 when the carriage reaches a given point in its forward traverse, and speed-multiplying connections between said pinion and said driver for moving the driver axially, with a lug or projection eccentrically connected to
80 said pinion, and a bar connected with said carriage and coacting with said lug to prevent rotation of said pinion until the carriage reaches said given point, substantially as described.
85

34. The combination of type-writing mechanism having a carriage moved step by step for letter-spacing, adding mechanism, a driver controlled and operated by type-operating mechanism and operating said adding
90 mechanism, said adding mechanism and said driver being movable one past or before the other, and mechanism for preventing said driver from operating said adding mechanism until the type-writer carriage shall have
95 reached a given point in its forward traverse, substantially as described.

35. The combination with type-operating keys and a carriage, of adding mechanism, a driver for independently operating each
100 element of the adding mechanism, connections between said driver and said carriage for moving the driver in one direction from element to element of the adding mechanism, and connection from certain of the keys for
105 moving said driver variable distances in another direction to operate said adding mechanism, substantially as described.

36. The combination of type-operating keys, a platen, independently-operable adding-wheels, a driver for said wheels movable independently in two directions and connected with said wheels one at a time beginning at a predetermined point of the letter-spacing, and two independent connections
110 between said keys and said driver for moving the driver in a step-by-step manner in one direction and for moving it variable distances in the other direction to operate said wheels, substantially as described.
115

37. The combination of a type-writer mechanism having a step-by-step moving carriage, adding mechanism, a rotatory and sliding driver for actuating said adding mechanism, connections with type-operating mechanism
120 for rotating said driver, and mechanism for connecting said driver with the carriage at a predetermined point in the forward traverse of said carriage and moving said driver axially into engagement with said adding
125 mechanism, substantially as described.

38. The combination of type mechanism, a carriage, independently-operable adding-wheels, a rotatory and axially-movable driver

for said wheels disconnected therefrom during a part of the forward movement of the carriage, mechanism connecting said driver with type-operating mechanism and rotating at variable distances, and means for moving the driver axially to bring the same into operative relation with said wheels one at a time after the carriage reaches a predetermined point in its forward progress, substantially as described.

39. The combination of type mechanism, a carriage, independently - operable adding-wheels, a rotatory driving-pinion for said wheels disconnected therefrom during a part of the traverse of the carriage, a journaled shaft with which the pinion rotates and along which it is movable, mechanism connecting said shaft with type-operating mechanism for rotating the shaft variable distances, and means for moving said driver along said shaft and connecting it with said wheels in succession after the carriage has reached a predetermined point in its forward traverse, substantially as described.

40. The combination of type mechanism, a carriage, independently - operable adding-wheels, a driving-pinion for said wheels disconnected therefrom during a part of the traverse of the carriage, a shaft with which the pinion rotates and along which it moves, mechanism connecting type - writing mechanism with said shaft for rotating it variable distances, and mechanism for connecting said driving-pinion with the carriage after the latter has reached a predetermined point and with said adding-wheels in succession, substantially as described.

41. The combination of type mechanism, having a carriage, independently - operable adding-wheels, a driver-pinion for said wheels disconnected therefrom during a part of the traverse of the carriage, a shaft with which the pinion turns and along which it may move, speed-multiplying mechanism intermediate said driver - pinion and the carriage thrown into operation at a predetermined point in the forward traverse of said carriage and moving said pinion along the shaft, means for connecting said driver-pinion with said adding-wheels one at a time, and means for connecting type-operating mechanism with said shaft and giving it a variable throw, substantially as described.

42. The combination with type-operating mechanism and a platen one of which moves for letter-spacing, of a series of independently-rotatable adding-wheels, independently-rotatable gears for rotating said wheels, and a pinion movable in the direction of its axis and controlled by type-operating mechanism for operating said independent gears one by one and brought into mesh with the first gear thereof at a predetermined point in the forward traverse of the moving element of said type-writing mechanism, with mechanism for discontinuously connecting said pinion with

said moving element, substantially as described.

43. The combination with type-operating mechanism and a platen one of which moves for letter-spacing, of a series of adding-wheels independently rotatable on the same shaft, a series of independently-rotatable gears connected therewith to rotate the same independently, a driving-pinion adapted to mesh with said independent gear one by one and to be out of engagement therewith during the first part of the traverse of the moving element of the printing mechanism, mechanism controlled by type-operating mechanism for rotating the said driving-pinion variable distances, and mechanism thrown into operation during the latter part of the traverse of said moving element of the printing mechanism for moving said operating-pinion in a step-by-step manner into mesh with and from one to another of said independent gears, substantially as described.

44. The combination of type mechanism, a carriage, independently - rotatable adding-wheels, gears for independently rotating said wheels, an axially-movable driving-pinion for operating said independent gears one by one and brought into mesh with the first gear thereof at a predetermined point in the forward traverse of the carriage, connections between type-operating mechanism and said driving-pinion for giving the latter a variable throw, and connections between said carriage and said driving-pinion for moving the pinion axially, and said connections being inoperative until and thrown into action when the carriage reaches a predetermined point in its forward traverse, substantially as described.

