

No. 702,052.

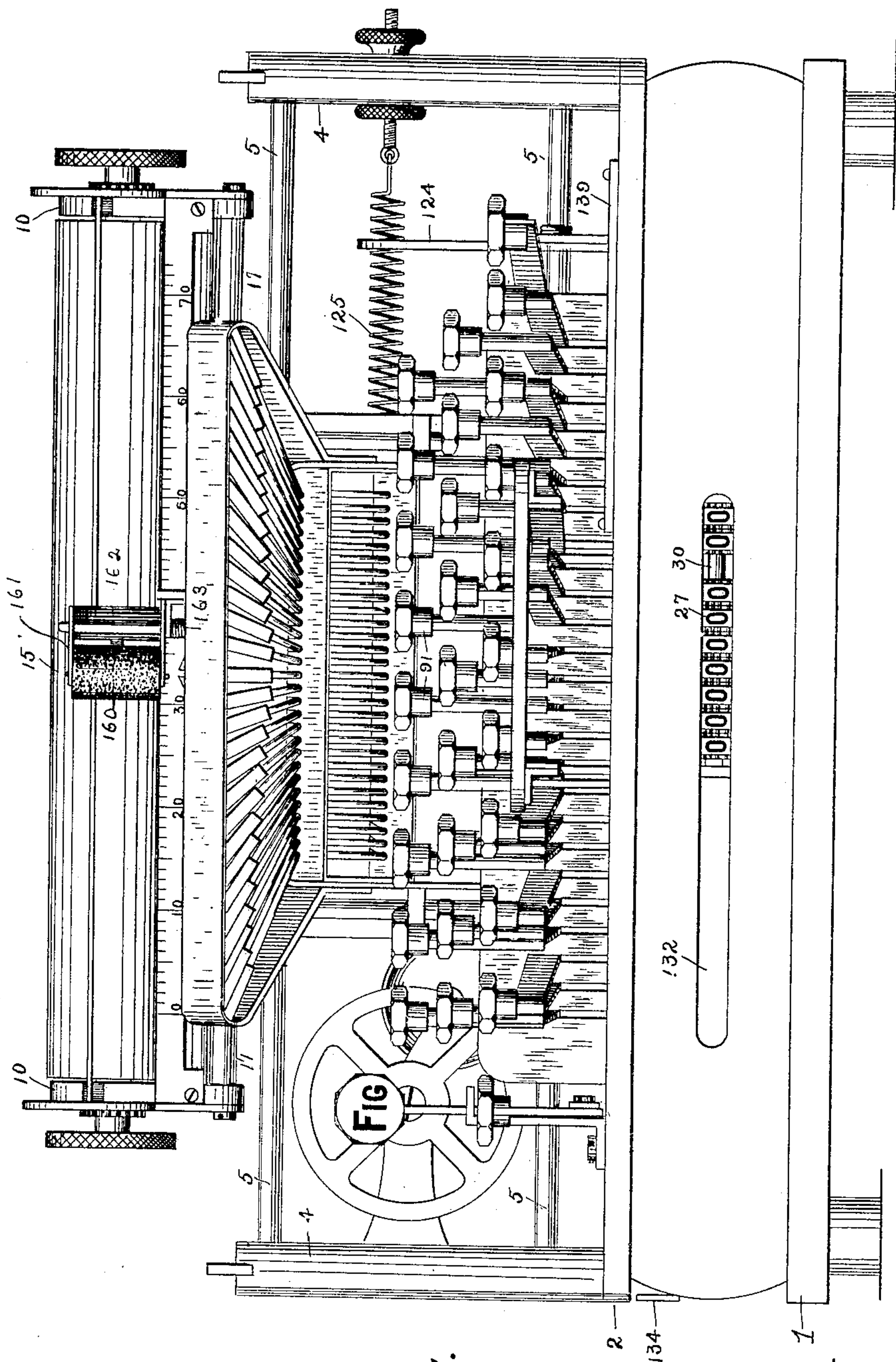
Patented June 10, 1902.

E. FITCH.  
ADDING MACHINE.

(Application filed Nov. 28, 1898.)

(No Model.)

7 Sheets—Sheet 1.



WITNESSES:

H. H. Steele.  
K. V. Donovan.

Fig. 1.

INVENTOR,

Eugene Fitch

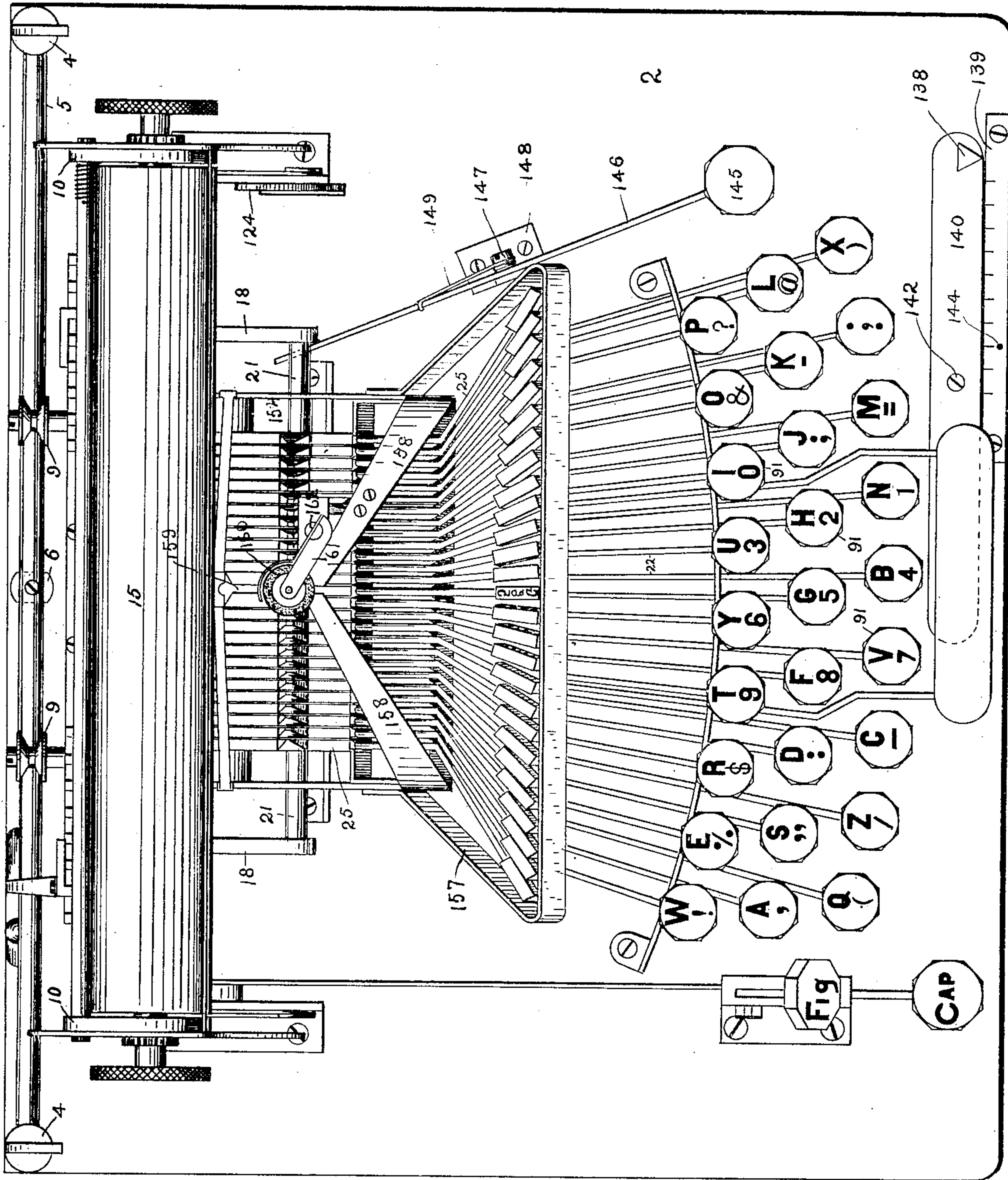
by James F. Fitch  
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E. FITCH.  
ADDING MACHINE.

(Application filed Nov. 28, 1898.)

(No Model.)

7 Sheets—Sheet 2.



WITNESSES:

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*Fig. 2.*

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E. FITCH.  
ADDING MACHINE.

(Application filed Nov. 28, 1898.)

(No Model.)

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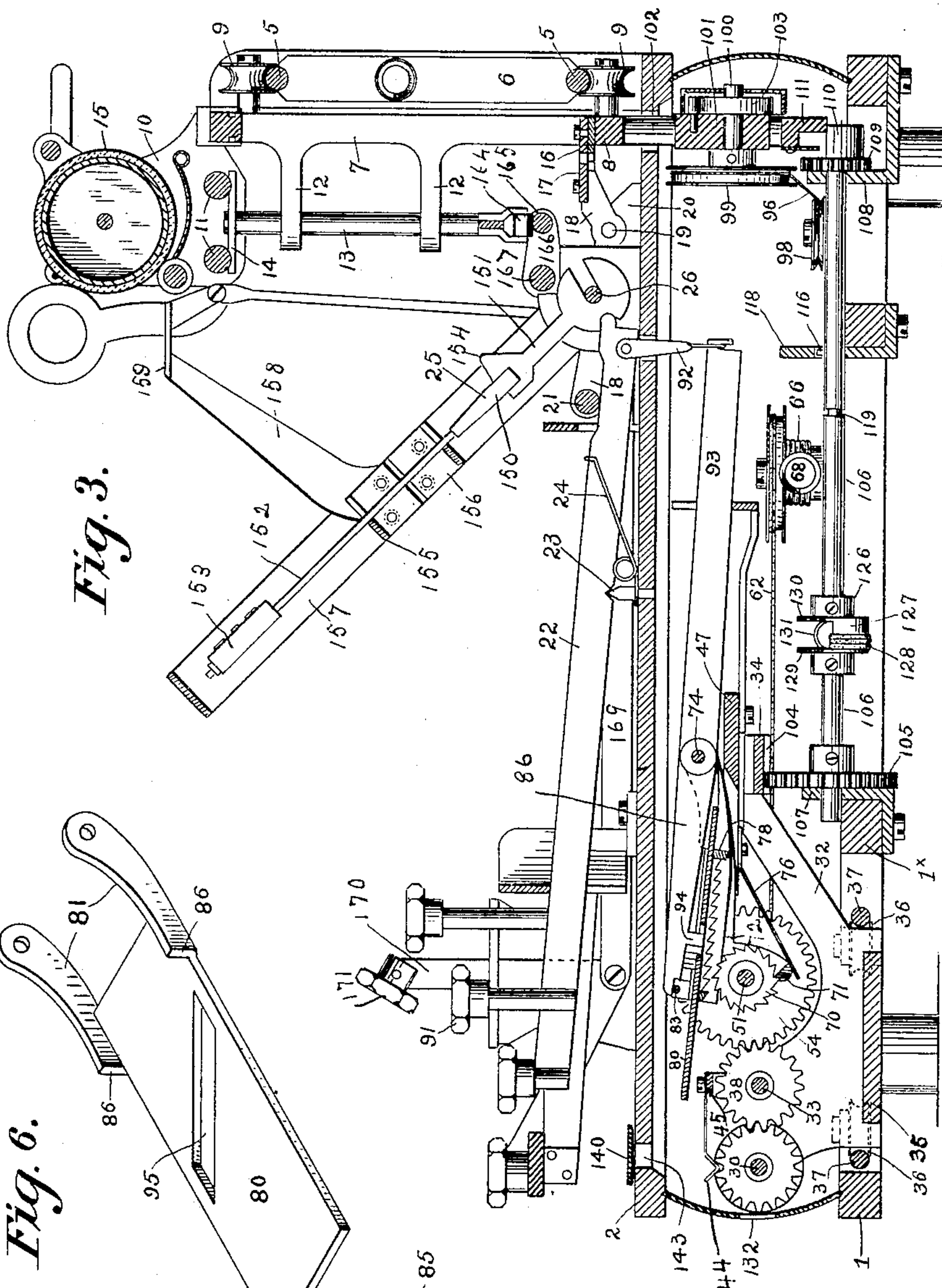


Fig. 3.

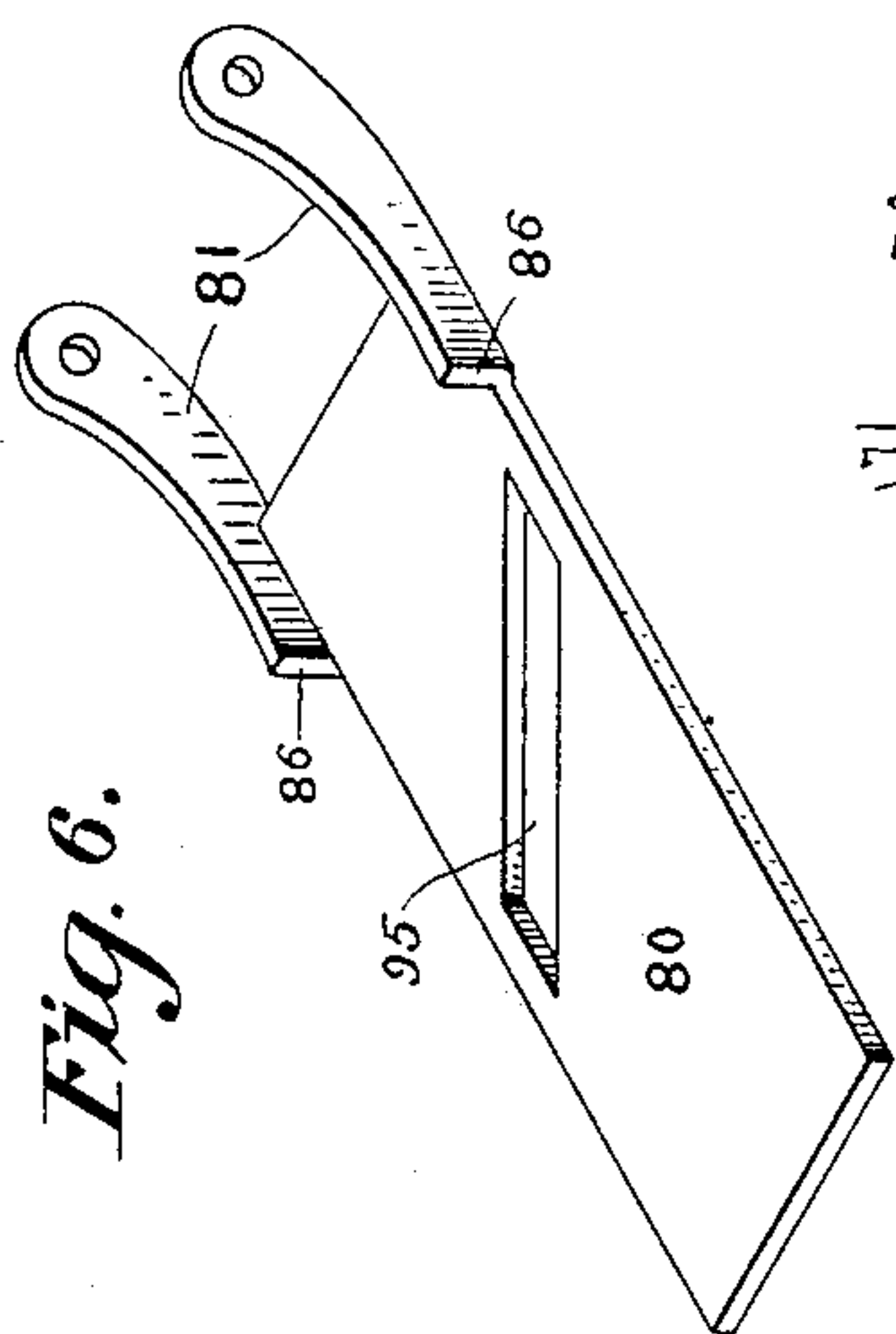


Fig. 6.

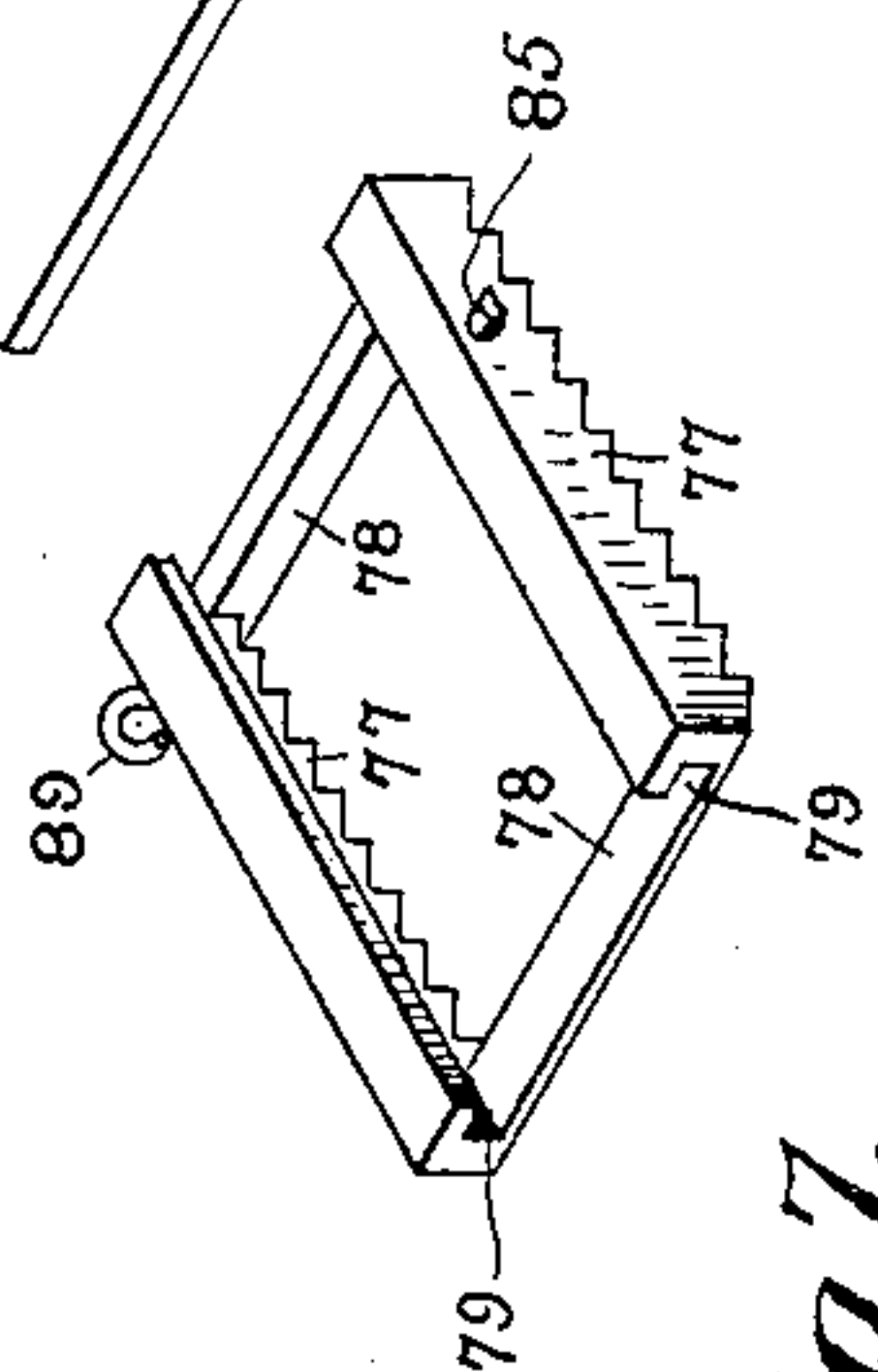


Fig. 7.

