No. 858,713. PATENTED JULY 2, 1907.

C. GABRIELSON.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 10, 1902.

5 SHEETS—SHEET 1.

FIG. 1.

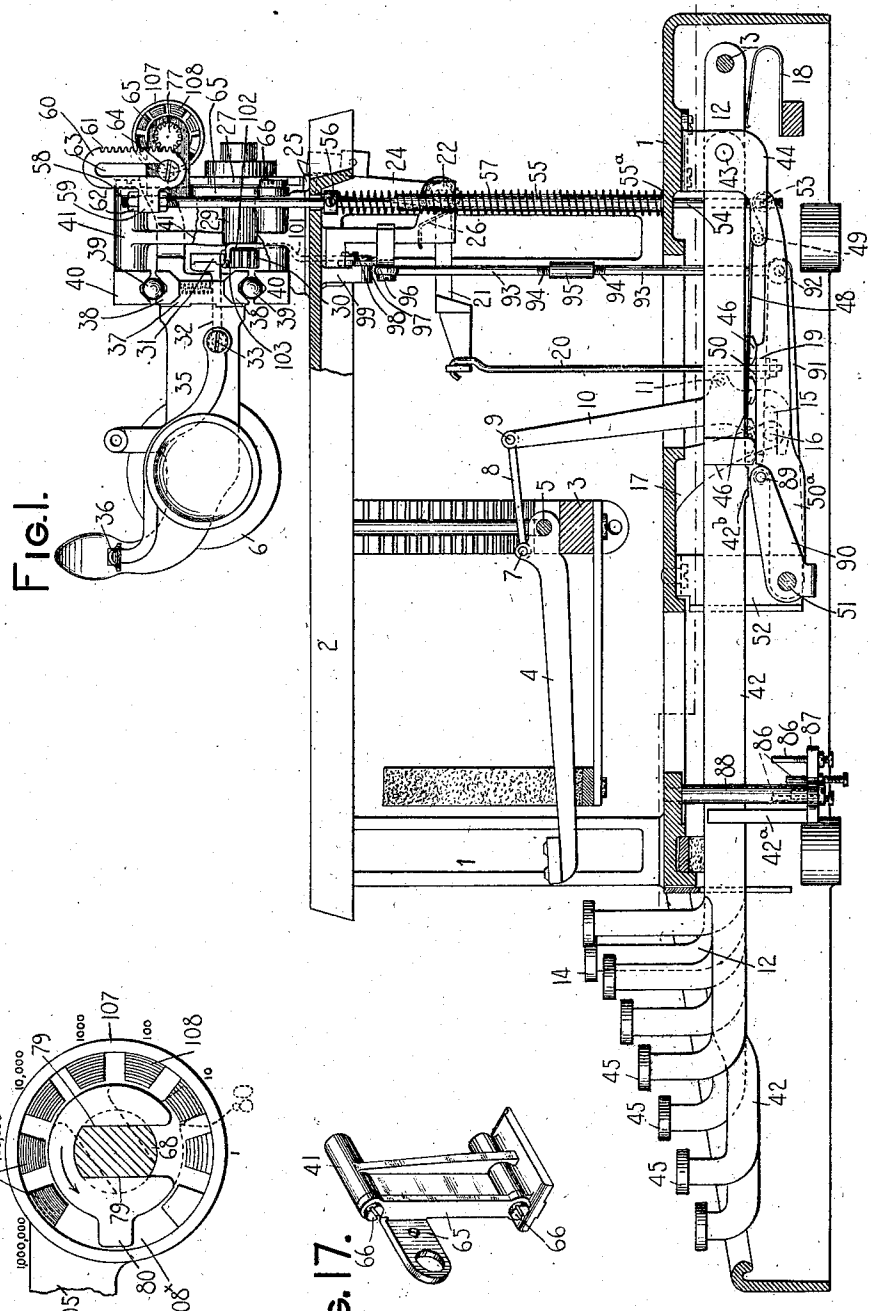

FIG. 16.