45. The combination of type mechanism, a carriage, independently - operable adding-wheels, a driving-pinion, a shaft with which said pinion rotates and along which it moves, mechanism intermediate type - operating mechanism and said shaft for rotating the shaft variable distances, and mechanism intermediate the carriage and the driving-pinion and discontinuously connected with one of said parts for bringing the driving-pinion into mesh with the adding-wheel-operating gears one by one and with the first gear thereof at a predetermined point in the forward traverse of the carriage, substantially as described.

46. The combination of type mechanism, a carriage having a uniform step-by-step feed for letter-spacing, independently-operable adding-wheels, independent gear for operating said wheels placed at a uniform distance from center to center greater than the uniform feed of the carriage, a driving-pinion movable in the direction of its axis into mesh with and from one to another of said independent gears, speed-multiplying connections between said carriage and said driving-pinion for moving the pinion in the direction of its

axis, said multiplying connections being inclusive of a rack upon the carriage and a pinion in mesh therewith, and mechanism controlled by type-operating mechanism for rotating said driving - pinion variable distances, substantially as described.

47. The combination of type mechanism, a carriage having a uniform letter-spacing feed, independently-operable adding-wheels, independent gears for rotating said wheels and placed at a uniform distance from center to center greater than the uniform letter-space feed of the carriage, a driving-pinion movable in the direction of its axis and out of mesh with said independent gears during a part of the forward traverse of the carriage, speed-multiplying mechanism between said carriage and said driving-pinion and thrown into operation at a predetermined point in the forward movement of the carriage and moving said driving-pinion axially into mesh with the first of said independent gears and from one to another thereof in succession, and mechanism intermediate type-operating mechanism and said driving-pinion for rotating the pinion variable distances, substantially as described.

48. The combination with type mechanism and a platen one of which moves uniform distances for letter-spacing, of independently-operable adding-wheels at a uniform distance apart from center to center greater than the uniform letter-space feed, an axially-movable rotary driver for said wheels and connected with said adding-wheels one at a time, and two independent mechanisms controlled by type - operating mechanism for moving the driver axially step by step in one direction and connecting it with said adding-wheels as described and for giving the driver variable motion in a rotary direction, substantially as described.

49. The combination with type-operating mechanism and a platen-carriage, of a series of independently-rotatable adding-wheels, a series of gears independently rotatable and connected each with a corresponding adding-wheel, a driving-pinion adapted to mesh with said independent gears and disengaged therefrom during the first part of the motion of said carriage to the left, connections thrown into operation at a predetermined point by said carriage for moving said driving-pinion axially into mesh with and from one to another of said independent gears, and mechanism controlled by type-operating mechanism for variably rotating said driving-pinion in one direction, substantially as described.

50. The combination of type mechanism, a carriage, a series of independently-rotatable adding-wheels each having a gear 179 thereon, a series of independent gears 178, intermediate gears 181 connecting gears 178 with the gears 179, a driving-pinion 190 automatically and discontinuously connected to the carriage during a part of the forward movement of the carriage, the said automatic con-

nection being effected by the forward run of the carriage, and the pinion 190 being adapted to mesh with said gears 178 one at a time and to be disengaged therefrom, connections between said carriage and said pinion 190 for moving the pinion 190 into mesh with the gears 178 in succession, and mechanism controlled by type-operating mechanism for rotating said pinion 190 variably, substantially as described.

51. The combination of a series of adding-wheels, a series of independent gears 178 connected to and rotating said adding-wheels, a driving-pinion having a step-by-step motion into mesh with and from one to another of said pinions 178, a reciprocating frame connected with said driving-pinion for rotating the same, and a series of cams for moving said reciprocating frame variable distances, type-writing mechanism, and means for moving said driving-pinion endwise and for operating said cams, substantially as described.

52. The combination with type-operating mechanism, a platen-carriage, independently-operable adding - wheels, gears connected therewith and operating the same, an axially-movable driver-pinion, mechanism intermediate said driver-pinion and the carriage including a rack on the carriage and a pinion on the frame disengaged from the rack during a part of the forward movement of the carriage, a locking-bar on said carriage, and a locking-lug connected with said pinion on the frame for preventing the rotation of said pinion before its engagement with said rack, with means for rotating said driver-pinion variable distances, substantially as described.

53. The combination with type-operating keys, a platen-carriage and adding mechanism, of mechanism for operating said adding mechanism and disengaged therefrom during a part of the forward movement of the carriage and said operating mechanism being partly operated by certain of the keys and partly by the carriage, and locking mechanism for said operating mechanism controlled by the carriage, substantially as described.

54. The combination of type mechanism, a carriage, adding mechanism, a driver for operating said adding mechanism and disengaged therefrom during a part of the forward motion of said carriage, a rack on said carriage, a pinion in the path of said rack with which the said rack meshes at a predetermined point in the forward motion of said carriage, mechanism intermediate said pinion and said driver for moving the driver in the direction of its axis of motion, a lug or projection connected and eccentrically placed with relation to said pinion, a locking-bar connected with said carriage and coacting with said lug to prevent rotation of said pinion until the carriage reaches said point, and means controlled from the keyboard for rotating said driver, substantially as described.

55. The combination of type mechanism, a carriage, adding-wheels and operating-gears

therefor placed at a uniform distance from center to center greater than the letter-space feed of said carriage, an axially-movable driving-pinion which is disengaged from said adding-wheel gear during a part of the forward motion of the carriage, a reciprocating rack to which said driving-pinion is connected and by which it is moved axially, a large pinion engaging said rack, a shaft carrying said pinion, a smaller pinion on said shaft, a short rack on the carriage for engaging with said smaller pinion at a predetermined point in the forward motion of the carriage, and a lug connected with and eccentrically placed with relation to said shaft or smaller pinion, a bar on said carriage coacting with said lug to lock the shaft against rotation until said short rack is in mesh with said pinion, and means controlled from the keyboard for rotating said driving-pinion variable distances, substantially as described.

