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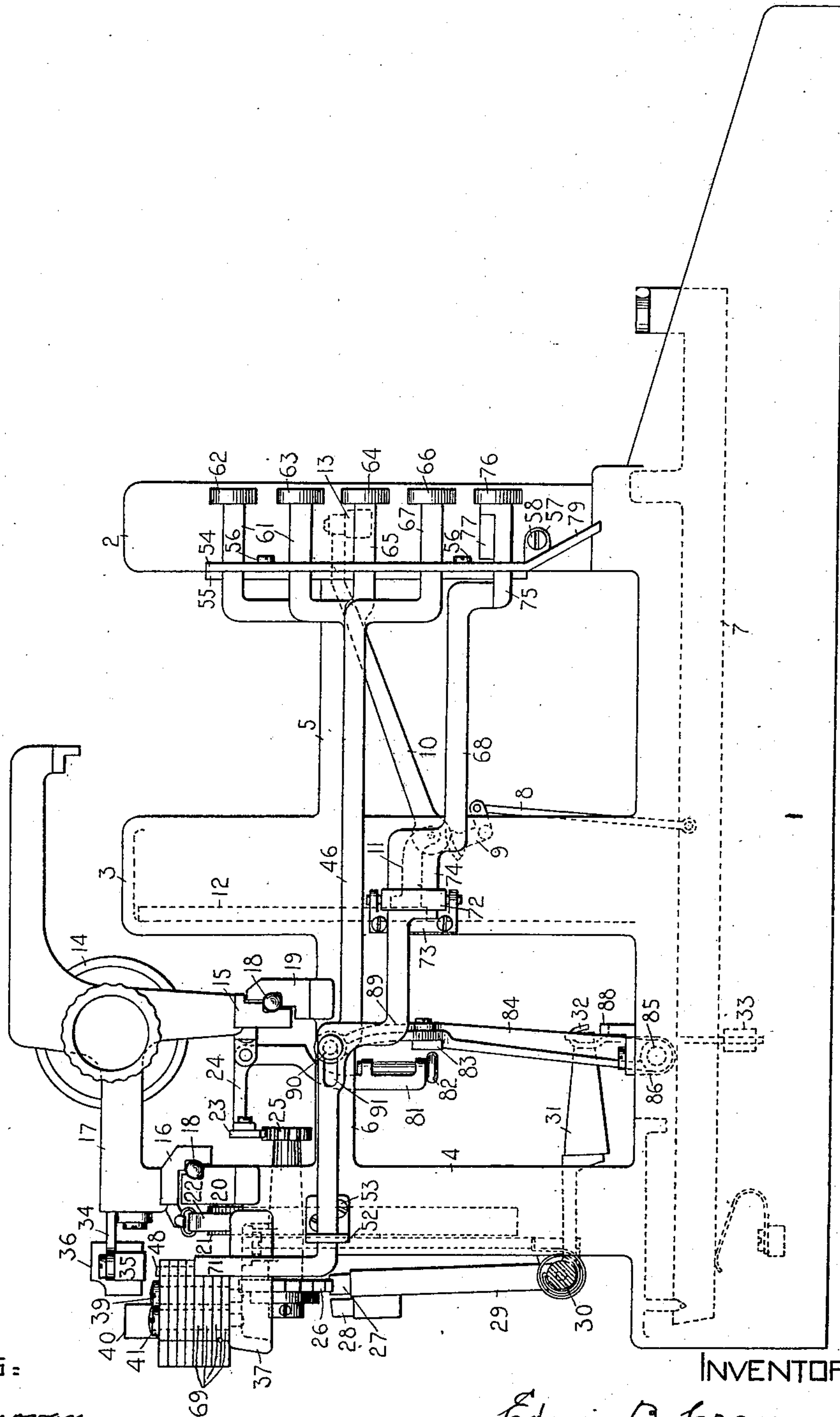
Patented Aug. 5, 1902.

**E. B. CRAM.**  
**TYPE WRITING MACHINE.**  
(Application filed June 28, 1901.)

(No Model.)

4 Sheets—Sheet 1.

FIG. 1.



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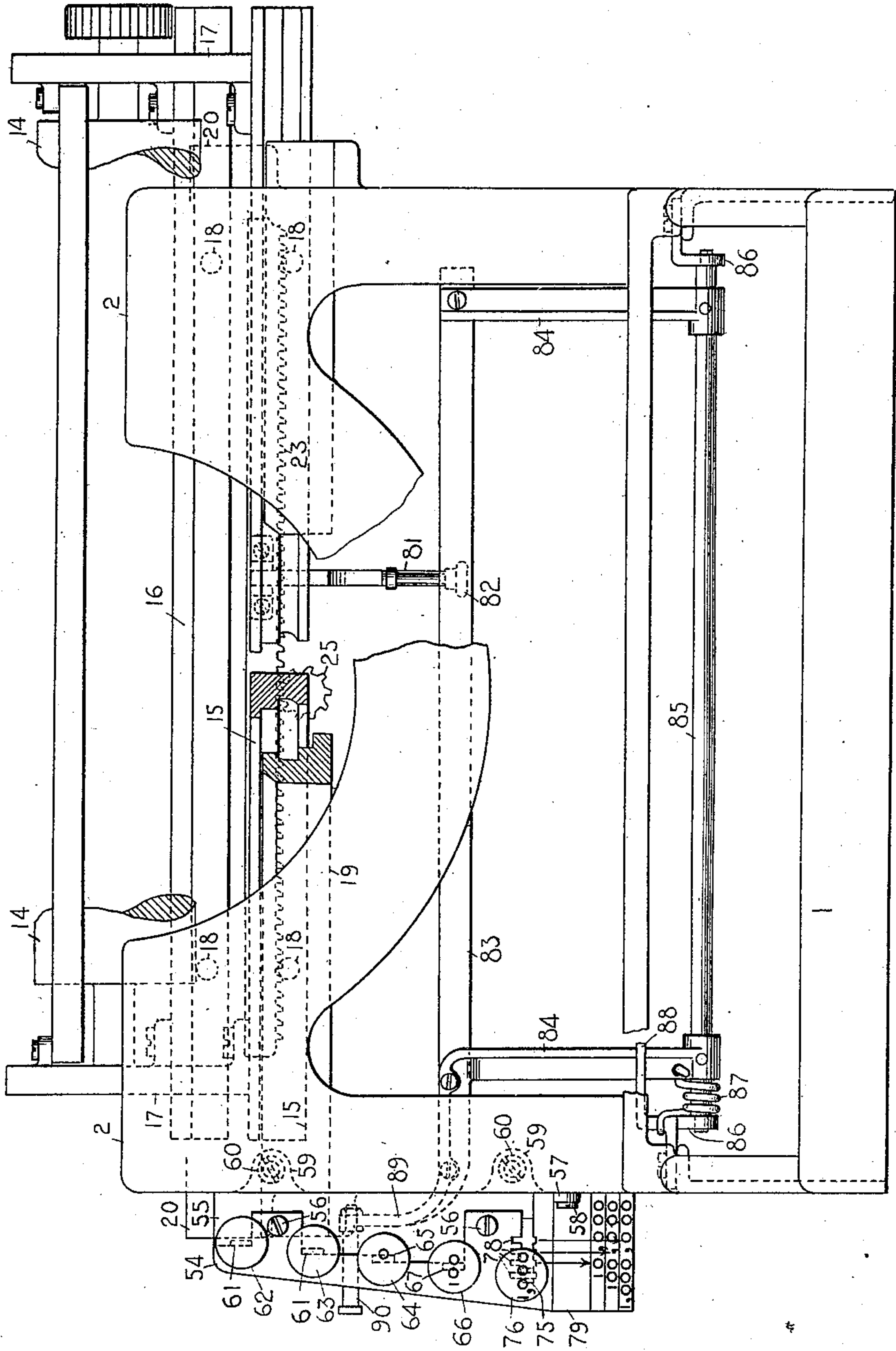
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4 Sheets—Sheet 2.