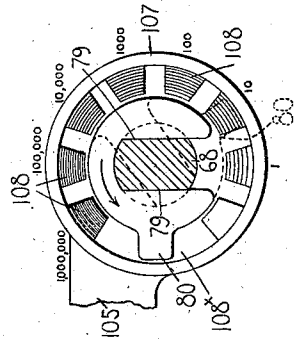

FIG. 17.

WITNESSES.

K. V. Donovan.

Charles A. Smith

INVENTOR

Carl Gabrielson

by Jacob Felbel

HIS ATTORNEY

No. 858,713. PATENTED JULY 2, 1907.

C. GABRIELSON.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 10, 1902.

5 SHEETS—SHEET 2.

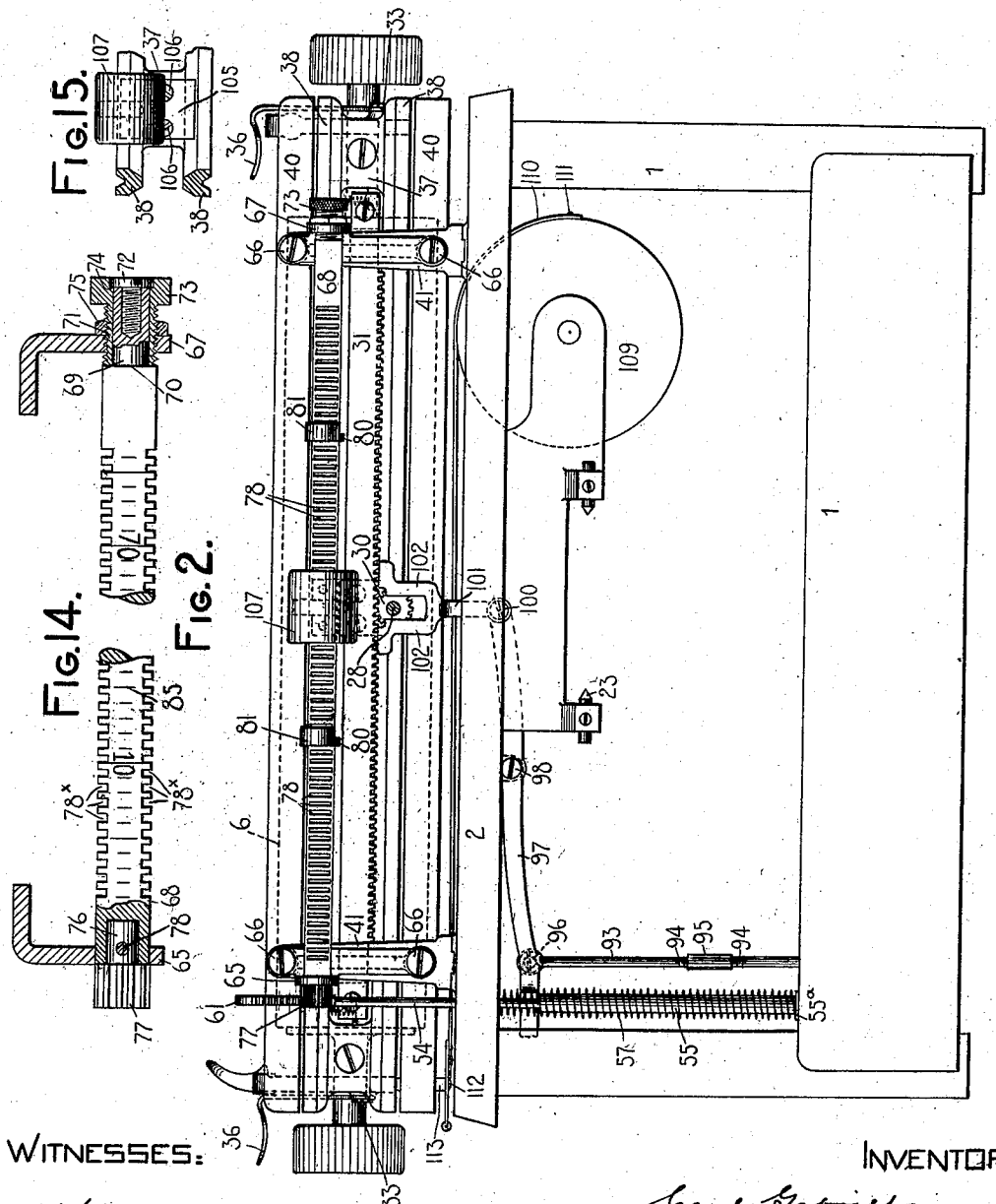