WITNESSES:

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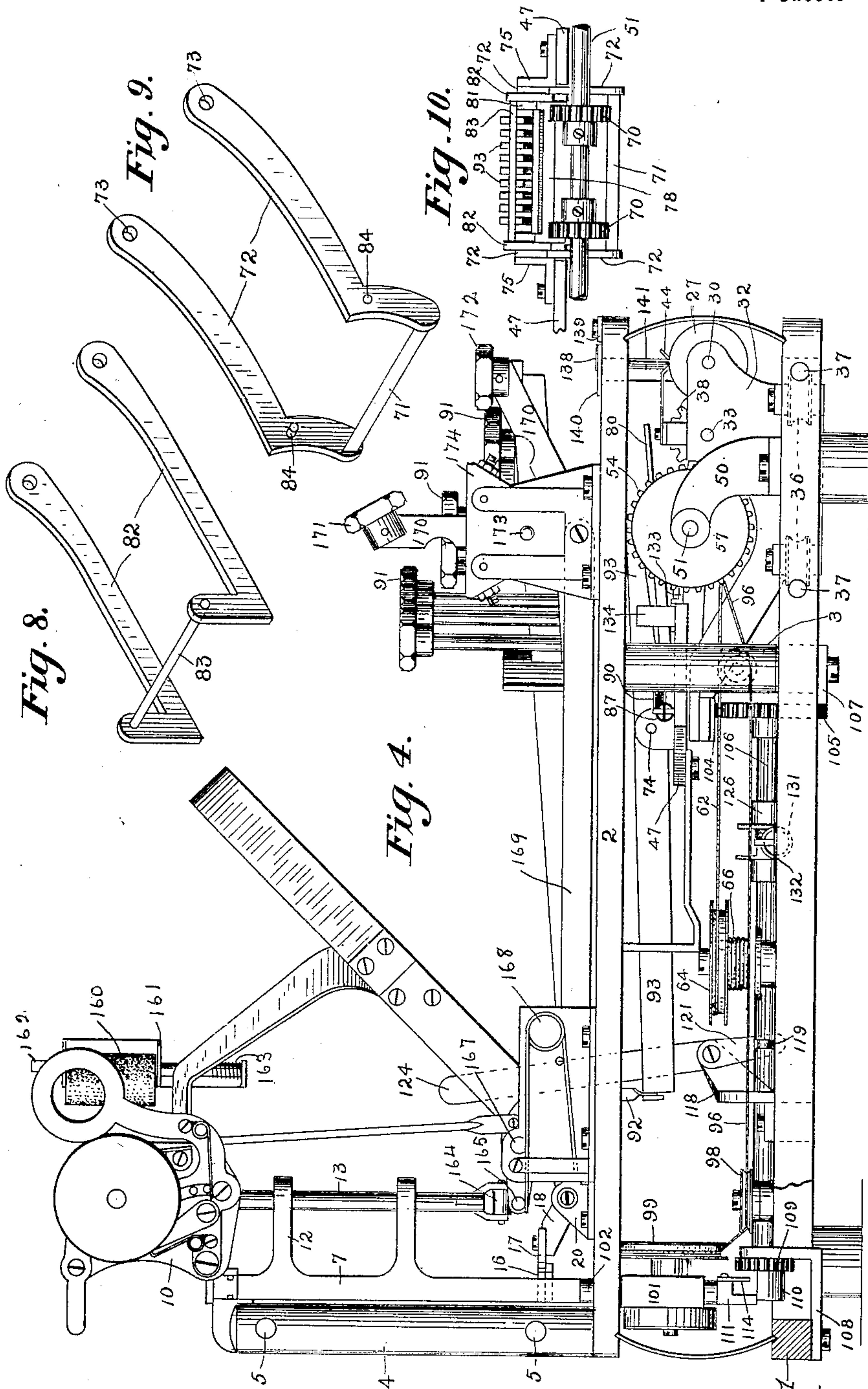
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E. FITCH.  
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(Application filed Nov. 28, 1898.)

(No Model.)

7 Sheets—Sheet 4.



WITNESSES:

*H. H. Steele.*

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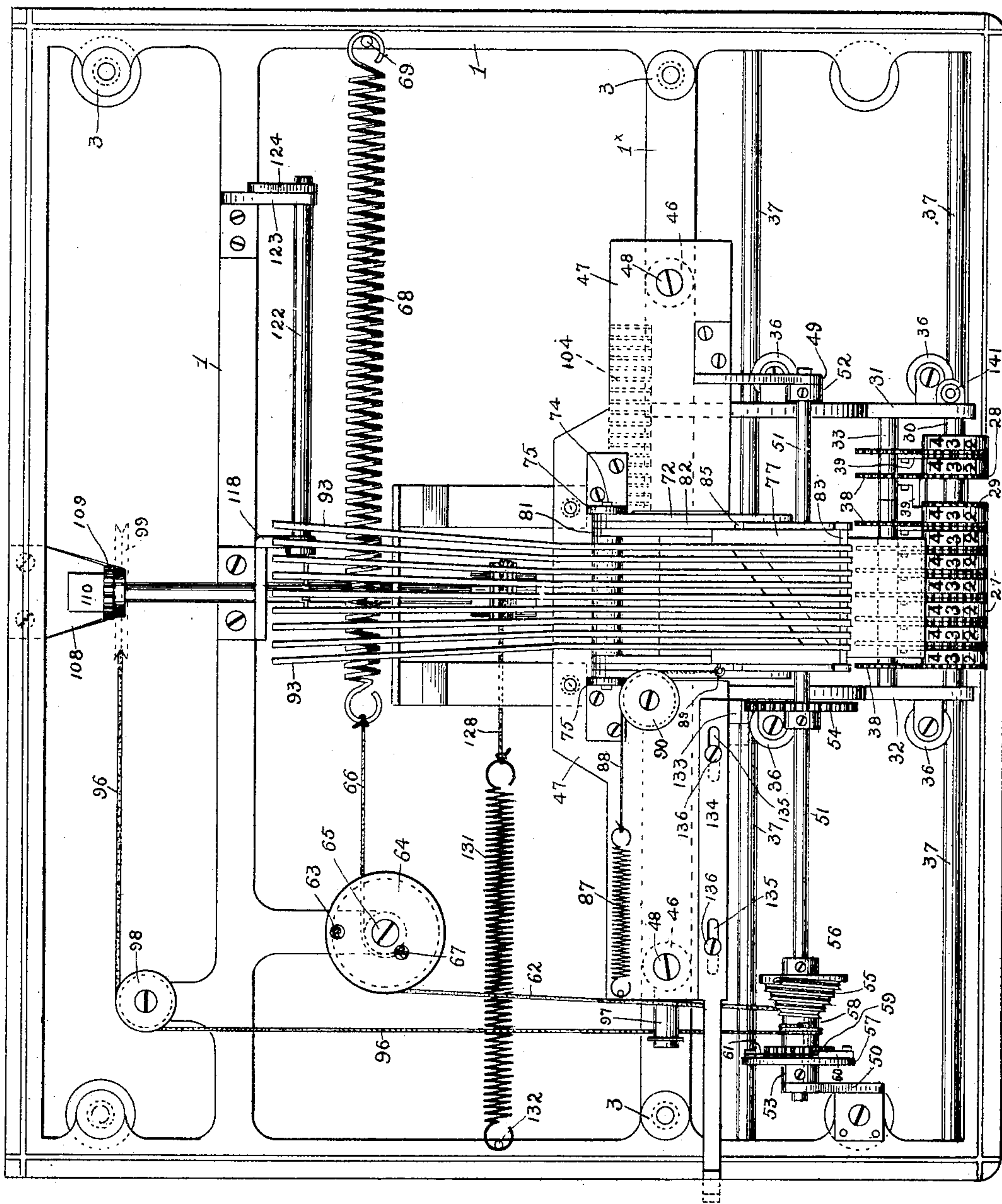


E. FITCH.  
ADDING MACHINE.

(Application filed Nov. 28, 1898.)

(No Model.)

7 Sheets—Sheet 5.



WITNESSES:

H. H. Steele.

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Fig. 5.

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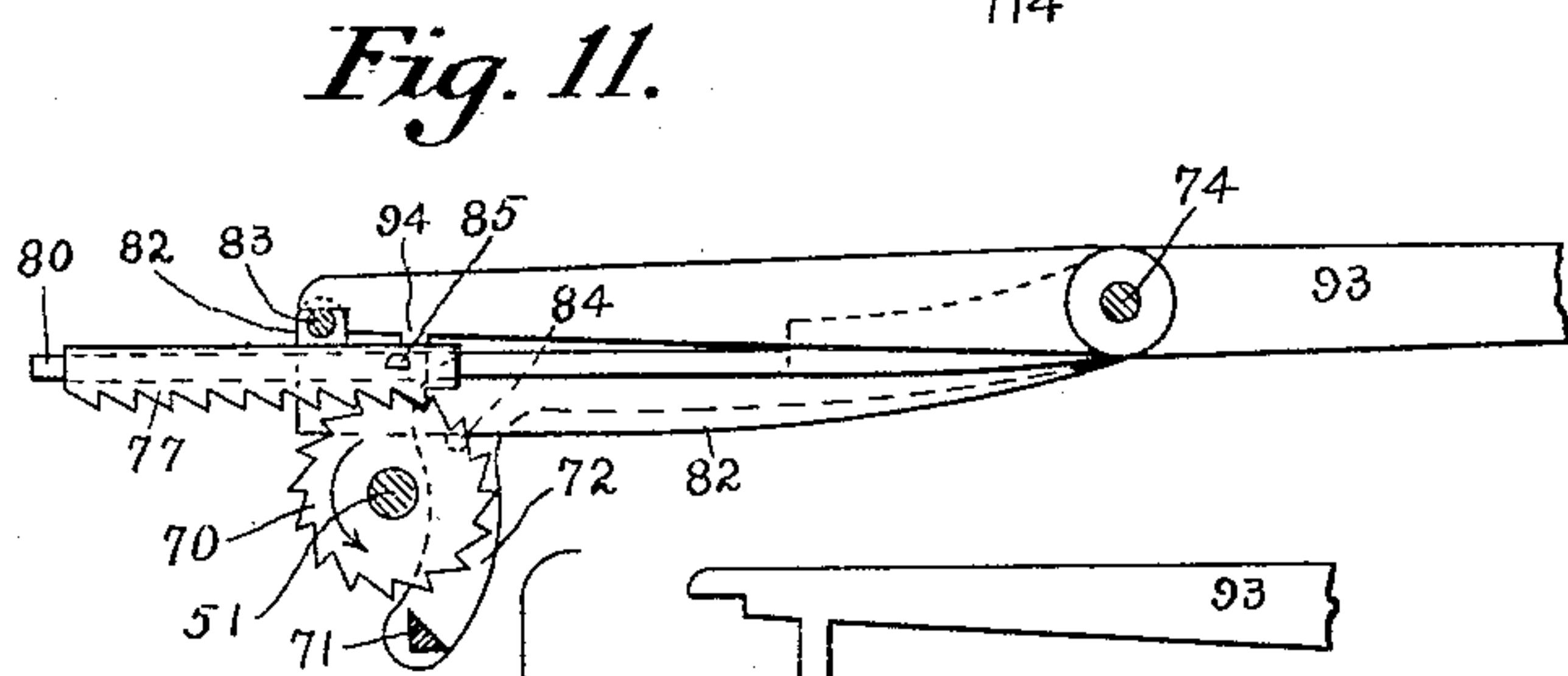
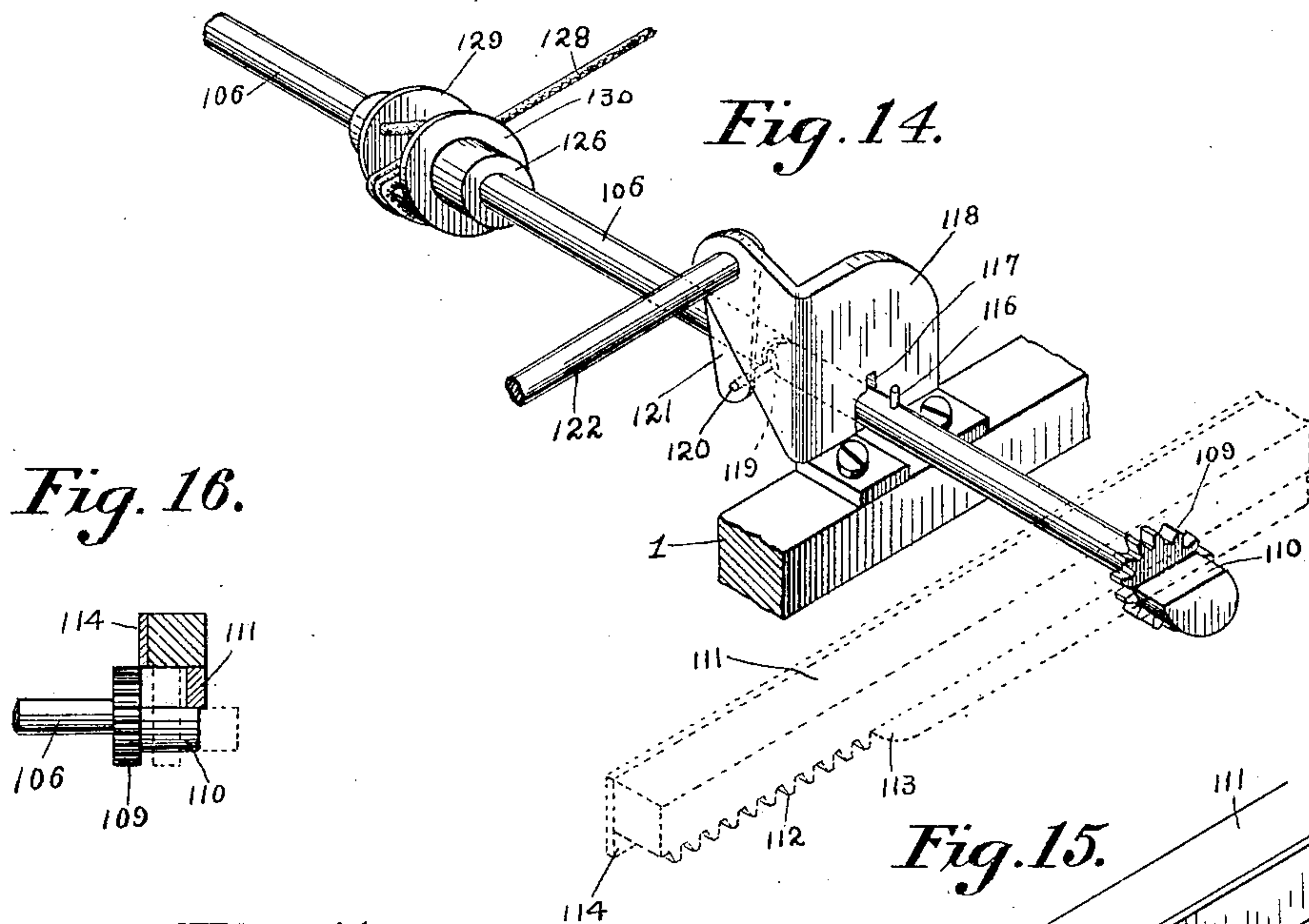
by Jacob Felbel

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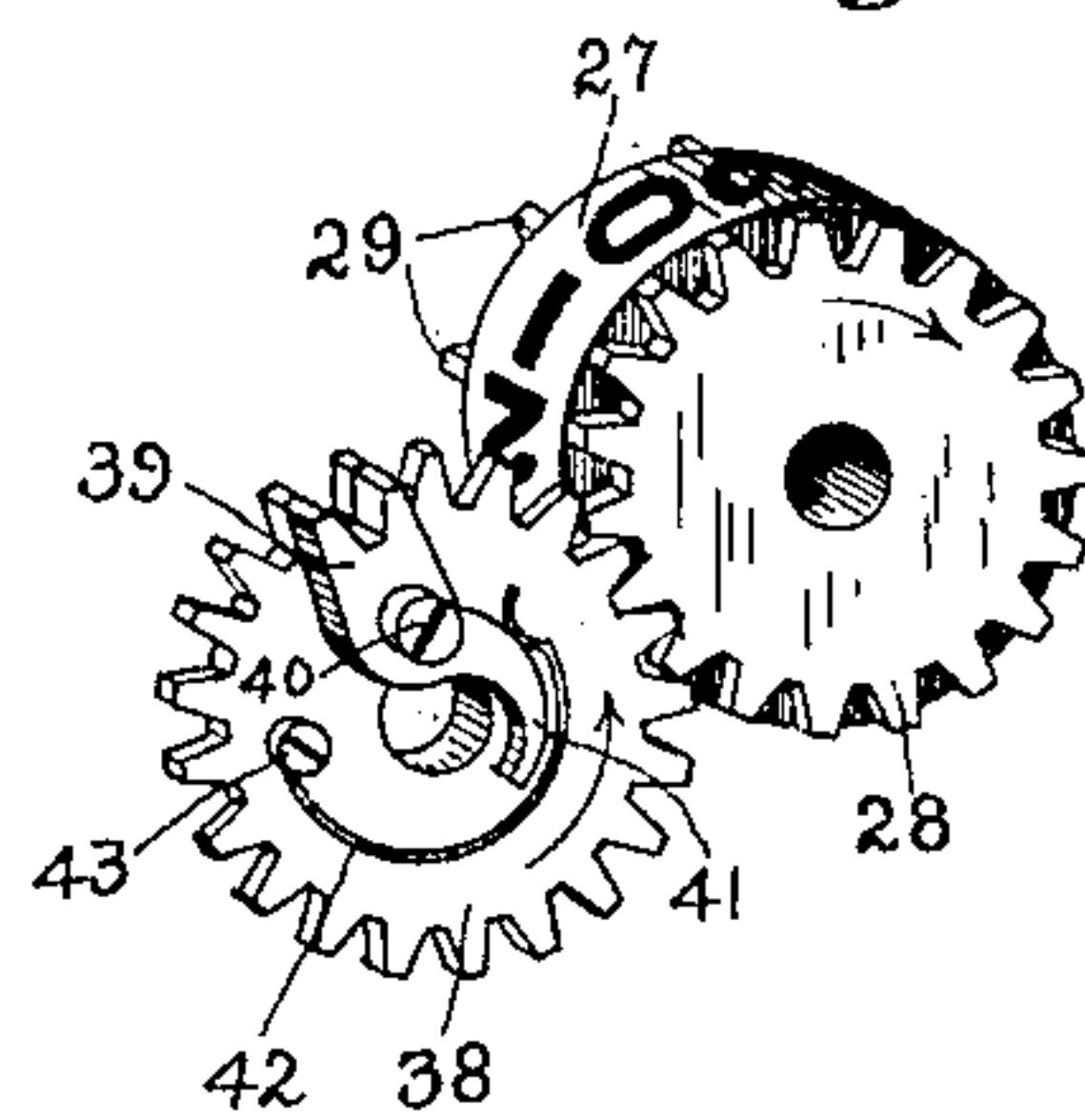
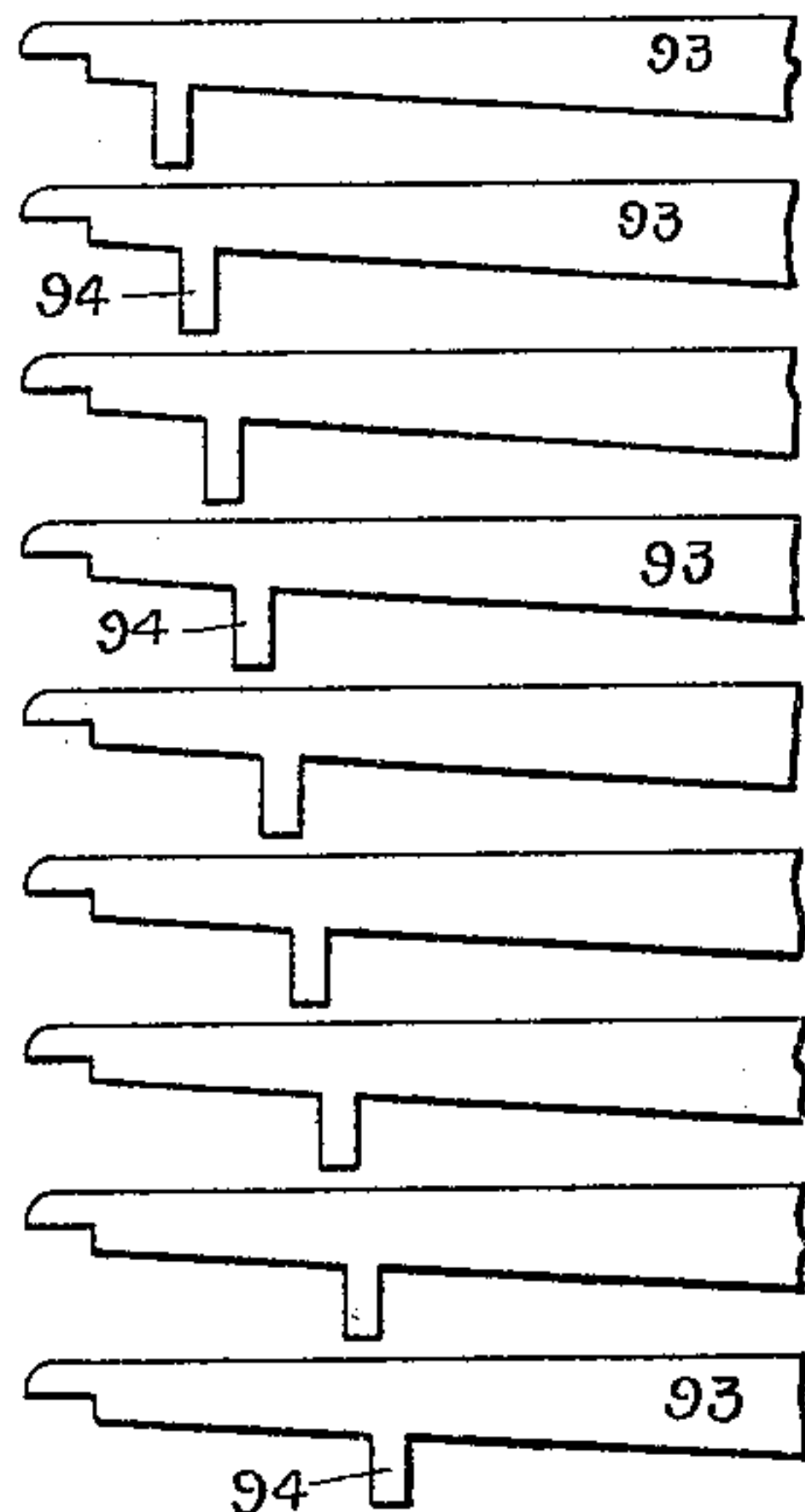
**E. FITCH.**  
**ADDING MACHINE.**  
(Application filed Nov. 28, 1898.)

