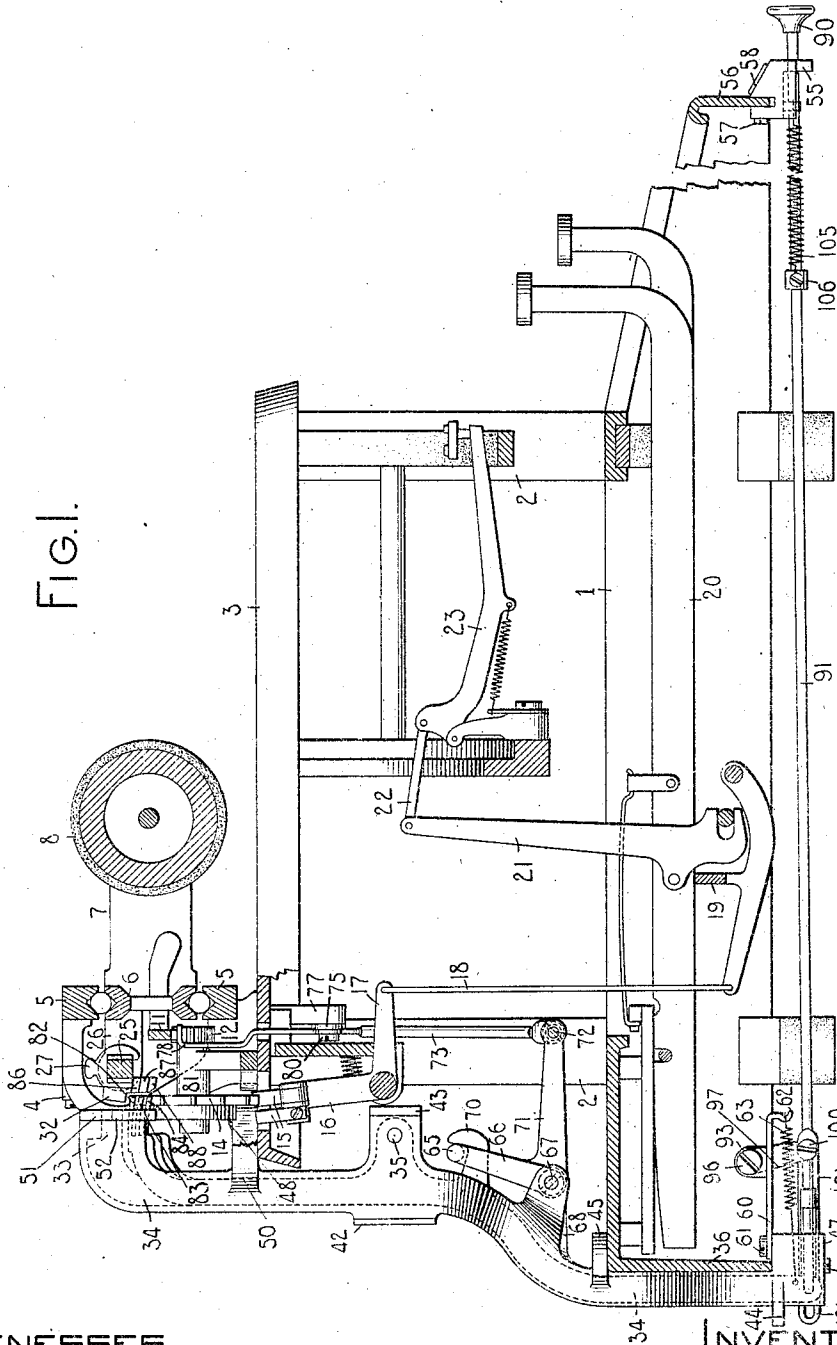


No. 874,806.

PATENTED DEC. 24, 1907.

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 24, 1906.

4 SHEETS—SHEET 1.



WITNESSES:

J. B. Reeves
Wm. Smith

INVENTOR:

Robert H. Strother

By Jacob Feld

HIS ATTORNEY

No. 874,806.

PATENTED DEC. 24, 1907.

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 24, 1906.