FIG. 15.

FIG. 14.

FIG. 2.

WITNESSES:

K. V. Donovan.

Charles E. Smith

INVENTOR

Carl Gabrielson

by Jacob Tebbel

HIS ATTORNEY

No. 858,713. PATENTED JULY 2, 1907.

C. GABRIELSON.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 10, 1902.

5 SHEETS—SHEET 3.

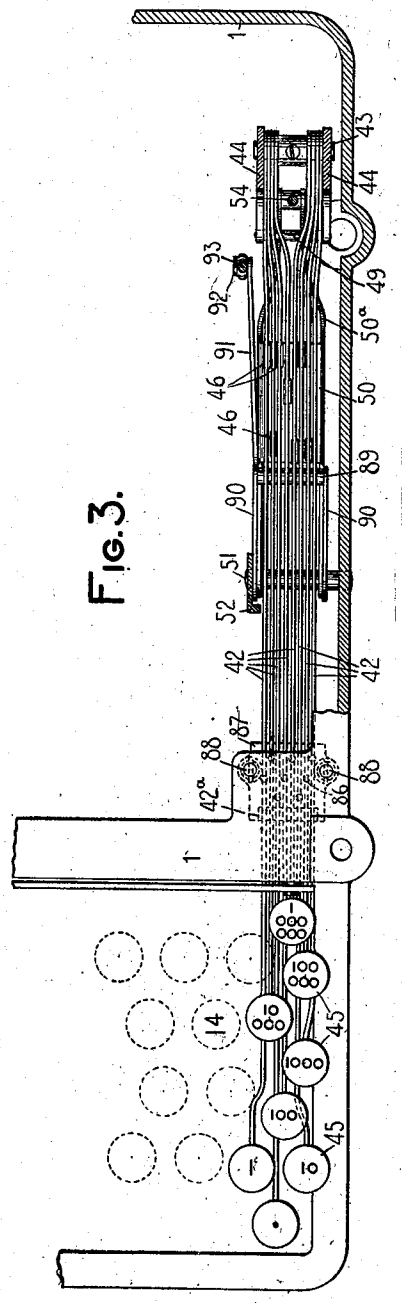

FIG. 3.