(No Model.)

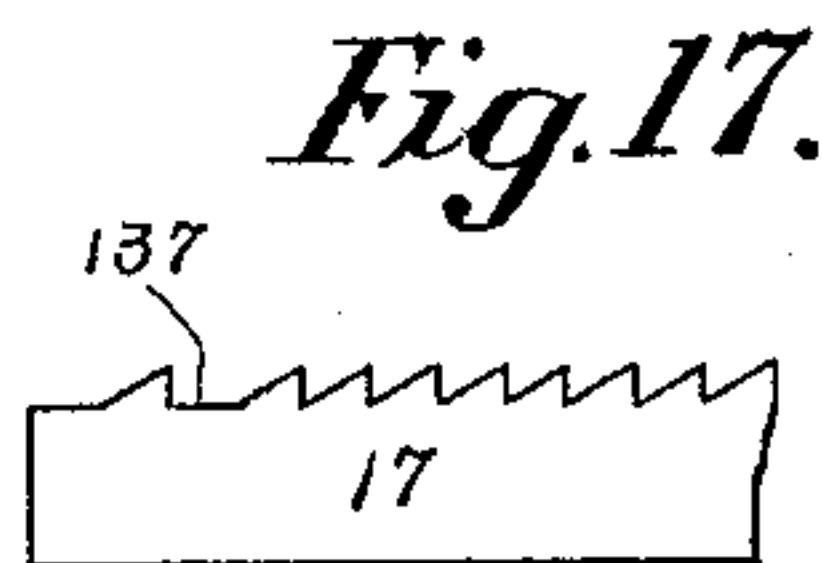
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*Fig. 12.*



*Fig. 13.*



*Fig. 17.*

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INVENTOR

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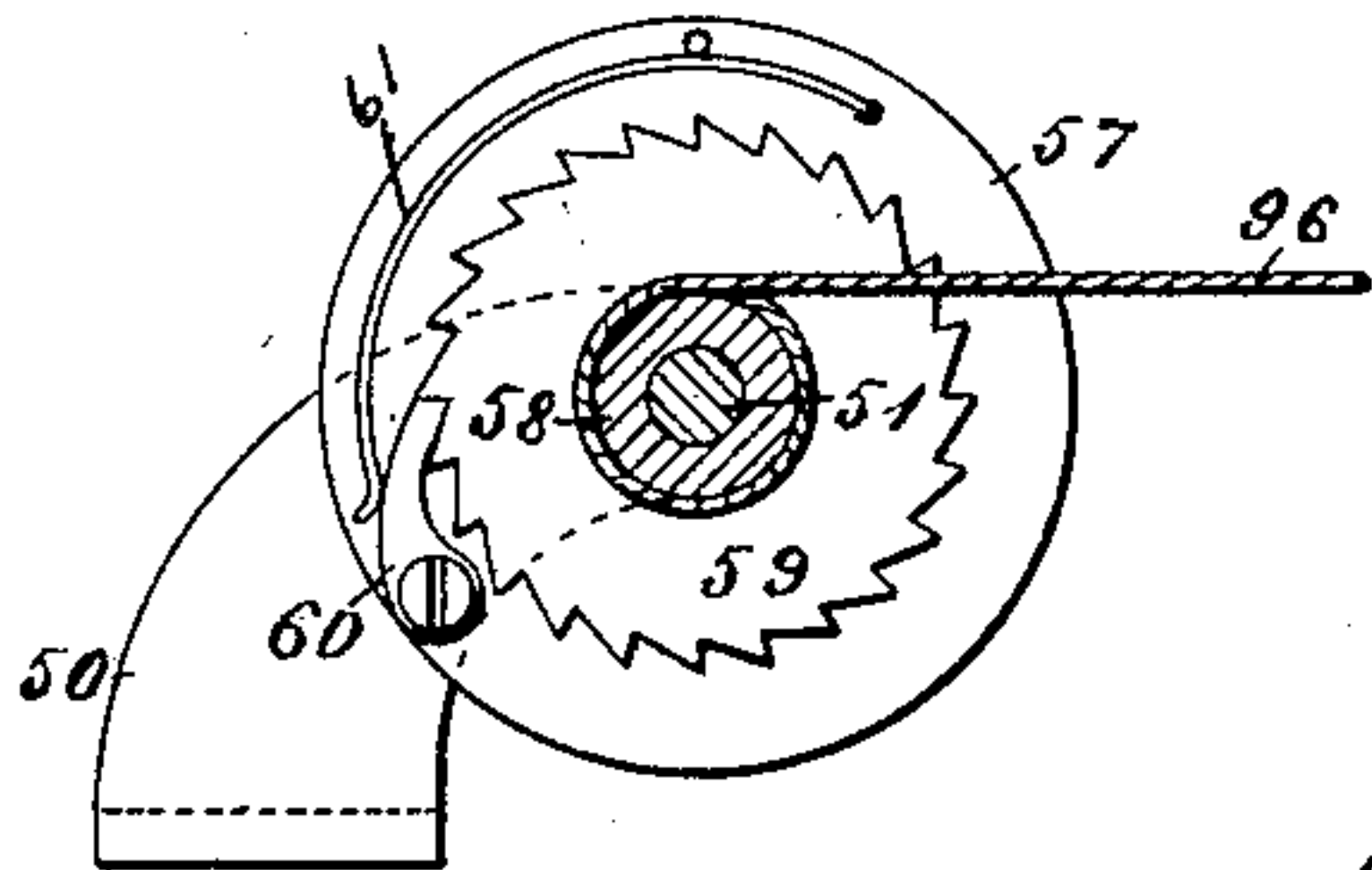
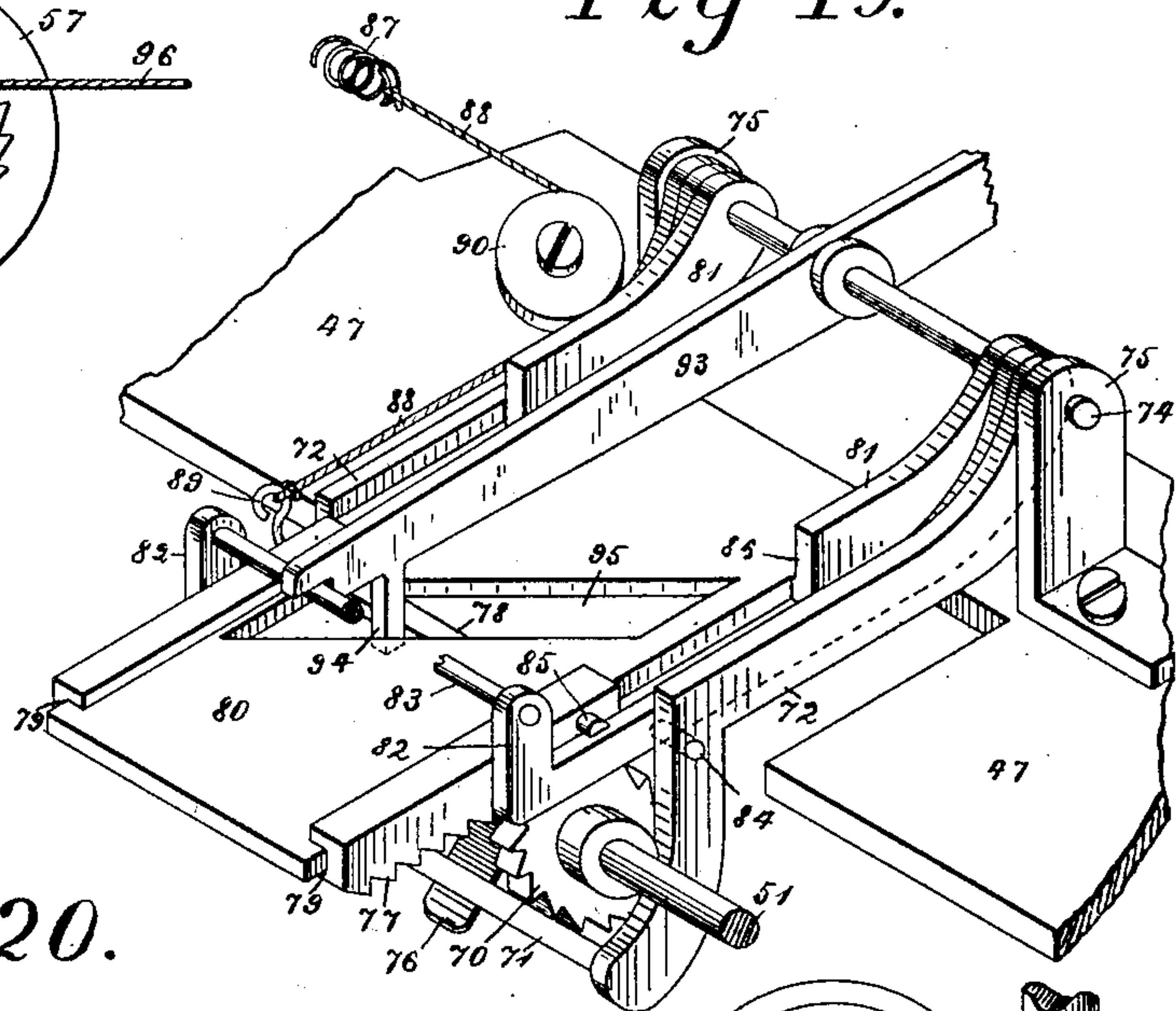
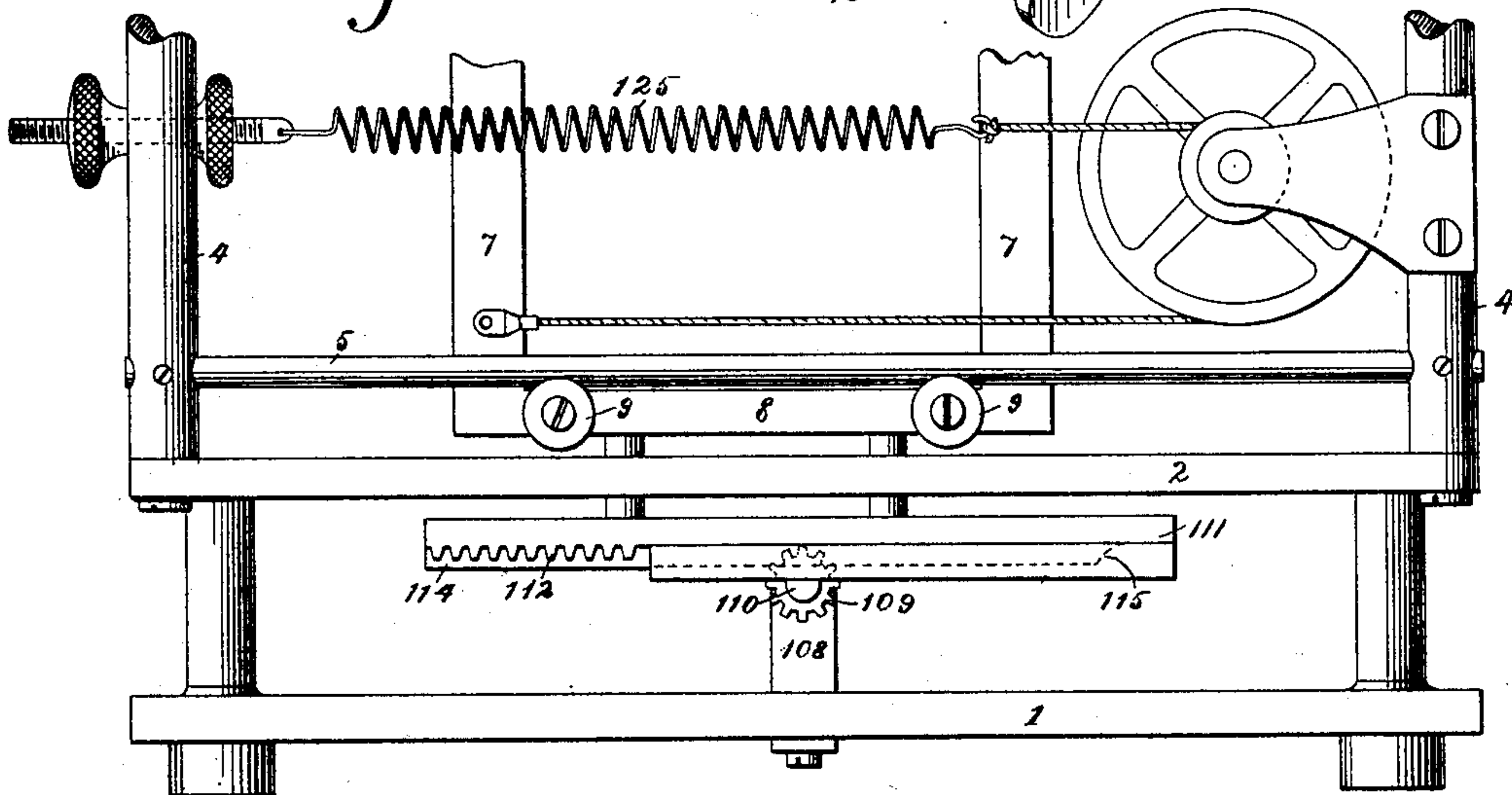
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E. FITCH.  
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(Application filed Nov. 28, 1898.)

(No Model.)

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*Fig. 18.**Fig 19.**Fig. 20.*

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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. 702,052, dated June 10, 1902.

Application filed November 28, 1898. Serial No. 697,613. (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, in the 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 a combined adding and type-writing machine, one object of the invention being to provide a machine capable of being used for ordinary type-writing work, as writing words and sentences, and by a simple adjustment of being rendered capable of doing such work and of registering and adding numbers.

15 Another object is in adding and recording the numbers added, to correct errors and defective records without operating the adding mechanism.

20 Another object is to record the sum of an addition without disturbing the adding mechanism.

25 Another object is to provide a means for quickly and accurately writing like denominations under each other in column.

30 Another object is to automatically space characters in the units-place and in the tenths-place at a greater distance apart than the usual regular spacing of the Arabian numerals would give.

35 Another object is in a combined type-writer and adder in which part of the adding mechanism is movable relatively to the rest of such mechanism and in which such relatively movable part is out of engagement with the rest during a part of the forward traverse of the type-writer carriage and is automatically connected with said carriage at a given point or time and is thereafter controlled in its step-by-step movement by said carriage to relieve the driving mechanism or spring of the type-writer carriage from the additional work of moving such movable adding-mechanism element whether it be the adding-wheels or a part of the driving mechanism for operating or turning such wheels.

40 45 Another object is in a combined type-writer and adder in which there are two car-

riages, one of which has a part of the adding mechanism mounted thereon and in which the said adding-mechanism carriage is spring (or weight) driven, to automatically throw or bring said driving mechanism into operation when the type-writer carriage reaches a given point in its forward traverse. 55

Another object is to operate an adding mechanism by power other than that derived from the strokes or movements of the hand in selecting numbers in the operation of adding. 60

Another object is in a combined type-writer and adding mechanism to operate the adding-wheels (or equivalent) by a spring-driven escapement-controlled mechanism, and as an adjunct thereto to rewind or reset the said spring (or weight) automatically during the operation of the type-writer. 65

Another object is in a combined type-writer and adder in which the adding mechanism can be rendered inoperative, so as to permit of the use of the machine for ordinary type-writing work, to provide that the chance of accidental engagement and disengagement of the two mechanisms shall be reduced to a minimum, and other objects, as will hereinafter more fully appear. 70 75

To these ends the invention includes features of construction and combinations of devices hereinafter described, and more particularly pointed out in the claims concluding this specification. 80

The preferred form of the invention is illustrated in the accompanying drawings, forming part of this specification, in which— 85

Figure 1 is a front elevation of the machine. Fig. 2 is a plan view thereof. Fig. 3 is a central vertical longitudinal or front to back sectional view. Fig. 4 is a side elevation from the left of the machine, certain parts of the casing being omitted or broken away to more clearly show the mechanism. Fig. 5 is a plan view of the adding mechanism and operating parts. Figs. 6, 7, 8, 9, 10, 11, and 12 are views of different parts of the mechanism for operating the adding mechanism. Fig. 13 is a perspective view of a number-wheel and operating-gears therefor. Fig. 14 is a detail perspective view of a part of the mechanism 90 95 100



intermediate the carriage of a type-writing machine and a carriage of an adding mechanism. Fig. 15 is a similar view of the other end and side of lock and release plate partially shown in Fig. 14. Fig. 16 is a detail view showing the position of the parts in which the adding-mechanism carriage may be connected to or disconnected from the carriage of the type-writing machine. Fig. 17 is a side view of a modified rack forming part of a carriage-feed mechanism. Fig. 18 is a detail view. Fig. 19 is a perspective view of the escapement mechanism for the adding-wheels. Fig. 20 is a rear elevation of the machine, some parts being omitted and others broken away.

The same part in the drawings will be referred to by the same numeral or character of reference.

The particular type-writing mechanism, carriage-feed mechanism, and paper-feed mechanism illustrated in the drawings form the subject-matter of a companion application for Letters Patent filed November 26, 1898, and serially numbered 697,505, and need not be particularly described herein, except in so far as the same are connected with the subject-matter of the present invention.

The working or moving parts of the various mechanisms shown in the drawings are supported by suitable framework composed of a bottom frame 1, a plate 2, posts 3, uniting the frame and plate, standards 4, rails 5, strut 6, and various brackets and other parts, as will hereinafter more fully appear.

The carriage of the typewriter illustrated comprises upright end pieces 7, united by bars 8, Figs. 3 and 20, and is provided with antifriction-rollers 9, which coact with the guide-rails 5. The platen-carrier comprises end pieces 10, which are united by tie-rods 11. The uprights 7 are provided with forwardly-extending arms 12, perforated vertically to form guides for the rods 13, which are secured to the rods 11 by plates 14 and screws. The platen 15 is suitably journaled in the end pieces 10 and is provided with suitable line-feed and paper-holding devices.

The paper-carriage is provided with ordinary fixed and movable pawls 16, Fig. 3, which coact with the rocking rack-bar 17. The rack-bar is supported by arms 18, which are pivoted at 19 to brackets or standards 20, rising from the plate 2. The universal bar 21 is carried at the front end of said levers 18 and overlies the key-levers 22. The key-levers 22 are pivoted at 23 on knife-edged pins, and the rear ends of such key-levers are held down by means of springs 24, bearing on the levers and attached to the said plate 2 by the said knife-edged pins. The jointed type-bars 25 are pivoted upon a shaft 26 and coact with the platen and key-levers in a manner hereinafter described.