4 SHEETS—SHEET 2.

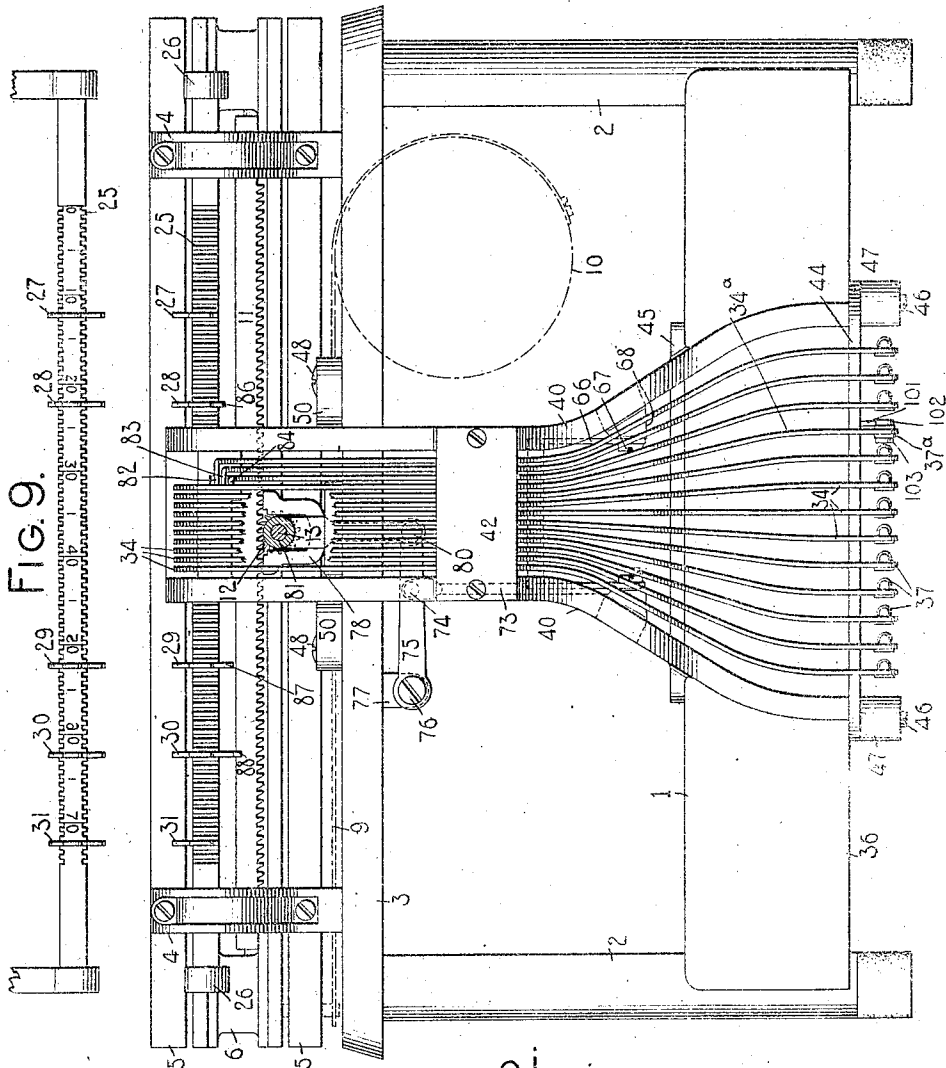


FIG. 9.

FIG. 2.

WITNESSES:

J. B. Davis.
Wm. Smith

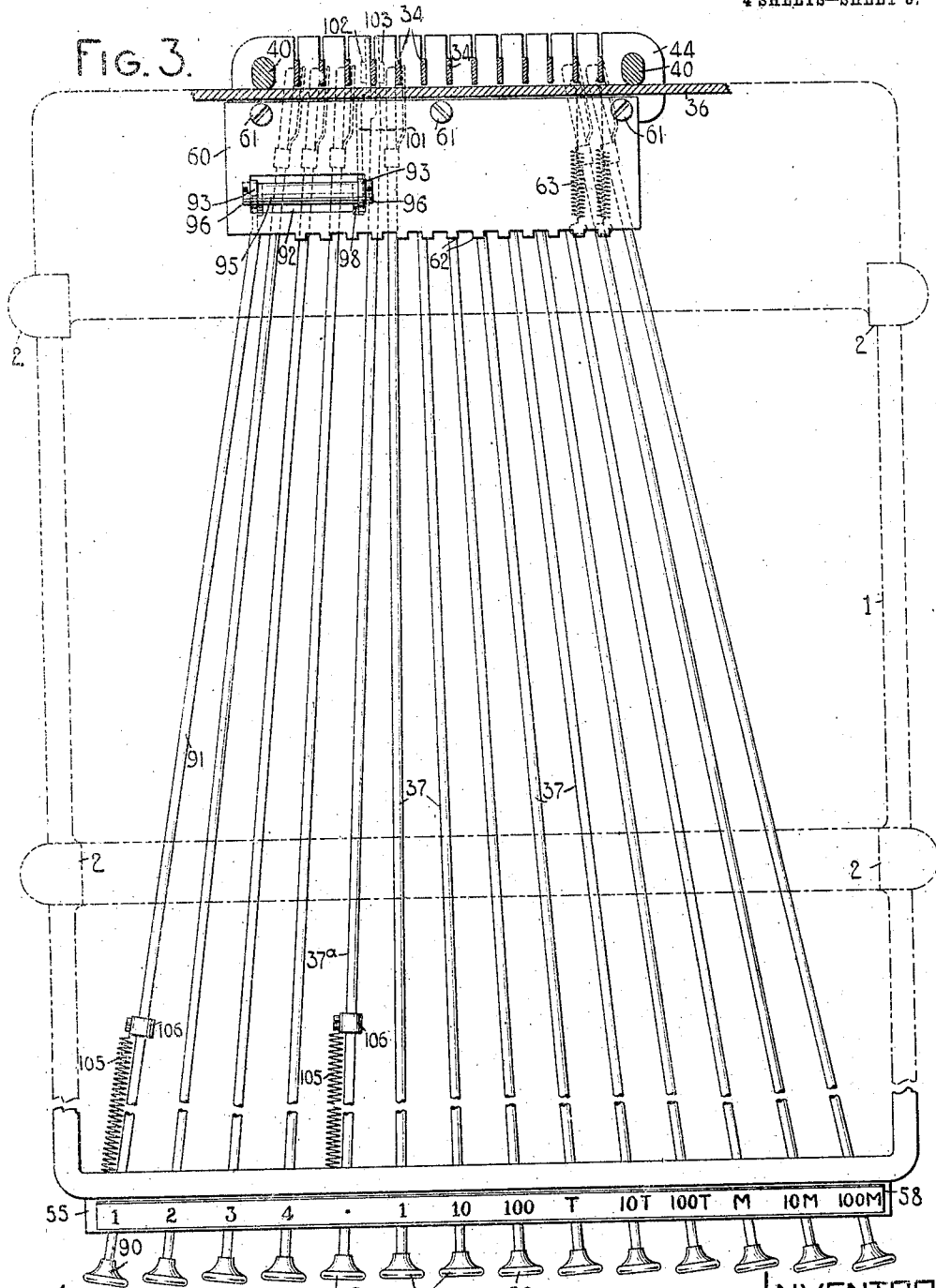
INVENTOR:

Robert H. Strother
By Jacob F. Bell

HIS ATTORNEY

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 24, 1906.

4 SHEETS—SHEET 3.



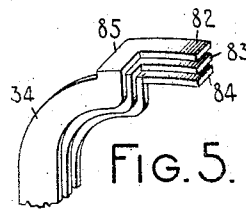
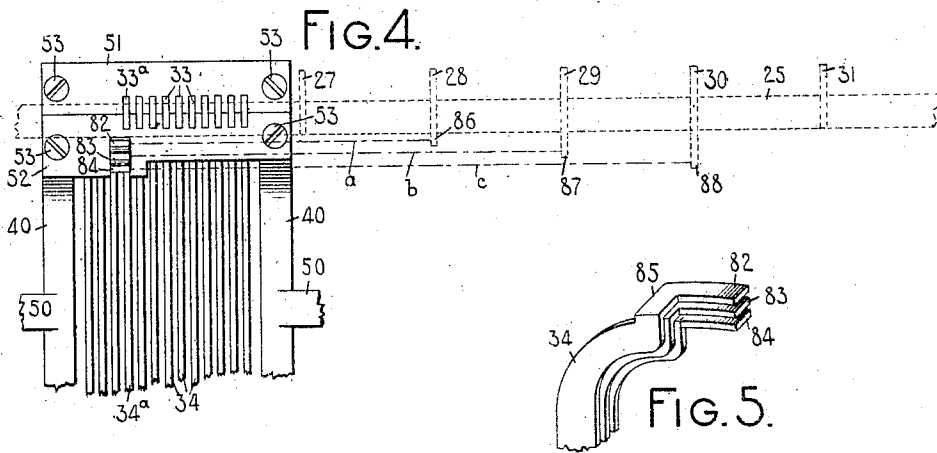
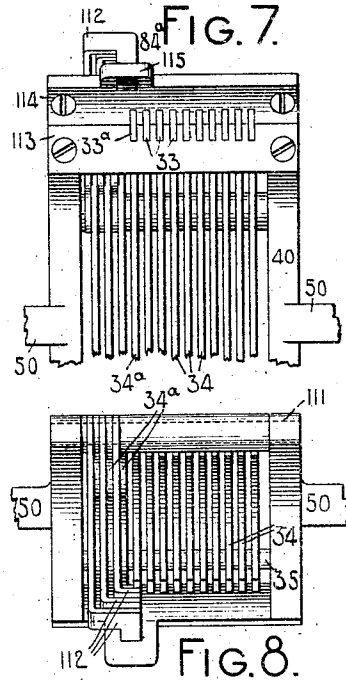
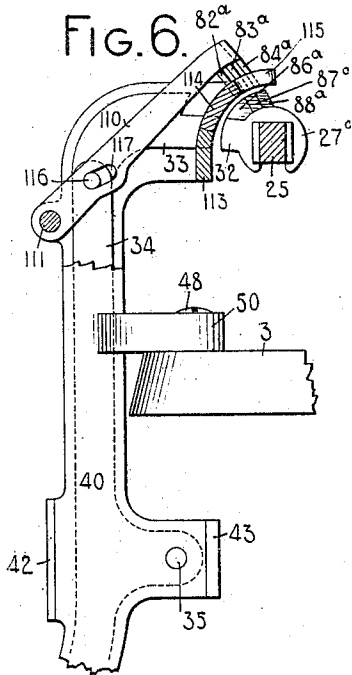
WITNESSES:

J. B. Reeves
Wm. E. Smith

INVENTOR:

Robert H. Strother
By Jacob Feld
HIS ATTORNEY

R. H. STROTHER.
TYPE WRITING MACHINE.
APPLICATION FILED SEPT. 24, 1906.



WITNESSES:

J. B. Reeves.
Wm. E. Smith

INVENTOR:

Robert H. Strother
By Jacob Falbel

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

ROBERT H. STROTHER, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 874,806.

Specification of Letters Patent.

Patented Dec. 24, 1907.

Application filed September 24, 1906; Serial No. 336,004.

To all whom it may concern:

Be it known that I, ROBERT H. STROTHER, citizen of the United States, and resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification:

My invention relates to typewriting machines and tabulating mechanism, and it has for its principal object to provide an improved column skipping mechanism that is more convenient, positive and certain in operation than those heretofore proposed.

Another object of my invention is to combine a column skipping device with a denominational tabulator in such fashion that the decimal key of the denominational tabulator will cause the carriage to be arrested at the same letter space position as any one of the column keys. With this arrangement, the column stop bar may be graduated to correspond with the carriage scale, and if a column stop be mounted on said bar at graduations 53; for example, one of the column keys, if operated, will cause said stop to arrest the carriage at letter space position 53 as indicated by the carriage scale, and the decimal key will also cause said stop to arrest the carriage at the same point. Heretofore, where a typewriter has usually been equipped with both denominational tabulator mechanism and column skipping mechanism, the key actuated stops of one of these mechanisms have been off-set from the other transversely of the machine with the result that the graduations on the column stop bar could be used only for one of them and not for the other.

Other objects of the invention will appear hereinafter.

To the above ends, my invention consists in certain features of construction and arrangements and combinations of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a front to rear vertical sectional view of a typewriting machine having my invention embodied therein. Fig. 2 is a rear elevation of the same with parts omitted. Fig. 3 is a top plan view of the key system of my tabulator mechanism, the upper parts of the machine being removed or sectioned away. Fig. 4 is a

fragmentary front view of the tabulator stops, and their guide, the remainder of the machine being removed or broken away. The column stop bar and column stops are shown diagrammatically in dotted lines. Fig. 5 is a fragmentary perspective view of the key actuated column selecting stops. Fig. 6 is a fragmentary view in side elevation, of another form of the stop mechanism, parts being shown in section and parts being broken away. Fig. 7 is a fragmentary front view of the same. Fig. 8 is a fragmentary top view of the same. Fig. 9 is a fragmentary top view of the column stop bar with column stops mounted thereon of the sort shown in Fig. 1.

My invention is applicable to typewriting machines generally, but I have here shown it applied to a Monarch typewriter. The main frame of this machine comprises a base 1, corner posts 2, and a top plate 3. Standards 4, rising from the top plate, support grooved stationary rails 5, between which runs the grooved rear bar or slide bar 6 of the carriage, which is supported by roller bearings in a well known manner. The carriage comprises end pieces 7, which support the platen 8. The carriage is drawn across the machine by a strap 9, connected with a spring drum 10, and its motion is controlled by a feed mechanism comprising a feed rack 11 pivoted to the carriage, a pinion 12, shaft 13, escapement wheel 14, and feed dogs 15 mounted on a dog rocker 16, having a forwardly extending arm 17 connected by a link 18 with the universal bar 19. Said universal bar lies under character key levers 20, which actuate sub-levers 21 connected by links 22 with front strike type bars 23. All of these parts are of well known construction, and, as far as the present invention is concerned, they may be of any suitable construction.