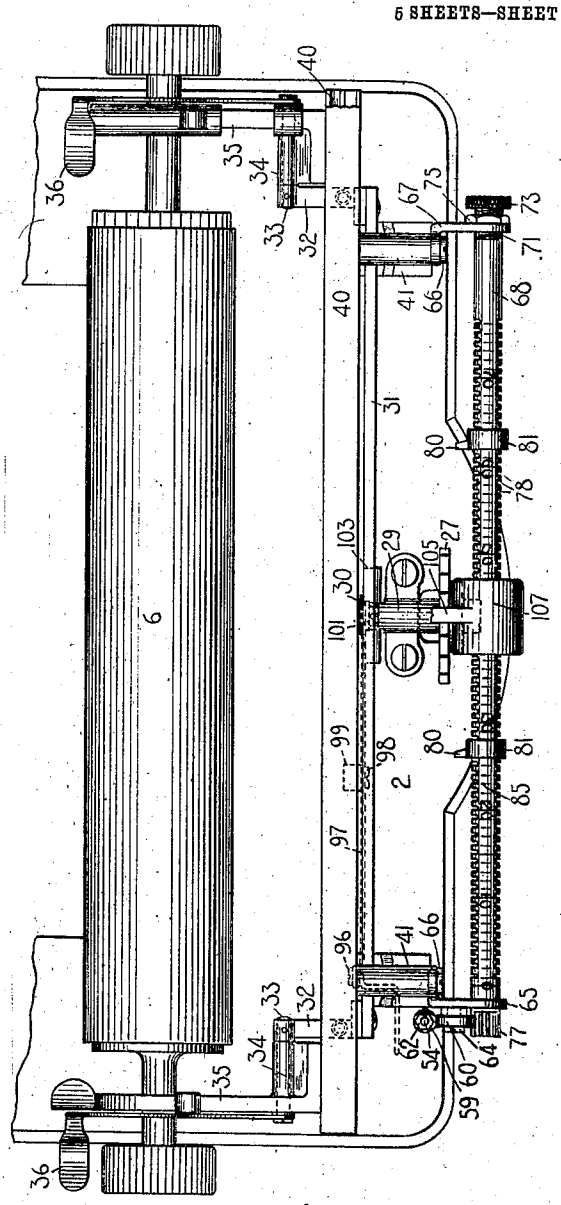

FIG. 4.

WITNESSES.

K. V. Donovan.

Charles E. Smith

INVENTOR

Carl Gabrielson

by Jacob Breidt

HIS ATTORNEY

No. 858,713. PATENTED JULY 2, 1907.

C. GABRIELSON.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 10, 1902.

5 SHEETS—SHEET 4.

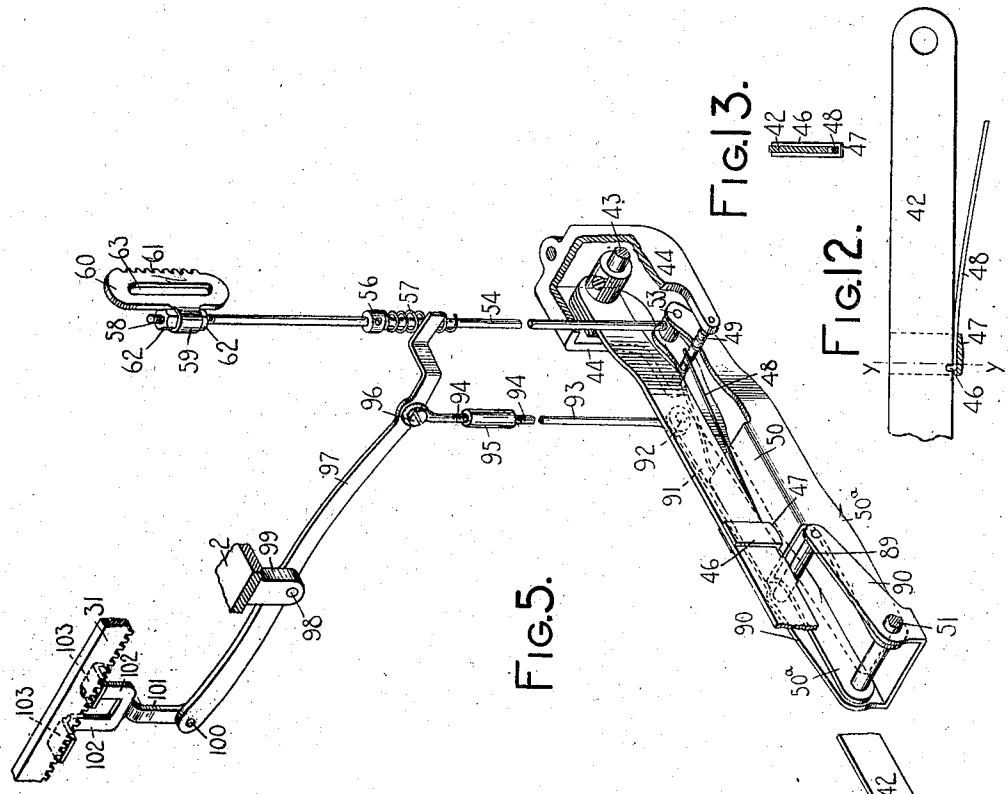

FIG. 5.