56. The combination with type mechanism, a carriage, and carriage release and stop mechanism adapted to release the carriage at any point and to arrest it at different distances from a predetermined point, of adding mechanism, and operating means for said adding mechanism disengaged therefrom during a part of the forward motion of said carriage and controlled partly from the keyboard and partly by said carriage, substantially as described.

57. The combination with type mechanism, a carriage and carriage release and stop keys adapted to coact with said carriage to release the same at any point and to arrest it at different distances from a given point, of adding mechanism, and operating means therefor disengaged therefrom during a part of the forward motion of said carriage and controlled partly from the keyboard and partly by said carriage, substantially as described.

58. The combination of type-writing mechanism including a carriage having uniform letter-space feed, independently-operable adding-wheels arranged side by side in a frame, independent pinions for operating said wheels placed at uniform distances from center to center greater than the uniform letter-space feed, an axially-movable driving-pinion, speed-multiplying connections between said carriage and said pinion for moving the pinion axially step by step into mesh with said pinions singly in succession, mechanism controlled from the keyboard for rotating said driving-pinion variable distances, and means for moving said adding mechanism into two positions in one of which the adding mechanism is operated by said driving-pinion and in the other of which the driving-pinion is not operatively connected with said mechanism, substantially as described.

59. In a type-writing machine, the combination with type-operating mechanism including a carriage having uniform letter-space feed, independently-operable adding-wheels, pinions connected therewith for ro-

tating the same independently and placed at a uniform distance from center to center greater than the uniform letter-space feed, an axially-movable driving-pinion, speed-multiplying connections between said carriage and said pinion for moving the latter axially into mesh with said pinions singly in succession, mechanism controlled from the keyboard for rotating said driving-pinion variable distances, and means for moving said adding mechanism into two positions in one of which it may be operated by said driving-pinion and in the other of which it is not operated thereby, substantially as described.

60. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disconnected from the carriage but adapted to be brought in coöperative relation with said carriage and type mechanism at a given point in the forward traverse of the carriage, mechanism for releasing said carriage, and a variable stop mechanism for arresting said carriage at different distances from a predetermined point, substantially as described.

61. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged from the carriage but adapted to be brought into coöperative relation with said mechanism and carriage at a given point in the forward traverse of the carriage, a mechanism for releasing said carriage from the control of said escapement, and a series of stops at letter-space distances apart for arresting said carriage at different distances from a predetermined point, substantially as described.

62. The combination of a type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged from said carriage but adapted to be brought into coöperative relation therewith and with said type mechanism at a given point in the forward traverse of said carriage, a mechanism for releasing said carriage, and a series of stops equal in number at least to the number-carriers of the adding mechanism representing units, tens, hundreds, &c., and adapted to arrest said carriage at different distances from a predetermined point, substantially as described.

63. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged from said carriage but adapted to be brought into coöperative relation therewith and with said type mechanism at a given point in the forward traverse of said carriage, a mechanism for releasing said carriage from the control of said escapement, and key-actuated stops for arresting said carriage at different distances from a predetermined point, substantially as described.

64. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged from said carriage but adapted to be brought into

coöperative relation therewith at a given point in the forward traverse of the carriage, a mechanism for releasing said carriage from the control of the escapement, and key-actuated stops arranged at letter-space distances apart and adapted to arrest said carriage at different letter-space distances from a predetermined point, substantially as described.

65. The combination with type mechanism, a power-driven escapement-controlled carriage, a carriage release and stop mechanism adapted to release the carriage and to reengage and stop the carriage at a given point, of adding mechanism brought into operative relation with the carriage and type mechanism when the carriage reaches said point, substantially as described.

66. The combination with type mechanism, a power-driven escapement-controlled carriage, a mechanism for releasing said carriage, and a stop interposable in the path of said carriage or a part thereon and adapted to arrest the carriage at a given point, with adding mechanism brought into operative relation with the carriage and type mechanism when the carriage reaches said point, substantially as described.

67. The combination with type mechanism, a power-driven escapement-controlled carriage, an adding mechanism adapted to be brought into operative relation with the carriage and type mechanism when the carriage reaches a predetermined point in its forward traverse, release mechanism adapted to release the carriage, and a stop interposable in the path of a part on or connected to and moving with the carriage to arrest the carriage so that upon the reengagement of the carriage with its controlling mechanism the adding mechanism will be in proper operative relation with said carriage and type mechanism, substantially as described.

68. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged from said carriage and inactive during a part of the forward traverse of said carriage and brought into operative relation therewith and with the type mechanism at a predetermined point in the forward motion of said carriage, a carriage-release mechanism adapted to release the carriage and permit it to run forward under the influence of the power, and a stop interposable in the path of a part on or connected to and moving with said carriage, said power, said release and said stop devices coöperating to permit or cause the power-driven carriage to move forward quickly to and to be arrested at said predetermined point on the release of the stop, substantially as described.

69. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism normally disengaged but adapted to be brought into coöperative relation with the carriage and type mechanism

when the carriage reaches a predetermined point in its forward traverse, a series of carriage-stops arranged at letter-space distances apart and adapted to arrest the carriage at different distances from a given point and means for releasing the carriage and permitting it to be driven forward quickly until arrested by the selected interposed stop, substantially as described.

70. The combination of type mechanism, a power-driven escapement-controlled carriage, adding mechanism brought into operative relation with the carriage and type mechanism when the carriage reaches a predetermined point in its forward traverse, a carriage-release mechanism, a series of carriage-stops arranged at letter-space distances apart and adapted to arrest the carriage at different distances from a given point, and keys for simultaneously releasing the carriage and interposing said stops, substantially as described.

71. The combination of type mechanism, a power-driven carriage, and adding mechanism adapted to be brought into operative relation with the carriage and type mechanism when the carriage reaches a predetermined point in its forward traverse, a series of key-levers each having a carriage-stop at one end, a coöperating stop or lug on the carriage adapted to coact with said key-operated stops, a universal bar actuated by all of said key-levers, a carriage-controlling escapement adapted to be separated by the operation of said universal bar and said key-levers to release the power-driven carriage and permit it to run forward freely until arrested by the stop interposed by the depression of one of said key-levers whereby the adding mechanism is brought into said operative relation and the carriage is immediately positioned for writing numbers in proper relation to other numbers in columnar arrangement, substantially as described.

72. The combination of type mechanism, a carriage, an adding mechanism having independent means for operating its number-carriers, a driver for operating said independent means one at a time and said driver and said means being disengaged during a part of the forward traverse of said carriage, and said driver and said adding mechanism being relatively movable step by step, means for automatically connecting said step-by-step element with the carriage when the latter reaches a given position in its forward traverse and moving step by step thereafter as the carriage moves into the positions in which there is engagement between said driver and said independent means, and means for moving the non-step-by-step movable element into position where there will not be engagement between said driver and said independent means while the said step-by-step moving element is in its positions for said engagement, substantially as described.

73. The combination of type mechanism, a

carriage, an adding mechanism having independent means for operating its number-carriers, a driver for operating said independent means one at a time and disengaged therefrom during a part of the forward traverse of the carriage, mechanism for connecting said driver with said carriage when the carriage reaches a given point in its forward traverse and thereafter moving the driver step by step into positions for meshing with and from one to another of said independent means, and means for moving said adding mechanism into and out of position for actuation by said driver, substantially as described.

74. The combination of type mechanism, a carriage, a series of number-wheels each provided with two gears, as 179, 180, independent pinions 181 meshing with gears 179, independent pinions 182 meshing with gears 180, independent gears 178 meshing with pinions 181, pinions 183 journaled eccentrically of and on gears 178 and adapted to coact with pinions 182 to "carry," spring-detents engaging said pinions 183 and permitting them to rotate freely in but one direction, said number-wheels, gears 178, 179, 180, pinions 181, 182, 183 and detents forming an adding mechanism, a driver adapted to operate said gears 178 one at a time but out of engagement therewith during part of the forward traverse of the carriage and said driver and said adding mechanism being movable one relatively to the other in a step-by-step manner to cause engagement or mesh of said driver and said gears 178, mechanism connecting said driver with type-operating mechanism to rotate the driver, and mechanism for connecting the step-by-step moving element of the driver-adder couple with the carriage when the last reaches a given point in its forward traverse and for moving said movable element step by step as the carriage further progresses by steps after such connection is established, substantially as described.

75. The combination of type mechanism, a carriage, a series of number-wheels each provided with two gears, as 179, 180, independent pinions 181 meshing with gears 179, independent pinions 182 meshing with gears 180, independent gears 178 meshing with pinions 181, pinions 183 journaled eccentrically of and on gears 178 and adapted to coact with pinions 182 to "carry," spring-detents engaging said pinions 183 and permitting them to rotate freely in but one direction, said number-wheels, gears 178, 179, 180, pinions 181, 182, 183 and detents forming an adding mechanism, a driver adapted to operate said gears 178 one at a time but out of engagement therewith during part of the forward traverse of the carriage, and said driver being movable step by step into engagement or mesh with and from one to another of said gears 178, mechanism connecting said driver with type-operating mechanism to rotate the driver and mechanism for connecting the driver with the carriage when the carriage

has reached a given point in its forward traverse and for moving said driver step by step into engagement with and from one to another of said gears 178 as the carriage further progresses step by step after such connection is established, substantially as described.

76. The combination of type mechanism, a carriage, two independently-rotatable number-wheels having the same axis of motion, a gear 179 on the wheel of lower denomination, a gear 180 on the wheel of higher denomination, a pinion 181 meshing with gear 179, a pinion 182 meshing with gear 180, a gear 178 meshing with pinion 181, a one-way yielding detent on gear 178 adapted to intermittently actuate pinion 182 to carry, said number-wheels, gears 178, 179, 180, pinions 181, 182 and detent forming an adding mechanism, a driver adapted to operate said gear 178 but out of engagement therewith during part of the forward traverse of the carriage, and said driver and said adding mechanism being movable one relatively to the other in a step-by-step manner to cause engagement or mesh of said driver and said gear 178, mechanism connecting said driver with type-operating mechanism to rotate the driver and mechanism for connecting the step-by-step moving element of the driver adder-couple with the carriage when the carriage reaches a given point in its forward traverse and for moving said movable element step by step as the carriage further progresses step by step after such connection is made, substantially as described.