Considered purely with relation to its function as an adding mechanism the preferred

form of my invention includes a series of independently-operable number-carriers, said parts being supported by a suitable frame, and in conjunction therewith a spring or power driven driver for operating said number-carriers one at a time, the said frame and the parts supported thereby or the said driver having motion of translation, whereby the driver and the said independently-operable carriers are caused to be operatively engaged, as described, and a key-controlled escapement which controls the rotatory motion of said driver. I prefer that the variable throw of the driver for operating said number-carriers to move them different distances, according to the amount they are to be turned or otherwise moved, shall be secured by a variable throw in the escapement itself.

In the preferred form of the adding mechanism (that shown in the drawings) the number-wheels are placed side by side and are independently rotatable. These wheels are supported in a carriage which is adapted to move to and fro in a direction parallel to the direction of motion of the carriage of the type-writing mechanism when the adding mechanism is used in conjunction with a typewriter. The adding-wheels are independently rotated one by one, except in the operation of carrying, at which time one wheel turns one or more wheels of higher denomination and are carried in succession from right to left into and out of position to be turned by a rotatory or other driver supported upon the fixed framework of the machine. Inasmuch as the type-writing proceeds from the left to the right and numbers are read from left to right, the direction of motion of the carriage of the adding mechanism in the preferred form of the invention is from right to left, and the adding-wheels are arranged with the highest denomination at the left and the lowest at the right.

Each number-wheel 27 (see Fig. 13) is provided on its periphery with the nine digits and the naught arranged in order at equal distances apart and is provided with a cog-wheel or gear 28, secured thereto at one side thereof. At the other side each wheel 27 (except the hundredths or lowest wheel) is provided with a toothed carrying wheel or gear 29, also fixed thereto. Each number-wheel, with its gear 28 and carrying-gear 29, is perforated axially to fit upon a shaft 30, whose ends are secured in the end pieces 31 32 of the carriage of the adding mechanism, Figs. 4 and 5. The end pieces 31 32 are secured together by means of the shaft 30, a shaft 33, a bar 34, Fig. 3, and a bottom plate 35, or by other suitable means, and are provided with antifriction-rollers 36, which coact with the guide-rods 37, secured to the frame 1. The number-wheels from units up to millions are placed side by side and also the tenths and hundredths wheels; but the units-wheel and the tenths-wheel are separated from each other a small distance, as shown in Fig. 1.



In the specific form of my invention shown in the drawings the pinions 28 do not extend beyond the peripheries of the number-carrying wheels and the shaft 33 forms a bearing-shaft for a series of pinions 38, Figs. 5 and 13, independent of each other and which mesh each with a corresponding one of the said pinions 28, as shown. Each of the pinions 38, except that driving the millions (or highest) number-carrier, is provided with a double-toothed carrying-pawl 39, pivoted thereto at 40, said pawl being in the plane of or adapted to coact with the carrying-pinion 29 of the number-wheel of the next higher denomination. Each pawl 39 is provided with a curved extension 41, extending beyond the center of the pinion 38 and coacting with the shaft 33 as a stop for limiting the rotation of the pawl in one direction upon its axis 40. Springs 42, secured to the face of the pinions 38 by screws 43, bear at their free ends upon the said extensions 41 and press said ends against the said shaft 33. Each number-wheel 27 is held against accidental rotation by a suitable detent 44, Fig. 3, at the end of a flat spring, which spring is secured to a bar 45, connecting the end pieces 31 32 aforesaid, said detents engaging with the teeth of the pinions 28 or 29. The V-shaped detent shown permits of the rotation of the number-wheel in either direction by the application of suitable force.

Mechanism by which the pinions 38 and their corresponding number-wheels may be driven will next be described.

One of the cross-bars 1<sup>x</sup> of the frame 1 is provided with uprights or standards 46, Fig. 5, to the tops of which a plate 47 is secured by screws 48. A bracket 49 extends forward and downward from the top of the plate 47, near one end thereof, and a bracket 50 extends rearwardly from the frame 1, near the left-hand front corner thereof, said brackets 49 50 being provided with suitable bearings in line with each other for a shaft 51, which is journaled therein and is held against endwise motion by collars 52 53, secured thereto as by set-screws. The rotatory shaft 51 is provided with a pinion 54, fast thereto and adapted to mesh with the pinions 38 as these are moved to and fro by the carriage of the adding mechanism. The shaft 51 is provided with a fusee 55, which is held against endwise motion by a collar 56 and a disk 57, the latter being integral with the collar 53 aforesaid. Between the fusee 55 proper and the disk 57 is a cylindrical portion 58, integral with the fusee or rigidly attached thereto, and a ratchet-wheel 59, fast to the said cylinder or barrel 58. The disk 57 is provided with a pivoted pawl 60, Figs. 5 and 18, which is pressed into contact with the ratchet 59 by a spring 61, secured to the disk and bearing on said pawl. The aforesaid pawl and ratchet permit of the rotation of the fusee and barrel in one direction independently of the shaft 51. A cord 62 has

one end secured to the fusee, and the other end of said cord is secured at 63 to a grooved disk 64, which is journaled at 65 on an arm 70 of the said frame 1. The disk 64 is provided with a barrel around which a cord 66 is wound. Said cord 66 is fast at one end at 67 to the disk 64 and the other end thereof is fast to one end of the helical spring 68, whose other end engages with a pin 69 on the frame 1. The tension of the contractile spring 68 tends to rotate the disk 64 and to unwind the cord 62 from the fusee 55, the pull of the cord 62, acting through the backing-ratchet 59 60, tending to rotate the shaft 51 and pinion 54. The shaft 51 is provided with two ratchet-wheels 70, fast thereon, Figs. 10, 11, and 19, and a swinging detent-bar 71 coacts with said ratchet-wheels to prevent the rotation of the shaft 51 in the described direction except when released, as hereinafter described. The detent-bar 71 is fixed to and carried by two arms 72, Fig. 9, pivoted at 73 on a shaft or rod 74, Fig. 19, which is supported in brackets 75, rising from the top of the fixed plate 47 aforesaid. A spring 76, fast at one end to the under side of the said plate 47, bears against the under side of the said bar 71 and normally maintains the said bar in its working or holding position, as shown in Fig. 3. The bar 71 forms the holding-dog of an escapement mechanism composed of said bar, ratchet-wheels 70, sliding ratchet-bars 77, and stops, hereinafter described. The said ratchet-bars 77 are attached to or are integral with cross-bars 78, the whole forming a rigid rectangular frame. (See Fig. 7.) The bars 77 are provided with grooves 79, which embrace the edges of a carrier, as plate 80, Figs. 6 and 19, on which the said frame may slide. The carrier-plate 80 is provided with arms 81, by means of which it is pivoted upon the rod 74 aforesaid. Between the arms 72 and the arms 81 arms 82 are placed and are independently pivoted upon the same bar or shaft 74. At their forward ends the arms 82 are united by a rod 83. The arms 82 rest upon pins or studs 84 in the arms 72, and the ratchet-bars 77 are provided with pins 85, which bear upon the tops of the arms 82. It will thus be seen that the force of the spring 76 is exerted in holding the detent 71 against the ratchet-wheel 70 and also in maintaining the arms 82, plate 80, and sliding ratchet-bars in their elevated or upper positions. The sliding ratchet-bars 77 are held in one extreme of their motion—to wit, against the stops 86 on the arms 81—by means of a spring 87 and cord 88, Figs. 5 and 19, one end of the spring being fast to the frame 1 or a pin on plate 47 and one end of the cord being fast to a hook or eye 89 on one of the ratchet-bars 77. For convenience the cord 88 passes about a pulley 90, journaled on the plate 47.

From the described construction it will be seen that upon the depression of the plate 80 the ratchet-bars 77, which are normally out of mesh with the ratchet-wheels 70, will be



carried down into mesh with said ratchet-wheels and that at the same time the holding-dogs or bar 71 will be moved out of engagement with the said ratchet-wheels through the medium of the pins 85, arms 82, pins 84, and arms 72, whereupon the shaft 51 and pinion 54 will be rotated by means of the spring 68 and the connections intermediate said spring and said shaft 51 until arrested in some manner.

Means whereby the amount of rotation of the shaft 51 and pinion 54 is varied or regulated will next be described.

By reference to Fig. 2 it will be seen that certain of the keys 91 are provided with the nine digits and the naught. Each of the corresponding key-levers 22, except that of the lever corresponding to the naught, is connected, by means of a strap or link 92, with the rear end of a corresponding lever 93, Figs. 3, 15, and 19, the said straps 92 passing through a suitable slot in the plate 2. The levers 93 are pivoted upon the rod 74 aforesaid, and at their forward ends said levers 93 overlie the rod 83. The levers 93 are provided each with a downward extension or lug 94, and these lugs 94 of the entire series of levers 93 are set back from the forward ends of the said levers 93 by regularly-increasing distances, as indicated in Fig. 12—that is to say, the said series of extensions 94 are in a line extending obliquely across the machine. The plate 80 is slotted obliquely at 95 to permit the said extensions 94 to pass there-through, though the said extensions 94 do not normally extend below the plate 80. The front ends of levers slant up on their under sides, so as to be depressible without touching the plate 80.

Upon operating or depressing any of the digit-bearing keys 91 the forward end of the corresponding lever 93 is depressed and carries down with it the rod 83, arms 82, arms 72, and bar 71. At the same time the plate 80 and ratchet-bars supported thereby fall of their own weight and the ratchet-bars mesh with the ratchet-wheels 70. The motion of the forward ends of the levers 93 about the axis 74 is greater than the similar motion of the plate 80, whence it results that the extension 94 of the depressed lever 93 is carried below the lower surface of the plate 80 and into the path of the rear cross-bar 78 aforesaid and stops the forward motion of the ratchet-bar 79, and so stops the motion of rotation of the shaft 51 and pinion 54. By reason of the oblique arrangement of the said extensions 94 the said forward motion or throw of the ratchet-bars 77 is stopped at different distances from the initial position of such bars, according to whichever digit-carrying key 91 may be depressed—that is to say, the extension or stop 94 corresponding to the "1" key permits the ratchet-bars to move forward a certain unit of space, the stop 94 corresponding to the "2" key permits the said ratchet-bars to be moved for-

ward two of such units of space, and so on for the remainder of the digit-keys, thus controlling or regulating the rotation of the pinion 54. On the release of the depressed digit-key the spring 76 returns the dog 71 and other parts of the escapement mechanism to the positions shown in Fig. 3.

As shown in Fig. 5 of the drawings, the pinion 54 is not in mesh with any of the pinions 38. This is the normal position of the parts during the greater extent of the motion of the carriage of the type-writing machine. As will be explained more at large hereinafter, the carriage of the adding mechanism may be put in motion toward the left at a predetermined point in the traverse of the paper-carriage toward the left. When the carriage of the adding mechanism is so put in motion, the first or left-hand pinion 38 is moved into mesh with the pinion 54, and thereafter the remaining pinions 38 come into mesh in succession with the said pinion 54 and the previously-engaged pinion moves out of mesh as the adding-mechanism carriage moves to the left. As shown in the drawings, each type-bar is provided with three type and the machine is provided with two shift-keys, respectively marked "Fig" and "Cap," for depressing and raising the platen-carrier, and also the keys carrying the digits are provided with letters to indicate the corresponding type. Inasmuch as the operation of any of these digit-keys during the ordinary type-writing will operate the levers 93 and so permit the spring 68 to rotate the pinion 54 it might soon result that the spring 68 would run down before any pinion 38 is brought into mesh with the pinion 54. I have therefore provided a device for maintaining the spring 68 under tension sufficient to meet the maximum demands thereon during the process of operating the adding-wheels, and such device will now be described.

A spring-setting cord 96, Fig. 5, has one end secured to the barrel 58, before mentioned, and is led therefrom in such wise that it is wound around said barrel as the cord 62 unwinds from the fusee 55. As shown in the drawings, the cord 96 passes under a pulley 97 (the cord 62 passes over such pulley) and around a second pulley 98, both pulleys being on the frame 1 or other part of the framework of the machine, and the other end of the cord 96 is fast to a pulley 99, Fig. 3, fast upon a shaft 100, journaled in a bearing in block 101. The block 101 is attached to and is moved with the paper-carriage, as by rods 102, connecting the block 101 with the bar 8 of the carriage. The shaft 100 is connected with the block 101 by means of a spiral or clock spring 103, one end of this spring being fast to the shaft and the other end being fast to a pin fixed to and projecting from the block 101. The spring 103 is so placed that its force is exerted to wind up the cord 96 on the pulley 99 as the paper-carriage moves from right to left, thus taking up any slack in the



cord 96. The length of the cord 96 is such that after the paper-carriage has reached a predetermined point in its return motion from left to right the cord is wholly unwound from the pulley 99, and the further motion of the carriage to the right causes the cord 96 to rotate the barrel 58, thus unwinding the cord 96 therefrom and rotating the fusee 55 to cause it to wind up the cord 62 and through the described connections to put the spring 68 under tension. Upon the feeding forward of the paper-carriage to the left the spring 103 takes up the slack of the cord 96 automatically, and the spring 68 does not rotate the shaft 51 except at such times as one of the digit-carrying keys 91 is depressed. If one of such keys is depressed, the wheel 54 is rotated a corresponding distance, as above described.

In so far as certain of the objects of my invention are concerned it is not material whether the driver 54 be relatively stationary and the adding-wheels be carried by and be movable to and fro with the adding-mechanism carriage or whether the arrangement be reversed, nor is it material in all cases that the adding-mechanism carriage be governed in its forward motion by the type-writer carriage in its forward motion. It is enough that the driven adding-mechanism carriage move in a step-by-step manner simultaneously or otherwise with the type-writer carriage and that it begin such motion when the latter carriage reaches a predetermined point in its forward traverse. I prefer, however, to govern the step-by-step motion of the adding-mechanism carriage from or by the typewriter-carriage rather than to govern it by an independent mechanism, as requiring a less complicated mechanism.

The mechanism shown in the drawings, whereby the carriage of the adding mechanism is started automatically at a predetermined point in the forward traverse of the paper-carriage and is thereafter moved in a step-by-step manner, will next be described.

The bar 34 of the carriage of the adding mechanism is provided with wide rack-teeth 104, Figs. 3 and 5, on the under side thereof. A pinion 105, fast on the shaft 106, meshes continuously with said rack-teeth 104. The shaft 106 is journaled in bearings 107 108 on the frame 1 and is capable of a limited endwise motion in said bearings, such motion not being sufficient to take the pinion 105 out of mesh with the said teeth 104. The shaft 106 has a second pinion 109 fast thereto at a point adjacent to the path of the block 101. The end of shaft 106 outside the pinion 109 is provided with a flat-faced lock-block 110, Figs. 14, 16, and 20, shown in the drawings as substantially half of a cylinder. The block 101 has a bar 111 attached thereto, said bar being parallel with the line of motion of the paper-carriage and being in the form of an angle-bar provided at its right-hand end with rack-teeth 112, said teeth being for coaction with

the pinion 109 whenever the said pinion is moved rearward by shaft 106 from the position shown in Fig. 3, as will presently appear. Bar 111 is of a length equal to or greater than the length of the carriage traverse, and the rack 112 is at the right-hand end part of said bar 111. The downwardly-extending part of the angle-bar 111 is adapted to glide over the flat surface of block 110 during the progress of the paper-carriage, and so prevent any motion of rotation of the shaft 106. The said downwardly-extending part of bar 111 extends from the left-hand end thereof continuously toward the right and terminates at 113 adjacent the point where the rack 112 begins, so that beginning from the said point 113, Fig. 14, the block 110 and shaft 106 are released and may be rotated. At its forward side the said bar 111 is provided with a downwardly-extending plate 114, which extends from the right-hand end of the bar 111 to a point 115, Fig. 15, near the left-hand end of said bar 111. The function of the plate 114 is to prevent the endwise motion of shaft 106 except at such time as the paper-carriage is in its extreme right-hand position, at which time the shaft 106, with its attached pinions 105 and 109, may be moved rearward from the position shown in Fig. 3 to bring the pinion 109 to the rear of the plate 114, and so into the path of the rack 112. As shown in Figs. 3, 4, and 16, the block or lug 110 is long enough to engage under bar 111 in both (endwise) positions of shaft 106; but it is obvious that the block may be of a length sufficient to cause such engagement only when shaft 106 is moved into its rearward position. The shaft 106 when in the position shown in Fig. 3 may be locked against rotation at all times by means of a pin 116 on the shaft and a slot 117 in the bracket 118, through which the shaft passes. The shaft 106 is provided with a circumferential groove 119, with which a pin 120 engages. The said pin 120 is carried by an arm 121 of a shaft 122, Fig. 5, which is journaled in the bracket 118 and in a bracket 123, secured to the frame 1. The shaft 122 is provided with an arm 124, adjacent to the bracket 123, which arm extends upwardly through a slot in the plate 2 and forms a hand-lever, Figs. 1, 2, and 4, by which the shaft 122 may be rocked, and so cause the shaft 106 to be moved endwise. As long as the shaft 106 and the attached parts are in the positions shown in Figs. 3 and 4 the adding mechanism is in the position shown in Fig. 5. Whenever it is desired to connect up the adding mechanism in order that it may perform its function, the paper-carriage is moved to its extreme right-hand position against the tension of its propelling-spring 125, Figs. 1 and 20, and the lever 124 is pulled forward, thus moving the shaft 106 and its attached pinions rearwardly of the machine, and so moving the pinion 109 into the path of the rack 112, as indicated in Fig. 14. This moves pin 116 clear of slot 117, and



so frees shaft 106 to that extent as soon as the paper-carriage has moved far enough to carry the pinion 109 beyond the point 115. The plate 114 and the bar 111 prevent undue end-wise motion of the shaft 106. When the paper-carriage has reached a predetermined point in its traverse to the left, the rack 112 comes into mesh with the pinion 109 and rotates the pinion and shaft. When the pin 116 is locked by the slot 117, the shaft 106 cannot rotate, and hence the adding-wheel carriage cannot move so as to engage any of the pinions thereon with the common driver 54. Thus the machine may be used solely as a type-writing machine and figures may be written freely at all portions of the line of writing without affecting the adding-wheels. In other words, the machine operates either as a simple type-writing machine or as a combined type-writing and adding machine, according to the adjustment of the lever 124. It will be perceived that it is not necessary when using the adding mechanism to adjust said lever 124 at the beginning of each line of writing, because after said lever is once adjusted and the pin thereby drawn out of the locking-slot the adding-wheel carriage becomes automatically coupled to the paper-carriage near the end of each line of writing and automatically uncoupled during each return stroke of the carriage. The function of said lever is merely to move the shaft end-wise far enough to withdraw the pin from the locking-slot and simultaneously move the gear 109 into line with the rack 112, so that the gear may be actuated by the rack at the same portion of each reciprocation of the paper-carriage. Fig. 14 shows the positions of the parts when the pinion 109 is in its rearward position, or in line with the rack 112, so that at the proper point in each traverse of the bar 111 said pinion may mesh with the rack, whose teeth, it will be understood, are cut the full width of the squared end of the bar 111. It will be observed that the pin 116 has been moved clear of the slot 117, thus permitting the shaft 106 to be rotated. The pinion 109 is by preference smaller than the pinion 105, and both said pinions engage their corresponding racks at their own top sides, whence it results that the carriage of the adding mechanism moves from right to left during the movement from right to left of the rack 112, the bar 111, and the paper-carriage, to which said bar is secured, the movement of said carriage being produced by the spring 125, Fig. 20, hereinafter mentioned, and being controlled in the usual manner by the escapement-pawls 16, which are common in type-writing mechanism and which permit step-by-step advance movements of the carriage at the successive operations of the type-keys. It is obvious, however, that if the rack 104 engaged the pinion 105 underneath the same the carriage of the adding mechanism would be moved from left to right, or the same result could be obtained by caus-

ing rack 112 to mesh with the under side of the pinion 109, in which case the positions of the block 110 and the bars 111 and 114 should be inverted. 70

The long horizontal shaft 106, which drives the adding-wheel carriage, is formed in two sections, the adjoining ends of the sections being rigidly connected by a coupling 126, Fig. 3, which is preferably formed in one piece and is secured to the shaft-sections by set-screws. A portion of said coupling between its ends is enlarged at 127 to form a drum, upon which is wound a cord 128, one end of said cord being secured to the drum and the other end thereof being attached to a contractile helical spring 131, Fig. 5. The function of this spring is to drive or assist in driving the shaft 106 and the adding-wheel carriage, which is geared thereto, thus relieving the mainspring 125, which drives the paper-carriage, to the end that the letter-feeding movements of the latter shall not be rendered too sluggish when the adding-wheel carriage is coupled thereto. It will be understood that it is desirable not only that the movements of the paper-carriage shall be prompt, so as to avoid irregular crowding or overlapping of the type impressions, but also that the movements of the adding-wheel carriage shall be prompt, so that a connection may be established between the common driver 54 and the adjoining pinion 38 before said driver is caused to rotate by the depression of a type-key, since if said driver should be rotated during a movement of the adding-wheel carriage and while the driver is not connected with any pinion 38 no pinion would be actuated by said wheel, and hence a mistake would occur in the adding operation. Except when the paper-carriage is coupled to the adding-wheel carriage said spring 131 performs no function, and during the portion of the paper-carriage travel at which the adding-wheel carriage is inactive I prefer that said spring should exert no turning action upon the shaft 106, as it would cause undue friction between the locking-piece 110 and the cooperating locking-bar 111. With this end in view I cut away a portion of the barrel 127 in such a manner as to leave opposite flanges 129 and 130, between which the cord 128 is confined, and the cut-away extending to the axis of its drum, so that when the adding-wheel carriage is in its normal position or at the extreme right-hand end of its travel the cord 128 may pass in a straight line from the spring 131 and substantially through the axis of the drum 127, so that said cord may normally pull at a dead-center, and hence exert practically no rotative influence upon the shaft. As soon as the shaft becomes coupled to the carriage-rack 112 said barrel is rotated, so that the cord is lifted and exerts a rotative influence upon the shaft. The diameter of the gear 105, which engages the rack 104 on the wheel-carriage, is so great that less than an entire revolution of the shaft is required for 75 80 85 90 95 100 105 110 115 120 125 130



moving the carriage to the limit of its travel, and hence the cord 128 is not again brought to a dead-center, but constantly exerts a driving influence upon the shaft and carriage. It will be seen that the portion of the drum 127 around which the cord is wound is semicylindrical in form, the plane face thereof passing substantially through the axis of the drum. If desired, the spring 131 and cord 128 may be omitted, and the paper-carriage-driving spring 125 may be given sufficient tension to drive both the type-writer carriage and the adding-wheel carriage.