FIG. 13.

FIG. 12.

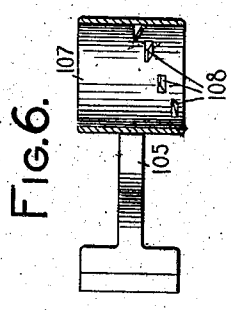

FIG. 6.

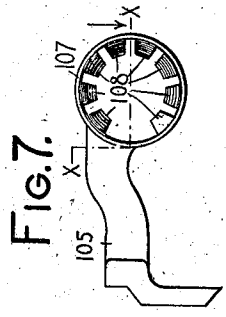

FIG. 7.

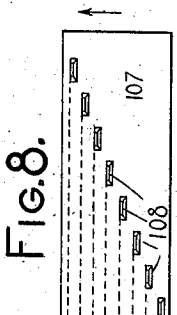

FIG. 8.

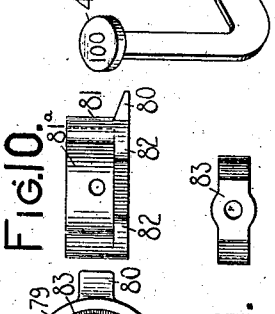

FIG. 10.

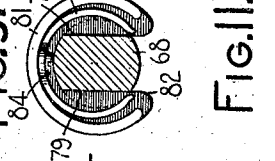

FIG. 11.

FIG. 9.

WITNESSES.

K. V. Donovan.

E. Smith

INVENTOR

Carl Gabrielson

by Jacob Tabor

HIS ATTORNEY

No. 858,713. PATENTED JULY 2, 1907.

C. GABRIELSON.

TYPE WRITING MACHINE.

APPLICATION FILED MAR. 10, 1902.

5 SHEETS—SHEET 5.

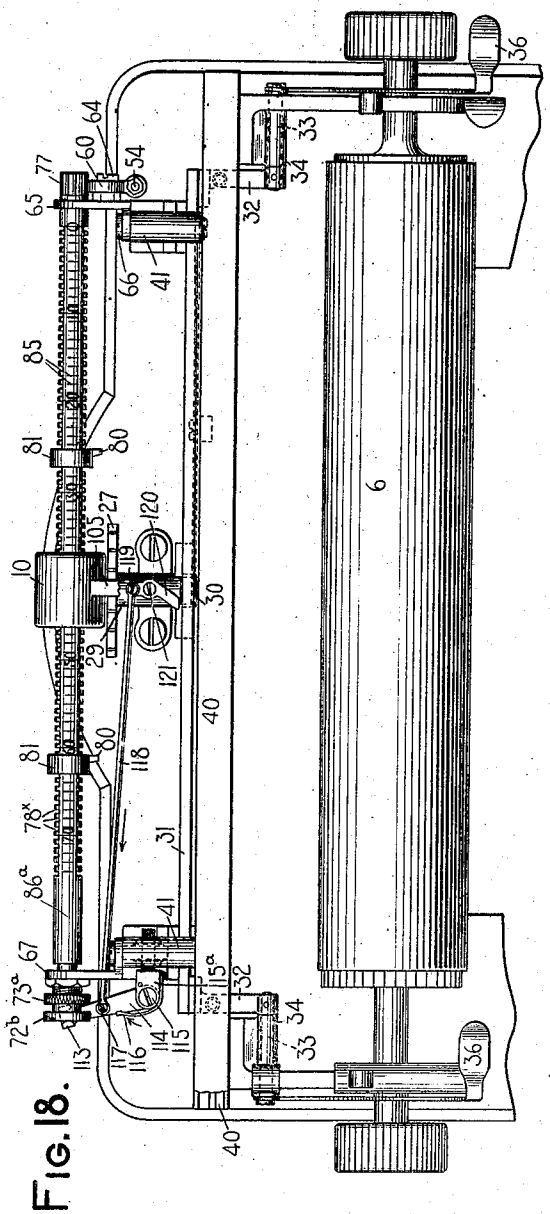

FIG. 18.