77. The combination of type mechanism, a carriage, two number-carrying wheels independently rotatable on the same axis, a gear 179 on the wheel of lower denomination, a gear 180 on the wheel of higher denomination, a pinion 181 meshing with gear 179, a pinion 182 meshing with gear 180, a driver-gear 178 meshing with pinion 181, a pinion 183 pivoted on gear 178 eccentrically thereof and adapted to engage with pinion 182 to "carry," a detent permitting said pinion 183 to rotate freely in but one direction, said number-wheels, gears 178, 179, 180, pinions 181, 182, 183 and the detent forming an adding mechanism, a driver adapted to operate said gear 178 but out of engagement therewith during part of the forward traverse of the carriage, and said driver and said adding mechanism being movable one relatively to the other in a step-by-step manner to cause engagement or mesh of said driver and said gear 178, mechanism connecting said driver with type-operating mechanism to rotate the driver and a mechanism for connecting the step-by-step moving element of the driver adder-couple with the carriage when the last reaches a given point in its forward traverse and for moving said movable element step by step as the carriage further progresses after such connection is made, substantially as described.

78. The combination of type mechanism, a carriage, a series of number-wheels inde-

pendently rotatable on the same shaft or axis, a series of independent driving or motion-transmitting gears operatively connected each with the corresponding number-wheel 5 and provided with stop pins or lugs, a series of pivoted detent-fingers adapted to coact with said stop pins or lugs to arrest said gears in given positions, and a frictional device for reversely rotating said wheels and gears until said fingers arrest said pins or lugs and bringing said wheels and gears to their initial or zero positions with a driver for operating said gears one at a time and disengaged therefrom during a part of the forward traverse 10 of the carriage and operatively connected with type-operating mechanism, and mechanism for connecting said driver with the carriage when the carriage has reached a given point in its forward traverse and for thereafter moving the driver step by step as the carriage progresses and into engagement with and from one to another of said gears, substantially as described.

79. The combination of type mechanism, a carriage, an adding mechanism having independently-operable number-carriers, driver mechanism for operating said adding mechanism and disengaged therefrom during a part of the forward traverse of the carriage, 30 a shaft journaled in the framework and discontinuously geared with the carriage but continuously geared with the driver mechanism, and connections between the driver mechanism and type mechanism, substantially as described.

80. The combination of type mechanism, a carriage, an adding mechanism having independently-operable number-carriers, a driving mechanism for operating said adding mechanism, connections between the driver mechanism and type mechanism, and a shaft journaled in the framework intermediate said driver mechanism and said carriage and continuously geared with one and discontinuously geared with the other of said driver mechanism and carriage elements, substantially as described.

81. The combination with a type-writing mechanism, including a carriage, a series of letter and figure types, and keys therefor, of a tabulating mechanism for controlling the movement of the carriage, and an adding mechanism brought into operative connection with both the carriage and the figure keys 55 upon the operation of the tabulating mechanism, substantially as described.

82. The combination of a platen, means for feeding said platen letter-space distances, a series of letter and figure types which cooperate with the platen and keys therefor, a series of adding-wheels, and key-controlled selecting means for automatically connecting the figure-keys with any of the adding-wheels, substantially as described.

83. The combination of a platen, means for feeding said platen letter-space distances, a series of letter and figure types which coop-

erate with the platen and keys therefor, a series of adding-wheels, a selecting-key associated with each adding-wheel, and means called into action upon the operation of any one of said selecting-keys for connecting its associated wheel with the figure-types, substantially as described. 70

84. The combination with the carriage of a type-writing machine, of a series of adding-wheels, means controlled by the carriage at one portion of its forward traverse for connecting any of the wheels to the figure-keys of the type-writing machine, and a series of tabulating-stops for arresting the carriage at any selected point in said portion of its travel, substantially as described. 75

85. The combination with the carriage of a type-writing machine of a series of adding-wheels, means controlled by the carriage at one portion of its forward traverse for connecting any of the wheels with the figure-keys of the type-writing machine, and a series of key-controlled stops for arresting the carriage at any selected point in said portion of its travel, substantially as described. 80

86. In a type-writing and adding mechanism, the combination of a power-driven carriage, a series of adding-wheels, means controlled by the carriage at one portion of its forward traverse for connecting any of the adding-wheels with the figure-keys of the type-writing machine, releasing mechanism for the carriage, a key constructed to operate the releasing mechanism, and a stop constructed to coact with the release-key for stopping the carriage, after its release, at the said portion of its forward traverse, substantially as described. 85

87. In a type-writing, tabulating and adding mechanism, the combination of a power-driven carriage, a series of adding-wheels, means controlled by the carriage at one portion of its forward traverse for connecting any of the adding-wheels with the figure-keys of the type-writer, a releasing device for the carriage, a series of keys constructed to operate the releasing device, and a series of stops constructed to coact with the releasing-keys for stopping the carriage, after its release, at any point in said portion of its travel, substantially as described. 90

88. The combination of a series of letter and figure types, a series of keys therefor, a carriage connected for letter-space movements to all the keys, whereby numbers may be written in a column on a predetermined portion of a page, and words may be written opposite numbers, a series of adding-wheels, and means automatically called into action only during the movement of the column past the printing-point in both directions of the carriage travel, for connecting the adding-wheels consecutively to the figure-keys at the forward traverse of the carriage, and for restoring said adding-wheel-connecting means to initial position at the return traverse thereof, substantially as described. 95

89. The combination of a series of letter and figure types, a series of keys therefor, a carriage connected for letter-space movements to all the keys, a series of adding-wheels, and means automatically called into action during only the final portion of the forward traverse of the carriage for connecting the adding-wheels consecutively to the figure-keys, and only during the initial portion of the reverse movement of the carriage for restoring said adding-wheel-connecting means to initial position, substantially as described.