Type-writer operators occasionally strike a wrong key, and so cause the impress of a wrong letter upon the paper on the platen. In such cases it is almost invariably true that the operator is aware of having struck the wrong key as soon as the stroke is done and notes the place for the purpose of making a correction later on. If, however, the type-writing mechanism is being used with adding or registering mechanism, it is more convenient to make the correction at the time the wrong key is struck; but this involves a double correction—to wit, the erasure of the wrong character from the paper and the setting back of the corresponding number-wheel (or wheels, if carrying occurs) to what it was before the wrong key was struck and then the subsequent striking of the right key, the type-writer carriage being also moved back to get the right digit in the right place. In this case the operator must move back the proper number-wheel by a number equaling the digit erroneously imprinted. For example, assuming that the numbering-wheels are in the position shown in Fig. 1—to wit, all showing the naught—and that it is intended to write the digit "9" in the units-place and that the "8" key has been struck instead; this will cause a turning of the units-wheel to bring the "8" into view in the slot 132, (it being assumed that the adding mechanism is connected with the paper-carriage and that the carriages are in proper position to have the pinion 54 into mesh with the pinion 38, which drives the units number-wheel.) To make the correction, the operator erases the "8" upon the paper on the platen and with a pencil-point or the like inserted between the teeth of a pinion on the units number-wheel moves the said wheel backward to bring the naught into view in the slot 132. Also the paper-carriage is to be set back one stop or space, thus moving the adding-mechanism carriage backward by the paper-space to bring the pinion 54 again into mesh with the pinion 38 driving the units number-wheel. Thereupon the proper key—to wit, the "9" key—is struck, and the "9" imprinted upon the paper on the platen, and the "9" upon the units-wheel of the adding mechanism is brought into view in the slot 132. A like method or operation is to be followed whatever may be the number erroneously shown in the slot 132 by the adding mechanism, care being taken, of course, to

turn the number-wheel backward the proper distance. It is observed that the pivoted spring-pressed pawls 39 will yield at such times as the carrying-wheels 29 pass by them should the pawls or any of them be in position to engage with the said carrying-pinions.

In writing bills or statements or other matter containing a column of numbers and summing up by the adding mechanism the sum-total of the amount written upon the paper on the platen is shown by the number-carriers through the slot 132, Figs. 1 and 3, and when it is desired to write this sum-total on the bill there are two ways in which it may be insured that the adding-wheels will not be moved while the operator reads the said sum therefrom and writes it upon the type-writing machine. One way is to disengage the adding mechanism from the type-writing mechanism, so that the latter may be operated without operating the former. This is done by disengaging pinion 109 from the groove formed by the bar 111 and plate 114—that is, by moving the shaft 106 into the position shown in Fig. 3 of the drawings. The second way to prevent the rotation of the number-wheels while writing the said summation is to lock the pinion 54 against rotation, while leaving the adding-mechanism carriage and its operating mechanism in position to be operated by the rack 112. In this case the pinions 38 will pass by and intermesh with the pinion 54 without being turned thereby during the said operation of writing the summation. For the purpose of so locking the said pinion 54 I provide a movable detent 133, Fig. 5, which may be moved into and out of mesh with the teeth of the pinion 54. As shown in the drawings, the said detent is carried by a sliding bar 134, which has a limited motion upon the plate 47 by means of slots 135 in the bar 134 and screws 136, passing through said slots and engaging the threaded holes in the plate 47. The bar 134 extends to the left-hand side of the machine in position to be conveniently operated by hand. When the detent 133 is in engagement with the pinion 54, the said pinion and its shaft are prevented from being rotated in either direction, though the detent 71 and ratchet-bars 77 are moved up and down whenever a digit-bearing key is struck. The ratchet-wheels 70 do not move, however.

At Fig. 17 is illustrated diagrammatically a rack 17, which may, if desired, be substituted for the usual feeding-rack, as shown at Figs. 3 and 4. In this figure a gap or interval 137 is shown between two of the rack-teeth, the gap being produced by cutting away an intermediate tooth. It will be understood that as a result of the extra space 137 the paper-carriage will be caused to feed a double space instead of the ordinary space, and it will also be understood that the adding-wheel carriage is accordingly moved a double space, and accordingly a gap is left between the units-wheel and the decimal-



wheels, as illustrated at Figs. 1 and 5. If no space were left in the rack 17 at 137, there would be no jump of the carriage, but only the usual letter-feeding movement thereof, and accordingly there would be only the usual single-step movement of the adding-wheel carriage, and hence the driver 54 would stand opposite the gap in the system of adding-wheels, so that if by mistake the operator should touch any figure-key, thus causing a rotation of the driver 54, none of the adding-wheels would be affected, and hence an error would occur in the adding operation. The purpose of leaving the gap 137 is therefore to provide against such an error and to insure that after the pinion 38, which engages the units-wheel, is moved out of engagement with the driver 54, the first decimal-pinion 38 shall be immediately moved into engagement with said driver. In this connection it will be observed at Fig. 5 that the tens-carrying pawl 39, which is mounted upon the tenths-pinion 38, is made of sufficient size to bridge the gap between the units and tenths numbering-wheels, so that tens may be carried from the tenths-wheel to the units-wheel at the proper time. In case a paper-carriage rack of uniform pitch is used care should be taken to strike either the period-key or the usual space-key after writing a figure in the units-column and before writing the succeeding figure.

The carriage of the adding mechanism is provided with a pointer 138, Fig. 2, which contacts with the scale 139, attached to or formed on the plate 2. As shown, the pointer 138 is carried by a bar 140, which is connected to the carriage of the adding mechanism by a post 141, Fig. 4, and screw 142, the post passing through a slot 143, Fig. 3, in the said plate 2.

Whenever the pointer 138 is opposite or over any one of the marks on the scale 139, it shows that the pinion 38 for operating the number-wheel of the corresponding denomination is in engagement with the driver 54. Thus if the pointer be opposite the third mark to the right of the decimal-point-indicating mark 144 on the scale 139 it indicates that the pinion 38 for operating the hundred-number carrier is in engagement with the pinion 54 and will be operated by said driver-pinion should a digit-bearing key be struck, it being understood, of course, that the pinion 109 is in mesh with the rack 112 at such time.

Although in this case I show the adding-wheels on the carriage of the adding mechanism and the driver 54 on the framework—that is to say with the former as having a to-and-fro motion relatively to the driver—it will be understood that in as far as that feature of my invention relating to an independent power mechanism for driving for the carriage (and attached parts) of the adding mechanism and in so far as certain objects of my invention are concerned the driver 54 may be made the so movable part of the adding mech-

anism (being moved axially in such case) and the adding-wheels may remain in a relatively fixed position, as shown and described in my application aforesaid.

It will be noted that the mechanism shown for connecting the type-writer and adding-mechanism carriages includes a journaled shaft, which is continuously geared with one and is discontinuously geared with the other of said carriages. I do not limit myself to the instance shown, (one in which the type-writer carriage is the one discontinuously geared to the shaft,) however, since my invention is in this respect broad enough to include the case wherein the adding-mechanism carriage is the one discontinuously geared to the shaft.

In order to provide for quickly moving the typewriter-carriage forward from any position to any other position, I provide a carriage-release key 145 on a lever 146, Fig. 2, which is pivoted at 147 to a bracket 148, rising from plate 2, and is held with key 145 elevated by a spring 149. The rear end of lever 146 lies under the universal bar 21 and lifts the same to such an extent whenever key 145 is depressed sufficiently that the rack 17 is wholly disengaged from dogs 16 and the paper-carriage is free to be moved forward by its spring 125 until it reaches the end of its traverse or is stopped by hand or automatically at some other point. The scale 139 and pointer 138 indicate the positions at which the carriages should be stopped.

The type-writing mechanism shown in the drawings comprises a series of type-bars 25, each formed in two parts hinged together at 150, the lower part 151 being fulcrumed upon the rod 26 above described and the upper part 152 being provided with a type-block 153, having three types thereon. The part 151 has a disk-shaped lower end, which is provided with an open-ended slot to engage with the rod 26 and at the side opposite the slot with a notch to engage the rounded end of the corresponding key-lever 22, all as shown in Fig. 3. Each part 151 is provided with a cam 154, substantially in line with the pivot 150, for a purpose presently to appear. The parts 152 are bent outwardly from a medial line of the machine, as illustrated at Fig. 2, and rest in combs 155 156, which are secured to a guard-frame 157, extending around the type-bars in their normal positions. Converging arms 158 are secured to the guard 157 and serve to guide the parts 152 to a central guide 159, by means of which the type-bars are brought to the printing-point of the platen 15. An ink-roller 160 lies in the path of the type on the bars at the guide 159 and imparts ink to the type when the latter strike it on their way to the printing-point and push it aside. The roller 160 is pivoted in arms 161, which are pivoted upon a vertical axis at 162. A spring 163 returns the roller to the position thereof shown in Fig. 2 as soon as the type releases. During the return motion of the type-bars the cams or guides 154 of the bars



adjacent to that operated coact to force the part 152 of the bar operated to its normal position, the working faces of cams 154 being inclined inwardly from each side of the machine, as shown in Fig. 2.

The platen-carrier 10 is provided with downwardly-extending arms or rods 13, provided at their lower ends with rollers 164, which run upon a rod 165. The latter is borne by arms 166, fast upon a rock-shaft 167, suitably journaled in the framework of the machine. Springs 168, secured to the frame of the machine and having a limited motion, rest under the ends of the shaft or rod 165 and hold the platen-carrier in a central position, in which the middle types of the blocks 153 will coact with the platen. The shaft 167 is connected by an arm and a link 169 with a V-shaped shift key-lever 170, having two keys 171 and 172 thereon and pivoted at 173 to a bracket 174, rising from the top plate 2. By pushing the key 171 rearwardly of the machine the link 169 is drawn forward and the shaft 167 is rocked, so as to lower arms 166 and rod 165 against the tension of the springs 168, thus permitting the platen-carrier 10 to move downwardly into position to coact with the lowermost types on the type-blocks 153. By depressing the key 172 to the limit of its motion the link 169 is moved rearwardly, and the shaft 167 is rocked to lift the arms 166 and rod 165, and so lift the platen to position in which it coacts with the upper types of the blocks 153.

The operation of the machine is as follows: A sheet of paper is inserted in the usual manner around the platen, and the paper-carriage is pushed to the right. This movement of the carriage sets the mainspring 125, Figs. 1 and 20. The capital shift-key 172, Fig. 4, is then depressed, swinging the lever 170 upon the pivot 177 and through the link 169 rocking the shaft 167 and elevating the horizontal shifter-bar 165 and the vertical rods 13, thus lifting the platen to the position for writing capital letters. While the platen is in this position a type-key 91 is depressed, so as to vibrate its lever 22, Fig. 3, and elevate the rear end thereof, thus swinging the arm 151 upwardly about the fulcrum 26 and carrying the type-bar 152 up, so that the capital type upon the block 153 strikes the paper upon the platen. During this movement the bar 152 contacts with the edge of the deflector 158 and is thereby guided toward the printing-point. Just before striking the platen the type contacts with the ink-roller 159 and receives a supply of ink therefrom, said roller being pushed aside by the type and swinging upon its pivot 162. The transverse universal bar 21 is also raised by the ascending rear end of the key-lever, thus causing the arms 18 to rock upon the pivots 19 and moving the feeding-rack 17 down out of engagement with the upper and into engagement with the lower feeding-dog 16, mounted upon the carriage. Upon the relief of the type-key 91 from pres-

sure the key-lever 22 is restored to its original position by the spring 24, the type-bar and the inking-roller 60 also returning to their normal positions. At the same time the universal bar 21 descends and the rack 17 rises, the latter thus releasing the lower dog and reengaging the upper dog 16, whereby the carriage is permitted to advance under the tension of the spring 125 to a position for receiving the next type impression in the usual manner. The capital shift-key 172 is now released, thus permitting the platen to descend to its normal central position. Then other type-keys are operated in succession, the middle or lower-case types upon the type-blocks striking the platen. When it is desired to print figures, the rear shift-key 171 is pushed rearwardly, and through the link 169 the shifter-bar 165 is depressed, thus permitting the vertical rods 13 and the platen to descend, so that the lower or digit types upon the type-blocks may strike the platen. When the key 171 is released, the platen is lifted by a spring 168 to its normal central position. It will be understood that by the successive type-key depressions the carriage is fed along step by step by the coöperation of the mainspring 125, the feeding-dogs 16, and the rack 17. When the line of writing is completed, the platen is given a slight rotation, so as to advance the paper thereon in line-space direction, and the carriage is pushed to the right for beginning a new line. The above-described operations may be continued indefinitely without affecting the adding-wheels. When it is desired to bring the adding mechanism into play, the handle 124, Figs. 1, 4, and 5, is pulled forwardly, thus rocking both the shaft 122 and its downwardly-projecting arm 121, and by means of the pin-and-slot engagement with the carriage-coupling shaft 106 the latter is slid rearwardly, so as to withdraw the pin 116 thereon from the locking-slot 117, Fig. 3 and 14, and simultaneously move the pinion 109 into line with the short rack 112, which is suspended from the lower portion of the paper-carriage. Care must be taken to see that the paper-carriage is at the extreme right-hand limit of its travel at the time that the lever 124 is swung forwardly, because when the carriage is in this position the cut-away 115, Figs. 15 and 20, stands opposite the pinion 109, and hence the rearward movement of the latter is not obstructed, whereas at any other point in the travel of the paper-carriage the bar or plate 114 would prevent the shifting of the pinion. It will be seen that this movement of the lever 124 puts the adding-wheel carriage-driving shaft 106 into condition to be automatically coupled to the paper-carriage mechanism at the terminal portion of each line of writing—that is, the portion at which figures are to be written in column upon the paper. The bar 134, Figs. 1 and 5, is also drawn toward the left, thereby withdrawing the locking-tooth 133 and releasing the number-wheel rotator



54, so that the latter may be intermittently rotated by the spring 68 when the figure-keys are manipulated. Having thus placed in condition for activity both the mechanism for rotating the number-wheels and the mechanism for coupling the latter to the paper-carriage, the type-keys may be manipulated so as to write words or items at the left-hand portion of the page or line in the manner already described. After such writing the paper-carriage is moved into position at the left for writing in the column. This carriage movement may be produced, if desired, by pressing the release-key 145, Fig. 2, thereby lifting the universal bar 21 and swinging the rack 17 down clear of both dogs 16, so that the carriage is free to run rapidly to the left under the influence of its driving-spring 125, said rack reengaging the dogs upon the return of the release-key to normal position. During said movement of the carriage the lock 110, Figs. 14 and 16, prevents rotation of the shaft 106, which drives the adding-wheel carriage, and hence the carriage stands idle. When, however, during said carriage movement the short rack 112 upon the carriage reaches and engages the pinion 109, the shaft 106 becomes automatically coupled to the paper-carriage. At the same moment block 110 is released by the bar 111, the locking portion of the latter terminating at the left-hand end of the short rack 112, and during the onward travel of the paper-carriage said pinion 109 and shaft 106 may be rotated freely by the rack 112. At the initial rotation of the shaft 106 and a half-drum 127, Fig. 3, the extreme right-hand end of the horizontal portion of the cord 128 is raised, and thereafter the spring 131, Fig. 5, exerts a rotative power upon the shaft and aids materially in driving the adding-wheel carriage.

As will be understood by reference to Fig. 5, a short preliminary travel of the adding-wheel carriage is necessary in order to bring the first pinion 38 thereon into engagement with the key-controlled rotator 54. This first pinion is of course associated with the millions number-wheel; but the operator may by touching the usual space-key or otherwise advance both the paper-carriage and the adding-wheel carriage until the number-wheel of the desired denomination is engaged by said rotator 54—that is, until the pointer 138, Fig. 2, stands opposite the graduation upon the scale 139 which corresponds to said denomination. If the number to be written and added is of the millions denomination, then the paper-carriage and adding-wheel carriage will be arrested when said index is opposite the extreme right-hand graduation upon said scale, or if it is of the hundred-thousand denomination when said index is opposite the second graduation, and so on.