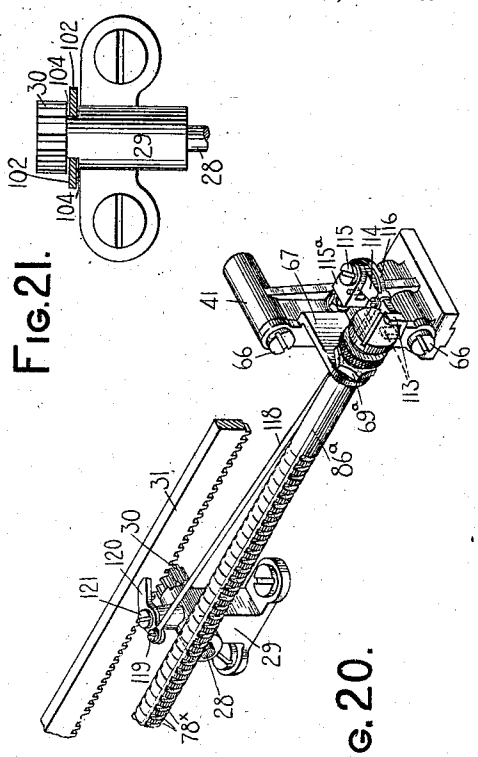

FIG. 21.

FIG. 20.

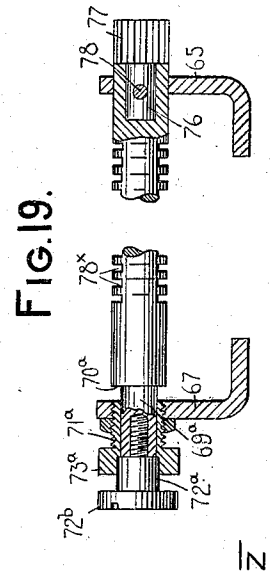

FIG. 19.

WITNESSES

K. V. Donovan.

Charles E. Smith

INVENTOR

Carl Gabrielson

by Jacob Felbel

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

CARL GABRIELSON, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 858,713. Specification of Letters Patent. Patented July 2, 1907.

Application filed March 10, 1902. Serial No. 97,494.

To all whom it may concern:

Be it known that I, CARL GABRIELSON, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to denominational tabulating mechanism for typewriting machines, and the main object of said invention is to provide a simple and efficient mechanism of the character described.

A further object of the invention is to provide simple and efficient automatically operated means for preventing rebound of the carriage when its travel is arrested by the engagement of the tabulator stops.

To these main ends my invention consists in the novel features of construction, arrangements and combinations of parts to be hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters designate like parts in the various views,—Figure 1 is a front to rear sectional view, with parts in elevation, of one form of typewriting machine embodying my invention. Fig. 2 is a rear elevation of the same, but omitting some of the parts for the sake of clearness. Fig. 3 is a fragmentary sectional plan view of a portion of the tabulating mechanism. Fig. 4 is a plan view of the rear upper portion of the machine and illustrating a portion of the tabulating mechanism. Fig. 5 is a detail perspective view of a portion of the tabulating mechanism. Fig. 6 is a transverse sectional view of the denominational stop carrier, the view being taken on the line *x*—*x* of Fig. 7, and looking in the direction of the arrow in said figure. Fig. 7 is a side view of the same. Fig. 8 is a developed plan view of the circular denominational stop support; the view illustrating the disposition of the denominational stops. Fig. 9 is a transverse sectional view of the stop rod with one of the tabulating stops in position thereon. Fig. 10 is a bottom view of one of the tabulating stops with the spring removed. Fig. 11 is a bottom view of the clamping spring for one of the tabulating stops. Fig. 12 is a detail fragmentary side view, partly in section, of one of the tabulator keys, and its spring. Fig. 13 is a transverse sectional view of the same, taken on the line *y*—*y* of Fig. 12. Fig. 14 is a detail plan view, partly in horizontal section, of the stop rod and its supporting means. Fig. 15 is a detail rear elevation of the denominational stop carrier and a portion of the carriage to which it is attached. Fig. 16 is an enlarged transverse sectional view through the stop rod, the view illustrating in full lines the tabulating and denominational stops and the relative arrangement thereof in the machine when the tabulating mechanism is not in operation. Fig. 17 is a detail perspective view of certain supporting brackets which will hereinafter be more fully described. Fig. 18 is a view similar to Fig. 4 but showing additionally the means for preventing a rebound of the carriage. Fig. 19 is a horizontal sectional view of the stop rod and its supporting means employed in connection with the means for preventing the rebound of the carriage. Fig. 20 is a perspective view showing portions of the mechanism illustrated in Fig. 18. Fig. 21 is a fragmentary detail plan view of the carriage feed pinion, its shaft and bearing; the view illustrating the means for guiding the feed rack releasing device in its vertical movement.