The carriage has mounted thereon a tabulator stop bar 25, supported at its ends by arms or brackets 26 projecting toward the rear of the machine from the back bar 6 of the carriage. The standards 4 are arched toward the rear in order to leave room for the stop bar and the column stops mounted thereon, to pass back and forth with the carriage. Said stop bar is made square in cross section and is formed in its front and rear faces with vertical slots spaced a letter space distance apart in order to secure the column

stops thereon in a well known manner. I have here shown five column stops 27, 28, 29, 30 and 31. Each of these consists of a piece of sheet metal cut into the general shape of an inverted U and made to straddle the stop bar 25, the two legs fitting into a pair of oppositely disposed vertical slots in said bar in the usual manner. These stops are, of course, adjustable longitudinally of the bar by removing them and replacing them in any desired slots. Each of the column stops has a rearwardly extending projection 32 adapted to cooperate with denominational tabulator stops 33 consisting of the forwardly extending upper ends of upright levers 34 pivoted intermediate their ends on a rod 35 and having their lower ends extending down behind the back plate 36 of the base 1 of the main frame. The levers 34 are pivoted at their lower ends to the rear ends of push rods 37 extending beneath the base of the machine to the front thereof and having denominational tabulator keys 38 mounted on their forward ends. The pivot rod 35 is mounted in a frame comprising upstanding side bars 40, connected together in several cross pieces, including two plates 42 and 43, one of which is behind and the other in front of the rod 35, said plates being fastened to the uprights 40 by screws. Two transverse flanges 44 and 45 connecting the uprights 40, lie one below and one above the rear part of the base 1, to which the frame is secured by clamping screws 46, threaded through lugs 47 and screwed up against the bottom edge of the back plate 36. The flange 44 has a series of open ended slots in its rear edge, as shown in Fig. 3, and the lower ends of the levers 34 pass through and are adapted to be guided by said slots. The frame is secured to the top plate by screws 48 passing through arms 50 and threaded into the top plate. The upper ends of the uprights 40 curve toward the front of the machine and have two plates 51 and 52 (Fig. 4) secured to their front faces by screws 53. The two plates are slotted at their proximate edges to form guides, a letter space distance apart, for the denomination stops 33.

The forward ends of the push rods 37 are slidably supported in a bar 55 (Figs. 1 and 3) having in its upper side a longitudinal slot to receive the front plate 50 of the base 1, to which said bar is secured by clamping screws 57. An indicating plate 58, mounted on the bar 35, has characters thereon to designate the several keys.

A plate 60 (Fig. 3) is secured to the cross piece 44 by screws 61, in front of the back plate 36. Hooks 62, bent down from the forward edge of this plate, have connected therewith the forward ends of contractile returning springs 63, the rear ends of which are connected with the levers 34.

The mechanism thus far described resem-

bles that of the well known Gorin tabulator so closely that its operation will be understood without further explanation.

The carriage release is operated by a universal bar 65, carried by arms 66, pivoted on shouldered and headed screws 67, threaded into brackets 68 projecting forward from the uprights 40 a little above the base 1. Each of the levers 34 has a forwardly projecting arm 70 having an up-turned end standing in front of the universal bar 65. The construction is such that when any of the keys 38 is operated, the universal bar will be moved toward the rear of the machine. One of the arms 66 is, in effect, an arm of a bell crank lever having a forwardly projecting arm 71 to the free end of which, at 72, is pivoted the lower end of a push link 73, the upper end of which is pivoted at 74 (Fig. 2) to a lever 75 of the third order. Said lever is pivoted at 76 to a bracket 77 depending from the top plate 3. A rack lifter 78 has a stem that extends through a suitable opening in the top plate 3 and is pivoted at its lower end on a shouldered and headed screw 80, threaded into the free end of the lever 75. The upper part of the rack lifter 78 is forked and straddles the housing 81 in which the shaft 13 is journaled, and each of its branches is bent toward the front of the machine, forming a horizontal arm that extends beneath the feed rack 11. The construction is such that said rack is lifted out of engagement with the pinion 12 and the carriage thus released from the escapement, whenever one of the keys 38 is operated.