FIG. 2.



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4 Sheets—Sheet 3.

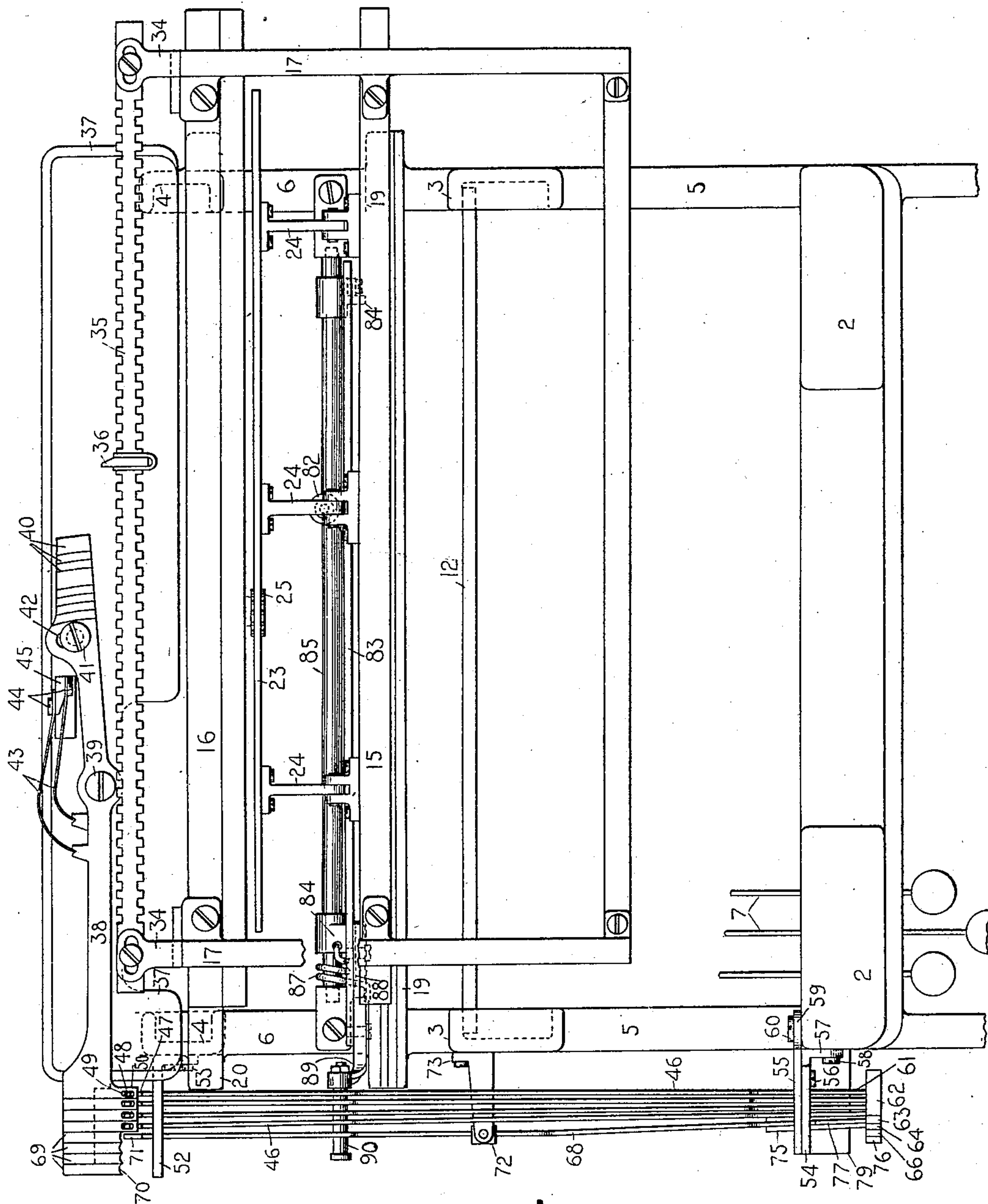


FIG. 3.