Assuming that the number to be written is "234.56," the carriages are advanced until the pointer 138 stands opposite the fifth graduation from the right on the scale 139,

at which time the fifth pinion 38 from the left at Fig. 5—that is, the pinion connected with the hundreds number-wheel—is engaged to the common rotator 54, while the paper-carriage stands in position to receive the impression of a type in the hundreds-column. Having thus positioned both the paper-carriage and the adding-wheel carriage, the figure shift-key 171 is pushed rearwardly, and the platen is hence depressed, and while the platen is in this position the type-key "2," Fig. 2, is depressed, thus swinging up its type-bar to impress the type "2" upon the paper, and also affecting the carriage-feed mechanism, as above described, while by the link 92 the rear end of the second lever 93, counting from the right at Fig. 5, is elevated, thereby depressing the forward end thereof, said lever turning upon the fulcrum-rod 74. The forward tip end of said lever bears down upon the cross-bar 83, Figs. 3, 5, 11, and 19, and presses down both said rod 83 and the side arms 82, the latter swinging upon the rod 74. At the same time the square rack-frame, consisting of the opposite racks 77 and the cross-bars 78, descends by gravity, the laterally-projecting pins 85 upon said racks resting upon the upper edges of the said descending arms 82, and by reason of the descent of said rack-frame the normally-disengaged racks are enabled to engage or mesh with the pinions 70, which prevent further downward movement of the racks as well as of the plate 80. These pinions are fixed upon the same shaft 51 that carries the adding-wheel rotator 54. In their downward movement the arms 82 bear down the pins 84, Figs. 9 and 19, and the side arms 72, which also swing upon said fulcrum-rod 74, and during the latter portion of the descent of the lever 93 the cross-bar 71, which is carried by the arms 72 and normally engages both of the pinions 70, is withdrawn from the latter. Simultaneously the lug 94 upon the lever 93 is projected downwardly through the oblique slot 95 and slightly below the bottom surface of the hinged plate 80, upon which, as hereinbefore described, said square rack-frame may slide. Hence it will be seen that the pinions 70 are released for a rotative movement, so as to slide the racks 77 forwardly along the plate 80, while simultaneously the lug 94 is placed in position to contact with the bar 78, and hence arrest the rack-frame. The arrest is effected in this instance when the ratchet-wheels and the actuator 54 have advanced two points, according to the position of the particular lug 94 which is associated with the type-key "2," said lug being so close to the normal position of the stop-bar 78 as to arrest the latter as soon as it has moved two points. This will be understood by reference to Figs. 11 and 19, at which figures, however, the racks are illustrated as having been arrested by the lug 94, associated with the "9" key. It will be understood that the rotary movement just referred to of the shaft



51 and the pinions 70 and 54, fixed thereon, is produced by the spring 68, acting through the cord 66, pulley 64, cord 62, fusee 55, and backing-ratchet 60. It may also be remarked, 5 parenthetically, that the cord 96 is simultaneously wound to a slight extent upon the barrel 58, said cord unwinding from the pulley 99 in opposition to the tension of the spring 103, Fig. 3, said cord having been automatically wound upon said pulley by said spring 10 during the movement of the paper-carriage from right to left or in letter-feeding direction. By means of the pinion 38 the rotator 54 is enabled to effect a rotation of the fifth 15 number-wheel from the right at Fig. 5 for a distance of two points, so that the figure "2" appears thereon through the sight-opening 132 at Fig. 1. During this movement of the number-wheel the detent 44, Fig. 3, bobs over the teeth of the pinion 28 and operates accurately to position not only said pinion and number-wheel after the actuation thereof, but also the pinion 38, so that the adding-wheel carriage may travel freely and without 25 danger of collision between a tooth of the pinion 38 and a tooth of the common rotator 54. The figure "2" having thus been impressed in the hundreds-column upon the paper and the hundreds number-wheel having been advanced two points, the finger-key "2" is released and returns to normal position under the influence of spring 24, thus permitting the return of the type-bar in the described manner and also enabling the stop-lever 93 to resume its normal position. As 35 the forward end of the latter rises the spring 76, Figs. 3, 11, and 19, lifts the detent bar or dog 71 into engagement with the escapement-wheel 70, and at the same time, by means of the detent-arms 72 and the pins 84 thereon, the frame, consisting of arms 82 and bar 83, is lifted, and the pins 85 lift the racks 77 out of mesh with the pinions 70, said racks swinging up with the plate 80, which is hinged upon the 40 rod 74. The reengagement of the detent-bar 71 with the power-driven wheels 70 prevents rotation of the latter when the racks 77 are withdrawn therefrom, and upon said racks becoming clear of the wheels the rack-frame is drawn rearwardly to normal position against the stops 86 by means of the cord 88 and the spring 87. As already explained, during the return of the key-lever 22 to normal position the universal bar 21 descends, the rack 17 55 rises, and the paper-carriage is permitted to feed a letter-space. During this movement of the paper-carriage the rack 112 thereon rotates the pinion 109, and by means of the shaft 106 and large gear 105, Fig. 3, which is in engagement with the rack 104 upon the adding-wheel carriage, the latter is given a corresponding endwise movement, said movement being greater than that of the paper-carriage owing to the difference in the diameters of the gears 109 and 105. This movement of the adding-wheel carriage is of course 65 assisted by the spring 131, and by said move-

ment the fifth-wheel 38 from the left, at Fig. 5, is moved out of engagement and the next pinion 38 is moved into engagement with the 70 rotator 54, thereby connecting the tens number-wheel to the figure-keys at the keyboard. Having thus both printed and added the "2," the finger-key for "3" is depressed, thus impressing the type "3" upon the paper, and 75 also through the third lever 93 from the right at Fig. 5, causing the operation of the escapement-pinions 70, the rotator 54, and the pinion 38 engaged therewith, so as to rotate the tens-wheel three points and cause the number "3" to appear thereon through the sight-opening 132 at Fig. 1. After releasing said 80 key the key "4" is depressed so as to print "4" in the units-column and turn the units-wheel four points. Then the period-key is 85 depressed, thus feeding both the paper-carriage and the adding-wheel carriage without causing a rotation of any number-wheel by reason of the space that exists between the units and tenths wheels, and in which space 90 the rotator 54 is located after the units-figure has been written and while the period-key is operated. Then the type-keys for "5" and "6," respectively, are operated with corresponding results. It will be understood, how- 95 ever, that if a rack such as illustrated at Fig. 17 is employed the period-key need not be manipulated between the units and tenths columns, since the paper-carriage will automatically skip a space at this time, and the 100 adding-wheel carriage will accordingly move far enough to engage the tenths-pinion 38 with the rotator 54. The platen 15 is now rotated, so as to advance the paper a line-space, and the carriage is moved back to be- 105 gin a new line. During this reverse movement of the carriage the rack 112 rotates the pinion 109 reversely, and hence by means of the shaft 106 and gear 105 the adding-wheel carriage is returned to its original position, 110 as illustrated at Fig. 5. At this moment the rack 112 leaves the pinion 109, thereby uncoupling the carriages, while the locking portion of the bar 111 engages the block 110 upon the pinion-shaft 106, and thereby prevents 115 further rotation of said shaft, and hence further movement of the adding-wheel carriage. It will also be understood that during the reverse rotation of the shaft 106 the cord 128 is wound upon the half-drum 127, thereby 120 resetting the spring 131, the cord 128 being finally restored to its original position and extending substantially through the axis of the drum 127, so as not to have any rotative effect upon the latter, thereby avoiding un- 125 due friction between the locking-block 110 and the bar 111. It will be understood that at each rotation of the fusee 55 by the spring 68 during the adding operation a length of the cord 96 has been wound upon the barrel 130 58, a considerable portion of said cord finally becoming wound about the barrel, said cord paying off from the sleeve 99. During the initial portion of the said return movement



of the paper-carriage the remainder of the cord is unwound from the sheave 99 (which is mounted upon the carriage) in opposition to the tension of the spring 103, since the tension of the latter is not sufficient to rotate the barrel 58 in opposition to the pull of the spring 68 acting through the cord 62. During the final portion of the return travel of the paper-carriage the unwound cord 96 is dragged along by the sheave, thereby forcibly rotating the barrel 58 and fusee 55, so as to wind the cord 62 upon the latter, and hence reset the spring 68. During this movement of the fusee the pawl 60 slips over the teeth of the ratchet 59, Figs. 5 and 18, while the shaft 51 and rotator 54 remain motionless, and hence it will be seen that said rotator cannot at any time be accidentally operated to rotate the adding-wheels backward, even if the return movement of the carriage should be begun while said rotator is engaged to one of the pinions 38.

The operation of writing words at the left-hand portion of the page and of writing and adding numbers at the right-hand portion thereof may be repeated indefinitely, the adding-wheels being rotated according to the values of the figure-keys operated. At each revolution of a pinion 38 the pawl 39 thereon, Figs. 5 and 13, comes once into mesh with the pinion 29 upon the right-hand face of the adding-wheel of next higher denomination and rotates said pinion 29 and its adding-wheel one point, thereby carrying ten. If it should happen at any time that the pawl 39 is in such engagement at the moment when the number-wheel of higher denomination is being independently actuated by the rotator 54, said pawl will yield and accommodate the movement of the number-wheel of higher denomination, so that the movement of the latter may not be transmitted through said pawl to the wheel of lower denomination, which would be the case if said pawl were rigidly attached to its pinion 38, thereby causing an error in the adding operation. The spring 42 restores the pawl to normal position after the yielding movement thereof, so that the tens-carrying operation may proceed as before.

It will be observed that I have combined a series of letter and figure types, keys therefor, a carriage connected for letter-space movement to all of the keys, a series of power-rotated adding-wheels, means for connecting each adding-wheel to any of the figure-keys, and means for enabling the connected key to limit the arc through which the adding-wheel is power-rotated. Said connecting means are normally called into action at a predetermined point in the traverse of the paper-carriage and are disconnectible from the paper-carriage by the lever 124. At said predetermined point the adding-wheel carriage-driving spring 131, which is normally on a center, and hence inoperative, is automatically brought into active operation. The

gearing connected to said spring is continuously connected with the adding-wheel carriage and discontinuously connected with the paper-carriage. The independent operating means 38 for the number-wheels are distances apart greater than the step-by-step feeding movements of the paper-carriage, this being due to the motion-multiplying mechanism which connects the paper-carriage to the adding-wheel carriage. The adding-wheel carriage moves at a greater rate of speed than the type-writer carriage, the motion of the former being, however, governed by the motion of the latter. The adding-wheel carriage moves in a direction of the axis of the driver 54. It will also be observed that a variable throw-escapement mechanism, including the racks 77, pinions or escapement-wheels 70, and detents 71, is common to and controllable by all the figure-keys and controls the rotatory movements of the driver 54, the latter being rotated progressively in one direction by the spring 68. The escapement-wheels 70 are power-driven, the movable holding-dog 71 coacts therewith, and the endwise-movable racks or ratchet-bars 77, which are also movable transversely of their length into and out of mesh with said wheels, are constructed to coöperate with the holding-dog to permit the escape movement of the wheels. The rack-carrier 80 is pivoted upon the fixed bar 74 independently of the pivotal mounting of the holding-dog 71. The reciprocatory feed-racks or ratchet-bars 77 are movable transversely into and out of mesh with the escapement-wheels 70, said racks being pressed in one direction of their reciprocation—that is, rearwardly—by the spring 87, which normally holds the rectangular rack-frame against stops 86 on the plate 80. The racks move endwise to and fro upon the carrier 80 and are arrested by independently-movable stop-bars 93 at different distances from their initial positions, said stops or stop-levers 93 being each adapted to move the holding-dog 71, so as to release the escapement-wheels 70. The bars 93 have stop-lugs 94 and are operated by connections which extend to the type mechanism. The stop-lugs 94 are arranged in a line which extends across and obliquely to the direction of the to-and-fro motion of the rectangular rack-frame. The plate 80 and the rack-bar frame thereon are connected by the pins 85 to the bail-arms 82, so as to be moved in one direction thereby—namely, in an upward direction—during the upward movement of the finger-key. The arms 82, taken together with the cross-bar 83, form a pivoted bail for moving the arms 72, which carry said holding-dog 71. It will be observed, further, that independent means, as 38, are provided for rotating each adding-wheel, said means being operated one at a time by the rotatory driver 54, which is driven by the spring 68. Means are connected with the type-writing mechanism for resetting the spring 68, said means



including the barrel 58 and the cord 96, thereby restoring the power for operating the adding-mechanism driver 54. In other words, the paper-carriage is a to-and-fro movable-spring setter connected with the spring 68, which actuates the number-wheel driver-wheel 54, so as to reset said spring from time to time.

By means of either the slide 134, which locks the adding-wheel driver against rotation, or the lever 124, which moves the coupling-pinion 109 to a position of disuse, the adding-wheels may be rendered inoperative at will.

While I have particularly described the illustrated form of my invention, I am not to be understood as limiting myself to such particular form, inasmuch as my invention is capable of being embodied in other forms and arrangements without departing from the spirit thereof.

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

1. The combination of type mechanism, a carriage, an adding or registering mechanism, a second carriage on which the adding-wheels are mounted, and means for automatically connecting said carriages together at a predetermined point in the forward motion of the type-writer carriage, means independent of the moving means of the first-mentioned carriage for moving the carriage on which the adding-wheels are mounted; substantially as described.

2. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, and independent spring-operated driving mechanism for said second carriage and automatically thrown or brought into operation when the type-writer carriage reaches a predetermined point in its forward traverse; substantially as described.

3. The combination of type mechanism, a carriage, an adding mechanism, one part of which has motion to and fro relatively to the other part, and an independent driving mechanism for moving said movable part and normally out of action until the said carriage reaches a predetermined point in its forward motion; substantially as described.

4. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, mechanism for connecting said carriages together when the type-writer carriage reaches a predetermined point in its forward traverse, and an independent spring for moving said second carriage but normally inactive before the type-writer carriage reaches said point and thrown into operation when said carriages are coupled together, substantially as described.

5. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, gearing continuously connected with one of said carriages and discon-

tinuously connected with the other thereof, and a drive-spring connected with said gearing and on a center until the gearing is connected with both carriages, substantially as described.

6. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, an independent driving mechanism for said second carriage, and means for automatically connecting said driving mechanism with the type-writer carriage when the latter reaches a predetermined point in its forward traverse; substantially as described.

7. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, an independent driving mechanism for said second carriage and normally inactive during a part of the forward traverse of the type-writer carriage, and means for automatically throwing or bringing said driving mechanism into action when the type-writer carriage reaches a predetermined point in said forward traverse; substantially as described.

8. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which the adding-wheels are mounted, an independent driving mechanism for said second-named carriage, and means for automatically connecting said driving mechanism with said type-writer carriage at a predetermined point in the forward traverse of the latter; substantially as described.

9. The combination of type mechanism, a carriage, an adding or registering mechanism including a series of adding-wheels, a second carriage on which the adding-wheels are mounted, normally inactive independent driving mechanism for said adding-mechanism carriage; and means for automatically throwing said driving mechanism into action when the type-writer carriage reaches a given point in its forward traverse; substantially as described.

10. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of the adding mechanism is mounted, a rack on the last-named carriage, a pinion meshing with said rack, a spring for rotating said pinion in one direction, and means for rendering said spring inoperative during a part and operative during the remainder of the forward traverse of the type-writer carriage; substantially as described.

11. The combination of type mechanism, a carriage, an adding or registering mechanism, a second carriage supporting the adding-wheels, a rack on said second carriage, a journaled pinion meshing with said rack, and mechanism for automatically connecting said pinion with the type-writer carriage at a predetermined point in the forward motion thereof; substantially as described.

12. The combination of type mechanism, a



carriage, an adding mechanism, a second carriage on which the adding-wheels are mounted, a journaled shaft provided with a pinion, a short rack connected with the type-writer carriage and adapted to move into and out of mesh with said pinion at a given point in the path of said type-writer carriage, and connections between said shaft and said adding-mechanism carriage for moving the latter to and fro; substantially as described.

13. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which the adding-wheels are mounted, a rack on said second carriage, a journaled shaft provided with two pinions one of which meshes with said adding-mechanism-carriage rack, and a short rack connected with the type-writer carriage and adapted to move into and out of mesh with the second pinion of said shaft at a given point in the path of the said type-writer carriage; substantially as described.

14. The combination of type mechanism, a carriage, an adding mechanism including a series of adding-wheels, a second carriage on which the adding-wheels are mounted, a short rack connected with the type-writer carriage, a journaled pinion with which said rack meshes at a given point in the forward traverse of said type-writer carriage connections between said pinion and the adding-mechanism carriage for moving the latter, and means for holding said pinion at rest while disengaged from said short rack; substantially as described.

15. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, a rack on said adding-mechanism carriage, a pinion meshing with said rack, a spring connected with said pinion and on a center during part of the forward traverse of the type-writer carriage, and means for moving said spring-driven mechanism off the center when the type-writer carriage reaches a predetermined point in its forward traverse; substantially as described.

16. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, a journaled shaft intermediate said carriages and continuously geared to one and discontinuously geared to the other of said carriages, and a spring connected with said shaft for rotating the same and on a center until the shaft is connected with both carriages; substantially as described.

17. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, a journaled shaft continuously connected with one of said carriages and discontinuously geared to the other thereof, and a drive-spring for said shaft but inactive until the shaft is connected with both carriages; substantially as described.

18. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which the adding-wheels are mounted, a rack on the last-named carriage, a pinion engaging with said rack, a spring for rotating said pinion in one direction, mechanism for automatically connecting the type-writer carriage and said pinion at a given point in the path of the type-writer carriage, and means for holding said pinion against rotation prior to such automatically-made connection; substantially as described.

19. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which the adding-wheels are mounted, spring-driven mechanism for moving the last-named carriage, means for connecting said last-named mechanism with the type-writer carriage at a given point in the forward traverse of the latter, and means for holding said spring-driven mechanism against motion until said automatic connection is made; substantially as described.

20. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, a rack on the last-named carriage, a journaled shaft provided with two pinions, one of which meshes with said rack, a spring for rotating said shaft in one direction, a short rack connected with the type-writer carriage and meshing with the second pinion upon said shaft at a predetermined point in the forward traverse of the type-writer carriage, and means for preventing rotation of said shaft before such predetermined point is reached; substantially as described.

21. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, a rack on the last-named carriage, a pinion meshing with said rack, a shaft carrying said pinion, a second pinion on said shaft, a short rack connected with the type-writer carriage for meshing with said second pinion at a given point in the forward traverse of the type-writer carriage, a flat-faced block connected with said shaft, a bar connected with the type-writer carriage and coacting with a flat or plane face of said block for preventing rotation of said shaft prior to such given point, and a spring connected to said shaft eccentrically thereof and "on a center" while the shaft is locked against rotation as aforesaid; substantially as described.

22. The combination of a type-writer carriage, a bar 111 connected therewith, a rack 112 on said bar 111, an endwise-movable journaled shaft, a pinion 109 on said shaft, a plate 114 connected with bar 111, and ending at 115, a flat-faced block 110 on said shaft, the plane of flat part of the said block and the bar 111 coacting to lock said shaft against motion, and the locking part of said bar 111 ending at 113 to permit the rotation of said shaft, an adding-mechanism carriage, and connections



between said shaft and said adding-mechanism carriage for moving the latter; substantially as described.

23. The combination of type mechanism, a carriage, an adding mechanism, an independent carriage on which the adding-wheels are mounted, and a shaft journaled in the framework of the machine and continuously geared with said adding-mechanism carriage and continuously geared with the type-writer carriage, whereby the type-writer carriage may move through part of its forward traverse while the adding-mechanism carriage remains stationary and the two carriages are connected together at a predetermined time or point and the motion of the adding-mechanism carriage is governed by that of the type-writer carriage, substantially as described.

24. The combination of type mechanism, a carriage, an adding mechanism, a second carriage on which part of the adding mechanism is mounted, a short rack connected with the type-writer carriage, a journaled shaft provided with a pinion movable into and out of the path of said short rack, and connections between said shaft and said adding-mechanism carriage; substantially as described.

25. The combination of type mechanism, a carriage, a short rack connected with said carriage, a rotatory pinion movable into and out of the path of said rack, an adding mechanism, a second carriage for carrying part of said adding mechanism, and continuously-operative connections between said second carriage and said pinion whereby the said carriages are automatically connected together at a given point in the forward traverse of the type-writer carriage whenever said pinion is in one position, and are not connected when said pinion is in another position; substantially as described.

26. The combination of type mechanism, a carriage, a short rack connected with said carriage, a rotatory pinion movable into and out of position for meshing with said short rack, a guard-plate connected with said type-writer carriage for preventing motion of said pinion into or out of position for meshing with said rack except in a given position of the plate and type-writer carriage, an adding mechanism, a carriage for a part of said adding mechanism, and connections between said adding-mechanism carriage and said pinion whereby the said carriages are automatically connected together at a given point in the forward traverse of the type-writer carriage whenever said pinion is in one position, and are not connected when said pinion is in another position; substantially as described.

27. The combination of type mechanism, a carriage, a short rack connected with said carriage, a rotatory pinion movable into and out of position for meshing with said rack, a locking-bar connected with said carriage and terminating adjacent one end of said rack, a flat-faced block rigid with said pinion and co-acting with said locking-bar to prevent rota-

tion of said pinion, a guard-plate connected with said bar or type-writer carriage for retaining said pinion in and out of position for meshing with said rack except in a given position of the said plate and carriage, an adding mechanism, and a second carriage carrying part of said adding mechanism and connected with said pinion to be moved thereby; substantially as described.

28. The combination of type mechanism, a carriage, a short rack connected with said carriage, an endwise-movable journaled shaft provided with a pinion for meshing with said rack in one endwise position of said shaft, a lever for moving said shaft endwise, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, and connections between said second carriage and said endwise-movable shaft whereby the shaft moves said second carriage to and fro; substantially as described.

29. The combination of a type-writer carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, an endwise-movable rotatory shaft, a short rack connected with the type-writer carriage, a pinion on said shaft and moved thereby into and out of position for meshing with said rack, connections between said shaft and the adding-mechanism carriage, and a drive-spring for the said shaft connected therewith "on a center" at such times as said rack moves out of mesh with the said pinion; substantially as described.

30. The combination of type mechanism, a carriage, adding mechanism, a second carriage on which part of said adding mechanism is mounted, a journaled shaft continuously geared with one and discontinuously geared with the other of said carriages, a spring connected with said shaft for rotating it in one direction but normally inactive until the shaft is geared with both carriages, and means for preventing rotation of said shaft until said shaft is geared with both carriages, substantially as described.