The column skipping or column selecting mechanism comprises separate key actuated column skipping stops, three such stops 82, 83 and 84 (Figs. 4 and 5) being shown in the present instance. In the form of the invention shown in Figs. 1 to 5, these stops consist of the ends of the three left-hand levers 34, formed as best shown in Fig. 5. Each of these three levers at its upper end is bent horizontally toward the right as shown at 85; and the stop ends of the levers project toward the front of the machine from these horizontal parts 85.

The lengths of the parts 85 of the several levers are such as to bring the three stops 82, 83 and 84 directly one above another, the right hand or working edge of each of the stops being beneath and in the same vertical plane as the right-hand or working face of the decimal stop 33^a, as shown in Fig. 4. The upper parts of the three levers 34 that carry the stops 82, 83 and 84, are nested, as shown in Fig. 5. These three stops project through a vertical slot in the guide plate 53, and the left-hand wall of said slot takes the stress of the blow when the carriage is arrested. Each of the column stops 28, 29 and 30 has its rear leg extended some distance below the stop projection 32 (Figs. 1 and 4) and these down-

ward extensions are of different lengths. The stops 27 and 31 do not extend down far enough to be caught by any of the stops 82, 83 and 84. The stop 28 has an extension 86 long enough to reach down to the level of the stop 82, but not to the stops 83 or 84. Stop 29 has an extension 87 that reaches down to the level of stop 83, but not to that of stop 84. Stop 30 has an extension 88 that reaches down to the level of stop 84. The parts of the stops 28, 29 and 30 that are adapted to contact with stops 82, 83 and 84 respectively, when one of the latter is projected into the path of the corresponding one of the former, may be called the "stop surfaces" or "contact surfaces" of the stops 28, 29 and 30. On Fig. 4 the paths of these three stop surfaces are represented by the lines *a*, *b* and *c*, respectively. All of these lines lie in a vertical plane transverse to the carriage run, one line being directly above another, and when one of the column skipping stops 82, 83, 84 is projected by operating the corresponding key, said column skipping stop moves in a direction transversely of said plane and transversely of the path of travel of the carriage—in the present instance, it moves substantially horizontally, or in a direction substantially perpendicular to said plane. Each of the stops 82, 83, 84, is always, both when in normal position and when in operated position, at the same level as that of the "stop surface" of the corresponding column stop. In most column skipping mechanisms, heretofore, the column has been selected by moving a stop differential distances in the plane that includes the paths *a*, *b* and *c*, the column selected being determined by the distance through which the key operated stop was caused to move. Such devices have depended for their accuracy on the accuracy with which the motion of the key operated stop was controlled, and it has been found extremely difficult to control its motion with the requisite precision. If said stop were moved even a little too far, it would catch the column stop preceding the one desired; and if it were moved not quite far enough, the desired column stop would pass it. My column skipping stop, when operated, does not cross the path of any "stop surface" except that of the column stop appropriate to that particular column skipping stop, so that, if the key be pushed in a little farther or not quite as far as usual, no harm is done and the right column stop is arrested infallibly.

The contacting faces of the column skipping stops 82, 83 and 84 being in the same vertical plane transverse to the carriage run as that of the decimal stop 33^a, the bar 25 may be graduated to correspond with the carriage scale, and each of these four stops will arrest the carriage at the letter space position corresponding to that in which the

column stop is placed on said bar. The construction is such that the decimal stop may be used as the first column selecting stop, and it may be operated for this purpose by that key 38^a that is designated on the index plate 58 by a period. In order to prevent confusion, however, I prefer to connect this stop with a second key 90, mounted on a push rod 91, at the extreme left of the system of rods 37 (Figs. 1 and 3). The plate 60 has an opening 92 formed therein, and ears 93 are struck up from the ends of said opening. A rock-shaft 95 is pivoted to said ears on pivot screws 96, and said shaft has arms 97 and 98 depending from the left and right-hand ends thereof, respectively through the opening 92. The rear end of the rod 91 is pivoted to the arm 97 at 100, and a short link 101 is pivoted at its forward end to the arm 98. The rear end of the link 101 is slotted as shown in Fig. 1, and a headed pivot-pin 102 (Fig. 2) is received within the slot, said pivot pin projecting from the left-hand side of the lever 34^a of the decimal stop. The push rod 37^a for this lever is also similarly slotted and connects with the right-hand side of the lever by means of a headed pin 103 (Fig. 2). The construction is such that if the decimal key 38^a be operated, the lever 34^a will be operated, the pin 102 moving idly in the slot in the link 101; and if the key 90 be operated, the shaft 95 will be rocked, and the lever 34^a will be operated, the pin 103 moving idly in the slot in the rod 37^a. In order to hold one of the push rods 37^a and 91 in normal position when the other rod is operated, each of these rods is provided with a light contractile spring 105, the rear end of which is connected with a collar 106 secured to the rod by a set screw, and the forward end of which is secured to the bar 55. On the index 58, the key 90 is designated by the numeral 1 as the first column selecting key, the numerals 2, 3 and 4 designating respectively the keys connected with the stops 82, 83 and 84. The key 38^a is designated as the decimal key, and the succeeding keys by characters indicating the various denominations up to hundreds of millions.