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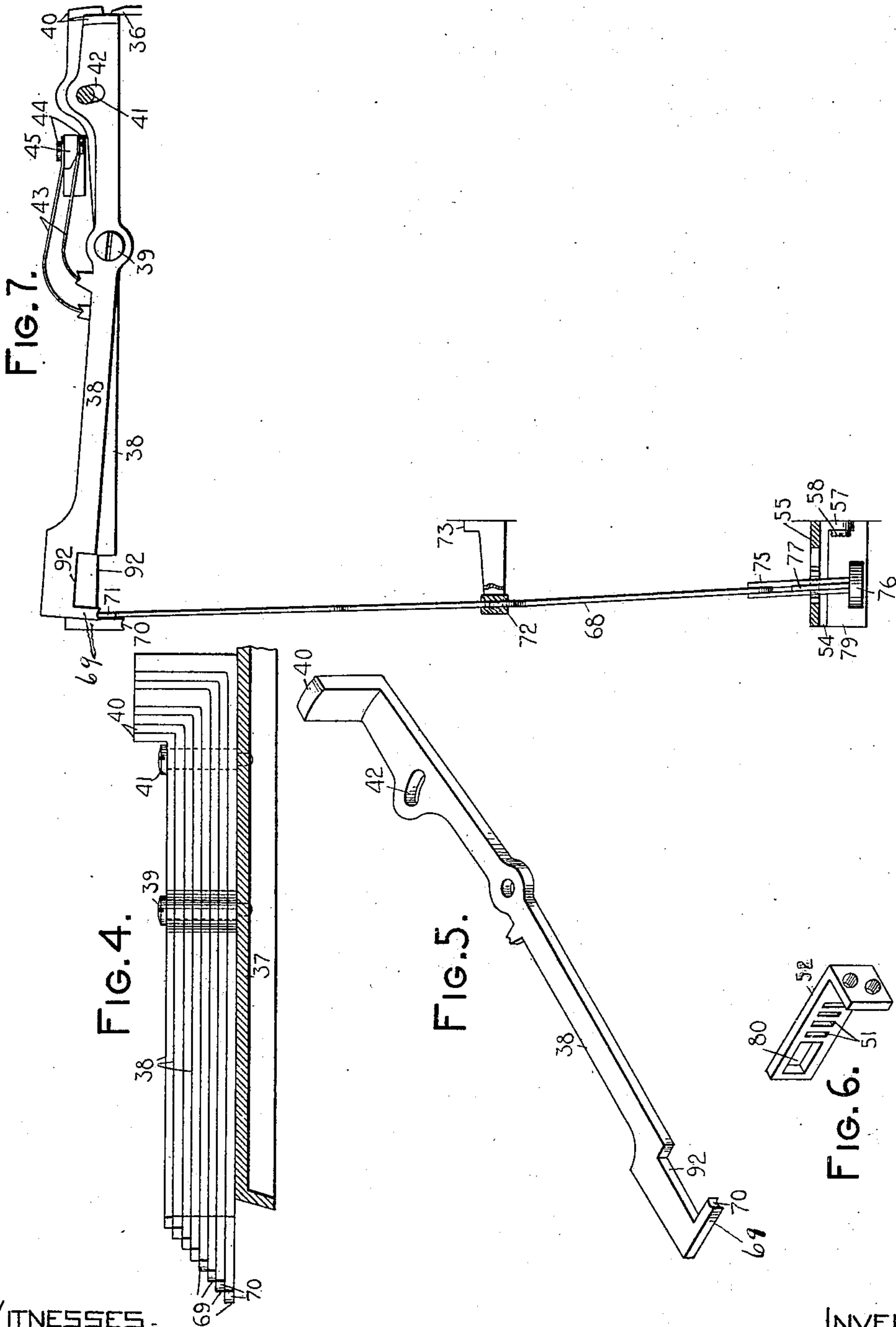
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4 Sheets—Sheet 4.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

EDWIN B. CRAM, OF BROOKLYN, NEW YORK, ASSIGNOR TO WYCKOFF, SEAMANS & BENEDICT, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 706,025, dated August 5, 1902.

Application filed June 28, 1901. Serial No. 66,384. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN B. CRAM, a citizen of the United States, and a resident of the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have  
5 invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to tabulating mechanisms of type-writing machines; and its object is to improve the construction thereof, to reduce the number of denomination-keys, and also to arrange the latter conveniently for the operator.

15 Other objects will hereinafter appear.

The invention consists in certain combinations of devices, features of construction, and arrangements of parts, all as will be hereinafter fully set forth, and particularly pointed  
20 out in the concluding claims.

In the accompanying drawings, Figure 1 is a left-hand side elevation of a front-strike writing-machine, showing my improvements applied thereto. Fig. 2 is a front view, and  
25 Fig. 3 a plan, of the machine. Fig. 4 is a front elevation of a set of denomination-stop levers. Fig. 5 is an enlarged perspective view of a denomination-stop lever. Fig. 6 is an enlarged perspective view of a guiding-bracket for the denomination-key rods. Fig.  
30 7 is a plan of a "thousands-key" and a plurality of stop-levers operated thereby, one of said stop-levers being shown in working position.

35 In the several views portions are omitted or broken away to disclose the invention more clearly, and similar parts are designated by similar numerals of reference.

The framework of the machine comprises  
40 a rectangular base 1 and front, middle, and rear standards 2, 3, and 4, erected thereon and joined by side bars 5 and 6. Key-levers 7, mounted in the base, are connected by links 8 to bell-cranks 9, which are geared to the  
45 hubs of rearwardly-striking type-bars 10, the latter being mounted, by means of brackets 11, upon a segment 12, extending between the opposite standards 3. The type-bars normally lie upon a curved rest 13, arranged be-

tween the standards 2, and strike rearwardly  
50 against a platen 14.

The platen is mounted in a traveling carriage comprising front and rear grooved bars 15 and 16, joined by end bars 17 and supported, by means of balls 18, upon front and rear grooved  
55 rails 19 and 20, the former rail being mounted upon the side bars 6 and the latter upon the rear standards 4. The carriage is propelled by a spring contained in a barrel 21, which is connected by a strap 22 to the car-  
60 riage, and the latter is provided with a longitudinal letter-feeding rack 23, secured upon rearwardly-extending arms 24, hinged upon the carriage, said rack meshing with an underlying pinion 25, which is connected to an  
65 escapement-wheel 26. The latter is controlled by a feeding-dog 27 and a detent-dog 28, both mounted upon a rocker 29, which is pivoted at 30 upon ears projecting from the rear standards 4 and has forwardly-extend-  
70 ing arms 31, which support, by means of depending hooks 32, a universal bar 33, extending transversely beneath the key-levers, so that when the latter are actuated for swing-  
75 ing the type-bars to the platen the feed-dogs are also operated and the carriage permitted to advance step by step, all substantially as set forth in my pending application filed  
June 1, 1901, Serial No. 62,683.