31. The combination of a type-writer carriage, an adding mechanism, a second carriage on which part of said adding mechanism is mounted, an endwise-movable shaft, a short rack connected with the type-writer carriage, a pinion on said shaft moved thereby into and out of position for meshing with said rack, connections between said shaft and the adding-mechanism carriage, and a drive-spring for the said shaft connected therewith "on a center" at such times as said rack moves out of mesh with said pinion, with means for locking said shaft against rotation when said pinion is in the path of said rack and during a part of the traverse of the type-writer carriage, substantially as described.

32. The combination of a series of letter and figure types and keys therefor, a carriage, adding-wheels, independent means for rotating each wheel, a spring-driven rotatory driver for operating said rotating means one



at a time, an independent carriage for either the said rotating means or the said driver and moving at a rate of speed different from that of the carriage first named, and a common escapement operated by any of the figure-keys for controlling the rotary motion of said driver, substantially as set forth.

33. The combination of type mechanism, a carriage, a second carriage moving at a rate of speed different from that of the first carriage, adding-wheels mounted upon the second carriage and provided with independently-operable rotative means, a common driver adapted to operate said rotative means and their associated adding-wheels one by one as they are moved along upon said second carriage, a spring for rotating said common driver progressively in one direction, and a variable-throw escapement mechanism controlled from the keyboard of the type mechanism for controlling the rotatory motion of said driver, substantially as described.

34. The combination of type mechanism, having a keyboard, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a rotatory spring-driven driver for operating said adding-wheels as the carriage therefor moves the same in the direction of the axis of said driver, and a variable-throw escapement mechanism controlled from the keyboard for controlling said driver; substantially as described.

35. The combination of type mechanism, a carriage, adding-wheels, a spring-driven rotatory driver for operating said wheels, a second carriage on which one of said driving and adding elements is mounted and by which it is moved relatively to the other, a key-operated escapement mechanism for controlling said driver and spring, and said driver being normally out of operative relation with the adding-wheels during a part of the forward traverse of the type-writer carriage, and means for connecting or gearing said carriages together during a part of the forward traverse of the type-writer carriage; substantially as described.

36. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said adding-wheels are mounted, a spring-driven rotatory driver out of operative relation with said wheels during a part of the forward motion of the type-writer carriage, a key-operated escapement for controlling the rotatory motion of said driver, and means for discontinuously gearing said carriages together, whereby the type-writer carriage may progress to a predetermined point before said carriages are coupled together and said driver is brought into operative relation with said wheels; substantially as described.

37. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of the forward traverse of said first-named car-

riage, escapement mechanism for controlling said driving mechanism, and connections between the type mechanism and said escapement mechanism for operating the latter; substantially as described.

38. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of the forward traverse of said first-named carriage, escapement mechanism for controlling said driving mechanism, and connections between the type mechanism and said escapement mechanism for operating the latter, with driving mechanism for said second carriage, inactive until the first-named carriage reaches a given point in its forward traverse; substantially as described.

39. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of the forward traverse of said first-named carriage, escapement mechanism for controlling said driving mechanism, and connections between the type mechanism and said escapement mechanism for operating the latter, with spring-driven mechanism for moving said second carriage but inactive until the first-named carriage reaches a predetermined point in its forward traverse; substantially as described.

40. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of the forward traverse of said first-named carriage, escapement mechanism for controlling said driving mechanism, and connections between the type mechanism and said escapement mechanism for operating the latter, with gearing continuously connected with one and discontinuously connected with the other of said carriages; substantially as described.

41. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of the forward traverse of said first-named carriage, escapement mechanism for controlling said driving mechanism, and connections between the type mechanism and said escapement mechanism for operating the latter, with gearing continuously connected with one and discontinuously connected with the other of said carriages, and a spring connected to said gearing for operating the same but inactive until the gearing is connected with both carriages; substantially as described.

42. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-driven mechanism for operating said wheels and disengaged therefrom during a part of



the forward traverse of said first-named carriage, an escapement-wheel connected to and controlling said driving mechanism, a detent for said wheel, a reciprocatory feed-rack or  
5 ratchet-bar movable transversely into and out of mesh with said wheel and spring-pressed in one direction of its reciprocation, a series of stops adapted to arrest said bar in different positions, and connections with type  
10 mechanism for operating said stops, detent and bar; substantially as described.

43. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, an escape-  
15 ment-controlled driver adapted to operate the adding-wheels one by one as they are moved along, a spring for rotating said driver in one direction, and means connected with the first-named carriage for setting said spring, dur-  
20 ing the return movement of said first-named carriage; substantially as described.

44. The combination of type mechanism, a carriage, adding-wheels, a second carriage on which said wheels are mounted, a spring-  
25 driven driver for operating said adding mechanism, a variable-throw escapement mechanism controlled from the keyboard of the type mechanism for controlling said driver, and means connected with the first-named car-  
30 riage for setting the spring operating said driver; substantially as described.

45. The combination of type mechanism having a keyboard, a carriage, adding-wheels supported upon another carriage, a spring-  
35 driven rotatory driver for operating said adding-wheels one by one but out of operative relation thereto during a part of the forward traverse of the first-named carriage, means for coupling said carriages together at a  
40 given point in said forward traverse and causing the adding-mechanism carriage to move step by step with the first-named carriage, a variable-throw escapement mechanism controlled from the keyboard for controlling said  
45 driver, and means connected with the first-named carriage for setting said driver-operating spring; substantially as described.

46. The combination of type mechanism, a carriage, adding-wheels, a spring-driven ro-  
50 tatory driver for said wheels, said driver and said adding-wheels being relatively movable, a second carriage upon which said movable element is mounted, a key-controlled variable-throw escapement for controlling the  
55 rotation of said driver, and means connected with said first-named carriage for setting the said driver-operating spring; substantially as described.

47. The combination of adding-wheels hav-  
60 ing independent driving means for the wheels, a driver for operating said adding-wheels, said driver and said adding-wheels being relatively movable, a carriage upon which said movable element is mounted, a spring for ro-  
65 tating said driver, type mechanism, a second carriage, mechanism connected with said second carriage for setting said spring, and an

escapement controlling the rotation of said driver and operated from the keyboard of the type-operating mechanism; substantially as 70 described.

48. The combination of type mechanism, a carriage, adding-wheels, independent oper-  
ating mechanisms for the wheels, a spring-  
75 driven rotatory driver for operating said means one by one, said driver and said adding-wheels being relatively movable and a second carriage upon which said movable ele-  
ment is mounted, an escapement controlled by the type-operating mechanism for control-  
80 ling the rotation of said driver, and means connected with said first-named carriage for setting the said driver-operating spring; substantially as described.

49. The combination of adding-wheels, in-  
85 dependent operating means for the wheels, a rotatory spring-driven driver for operating said means one at a time, and said driver and said adding-wheels and means being relatively movable, a type-writer carriage, a sheave or  
90 pulley journaled on and connected to said carriage by a spring, a cord fast to said pulley and connected to set the driver-operating spring as the type-writing carriage is moved in one direction, and an escapement controlled  
95 from the type-operating mechanism of the type-writer for controlling the rotation of said driver; substantially as described.

50. The combination of type mechanism, a carriage, adding-wheels, independent operat-  
100 ing means for the wheels, a driver for operating said means one at a time, said driver and said adding-wheels being relatively movable, and being disengaged one from the other during a part of the traverse of the said carriage, a shaft  
105 with which said driver is connected, a barrel loose on said shaft, a backing-ratchet connecting said barrel and said shaft, a cord connected with said barrel for rotating it in one di-  
110 rection and connected with a spring, a second cord connected with said barrel for rotating it in the opposite direction, said second cord also being connected with said carriage, and an es-  
115 capement operated from the keyboard of the type mechanism for controlling the rotation of said driver; substantially as described.

51. The combination of type mechanism, a carriage, adding-wheels, independently-oper-  
able driving means for said wheels, a single  
120 driver for operating said driving means one at a time and disengaged therefrom during a part of the traverse of the said carriage, a spring and connections for operating said driver, an escapement controlled from the type-operat-  
125 ing mechanism for controlling the rotation of said driver, means connected with the said carriage for setting said driver-operating spring, and means for causing engagement between  
130 said driver and said driving mechanisms of the adding mechanism one at a time after the said carriage has reached a given point in its forward traverse; substantially as described.

52. The combination of type mechanism, a carriage, adding-wheels, independent operat-



ing means for said wheels, a spring-driven driver for operating said independent means one at a time and disengaged therefrom during a part of the traverse of the said carriage, 5 said driver and adding-wheels and operating means being relatively movable, means for causing said driver and said adding-wheels and operating means to move relatively after the said carriage has reached a given point in 10 its forward traverse, an escapement operatively connected with the type-operating mechanism for controlling the rotation of said driver, and means for locking said driver against rotation at will; substantially as described. 15

53. The combination of a power-driven escapement-wheel, a movable holding-dog coacting therewith, and an endwise-movable rack or ratchet bar movable transversely of 20 its length into and out of mesh with said wheel and constructed to cooperate with the holding-dog to permit the escape movements of the wheel; substantially as described.

54. The combination of a power-driven escapement-wheel, a movable detent coacting therewith, an endwise-movable rack or ratchet bar movable transversely of its length 25 into and out of mesh with said escapement-wheel and constructed to cooperate with the holding-dog to permit the escape movements of the wheel, and means for arresting said rack or ratchet bar in its endwise motion at different 30 distances for its initial position; substantially as described.

55. The combination of a power-driven escapement-wheel, a pivoted holding-dog coacting therewith, an independently-pivoted carrier, an endwise-movable rack or ratchet bar 35 on said carrier adapted to coact with said holding-dog and said escapement-wheel, and a driver controlled by said escapement-wheel; substantially as described. 40

56. The combination of an escapement-wheel, a movable holding-dog coacting with 45 said wheel, a rack or ratchet bar for coaction with said escapement-wheel, a movable carrier on which said bar is mounted to move endwise to and fro, independently-movable stops for arresting said rack or ratchet bar at 50 different distances from its initial position, and a driver controlled by said escapement-wheel; substantially as described.

57. The combination of an escapement-wheel, a spring-pressed holding-dog coacting 55 therewith, an endwise-movable rack or ratchet bar movable transversely into and out of mesh with said wheel, independently-movable stops for arresting said bar at different distances from its initial position, connections between 60 said stops and said holding-dog whereby each stop moves the dog to release the wheel, and a driver controlled by said escapement-wheel; substantially as described.

58. The combination of an escapement-wheel, a spring-pressed pivoted holding-dog 65 for coaction with said wheel, a pivoted carrier, a rack or ratchet bar movable endwise

to and fro on said carrier and adapted to mesh with said wheel, independently-movable stops 70 for arresting said bar at different distances from its initial position, means operated by each of said stops for disengaging said dog from the wheel, and a driver controlled by said escapement-wheel, substantially as described. 75

59. The combination of an escapement-wheel, a movable holding-dog therefor, an endwise-movable rack or ratchet bar for coaction with said wheel and movable transversely into and out of mesh therewith, independently-movable stops arranged in line oblique to said bar and adapted to arrest the 80 same at different distances from the initial position thereof, and a driver controlled by said escapement-wheel, substantially as described. 85

60. The combination of an escapement-wheel, a movable holding-dog therefor, an endwise-movable rack or ratchet bar movable transversely into and out of mesh with said 90 wheel, independently-movable stops arranged in a line oblique to said bar and adapted to stop the said bar at different distances from its initial position, connections whereby each stop operates said holding-dog, and a driver 95 controlled by said escapement-wheel, substantially as described.

61. The combination of an escapement-wheel, a movable holding-dog coacting therewith, a movable carrier, a rack or ratchet 100 bar movable endwise to and fro on said carrier and moved into and out of mesh with said wheel by said carrier, independently-movable stops arranged in line oblique to the direction of reciprocation of said bar and 105 adapted to arrest the said bar at different distances from its initial position, connections whereby each stop operates said movable dog, and a driver connected with and controlled by said escapement-wheel; substantially as 110 described.

62. The combination of an escapement-wheel, a spring-pressed holding-dog coacting with said wheel, an endwise-movable rack or ratchet bar movable transversely into and out 115 of mesh with said wheel, independently-movable stops arranged in line oblique to the line of reciprocation of said bar and adapted to arrest said bar at different distances from its initial position, means intermediate said stops 120 and said dog whereby each stop disengages the dog from the said wheel, and a driver connected with and controlled by said escapement-wheel, substantially as described.

63. The combination of an escapement-wheel, a holding-dog, a frame provided with two rack or ratchet bars for coaction with said escapement-wheel, said frame being movable transversely thereof and also movable to and fro in the direction of said bars, 125 independently-movable stops arranged in line across said frame and adapted to coact therewith to arrest the frame at different distances from the initial position thereof, and a driver 130



connected with and controlled by said escapement-wheel; substantially as described.

64. The combination of an escapement-wheel, a holding-dog, a rectangular frame provided with two ratchet-bars for coaction with said wheel and movable into and out of mesh therewith, said frame being movable to and fro in the direction of said bars, independently-movable stops arranged in line oblique to the line of reciprocation of said frame and adapted to coact with an end thereof to arrest the frame at different distances from the initial position thereof, and a driver controlled by said escapement-wheel, substantially as described.

65. The combination of an escapement-wheel, a spring-pressed holding-dog, a pivoted carrier, a frame provided with two rack or ratchet bars and movable to and fro on said carrier in the direction of said bars, independently-movable stops adapted to coact with said frame to arrest it at different distances from its initial position, means operated by each of said stops for moving said holding-dog away from the wheel, and a driver controlled by said escapement-wheel; substantially as described.

66. The combination of an escapement-wheel, a spring-pressed holding-dog therefor, a pivoted carrier, a rectangular frame provided with rack or ratchet bars and movable to and fro on said carrier in the direction of said bars, stops arranged in line oblique to the line of reciprocation of said bars and independently movable into the path of an end of said frame, means whereby each stop disengages said holding-dog from the wheel, and a driver controlled by said escapement-wheel; substantially as set forth.

67. The combination of an escapement-wheel, a spring-pressed holding-dog therefor, pivoted arms 72 carrying said dog, a pivoted carrier, a rectangular frame movable to and fro on said carrier and provided with rack or ratchet bars, a pivoted bail operatively connected with arms 72 to move the same, a series of levers adapted to operate said bail and provided with stop lugs or projections arranged in a line across and oblique to the direction of the to-and-fro motion of said frame on said carrier, and a driver controlled by the said escapement-wheel; substantially as described.

68. The combination of an escapement-wheel 70, a dog 71, pivoted arms 72 carrying said dog, an obliquely-slotted plate 80 pivoted upon the same axis as the arms 72, a rack or ratchet bar frame slidable on said plate 80, a spring for holding said frame against stops on said plate, a pivoted bail, a series of levers 93 provided with stops or projections 94 and constructed to bear on said bail and said bail resting on the arms 72 or projections therefrom, a spring 76 coacting with the dog 71, means whereby the plate 80 and rack-bar frame are connected with the bail to be moved in one direction thereby, and a driver-pinion

as 54 connected with said escapement-wheel, substantially as described.

69. The combination of adding-wheels, a spring-driven escapement-controlled driver common to all of said wheels and constructed to operate one of said wheels at a time, a carriage on which one of said driver and adding elements is mounted and means for automatically bringing about the cooperative relation between said driver and said wheels in succession; substantially as described.

70. The combination of a series of number-wheels independently rotatable on a shaft and each provided with operating and carrying gears, a series of driving-gears independently journaled on a shaft parallel to the first-named shaft and meshing with the operating-gears aforesaid, a spring-pressed pivoted pawl on each driver-gear save the last, and adapted to coact with the carrying-gear of the number-wheel of next higher denomination, with an extension rigid with each pawl and adapted to coact with the second shaft above named to stop the motion of the pawl in one direction; and a single driver which is adapted to cooperate with all of said driving-gears; substantially as described.

71. The combination of a series of number-wheels, independent driving means therefor, and a frame for supporting said parts, with a power-driven driver, an escapement-wheel connected with said driver, a movable holding-dog coacting with said wheel, a key-controlled variable-throw endwise-movable rack or ratchet bar movable into and out of mesh with said wheel, a frame for supporting said driver, and means for causing relative motion of said frames to engage the driver and said operating means one at a time, substantially as described.

72. The combination of adding-wheels, independent operating means for said wheels, a spring-driven driver for operating said means one by one, said driver and said wheels and means being relatively movable, a carriage for said movable element, a platen, a second carriage, key-operated digit-type carriers coacting with said platen, one of said platen and said key-operated digit-type-carrier elements being supported by said second carriage, an escapement for controlling the rotation of said driver, and means connecting said escapement and said type-operating mechanism; substantially as described.

73. The combination of adding-wheels, independent operating means for said wheels, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, a platen, a carriage, key-operated digit-type carriers coacting with said platen, an escapement for controlling the rotation of said driver, and means connecting said escapement and said type-operating mechanisms, with a detent device movable into and out of position for coaction with and for locking said driver against rotation; substantially as described.



74. The combination of adding-wheels, independent operating means for said wheels, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, a carriage for said movable element, a platen, a second carriage, key-operated digit-type carriers coacting with said platen, one of said platen and type-carrier elements being mounted upon said second carriage, a variable-throw escapement for controlling the rotation of said driver, and means for connecting said escapement and said type-operating mechanism; substantially as described.

75. The combination of adding-wheels, independent operating means therefor, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, a platen, a carriage, key-operated digit-type carriers coacting with said platen, a variable-throw escapement for controlling the rotation of said driver, and means connecting said escapement and said type-operating mechanism, with a detent device movable into and out of position for coaction with and for locking the said driver against rotation; substantially as described.

76. The combination of adding-wheels, independent operating means for said wheels, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, a key-controlled escapement for controlling said driver, and a to-and-fro movable spring-setter connected with said driver-operating spring for setting the same from time to time; substantially as described.

77. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said mechanisms one at a time, said adding mechanism and said driver being movable one past or before the other, an escapement-wheel connected with said driver, an endwise-movable rack or ratchet bar movable transversely of its length into and out of mesh with said wheel, and a movable detent coacting with said wheel at such transverse movements of the rack, to permit the escapement movements of the wheel; substantially as described.

78. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a movable detent coacting with said wheel, an endwise-movable rack or ratchet bar movable transversely of its length into and out of mesh with said escapement-wheel, and constructed at such movements to cooperate with the said movable detent to permit the escapement movements of the wheel, and means for arresting the endwise motion of said bar at different distances from the initial position of said bar, substantially as described.

79. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a pivoted holding-dog coacting with said wheel, an independently-pivoted carrier, and an endwise-movable rack or ratchet bar on said carrier adapted to be moved thereby transversely into and out of mesh with said wheel and to cooperate at such movements with the said holding-dog, to permit the escapement movements of the wheel; substantially as described.

80. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a movable holding-dog coacting with said wheel, a rack or ratchet bar for coaction with said wheel, a movable carrier on which said bar is mounted and reciprocates endwise, and stops movable into and out of position for arresting the bar at different distances from its initial position; substantially as described.

81. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a movable holding-dog for coacting with said wheel, a rack or ratchet bar for coaction with said wheel, a movable carrier on which said bar is mounted and reciprocates endwise, and stops movable independently into and out of position for arresting the bar at different distances from its initial position; substantially as described.

82. The combination of adding-wheels, independent operating means therefor a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a spring-pressed holding-dog coacting with said wheel, an endwise-movable rack or ratchet bar transversely movable into and out of mesh with said wheel, movable stops for arresting said bar at different distances from its initial position, and connections between said stops and said holding-dog for moving the dog to release the wheel; substantially as described.

83. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a spring-pressed holding-dog coacting with said wheel, an endwise-movable rack or ratchet bar transversely movable into and out of mesh with said wheel, independently-movable stops for arresting said bar at different distances from its initial position, and connections be-



tween said stops and said holding-dog whereby each stop moves the dog to release the wheel; substantially as described.

84. The combination of adding-wheels, independent operating means therefor, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a spring-pressed pivoted holding-dog for coaction with said wheel, a pivoted carrier, a rack or ratchet bar movable endwise to and fro on said carrier and adapted to mesh with said wheel, movable stops for arresting said bar at different distances from its initial position, and means operated by said stops for disengaging said dog from the wheel; substantially as described.

85. The combination of adding-wheels, independent operating means therefor, a spring-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a spring-pressed pivoted holding-dog for coaction with said wheel, a pivoted carrier, a rack or ratchet bar movable endwise to and fro on said carrier and adapted to mesh with said wheel, independently-movable stops for arresting said bar at different distances from its initial position, and means operated by each of said stops for disengaging said dog from the wheel; substantially as described.