When the machine is used for work requiring the selection of columns only, the column stops 27, 28, 29 and 30 are used, and each of them is set at the numeral on the bar 25 corresponding to that on the carriage scale at which it is desired to have the carriage arrested; and the column selecting keys 1, 2, 3, 4 are employed. When the machine is used for writing columns of figures, the column stops are placed at the numerical positions at which it is desired to write the decimal points. Sometimes the same piece of work requires both the selection of columns and the selection of denominational positions within some or all of the columns. The machine as shown in the drawings, is equipped for working in five

columns. If it is desired to write \$200 in the fifth column, the key marked 4 on the index 58, is first operated. This key being connected with the stop 84, will let column stops 27, 28 and 29 pass it, and will arrest stop 30. The denomination key marked 100 on the scale 58 is then operated, with the result that the carriage is released and is arrested by the column stop 31, encountering the hundreds stop 33. One of the advantages of the present invention will be perceived from the fact that by adding the three stops 82, 83, 84 to an ordinary denomination tabulator, provision is made for writing five columns of figures and for instantly selecting any one of said columns. Another advantage is the certainty with which the columns are selected, due to the fact that the column of each of the selecting stops moves directly into the path of the contact surface of the corresponding column stop without crossing the path of the contact surface of any other column stop. Another advantage is that all of the column stops may be set on the bar 25 by reference to the numerals on said bar without experiment or calculation, due to the fact that the column selecting stops all have their contacting surfaces in the same vertical plane, and in the same vertical plane as the contacting surface of the decimal stop.

In Figs. 6, 7 and 8 I have illustrated another form of my invention. In this form of the invention the arrangement and construction of the keys and push rods, the frame work, the levers 34, the carriage release and all other parts below the top plate are or may be identical with those already described, except in one particular that will be mentioned. In this form of the invention the column selecting stops 82^a, 83^a and 84^a are on the ends of three levers 110, which are pivoted on a rod 111 mounted at its ends on ears projecting toward the rear of the machine from the upright frame pieces 40 as shown in Fig. 6. In said figure this rod is shown in section and the left-hand frame piece 40 is broken away. The levers 110 extend from the pivot rod 111 upward and toward the front of the machine and they have their upper ends bent toward the right as shown at 112 in Fig. 7, and the stops 82^a, 83^a and 84^a consist of the forwardly and downwardly projecting ends of these horizontal parts 112. The right hand or contacting faces of these three stops stand above and in the same fore and aft vertical plane as the contacting face of the decimal stop 33^a. The horizontally bent parts 112 are nested as shown so that one of the stops comes under another. The decimal stops project through suitable guiding slots in two plates 113 and 114 which are secured to the front faces of the forwardly projecting parts of the uprights 40 and which are curved, as shown in Fig. 6 to conform substantially to

the curvature of the standards 4. The contact surfaces 86^a, 87^a and 88^a of the second, third and fourth column stops, consist in this form of the mechanism of upwardly extending segmental extensions of the stop surfaces 32 which are adapted to cooperate with the denominational stops 33. The stop surface 86^a projects high enough to be arrested by the stop 82^a but not high enough to be arrested by the stop 83^a. The stop surface 87^a is adapted to be arrested by said stop 83^a and the stop surface 88^a is adapted to be arrested by the stop 84^a. The column selecting stops project through a slot formed in a lug or projection 115 formed on the upper edge of the guide-plate 114. The three left-hand levers 34 are made a little shorter than the remainder of said levers as shown in Fig. 6 and each of them has a pin 116 projecting therefrom near its upper end into a slot 117 formed in one of the levers 110. The construction is such that said levers are normally held in their upper retracted positions but each of them is adapted to be moved down into the path of the corresponding stop surface 86^a, 87^a or 88^a when this lever 34 has its upper end moved toward the front of the machine by the operation of the corresponding column selecting key. It will be seen that in this form of the invention the decimal stop 33^a is adapted to arrest the first of the column stops, the stop 82^a to arrest the second of said stops and so on; but that the stop 84^a is operated by the extreme left-hand one of the keys. In this form of the invention, therefore, the fourth key from the left is connected with the decimal stop and is marked "1", the third key from the left is connected with the stop 82^a and is marked "2", the second key from the left is marked "3" and is connected with the stop 83^a and the left-hand key is marked "4" and is connected with the stop 84^a. In this form of the invention the denominational tabulator is identical in construction with that shown in Figs. 1 to 5. It will be seen that in this form of the invention the stop surfaces 86^a, 87^a and 88^a are set to move in paths all of which are in the same plane, which plane in this instance is inclined upward and toward the front of the machine as represented by the dotted line *x* in Fig. 6; and that the column selecting stops move in paths transversely of this plane and nearly perpendicular thereto, so that no column stop ever moves across the path of any other contact surface than that with which it is designed to cooperate.