90. The combination of a series of letter and figure types and keys therefor, a series of adding-wheels, a selecting-key associated with each adding-wheel, and means called into action upon the operation of any one of said selecting-keys for automatically connecting its associated wheel with the figure-keys and simultaneously moving the carriage so that the corresponding digit-column on the paper is brought to the printing-point, substantially as described.

91. The combination of a series of letter and figure types, a series of keys therefor, a power-driven carriage connected to all the keys for letter-space movements, a series of adding-wheels, a series of tabulating-keys connected to the carriage, each of which is constructed to release the carriage and cause it to be arrested at a predetermined point, the carriage being constructed to automatically connect with the adding-wheels upon being so released, and to automatically bring into connection with the figure-keys the adding-wheel that corresponds to the digit-column that is brought to the printing-point when the carriage is so arrested, substantially as described.

92. The combination of a power-driven paper-carriage, including letter and figure types and keys therefor, a series of adding-wheels, driving means therefor, said wheels and said driving means being relatively movable, key-operated variable stop mechanism connected to the paper-carriage and constructed to release and cause the same to be arrested at different points, as determined by the particular stop-key operated, and means controlled by said carriage for automatically connecting said wheel-driving means to the carriage after it is so released and before it is so arrested, so as to produce a relative movement of the adding-wheels and their said driving means, and to thereby connect to the figure-keys the adding-wheel that corresponds to the digit-column that is brought to the printing-point when the carriage is so arrested, substantially as described.

93. In a combined type-writing and adding machine, mechanism whereby type-writing may be done on one part of the line without adding, and whereby adding may be done at the end of the line when writing figures in a column, a set of denomination or order keys connected to the adding mechanism and to the paper-carriage of the type-writer for vari-

ably positioning the paper-carriage and adding mechanisms, whereby when any selected denomination-key is actuated the paper-carriage is released and brought rapidly to a point corresponding to the denomination of the number to be written in the column, and at the same time the adding mechanism is automatically adjusted to a corresponding point, so that when a type-key is struck the figure will be printed in the proper position in the column, and the adding-wheel of the same denomination will be simultaneously affected, so as to correctly add the figure printed.

94. The combination of a series of letter-types and keys therefor, a series of figure-types and keys therefor, a carriage connected for letter-space movements to all the keys, whereby words may be written at one portion of each line in connection with numbers written at another portion of each line, a series of adding-wheels, means called into action at a predetermined portion of the traverse of the said carriage for engaging any adding-wheel to the figure-keys, and means for enabling any key to limit the rotative movement of the adding-wheel to an extent corresponding with the numeral represented by the key, whereby the successive numbers so written at such portion of the carriage traverse may be added, substantially as described.

95. The combination of a carriage, a series of figure-types and keys therefor, a series of number-carriers, a series of independently-movable devices, as 178, for operating said number-carriers, a variable-throw driver operatively connected to said figure-keys and constructed and arranged to drive said number-carrier-operating devices one at a time, automatically-operative means controlled by said carriage for causing a relative step-by-step movement between said driver and said number-carrier-operating devices, and hand-operated means for positioning said movable devices where the step-by-step movement thereof and the driver with relation one to another will be ineffective to bring the parts into coöperative relation, substantially as described.

96. The combination of a series of figure-types and keys therefor, a series of number-carriers, a series of independently-movable devices for operating said number-carriers, a variable-throw driver connected to said figure-keys and constructed and arranged to drive said number-carrier-operating devices one at a time, means controlled by said carriage for causing a relative step-by-step movement between said driver and said number-carrier-operating devices, and key-controlled selecting means for automatically connecting the figure-keys and driver with any desired number-carrier, substantially as described.

97. The combination of figure-types and keys therefor, a paper-carriage, number-wheels, a gear on each side of and fixed to each of the number-wheels, gears 178, one for

each of the number-wheels, one or more pinions 183 pivoted to each of said gears 178, and intermediate pinions 181 and 182 between the gears 178 and the gears on the number-wheels, there being twice as many pinions 181 and 182 as there are gears 178.

98. The combination of a series of figure-types and keys therefor, a paper-carriage controlled by said keys, a rack 191 moved by said carriage, a pinion 195 meshing with said rack, a second pinion 198 moved by said pinion 195, a rack 199 meshing with the pinion 198, a gear 190, the axial movement of which is controlled by the rack 199, and number-carriers operable one at a time by said gear 190, substantially as described.

99. The combination of a series of key-controlled figure-types, a carriage, an adding mechanism including a second carriage, speed-multiplying connections between said carriages, and key-controlled selecting means for automatically connecting the figure-keys with any desired number-carrier in said adding mechanism, substantially as described.