86. The combination of adding-wheels, independent operating means, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a movable holding-dog for said wheel, an endwise-movable rack or ratchet bar for coaction with said wheel and movable transversely into and out of mesh therewith, and independently-movable stops arranged in line oblique to said bar and adapted to arrest the same at different distances from the initial position thereof; substantially as described.

87. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected to said driver, a movable holding-dog for said wheel, an endwise-movable rack or ratchet bar movable transversely into and out of mesh with said wheel, independently-movable stops arranged in a line oblique to said bar and adapted to stop the same at different distances from the initial position thereof, and connections whereby each stop operates said holding-dog, substantially as described.

88. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, an escape-

ment-wheel connected with said driver, a movable holding-dog coacting with said wheel, a movable carrier, a rack or ratchet bar movable endwise to and fro on said carrier and moved into and out of mesh with said wheel thereby, independently-movable stops arranged in line oblique to the direction of reciprocation of said bar and adapted to arrest the said bar at different distances from its initial position, and connections whereby each stop operates said movable dog; substantially as described.

89. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said adding-wheels and means and said driver being relatively movable, an escapement-wheel connected with said driver, a spring-pressed holding-dog coacting with said wheel, an endwise-movable rack or ratchet bar movable transversely into and out of mesh with said wheel, independently-movable stops arranged in line oblique to the line of endwise motion of said bar and adapted to arrest said bar at different distances from its initial position, and connections intermediate said stops and said dog whereby each stop disengages the dog from the said wheel; substantially as described.

90. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, escapement-wheels connected with said driver, a holding-dog for said wheels, a frame provided with two rack or ratchet bars for coaction with said escapement-wheels, said frame being movable transversely of its length and also movable to and fro in the direction of said bars, and movable stops adapted to arrest the frame at different distances from the initial position thereof in said endwise motion; substantially as described.

91. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one by one, said driver and said adding-wheels and means being relatively movable, escapement-wheels connected with said driver, a holding-dog for said wheels, a frame provided with two rack or ratchet bars for coaction with said escapement-wheels, said frame being movable transversely of its length and also movable to and fro in the direction of said bars, and independently-movable stops arranged in line across said frame and adapted to coact therewith to arrest the same at different distances from the initial position thereof, substantially as described.

92. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, and escapement-wheels connected with said driver, a holding-dog for said wheel, a rectangular frame provided with two ratchet-bars for co-



action with said wheels and movable into and out of mesh therewith, said frame being movable to and fro in the direction of said bars and independently-movable stops arranged in line oblique to the line of reciprocation of said frame and adapted to coact with an end thereof to arrest the frame and bars at different distances from the initial position thereof; substantially as described.

93. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, escapement-wheels connected with said driver, a spring-pressed holding-dog for said wheels, a pivoted carrier, a frame provided with two rack or ratchet bars adapted to mesh with said wheels and movable to and fro on said carrier in the direction of said bars, independently-movable stops adapted to coact with said frame to arrest it at different distances from its initial position, and means operated by each of said stops for moving said holding-dog away from the wheel; substantially as described.

94. The combination of adding-wheels, independent operating means therefor a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, escapement-wheels connected with said driver, a spring-pressed holding-dog for said wheels, a pivoted carrier, a rectangular frame provided with rack or ratchet bars adapted to mesh with said wheels and movable to and fro on said carrier endwise of said bars, stops arranged in line oblique to the line of reciprocation of said bars and independently movable into the path of an end of said frame, and means whereby each stop disengages said dog from the wheel; substantially as described.

95. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, escapement-wheels connected with said driver, a spring-pressed holding-dog for said wheels, pivoted arms 72 carrying said dog, a pivoted carrier, a rectangular frame provided with rack or ratchet bars adapted to mesh with said wheels and movable endwise of said bars to and fro on said carrier, a pivoted bail connected with arms 72 for moving the same, and a series of levers adapted to operate said bail and provided with stop lugs or projections arranged in a line oblique to the direction of the endwise motion of said frame on said carrier and adapted to coact with said frame, substantially as described.

96. The combination of adding-wheels, independent operating means therefor, a power-driven driver for operating said means one at a time, said driver and said adding-wheels and means being relatively movable, an escapement-wheel connected with said driver, a dog 71 for said wheel, pivoted arms 72 carry-

ing said dog, a pivoted obliquely-slotted plate 80, a spring-operated rack or ratchet bar frame slidable on said plate 80, a pivoted bail, a series of levers provided with stops or projections and resting on said bail and said bail resting on the arms 72 or projections therefrom, a spring 76 coacting with the dog 71, and means whereby the plate 80 and rack-bar frame carried thereby are connected with the bail to be moved in one direction thereby; substantially as described.

97. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels having independent operating means therefor, and said means being at distances apart greater than said step-by-step feed, a second carriage on which said wheels and means are mounted, a driver disengaged from said independent means during a part of the forward traverse of the first-named carriage, motion-multiplying mechanism for connecting said carriages and thrown into operation when the first-named carriage reaches a predetermined point in its forward traverse, a spring for rotating said driver, and an escapement mechanism operated from the type-operating mechanism and controlling the rotatory motion of said driver.

98. The combination of a carriage, type mechanism, adding-wheels, independent operating means for said wheels, a second carriage upon which said wheels and independent means are mounted, driving mechanism for said second carriage and normally out of action until the first-named carriage reaches a predetermined point in its forward motion, a spring-driven rotatory driver for operating said independent means and disengaged therefrom until the said driving mechanism is thrown into operation, escapement mechanism for controlling said driver and operatively connected with the type mechanism, and mechanism for throwing the driving mechanism for the second carriage into operation when the first-named carriage reaches said point and controlling the motion of the second carriage but permitting it to move faster than the first-named carriage, substantially as described.

99. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels having independent operating means therefor, said means being arranged at distances apart greater than the step-by-step letter-space feed of said carriage, a second carriage upon which said adding-wheels and operating means are mounted, a power-driven driver for operating said independent means one by one and disengaged therefrom during a part of the forward traverse of the first-named carriage, an escapement mechanism operatively connected with the type mechanism and controlling the rotatory motion of said driver, speed-multiplying mechanism for connecting said carriages when the first-named carriage reaches a predetermined point in its forward traverse, and a



drive-spring for the second carriage thrown into operation when said carriages are connected together, substantially as described.

100. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding mechanism having independent operating means for its number-carriers and said means being arranged at distances apart greater than the step-by-step feed of said carriage, a spring-driven escapement-controlled driver for operating said number-carrier-operating means one at a time and disengaged therefrom during a part of the forward traverse of said carriage, a second carriage upon which the number-carriers and their operating means are mounted, speed-multiplying mechanism continuously connected with one of said carriages and discontinuously connected with the other thereof, and a spring for moving said second carriage but normally inactive until said carriages are coupled together, whereby the motion of the second carriage is greater than but is governed by that of the first-named carriage, substantially as described.

101. The combination of type mechanism, a carriage having a step-by-step letter-space feed, number-carriers, independent operating means therefor spaced apart at distances greater than said step-by-step feed, a spring-driven escapement-controlled driver for but disengaged from said independent means during a part of the forward traverse of the first-named carriage, a rack on said first-named carriage, a pinion with which said rack meshes at a given point in the forward traverse of said first-named carriage, speed-multiplying mechanism connecting said pinion with the second carriage, and a spring automatically thrown or brought into operation when the first-named carriage is connected with said pinion through said rack, substantially as described.

102. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels, independent operating means for said wheels and said means being at distances apart greater than said step-by-step feed, escapement-controlled driving mechanism for operating said means one at a time and operatively connected with the type mechanism, a second carriage on which one of said parts of said adding mechanism is mounted, and speed-multiplying mechanism for connecting a step-by-step moving part of or connected to the type-writing mechanism with the second carriage when the said first-named carriage reaches a predetermined point in its forward traverse.

103. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels, independent operating means for said wheels and said means being at distances apart greater than said step-by-step feed, escapement-controlled driving mechanism for operating said means one at a time and operatively connected with the type mechanism,

a second carriage on which one of said parts of said adding mechanism is mounted, driving mechanism for said second carriage normally out of action until the first-named carriage reaches a predetermined point in its forward motion, and mechanism for throwing the said driving mechanism for the second carriage into operation when the first-named carriage reaches a predetermined point in its forward traverse and controlling the motion of the second carriage but permitting it to move faster than the first-named carriage, substantially as described.

104. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels, independent operating means for said wheels and said means being at distances apart greater than said step-by-step feed, escapement-controlled driving mechanism for operating said means one at a time and operatively connected with the type mechanism, a second carriage on which one of said parts of said adding mechanism is mounted, speed-multiplying mechanism for connecting said carriages when the first-named carriage reaches a predetermined point in its forward traverse, and a drive-spring for the second carriage which is inactive until and is thrown into operation when said carriages are connected together, substantially as described.

105. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels, independent operating means for said wheels and said means being at distances apart greater than said step-by-step feed, escapement-controlled driving mechanism for operating said means one at a time and operatively connected with the type mechanism, a second carriage on which one of said parts of said adding mechanism is mounted, speed-multiplying mechanism continuously connected with one of said carriages and discontinuously connected with the other thereof, and a spring for moving said second carriage but normally inactive until said carriages are coupled together, whereby the motion of the second carriage is greater than but is governed by that of the first-named carriage, substantially as described.

106. The combination of type mechanism, a carriage having a step-by-step letter-space feed, adding-wheels, independent operating means for said wheels and said means being at distances apart greater than said step-by-step feed, escapement-controlled driving mechanism for operating said means one at a time and operatively connected with the type mechanism, a second carriage on which one of said parts of said adding mechanism is mounted, a rack on said first-named carriage, a pinion with which said rack meshes at a given point in the forward traverse of said first-named carriage, speed-multiplying mechanism connecting said pinion with the second carriage, and a spring automatically thrown or brought into operation when the



first-named carriage is connected with the second carriage through said pinion and connections.

107. The combination of type mechanism, 5 a platen, and a power-driven carriage for one of said parts, with independently-operable number-carriers, mechanism for operating said carriers one at a time and controlled from the keyboard of the type mechanism, a 10 second carriage upon which one of said adding mechanism elements is mounted to move past the other, a drive-spring for said second carriage, mechanism for connecting the second carriage with a step-by-step moving part 15 of the type-writing mechanism when the first-named carriage reaches a predetermined point in its forward traverse, and an escapement mechanism for governing the motions of both of said carriages, substantially as de- 20 scribed.

108. The combination of type mechanism, a platen, and a power-driven carriage for one of said parts, with adding-wheels having in- 25 dependent operating means spaced at distances apart greater than the letter-space feed of said carriage, a driver for operating said means one at a time and controlled from the keyboard of the type mechanism, a second 30 carriage upon which one of said driver and adding-wheel elements is mounted, a drive-spring for said second carriage independent of the power for the first-named carriage, speed-multiplying mechanism for connecting 35 the second carriage with a step-by-step moving part connected to the first-named carriage as the first-named carriage reaches a predetermined point in its forward traverse, and an escapement mechanism for controlling the motions of both of said carriages, substan- 40 tially as described.

109. The combination of type mechanism, a platen, and a power-driven escapement-controlled carriage for one of said parts, with 45 number-wheels having independent operating means therefor placed at distances apart greater than the letter-space feed of the said carriage, a driver for operating said means one at a time and controlled from the key- 50 board of the type mechanism, a second carriage upon which one of said adding and driver elements is mounted, an independent drive-spring for said second carriage and normally inactive until the first-named carriage reaches a predetermined point in its forward traverse, 55 and speed-multiplying mechanism continuously connected with one and discontinuously connected with the other of said carriages and thrown into operation when the first-named carriage reaches a predetermined point in its 60 forward traverse, substantially as described.

110. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism oper- 65 able from the keyboard of the type-writing mechanism and having a part thereof mounted upon a second power-driven carriage, said power for the said second carriage being nor-

mally inactive until the carriages are coupled together, and coupling mechanism thrown into operation when the first-named carriage 70 reaches a predetermined point in its forward traverse, substantially as described.

111. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism hav- 75 ing a spring-driven driver, a second carriage upon which part of said adding mechanism is mounted, an independent spring for moving said second carriage and normally inactive until the carriages are coupled together, 80 an escapement for controlling said spring-driven driver and operatively connected with the type-operating mechanism aforesaid, and mechanism for coupling said carriages together when the first-named carriage reaches 85 a predetermined point in its forward traverse, substantially as described.

112. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism hav- 90 ing a power-driven escapement-controlled driver operable from the keyboard of the type-writing mechanism and thrown into operation when said mechanisms are coupled together, an independent power-driven carriage on 95 which a part of said adding mechanism is mounted and said independent power being normally inactive until the type-writing and the adding mechanisms are coupled together, coupling mechanism thrown into operation 100 when the first-named carriage reaches a predetermined point in its forward traverse, and means connected with the type-writing mechanism for restoring the power for operating said adding-mechanism driver, substantially 105 as described.

113. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism oper- 110 able from the keyboard of the type-writing mechanism and thrown into operation when the said mechanisms are coupled together, an independent power-driven carriage on which part of said adding mechanism is mounted, 115 said independent power being normally inactive until the type-writing and adding mechanisms are coupled together, and coupling mechanism having a disconnectible part and thrown into operation when said part is in one position and when the first-named car- 120 riage reaches a predetermined point in its forward traverse and remaining inactive when said disconnectible part is in a different position, substantially as described.

114. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism hav- 125 ing a spring-driven escapement-controlled driver operated from the keyboard of the type-writing mechanism, an independent power- 130 driven carriage on which part of said adding mechanism is mounted, said independent power being normally inactive and said driver being disengaged from the number-carriers



of the adding mechanism until the adding and the type-writing mechanisms are coupled together, coupling mechanism thrown into operation when the first-named carriage reaches a given point in its forward traverse, and means for resetting the driver-operating spring during the return movements of the first-named carriage, substantially as described.

115. The combination of type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism having a spring-driven escapement-controlled driver operated from the keyboard of the type-writing mechanism, an independent power-driven carriage on which part of said adding mechanism is mounted, said independent power being normally inactive and said driver being disengaged from the number-carriers of the adding mechanism until the adding and the type-writing mechanisms are coupled together, coupling mechanism having a disconnectible part and thrown into operation when said part is in one position and when the first-named carriage reaches a given point in its forward motion and being inoperative to couple up when said part is in a different position, and means connected with the type-writing mechanism for resetting the driver-operating spring during the return movements of the first-named carriage.

116. The combination of key-operated type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism having independently-operable number-carriers and a spring-driven escapement-controlled driver controlled by certain of said keys, an independent power-driven carriage on which part of said adding mechanism is mounted and said power being normally inactive until said second carriage is coupled with the type-writing mechanism and said driver also being disengaged from the number-carrier operating means until such coupling together, and means for coupling the second carriage with the type-writing mechanism and thrown into operation when the first-named carriage reaches a predetermined point in its forward traverse, substantially as described.

117. The combination of key-operated type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism having independently-operable number-carriers and a spring-driven escapement-controlled driver controlled by certain of said keys, an independent power-driven carriage on which part of said adding mechanism is mounted and said power being normally inactive until said second carriage is coupled with the type-writing mechanism and said driver also being disengaged from the number-carrier operating means until such coupling together, and coupling mechanism having an adjustable part and adapted when said part is in one position to couple the adding-mechanism carriage with the type-writ-

ing mechanism when the first-named carriage reaches a predetermined point in its forward traverse and remaining inactive when said part is in another position, substantially as described.

118. The combination of key-operated type-writing mechanism having a power-driven escapement-controlled carriage, an adding mechanism having independently-operable number-carriers and a spring-driven escapement-controlled driver controlled by certain of said keys, an independent power-driven carriage on which part of said adding mechanism is mounted and said power being normally inactive until said second carriage is coupled with the type-writing mechanism and said driver also being disengaged from the number-carrier operating means until such coupling together, coupling mechanism having an adjustable part and adapted when said part is in one position to couple the adding-mechanism carriage with the type-writing mechanism when the first-named carriage reaches a predetermined point in its forward traverse and remaining inactive when said part is in another position, and means connected with the type-writing mechanism and resetting the spring for said adding-mechanism driver at each return of the first-named carriage, substantially as described.

119. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all the keys, a series of power-rotated adding-wheels, means for connecting any adding-wheel to any figure-key, and means for enabling the key to limit the arc through which the wheel is power-rotated, substantially as described.

120. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all the keys, a series of adding-wheels, and a power-driven driver common to all the wheels and constructed to connect any figure-key to any adding-wheel and to also rotate the latter a distance limited by the key, substantially as described.

121. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all the keys, a series of power-rotated adding-wheels, means called into action at a predetermined portion of the traverse of the said carriage for connecting any adding-wheel to any figure-key, and means for enabling the key to limit the arc through which the wheel is power-rotated, substantially as described.

122. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all the keys, a series of adding-wheels, and a power-driven driver common to all the wheels and constructed to be called into action at a predetermined portion of the traverse of the said carriage for connecting any figure-key to any adding-wheel and for also rotating the



latter a distance limited by the key, substantially as described.

123. The combination of a series of letter and figure types and keys therefor, a carriage 5 connected for letter-space movements to all the keys, a series of adding-wheels, means normally called into action at a predetermined point of the traverse of the said carriage for connecting any adding-wheel to any figure- 10 key, and means for rendering the adding-wheels inoperative at will, substantially as described.

124. The combination of a series of letter and figure types and keys therefor, a carriage 15 connected for letter-space movements to all the keys, a series of adding-wheels, and disconnectible means normally called into action at a predetermined point of the traverse of the said carriage for connecting any add- 20 ing-wheel to any figure-key, substantially as described.

125. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all 25 the keys, a series of adding-wheels, a spring for rotating the wheels to perform addition, and means for resetting the said adding-wheel spring, said resetting means being operated by the carriage during its return movement 30 to begin a new line of writing.

126. The combination of a series of letter and figure types and keys therefor, a power-driven carriage connected for letter-space 35 movements to all the keys, a series of adding-wheels, a spring for rotating the wheels to perform addition, and means for resetting the said adding-wheel spring, said resetting means being operated by the carriage during its return movement to begin a new line of 40 writing.

127. The combination of a series of letter and figure types and keys therefor, a carriage connected for letter-space movements to all the keys, a series of adding-wheels, a spring 45 for rotating the wheels to perform addition, and means for resetting the said adding-wheel spring, said resetting means being operated by the carriage during its return movement to begin a new line of writing.

128. The combination of type mechanism, a carriage, coöperating adding mechanism, and means for applying a source of power independent of that employed to move or control the carriage, to actuate the adding mech- 55 anism.

129. The combination of type mechanism, a paper-carriage, coöperating adding mechanism, a second carriage on which a portion of said adding mechanism is carried, and means 60 for applying a source of power independent

of that employed to move the type-writer carriage to actuate the carriage of the adding mechanism.

130. The combination of type mechanism, a carriage, adding-wheels, and means for ap- 65 plying a source of power which is independent of the carriage moving or controlling means, to rotate said adding-wheels.

131. The combination of type mechanism, a type-writer carriage, adding mechanism in- 70 cluding adding-wheels, a second carriage on which a portion of said adding mechanism is carried, and means for applying a source of power which is independent of the type-writer-carriage moving or controlling means, to move 75 the carriage which carries a portion of the adding mechanism and to rotate said adding-wheels.

132. The combination of type mechanism, a type-writer carriage, an adding and register- 80 ing mechanism which comprises a series of adding-wheels, a movable carriage on which said adding-wheels are mounted, and means for applying a source of power which is independent of the means for moving the type- 85 writer carriage, to actuate or move the carriage which carries the adding-wheels.

133. The combination of type mechanism, a type-writer carriage, an adding and register- 90 ing mechanism which comprises a series of adding-wheels, a movable carriage on which said adding-wheels are mounted, means for applying a source of power which is independent of the means for moving the type- 95 writer carriage, to actuate or move the carriage which carries the adding-wheels, a driver for rotating said adding-wheels, and means independent of the type-writer-carriage driving and controlling means for act- 100 uating said driver.

134. The combination of type mechanism, a power-driven type-writer carriage, an adding and registering mechanism which comprises a series of adding-wheels, a carriage for said 105 adding-wheels, said adding-wheels being automatically brought into coöperative relation when the first-mentioned carriage reaches a predetermined point of its travel, and means independent of the type-writer-carriage driving means for affording a movement of the 110 adding-wheel carriage.

Signed at 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.