Supported upon rearwardly-extending  
80 brackets 34, attached to the carriage at its rear side, is a rack 35, upon which may be adjusted column-stops 36 of any suitable construction. Resting upon a top plate 37, which  
85 surmounts the rear standards 4 and underlies the column-stop rack 35, is a set or bank of denomination-stop levers 38, which are placed facewise one upon another and ful-  
crumed between their ends upon a single vertical pivot-screw 39, which is tapped into the  
90 top plate 37, the axis of said screw being substantially in the same vertical plane with the rear edges of the column-stops 36. The denomination-stops project upwardly at 40 from  
95 the right-hand ends of the levers 38, the upper edges of said stops being flush or level with one another and the vertical length of the stops being graduated according to the



height of their respective levers, the lower-most lever accordingly having the longest stop or projection and the uppermost lever having the shortest, while the stops for the intermediate levers range between these two extremes, as will be seen at Fig. 4. The horizontal swinging movements of the stop-levers 38 are limited by a stop-screw 41, which is passed down through coincident perforations 42, formed in the stop ends of all of the levers, which are pressed rearwardly against the shank of said screw 41 by long and short springs 43, which may be arranged alternately one above another, one spring for each lever, all of the springs being secured by screws 44 to a bracket 45, erected upon the top plate. Normally the denomination-stops clear the column-stops 36; but the former may be swung forwardly upon the pivot 39 into the path of the column-stops, so as to intercept the latter, and thereby arrest the carriage.

At their left-hand ends the four upper levers in the series are connected to forwardly-extending key-bearing push-rods 46 by means of vertical arms 47, formed upon the rear ends of the latter, Fig. 3, said arms being provided at their upper ends with upwardly-directed fingers 48, Figs. 1 and 3, which pass through eyes 49, formed in horizontal fingers 50, extending forwardly from the left-hand ends of the stop-levers, the vertical fingers 48 being of graduated lengths, according to the respective elevations at which their connected levers lie. The rear ends of the push-rods 46 are guided in vertical slots 51, formed in a bracket 52, projecting outwardly from the left-hand standard 4 and secured thereto by screws 53, while the forward ends of said rods are offset upwardly and downwardly and guided in a vertical bracket arranged at the left-hand side of the machine, just in rear of the keyboard, and consisting of front and rear plates 54 and 55, secured together by screws 56, the front plate 54 being also at its lower end attached to the standard 2 by an ear 57 and screw 58, and the rear plate 55 being secured to the rear side of said standard by ears 59 and screws 60. The bodies of said push-rods 46 lie side by side, and their key-bearing offset stems 61 are guided in cut-aways or notches formed at the meeting or overlapping edges of the two irregularly-shaped plates 54 and 55, as will be understood by reference to Fig. 2. The top key 62 is carried by the inner or right-hand push-rod 46 and connected to the topmost and shortest stop-lever 38, which is adapted to arrest the carriage in position for writing a decimal point. The next lower and outer key 63 is carried by an upwardly-offset stem 61, formed upon the second push-rod 46, which is connected to the second lever 38, whose stop is adapted to arrest the carriage in position for writing units. The third denomination-key (designated as 64) is carried by a stem 65, which is substantially in line with the body

of third push-rod 46, the latter being connected to the third stop-lever 38, whose stop is adapted to arrest the carriage in position for writing tens. The fourth key 66 is carried upon a downwardly-offset stem 67, formed upon the outermost of the four push-rods 46 and connected to the fourth lever 38, whose stop is adapted to arrest the carriage in position for writing hundreds.

The group of four lower stop-levers 38, which are respectively adapted to arrest the carriage at positions for writing thousands, tens of thousands, hundreds of thousands, and millions, are operated by a single key-bearing irregularly-shaped push-rod 68, the left-hand ends of said levers having short forwardly-projecting fingers 69, whose ends are notched or concaved at 70 to engage a vertical arm 71, which projects upwardly from the rear end of said push-rod and normally stands in front of the finger 69 which is carried upon the thousands-lever, but is adjustable laterally to a position in front of any of the other fingers 69. This adjustment is secured by means of a swivel-piece 72, which is pivoted upon a bracket 73, fixed upon the standard 3, and is slotted vertically, so as to receive a widened portion 74 of the push-rod 68, said swiveling device being arranged between the ends of the push-rod, so that by a movement of its key toward the right the said vertical arm 71 may be swung toward the left to the desired position. The widened portion 74 is of sufficient length from front to rear to enable the necessary rearward movement of the rod. At its forward end said rod is provided with a downwardly-offset stem 75, bearing a key 76, said stem having along its upper edge a guiding-feather 77, which is adapted to enter any of a series of denomination-notches 78, formed upon the lower edge of an inwardly-projecting portion of the vertical plate 54 and corresponding to the fingers 69, so that when the feather 77 is in register with the outer notch 78 the arm 71 stands in front of the inner finger 69, as at Fig. 3, and when said feather is working in the inner notch 78 said arm stands in front of the outer finger 69, and when the feather is working in the intermediate notches the arm 71 stands in register with the intermediate fingers. Thus by swinging the key 76 to the right or left the feather may be brought in register with any desired denomination-notch 78, so that by means of this key any of the lower set of four stop-levers may be swung, and hence the carriage may be arrested in position for writing any denomination from a thousand to a million. The lower portion of the guide-plate 54 is inclined forwardly and downwardly at 79 and marked "10,000," "100,000," and "1,000,000," the first of said numbers being uppermost on the plate and being indicated by an arrow which is directed from the second denomination-notch 78, the next number being likewise associated with the third notch and



the lowest number with the fourth notch, so that by observing the arrows the operator is enabled to determine how far to swing the key in order to enable him to operate the desired denomination-stop by a subsequent push upon said key. The rear end of said push-rod 68 is guided by the top and bottom edges of a perforation 80, formed in the outer portion of the bracket 52, said perforation being of sufficient width to permit the lateral stop-selecting movement of the rod.