In both forms of the invention, the denomination stops are disposed in a series extending parallel to the direction of travel of the carriage, and column selecting stops are disposed in a series at right angles thereto. The invention is capable of embodiment in numerous other forms than the two here

shown, and various changes may be made in the details of construction and arrangement without departing from said invention.

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

1. The combination, with a carriage, of tabulator mechanism comprising a plurality of column stops and a plurality of separately operable column selecting stops, said column stops and selecting stops having relative motion during the travel of the carriage and said selecting stops having their contacting surfaces in the same plane transverse to the direction of such relative motion.

2. The combination with a carriage, of tabulator mechanism comprising a plurality of column stops and a plurality of separately operable column selecting stops, said column stops and selecting stops having relative motion during the travel of the carriage, said selecting stops having their contacting surfaces in the same plane transverse to the direction of such relative motion, and said column stops having their contacting surfaces in different lines parallel to the direction of such relative motion.

3. In a typewriting machine, the combination with a carriage, of tabulator mechanism comprising column stops mounted to move in unison with the travel of the carriage and having contact faces that move in different paths, and separately operable column selecting stops for cooperation with said column stops, all of said column selecting stops having their contacting surfaces in the same plane transverse to the direction of motion of said column stops.

4. In a typewriting machine, the combination with the carriage, of tabulator mechanism comprising column stops, denomination stops and column selecting stops, all of said column selecting stops and one of said denomination stops having their working faces in the same plane perpendicular to the direction of travel of the carriage.

5. In a typewriting machine, the combination with a carriage, of tabulator mechanism comprising column stops and a plurality of denomination selecting devices, and a plurality of column selecting devices both cooperating with the same column stops, said column selecting devices being so situated as to arrest the carriage at one of the denominational positions determined by said denominational selecting devices.

6. In a typewriting machine, the combination with the carriage, of tabulator mechanism comprising column stops, denomination stops and column selecting stops, and keys for said denomination and column selecting stops, one of said stops being adapted for use

as either a denomination or column selecting stop and having two keys, one a denomination key and the other a column selecting key.

7. In a typewriting machine, the combination with the carriage, of tabulator mechanism comprising column stops, denomination stops and column selecting stops and keys for said denomination and column selecting stops, the denomination stop corresponding to the decimal point being adapted to serve also as a column selecting stop and having two keys connected therewith, one of said keys being designated as a denomination key and the other as a column selecting key.

8. In a typewriting machine, the combination with the carriage, of tabulator mechanism comprising column stops, a plurality of levers mounted side by side and having their ends constituting column selecting stops, and bent laterally to bring the working face of one stop into the same vertical plane as that of another; and keys controlling said column selecting stops.

9. In a typewriting machine, the combination with the carriage, of tabulator mechanism comprising column stops and cooperating key-controlled stops, said key-controlled stops comprising two series of stops, each separately operable, one series arranged in a line parallel with the direction of travel of the carriage and the other in a line at right angles to the direction of the travel of the carriage.

10. In a typewriting machine and in tabulating mechanism, the combination with the carriage, of tabulator mechanism comprising denomination stops and column selecting stops, and two keys connected with one of said stops and each having lost motion connection with said stops so that when said stop is operated by one key it will not disturb the other key.

11. In a typewriting machine and in tabulating mechanism, the combination with the carriage, of one or more column stops mounted on said carriage, a plurality of key-operated stops cooperating with said column stops, one of said key-operated stops being connected with two keys, the connections between one of said keys and said stop including a transverse rock shaft.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 22nd day of September, A. D. 1906.

ROBERT H. STROTHER.

Witnesses:

E. M. WELLS,
J. B. DEEVES.