100. The combination of a series of figure-types and keys therefor, a carriage, a series of number-carriers, a driver for operating said carriers one by one, connections between said driver and the figure-keys, speed-multiplying connections between said carriage and said driver, and a series of selecting-keys for automatically connecting the driver with any desired number-carrier, substantially as described.

101. The combination of a series of figure-types and keys therefor, a carriage, a series of number-wheels, a series of independently-operable gears for actuating said number-wheels, said gears being placed at intervals greater than the letter-space movements of said carriage, a driving-pinion movable in an axial direction from gear to gear, speed-multiplying mechanism connecting said carriage to said driving-pinion, and connections from said pinion to said figure-keys, substantially as described.

102. The combination of a series of figure-types and keys therefor, a carriage, a series of number-wheels, a series of independently-operable gears for actuating said number-wheels, said gears being placed at intervals greater than the letter-space movements of said carriage, a driving-pinion movable in an axial direction from gear to gear, speed-multiplying mechanism connecting said carriage to said driving-pinion, connections from said pinion to said figure-keys, and a key-controlled selecting mechanism for automatically connecting the driver with any desired number-carrier, substantially as described.

103. The combination of a series of figure-types and keys therefor, a carriage, a series of number-wheels, a series of independently-operable gears which cooperate with and are adapted to actuate said number-wheels, gear 190 which is operatively connected to said figure-keys, rack 191, pinion 195, pinion 198,

rack 199, said racks and pinions comprising intermediate mechanism between the carriage and gear 190, for bringing about an axial movement of said gear 190 and the actuating-gears with relation one to another, and a key-controlled selecting mechanism for automatically connecting said gear 190 with any desired number-wheel-actuating gear, substantially as described.

104. The combination of a key-operated type mechanism, a carriage, adding mechanism, a driver for independently operating each element of the adding mechanism, connections between said driver and said carriage for moving the driver in one direction from element to element of the adding mechanism, connections from said key-operated type mechanism for moving said driver variable distances in another direction to operate said adding mechanism, and a key-controlled selecting mechanism for automatically connecting said driver with any desired element of the adding mechanism, substantially as described.

105. The combination of a key-operated type mechanism, a spring-propelled carriage, a series of adding-wheels, a driver movable from wheel to wheel, connections from said driver to said key-operated mechanism for moving said driver in one direction, connections from said driver through said carriage to said key-operated mechanism for moving said driver in another direction, and connections from said driver through said carriage to an independent series of keys for automatically connecting said driver with any desired wheel, substantially as described.

106. The combination of a key-operated type mechanism, a series of adding-wheels, a series of independently-actuable gears for operating said adding-wheels, a driving-pinion common to all of said gears, a reciprocatory frame for operating said driving-pinion, a series of key-operated cams connected to said type mechanism for operating said reciprocatory frame, means for moving said driving-pinion from gear to gear, and a key-controlled selecting mechanism for automatically connecting said driving-pinion with any desired gear, substantially as described.

107. The combination of a key-operated type mechanism, a carriage, an adding mechanism including another carriage, said carriages being spring-propelled and the carriage of the adding mechanism being connected to move at greater speed than the first-mentioned carriage, and connections between said type mechanism and said adding mechanism, whereby the number printed at the operation of a key is automatically added, substantially as described.

108. The combination of a series of figure-types, keys therefor, a carriage, an adding mechanism including a carriage, said carriages being spring-propelled and the carriage of the adding mechanism being connected to move faster than the first-mentioned carriage,

connections between said type-keys and said adding mechanism, whereby the number printed at the depression of a key is automatically added, and a key-operated mechanism for connecting said figure-keys simultaneously with any desired number-carrier of the adding mechanism, substantially as described.

109. The combination of a series of number-carriers, a key-controlled common actuator therefor, a propelling-spring for causing relative movements between said number-carriers and said actuator, an escapement mechanism for controlling said movements, a releasing mechanism, and a key-controlled stop mechanism, whereby said spring is enabled to cause a rapid relative movement between said number-carriers and said actuator, independently of said escapement mechanism, and whereby said relative movement is arrested at a point predetermined by said key-controlled stop mechanism, substantially as described.

110. The combination of a series of figure-types, keys therefor, a series of number-carriers, a common actuator for said carriers, connections from said keys to said actuator, a propelling-spring for causing relative movements between said number-carriers and said actuator, escapement mechanism for controlling said relative movements, releasing mechanism, and a key-controlled stop mechanism, whereby said spring is enabled to cause relative movement between said number-carriers and said actuator, independently of said escapement mechanism, and whereby said relative movement is arrested at a point predetermined by said key-controlled stop mechanism, substantially as described.

111. The combination of a series of figure-types, keys therefor, a series of number-wheels, a common rotary driver for said number-wheels, connections from said driver to said keys, a propelling-spring for moving said driver in an axial direction along said series of number-wheels, escapement mechanism for controlling said axial movements of the common driver, a releasing mechanism, a series of stops, and a series of denomination-keys connected to said stops and to said releasing mechanism, the construction and arrangement being such that at the depression of any of said denomination-keys said common driver is released from the control of said escapement mechanism and is moved rapidly by said propelling-spring until arrested by the stop associated with the operated denomination-key, and in position to effect a rotation of the number-wheel corresponding to the denomination of the said depressed key.

112. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means controlled by said letter-keys for effecting a letter-space feed of the carriage, adding mechanism, actuating means

therefor, and key-controlled mechanism for effecting a movement of the carriage through any desired number of letter-space distances and to place the adding mechanism and its actuating means in cooperative relation.

113. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means controlled by said letter-keys for effecting a letter-space feed of the carriage, adding mechanism, actuating means therefor, means for maintaining said adding mechanism out of operation during a portion of the movement of the carriage, and key-controlled mechanism for effecting a movement of the carriage through any desired number of letter-space distances and to automatically place the adding mechanism and its actuating means in cooperative relation.

114. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means controlled by said letter-keys for effecting a letter-space feed of the carriage, adding mechanism, actuating means therefor, and key-controlled mechanism for effecting a movement of the carriage through any desired number of letter-space distances and to place any desired portion of the adding mechanism and its actuating means in cooperative relation.

115. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means controlled by said letter-keys for effecting a letter-space feed of the carriage, actuating mechanism therefor, and key-controlled mechanism for releasing the carriage from its letter-space-feeding mechanism to permit a free movement of the carriage through any desired number of letter-space distances and to place the adding mechanism and its actuating means in cooperative relation and to automatically reengage the carriage with the letter-spacing means after the carriage has been moved as described.

116. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means for effecting a letter-space feed of the carriage, adding mechanism, actuating means therefor, and selecting mechanism for effecting a free movement of the carriage throughout any number of letter-space distances and to automatically arrest the carriage at any one of a number of positions where the adding mechanism and its actuating means are brought into cooperative relation.

117. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means for effecting a letter-space feed of the carriage, adding mechanism, actuating means therefor, a plurality of key-controlled selecting-stops carried by the framing of the machine and means cooperating therewith for effecting a free movement of the carriage throughout any number of letter-space distances and to automatically arrest the carriage at any one of a number of positions

where the adding mechanism and its actuating means are brought into coöperative relation.

118. In a combined type-writing and adding machine, the combination of a carriage, letter-keys, means for effecting a letter-space feed of the carriage, adding mechanism which during certain portions of the movement of the carriage is maintained out of operation, actuating means for said adding mechanism, key-controlled mechanism for releasing the carriage from its letter-spacing means, and adjustable means for determining the point of arrest of the carriage and whether or not the adding mechanism is to be rendered operative.

119. The combination of a carriage, letter-keys, means for effecting a letter-space feed of the carriage, adding mechanism, means for maintaining the adding mechanism out of operation during certain portions of the movements of the carriage, but which causes the adding mechanism to be automatically brought into condition to be operated by a further movement of the carriage, actuating means for said adding mechanism, key-controlled mechanism for releasing the carriage from its letter-spacing means and for automatically selecting any desired element of the adding mechanism for operation, and adjustable means for determining the point of arrest of the carriage and whether or not the adding mechanism is to be rendered operative.

120. The combination with a type-writing machine, of adding mechanism operatively connected therewith, said adding mechanism comprising adding-wheels, a driver and means for moving said driver in an axial direction, and hand-operated means for adjusting said driver and its coöperating adding-wheels one with relation to the other without disconnecting the driver from said moving means, whereby the driver though rotated is rendered ineffective to coöperate with its coöperating mechanism.

121. The combination with a type-writing machine, of adding mechanism operatively connected therewith, said adding mechanism comprising number-wheels, a driver, means for automatically moving said driver in an axial direction, and a plurality of intermediate wheels which transmit motion to the number-wheels and which coöperate with the driver, and hand-operated means for adjusting said driver and its coöperating wheels one with relation to the other, whereby the driver though rotated is rendered ineffective to coöperate with its intermediate wheels and number-wheels.

122. The combination with a type-writing machine, of adding mechanism, key-controlled denominational mechanism for automatically rendering any desired portion of the adding mechanism operative and for simultaneously positioning the carriage of the type-writing machine to the corresponding denominational position.

123. The combination with a type-writing machine, of adding mechanism comprising number-wheels and means for operating the number-wheels, and key-controlled denominational mechanism for automatically rendering any desired number-wheel of the adding mechanism operative by its operating means and for simultaneously positioning the carriage of the type-writing machine to the corresponding denominational position.

124. The combination with a type-writing machine of adding mechanism, key-controlled denominational mechanism for automatically rendering any desired portion of the adding mechanism operative and for simultaneously positioning the carriage of the type-writing machine to the corresponding denominational position, and indices for said denominational mechanism.

125. The combination of a carriage, letter-keys, means controlled by said letter-keys for effecting a letter-space feed of the carriage, adding mechanism, actuating means therefor, key-controlled mechanism for effecting a movement of the carriage through any desired number of letter-space distances and to place the adding mechanism and its actuating means in operative relation, and denominational indices for said key-controlled mechanism.

126. The combination with a type-writing machine, of adding mechanism which is adapted to be automatically thrown into or out of coöperative relation with the type-writing machine by an operation of the machine, said adding mechanism comprising a plurality of disconnected independently-operable number-wheels, an axially-moved driver which rotates all of said wheels, and intermediate mechanism between said driver and number-wheels, whereby the said intermediate mechanism performs the "carrying" operation of the number-wheels.

Signed in the borough of Manhattan, in the city of New York, in the county of New York and State of New York, this 23d day of November, A. D. 1898.

EUGENE FITCH.

Witnesses:

R. W. BARKLEY,
K. V. DONOVAN.