Upon the carriage-rack frame 24 is secured a depending release-arm 81, provided at its lower end with an antifriction-roller 82, which occupies a position just in rear of a transverse horizontal bar 83, carried upon the upper ends of rocker-arms 84, said arms being fixed upon a transverse rock-shaft 85, mounted in bent ears 86, attached to the opposite side walls of the base 1. Said shaft is provided with a returning-spring 87, which causes the left-hand rocker-arm 84 normally to bear against a stop 88, projecting inwardly from the ear or bracket 86. Said rocker-arm 84 is extended laterally and upwardly at 89 and provided with a horizontal bearing-pin 90, which is passed through a series of coincident slots 91, formed in the several push-rods, so that when any one of the latter is pushed rearwardly to actuate its associated stop-lever the pin 90 is pressed rearwardly, causing the arms 84 to rock, thus carrying the bar 83 rearwardly and acting upon the roller 82 and arm 81, so as to swing the frame 24 upwardly and lift the feed-rack 23 from the pinion 25.

In operation the column-stops 36 are adjusted along the rack 35 as required, and then the carriage is pushed to the right to begin the writing of a line. Upon the operation of any of the four upper denomination-keys its connected rod 46 slides rearwardly and by means of arm 47 and finger 49 swings the lever 38 upon the pivot 39, suitable cut-aways 92 being provided, so as to permit the movement of any arm 47 and lever 38 independently of the other levers. The stop 40 upon the right-hand end of said lever is thus swung forwardly into the path of the column-stops 36, and at the same time the forward end of the slot 91 in the push-rod engages the bearing-pin 90, and thereby rocks the release-frame 83 84 85 in the above-described manner, thus swinging the arm 81 and lifting the feeding-rack 23, so as to free the carriage from the control of its escapement devices 26 27 28. Said carriage is thereupon drawn rapidly to the left by the spring-barrel 21 and strap 22 until arrested by the contact of a column-stop 36 with the projected denomination-stop 40 in position to begin the writing of a number having the denomination of the operated key. Then the key is released, and by means of the springs 43 and 87 the parts are returned to normal position.

When it is desired to arrest the carriage at the thousands position, the lowermost denomination-key 76 is pushed in, and its arm 71 en-

gages with the right-hand finger 70, the latter being formed upon the uppermost of the four lower stop-levers 38, and hence the fourth stop 40 from the right is projected into the path of the succeeding column-stop, and the carriage is accordingly arrested at the position for writing thousands. If, however, it is desired to write tens of thousands or any higher denomination, said key 76 is first swung to the right until the feather 77 thereon stands in register with that one of the notches 78 which corresponds to the desired denomination, as may be determined by referring to the index-plate 79. Then said key is pushed rearwardly, the feather 77 entering the selected notch and the arm 71 swinging the corresponding stop-lever 38 and projecting its stop into working position. At the same time the carriage is released and allowed to run down until arrested by the projected stop. When the carriage is thus positioned, the key-levers 7 are operated in the usual manner, and through the links 8, bell-cranks 9, and type-bars 10 cause the desired characters to be impressed upon the paper, the carriage being fed accordingly by the escapement devices, as already set forth.

If it is desired when writing to point off the figures in groups of three by inserting a comma after millions and one after thousands, the first and fourth stops 40 from the right may be made of double thickness, as illustrated, so as to allow for the extra spaces taken by the punctuation-marks. Otherwise the stops may be made of uniform thickness.

It will be seen that the denomination-stop levers 38 extend longitudinally of the carriage and cooperate with the stop 36 to arrest the latter at variable positions; that the contact or stop ends of said levers terminate at letter-space intervals; that said levers are mounted upon a common fulcrum 39, which is arranged transversely of the run of the carriage; that the ends of the levers overlap and that the stops are formed upon the overlapping ends; that the levers are of graduated lengths and arranged side to side; that the stops are parallel with the common fulcrum 39; that the contact ends of the stops are flush; that the stops are of graduated heights, according to the elevations of their several levers, the latter being of graduated lengths, according to the locations of their several stops; that the stops are formed upon one set of the lever ends and that the key connections are attached to the other set of lever ends; that the levers extend from the fulcrum 39 in a direction opposite to the advance movement of the carriage; that the stops thereon are moved sidewise thereby into position for engaging the column-stops 36; that the series of levers are banked upon the top plate of the machine and work upon a common vertical fulcrum and have upon one set of their ends a series of vertically-projecting stops; that rods extend forwardly from the other set of lever ends to the front of the machine and that keys are



mounted upon the forward ends of said rods, the key ends of the rods diverging and the keys being arranged in a downwardly-extending row at the side of the machine, the key-stems being offset upwardly and downwardly from the forward ends of the rods and a bracket being provided for guiding said offset stems; that the upwardly-extending devices upon the rods which engage the outer ends of the stop-levers are of graduated lengths, according to the elevations of the several levers; that the longest of said levers lies at the bottom of the bank or series and has the longest stop and is actuated by the outermost rod, and that the shortest lever lies at the top and has the shortest stop and is actuated by the innermost rod. It will further be seen that means are provided for enabling the selecting-key 76 to operate any denomination-stop lever in the lower group of four levers independently of the remaining levers in said group; that said key when moved in one direction may select any of said levers and when moved in another direction may set the selected lever and its stop; that the rod 68 is mounted for movement in transverse directions, said rod moving widthwise for selecting a stop and longitudinally for operating said stop; that said rod is movable from one lever to another and adapted to vibrate any of said levers; that it is swiveled between its ends and has a part adapted to engage any of the notches 70, so as to swing the engaged lever upon its pivot; that a denomination-indicator is provided for the key 76, attached to said rod 68, said indicator including the plate 79 and the numbers and arrows marked thereon; that means are arranged at said key for guiding it during its stop-setting movement, said means including a series of slots 78. It will also be perceived that the number of denomination-keys is less than the number of denomination-stops and that at least one of said keys has means for projecting a plurality of said stops, the other keys being preferably connected each to a single stop; that stop-setting devices are controlled by a plurality of denomination-keys, at least one of the latter controlling means for causing the arrest of the carriage in a plurality of denominational positions; that the selected key 76 has means for operating some of the levers 38 and that the keys 62, 63, 64, and 66 are connected one to each of the remaining levers 38; that the key-rod 68 has a transverse stop-selecting movement and a longitudinal stop-setting movement, whereby it may operate several of the denomination-stops, and that the series of rods 46 have longitudinal stop-setting movements and are connected one to each of the remaining denomination-stops; that the key-rods are fewer in number than the denomination-stop levers, and that one of said rods is movable from one lever to another in the lower group of four levers and is adapted to vibrate any of the levers in said group. It will also be seen that the car-

riage-releasing device 83 has a part 90, which extends transversely of the rods 46, so as to be engaged thereby; that said carriage-releasing device is operable by any of the denomination-keys at the stop-setting movements of the latter; that the bar 83 extends longitudinally of the carriage and is adapted to engage the arm 81 or the antifriction-roller 82 thereon, and that means are operated by the denomination-determining mechanism for moving said bar 83 and causing it to engage the arm 81 and release the carriage-feed rack 23.

Many variations may be resorted to within the scope of the invention, and portions of my improvements may be used without others.

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

1. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop upon said carriage, a series of denomination-stop levers pivoted upon the framework and extending longitudinally of the carriage and coöperating with said stop to arrest the latter at variable positions, the contact or stop ends of said levers terminating at letter-space intervals, and keys for swinging said levers and causing their said stops to be projected into the path of travel of the stop on the carriage.

2. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop upon said carriage, a series of denomination-stop levers pivoted upon the framework and extending longitudinally of the carriage and mounted upon a common fulcrum which is arranged transversely of the run of the carriage, one set of the ends of said levers overlapping and terminating at letter-space intervals and being adapted to coöperate with said stop for variably arresting the carriage, and a series of keys mounted in the framework and adapted to act on the other set of the ends of said denomination-stop levers.

3. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop upon said carriage, a series of levers pivoted upon the framework and extending longitudinally of the carriage, a series of projecting stops formed upon the ends of said levers and arranged at letter-space intervals, a carriage-release mechanism, and keys connected to said levers and also to said carriage-release mechanism.

4. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers of graduated lengths working upon a common fulcrum and arranged side to side, stops projecting from the ends of said levers in a direction parallel with said common fulcrum, the contact ends of said stops being flush, and keys connected to said levers.

5. In a type-writing and tabulating mech-



anism, the combination with a carriage and carriage-feeding devices, of a stop, a bank of levers, a support therefor, a common vertical fulcrum for said levers, stops formed upon the ends of said levers and arranged at letter-space intervals, the stops being of graduated lengths according to the elevations of their several levers, and the latter being of graduated lengths according to the locations of their several stops, and means for swinging said levers so as to enable said stops to cooperate with the first-mentioned stop for arresting the carriage.

6. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers pivoted between their ends upon a common fulcrum, stops formed upon one set of the ends of said levers and projecting in a direction parallel to said fulcrum, and key connections attached to the other set of lever ends, the levers being of graduated lengths, and the stops being also of graduated lengths and being flush at their contact ends, the shortest lever having the shortest stop and its key connection being the nearest to said fulcrum, the longest lever having the longest stop and its key connection being the most remote from said fulcrum, and the intermediate levers having the intermediate stops and intermediate connections.

7. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop upon the carriage, a series of levers supported upon the framework at the rear of the carriage and extending longitudinally of the latter, said levers having stops arranged at letter-space intervals along the run of the carriage, and connections extending from said levers forwardly to the keyboard of the machine, said connections bearing keys at their forward ends.

8. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a rack arranged upon the carriage, a column-stop adjustable along said rack, and a series of key-operated stop-levers mounted upon the frame and arranged longitudinally of said rack, said stop-levers terminating successively at letter-space intervals along said rack so as to arrest the carriage variably according to the lever operated.

9. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a rack arranged upon the carriage, a column-stop adjustable along said rack, and a series of key-operated stop-levers mounted upon the frame and arranged longitudinally of said rack, said stop-levers terminating successively at letter-space intervals along said rack, so as to arrest the carriage variably according to the lever operated, said levers being of graduated length and mounted side to side upon an axis or fulcrum which extends transversely of the rack.

10. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a rack arranged upon the carriage, a column-stop adjustable along said rack, and a series of key-operated stop-levers mounted upon the frame and arranged longitudinally of said rack, said stop-levers terminating successively at letter-space intervals along said rack, so as to arrest the carriage variably according to the lever operated, and also vibrating in horizontal planes and being connected by endwise-movable forwardly-extending rods to keys arranged at the keyboard of the machine.

11. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a rack arranged upon the carriage, a column-stop adjustable along said rack, and a series of key-operated stop-levers mounted upon the frame and extending from a common vertical fulcrum or pivot in a direction opposite to the advance movement of the carriage and being provided with vertically-projecting stops of graduated lengths and arranged at letter-space intervals, said stops being moved sidewise by the levers into position for engaging said column-stop.

12. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop upon the carriage, a series of vertical stops arranged at letter-space intervals upon the framework, a series of levers banked one upon another and working upon a common vertical axis which is arranged between the ends of the levers, and keys connected to the ends of said levers opposite to the stops.

13. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop rack mounted upon the rear portion of the carriage, a series of levers banked upon the top plate of the machine and working upon a common vertical fulcrum and having formed upon one set of their ends a series of projecting stops, rods extending forwardly from the other set of lever ends to the front of the machine, and keys mounted upon the forward ends of said rods.

14. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop rack mounted upon the rear portion of the carriage, a series of levers banked upon the top plate of the machine and working upon a common vertical fulcrum and having formed upon one set of their ends a series of projecting stops, rods extending forwardly from the other set of lever ends to the front of the machine, and keys mounted upon the forward ends of said rods, the key ends of said rods diverging, the keys being arranged in a downwardly-extending row at the side of the machine.

15. In a type-writing and tabulating mechanism, the combination with a carriage and



carriage-feeding devices, of a stop upon the carriage, a series of levers 38 banked upon the framework and extending longitudinally of the carriage, a common vertical fulcrum 39 for said levers, a series of coincident slots 42 formed on said levers, a common stop 41 passing through said slots, springs 43 bearing against said levers, push-rods 46 engaging said levers and extending forwardly therefrom, and keys carried by the forward ends of said push-rods.

16. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop upon the carriage, a series of levers 38 banked upon the framework and extending longitudinally of the carriage, a common vertical fulcrum 39 for said levers, springs 43 bearing against said levers, and key-bearing rods 46 engaging said levers and extending forwardly therefrom, said rods having upwardly-projecting fingers 48 which engage eyes formed in said levers, and the latter having cut-aways 92.

17. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop upon the carriage, a series of levers working upon a common vertical axis and extending longitudinally of the carriage and having at their inner ends a series of denomination-stops arranged at letter-space intervals, and a series of forwardly-extending rods having at their rear ends upwardly-extending devices engaged to the outer ends of said levers, said rods diverging at their forward ends and bearing keys.

18. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop upon the carriage, a series of levers working upon a common vertical axis and extending longitudinally of the carriage and having at their rear ends a series of denomination-stops arranged at letter-space intervals, a series of forwardly-extending rods having at their rear ends upwardly-extending devices engaged to the outer ends of said levers, a bracket 52 for the rear ends of said rods, differently-offset key-bearing stems on the forward ends of said rods, and a bracket for guiding said offset stems.

19. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop upon the carriage, a series of levers of graduated lengths working upon a common vertical axis and extending longitudinally of the carriage and having at their inner ends a series of denomination-stops arranged at letter-space intervals, a series of forwardly-extending rods having at their rear ends upwardly-extending devices engaged to the outer ends of said levers, said rods being disposed side by side and having at their forward ends upwardly and downwardly offset key-stems, and means for guiding said rods.

20. In a type-writing and tabulating mechanism,

the combination with a carriage and carriage-feeding devices, of a column-stop upon the carriage, a series of levers banked one above another and working upon a common fulcrum and extending longitudinally of the carriage and having at their inner ends a series of denomination-stops arranged at letter-space intervals, said stops being of graduated heights and terminating upon the same level, a series of rods having at their rear ends a series of upwardly-extending devices of graduated lengths engaged to the outer ends of said levers, and keys connected to the forward ends of said rods.

21. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop upon the carriage, a series of levers banked one above another and working upon a common fulcrum and extending longitudinally of the carriage and having at their inner ends a series of denomination-stops arranged at letter-space intervals, said stops being of graduated heights and terminating at the same level, a series of rods having at their inner ends upwardly-extending devices of graduated lengths engaged to the outer ends of said levers, and keys connected to the forward ends of said rods, the longest of said levers lying at the bottom and having the longest stop and being connected to the outermost rod, and the shortest lever lying at the top and having the shortest stop and being connected to the innermost rod, and cut-aways formed in the outer ends of said levers so as to permit independent movement thereof by said rods.

22. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a group of denomination-stops coöperating therewith, a selecting-key, and means for enabling said key to operate any of said denomination-stops independently of the remaining denomination-stops.

23. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops coöperating therewith, a series of denomination-stop levers, a selecting-key, and means for enabling said key to operate any of said levers independently of the remaining levers.

24. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a column-stop adjustable along the carriage, a series of denomination-stops arranged side by side at letter-space intervals, levers upon which said denomination-stops are mounted, and a selecting-key having means for engaging any of said levers.

25. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops coöperating therewith, a key, and means for enabling said key when moved in one direction to select any of said



stops and when moved in another direction to set the selected stop.

26. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop and a denomination-determining mechanism, the latter including a series of levers connected to means for variably arresting the carriage, and also including means for enabling said key to select any of said levers and then to operate or set the selected lever independently of the other levers.

27. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers having ends formed and arranged for cooperation with said stop to variably arrest the carriage, a key, and means for enabling said key to select any of said levers and then set the selected lever.

28. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers arranged side to side and having a common fulcrum, said levers having ends formed and arranged for cooperation with said stop to variably arrest the carriage, a key, and means for enabling said key to select any of said levers and then set the selected lever.

29. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers extending longitudinally of the carriage, stops projecting from their ends and cooperating with the first-mentioned stop to variably arrest the carriage, a key, and means for enabling said key to select any of said levers and then set the selected lever.

30. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops for cooperation therewith, and a rod mounted for movement in transverse directions, said rod moving in one direction for selecting a stop and moving in another direction for operating said stop.

31. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of independently-movable denomination-stops for cooperation therewith, and a key-rod having a transverse stop-selecting movement and a longitudinal stop-setting movement.

32. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of independently-movable stop-levers, and a rod movable from one lever to another and adapted to vibrate any of said levers.

33. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops, and an endwise-movable swiveled rod for selecting and setting the stops.

34. In a type-writing and tabulating mechanism,

the combination with a carriage and carriage-feeding devices, of a stop, a series of levers pivoted between their ends and having means at one set of their ends for variably arresting the carriage, and a rod for engaging any of the levers at the other set of their ends and adapted to vibrate the engaged lever upon its pivot.

35. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers pivoted between their ends and formed and arranged at one set of their ends for variably arresting the carriage, notches in said levers, and an endwise-movable rod swiveled between its ends and having a part adapted to engage any of said notches and swing the engaged lever upon its pivot.

36. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers pivoted between their ends, a series of denomination-stops upon said levers, notches 70 and cut-aways 92 upon said levers, and an endwise-movable swiveled rod having an arm or finger adapted to engage any of said notches 70 and swing the engaged lever upon its pivot.

37. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of levers extending longitudinally of the carriage and having projecting stops adapted for cooperation with the carriage-stop, a common fulcrum for said levers, fingers 69 formed upon the ends of said levers opposite said stops, rod 68 having an arm or finger 71 for engaging any of said fingers 69, swiveling device 72 for said rod, and key 76.

38. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a selecting-key, means for enabling said key to operate any of said denomination-stops independently of the remaining denomination-stops, and a denomination-indicator for said key.

39. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops for cooperation therewith, a series of denomination-stop levers, a selecting-key, means for enabling said key to operate any of said levers, and a plate arranged at said key and marked to indicate the denominations corresponding to the several stop-levers.

40. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a key, means for enabling said key when moved in one direction to select any of said stops and when moved in another direction to set the selected stop, and means arranged at the key for guiding the latter during the stop-setting movement thereof.



41. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a selecting-key, means for enabling said key to operate any of said denomination-stops independently of the remaining denomination-stops, a denomination-indicator for said key, and means arranged at said key for guiding the latter during the stop-setting movement thereof.

42. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a key-rod movable transversely for selecting any of said stops and also movable longitudinally for operating the selected stop, and a series of guiding-slots for said rod.

43. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a key-rod movable transversely for selecting any of said stops and also movable longitudinally for operating the selected stop, a series of guiding-slots for said rod, and a denomination-indicator.

44. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a set of denomination-stops, and a set of keys therefor, the number of keys being less than the number of the denomination-stops, one of said keys having means for projecting a plurality of said stops, and the other keys being connected each to a single stop.

45. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a set of denomination-stops, and a set of keys, the number of keys being less than the number of the denomination-stops, and at least one of the keys having means for setting a plurality of the denomination-stops.

46. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of cooperating stop members, and stop-setting devices controlled by a plurality of denomination-keys, at least one of said keys controlling means for causing the arrest of the carriage at a plurality of denominational positions.

47. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a series of denomination-stop levers, a selecting-key having means for operating some of said levers, and keys connected one to each of the remaining levers.

48. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a series of keys, the number of said keys being less than the number of said denomina-

tion-stops, means for enabling at least one of said keys when moved in one direction to select one of several denomination-stops and when moved in another direction to set the selected stop, and means for enabling the other keys to operate the other denomination-stops.

49. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of independently-movable denomination-stops for cooperation therewith, a key-rod having a transverse stop-selecting movement and a longitudinal stop-setting movement, whereby it may operate several of said denomination-stops, and a series of key-rods having longitudinal stop-setting movements and connected one to each of the remaining denomination-stops.

50. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of independently-movable stop-levers, and a series of rods, said rods being fewer in number than said levers, and at least one of said rods being movable from one lever to another and adapted to vibrate the selected lever.

51. In a type-writing and tabulating mechanism, the combination with a carriage and carriage-feeding devices, of a stop, a series of denomination-stops, an endwise-movable swiveled rod for selecting and setting several of the denomination-stops, and endwise-movable rods connected one to each of the remaining stops.

52. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of denomination-stop levers, a series of key-rods connected to said levers, and a carriage-releasing device having a part which extends transversely of said rods so as to be engaged thereby.

53. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a rack arranged upon the carriage, a column-stop adjustable along said rack, a series of key-operated stop-levers mounted upon the frame and arranged longitudinally of said rack, said stop-levers terminating successively at letter-space intervals along said rack so as to arrest the carriage variably according to the lever operated, and also vibrating in horizontal planes and being connected by endwise-movable forwardly-extending rods to keys arranged at the keyboard of the machine, and carriage-releasing devices including a part extending across said rods and engageable thereby.

54. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a selecting-key, means for enabling said key to operate any of said denomination-stops independently of the re-



maintaining denomination-stops, and a carriage-releasing device operated by said key.

55. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a series of denomination-stop levers, a selecting-key, means for enabling said key to operate any of said levers independently of the remaining levers, and a carriage-releasing device operated by said key.

56. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of denomination-stops cooperating therewith, a key, means for enabling said key when moved in one direction to select any of said stops and when moved in another direction to set the selected stop, and a carriage-releasing device operated by the stop-setting movement of said key.

57. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a denomination-determining mechanism, the latter including a series of levers connected to means for variably arresting the carriage, and also including means for enabling said key to select any of said levers and then to operate or set the selected lever independently of the other levers, and a carriage-releasing device operated by the lever-setting movement of said key.

58. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of denomination-stops for cooperation therewith, a rod mounted for movement in transverse directions, said rod moving in one direction for selecting a stop and moving in another direction for operating said stop, and a carriage-releasing device engaged by said rod at the stop-setting movement thereof.

59. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of independently-movable denomination-stops for cooperation therewith, a key-rod having a transverse stop-selecting movement and a longitudinally stop-setting movement, and a carriage-releasing device engaged by said rod at the longitudinal movement thereof.

60. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of independently-movable stop-levers, a rod movable from one lever to another and adapted to vibrate any of said levers, and a carriage-releasing device engaged by said rod at the lever-vibrating movement thereof.

61. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a

stop, a series of denomination-stops, an endwise-movable swiveled rod for selecting and setting the stops, and a carriage-releasing device operable by said rod.

62. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a set of denomination-stops, a set of keys, the number of keys being less than the number of the denomination-stops and at least one of the keys having means for setting a plurality of the denomination-stops, and a carriage-releasing device operable by all of said keys.

63. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of cooperating stop members, stop-setting devices controlled by a plurality of denomination-keys, at least one of said keys controlling means for causing the arrest of the carriage in a plurality of denominational positions, and a carriage-releasing device operable by all of said keys.

64. In a type-writing and tabulating mechanism, the combination with a power-driven carriage and carriage-feeding devices, of a stop, a series of independently-movable denomination-stops for cooperation therewith, a key-rod having a transverse stop-selecting movement and a longitudinal stop-setting movement, whereby it may operate several of said denomination-stops, a series of key-rods having longitudinal stop-setting movements and connected one to each of the remaining denomination-stops, and a carriage-releasing device operable by all of said rods.

65. In a type-writing and tabulating mechanism, the combination with a power-driven carriage, of a carriage-feed-rack frame, escapement devices connected thereto, arm 81 upon said frame, bar 83 extending longitudinally of the carriage and adapted to engage said arm, a stop for said carriage, a denomination-determining mechanism, and means operated by said denomination-determining mechanism for moving said bar 83 and causing it to engage the arm 81 and release the carriage-feed rack.

66. In a type-writing and tabulating mechanism, the combination with a power-driven carriage, of a carriage-feed-rack frame, escapement devices connected thereto, arm 81 upon said frame, bar 83 extending longitudinally of the carriage and adapted to engage said arm, rocker-arms 84 carrying said bar 83, pin 90 connected to said bar, a stop for said carriage, and a denomination-determining mechanism, including means for moving said pin 90 and causing the bar 83 to engage the arm 81 and release the carriage-feed rack.

67. In a type-writing and tabulating mechanism, the combination with a power-driven carriage, of a carriage-feed-rack frame, escapement devices connected thereto, arm 81 upon said frame, bar 83 extending longitudinally of the carriage and adapted to engage



said arm, a column-stop adjustable along the carriage, a set of denomination-stop levers, key-rods for operating said levers, and means for enabling said key-rods to operate said  
5 bar 83.

Signed at the borough of Manhattan, city of New York, in the county of New York and

State of New York, this 27th day of June, A. D. 1901.

EDWIN B. CRAM.

Witnesses:

K. V. DONOVAN,  
E. M. WELLS.