1 is generally the framing of the machine, 2, the top plate, and 3, the type bar segment in which the type bars 4 are pivoted at 5 and are segmentally arranged and adapted to be moved upwardly and rearwardly to the platen 6. To each type bar is pivoted at 7 a draw link 8 which in turn is pivoted at 9 to an upwardly extending bell crank lever 10 which is pivoted at 11 to a key lever 12 that is pivoted in the frame of the machine at 13 and is provided with the usual finger key 14. This bell crank or sub-lever 10 has a depending portion which extends below its associated key lever and which is slotted at 15 for co-operation with a fixed fulcrum bar 16 that may be supported by suitable brackets 17 and each of the key levers may be restored to the normal position by a spring 18, all as fully shown and described in the Letters Patent No. 657,927, granted to Jacob Felbel, September 18, 1900. Extending beneath the various key levers 12 is a transverse universal bar 19 which is connected at its ends to upright links or rods 20 which in turn are connected at their upper ends to a rocker arm 21 that projects from a rock shaft 22, supported by centers or pivots 23 and provided with a carrier 24 for the usual feed dogs 25.

26 is the usual returning spring for the dog rocker. The feed dogs 25 co-operate with a feed or escapement wheel 27 which is operatively connected to a shaft 28, (see Fig. 21) that rotates in a bearing 29 and which is provided at its forward end with a feed pinion 30. Co-operating with this feed pinion 30 is a carriage feed rack 31 that is carried by arms 32 which are secured to rock shafts 33 adapted to rotate in bearings 34 on the carriage 35. These rock shafts 33 may each be provided with a finger key or crank arm 36 by means of which the rack 31 may be elevated or disengaged from the feed pinion 30 and thus permit a free movement of the carriage. This carriage 35 includes a bar 37 having oppositely disposed track or race-ways 38. Anti-friction balls 39 are adapted to be received within these race-ways and in the co-operating race-ways of the fixed rails 40, which are secured to brackets or uprights 41, that in turn are mounted to the top plate 2 of the machine.

Preferably at the lower right-hand side of the ma-

chine is provided a series of denominational key levers 42 which are pivoted at their rear ends on a rod or pin 43 that is supported by bracket arms 44 depending from the base portion of the frame of the machine. Each of these denominational key levers extends to the keyboard of the machine and is provided with a finger key or button 45. Each denominational key lever is likewise provided with a contact piece 46 which is preferably rounded at its lower contact face 47 and these contact pieces are made in loop or U-form and are so secured to the lever as to leave a space between the bottom of the lever and the loop for the reception of one end of a spring 48, which at this point may also engage a notch in the key lever, as shown in Figs. 12 and 13. The rearwardly projecting free end of each spring is adapted to bear upon a fixed cross-bar 49 which is carried by the bracket arms 44.

Upon examination of Fig. 1 of the drawings, it will be observed that the various contact pieces 46 are secured to their respective denominational key levers at varying distances from the pivot rod 43 thereof. These contact pieces 46 are adapted to bear upon an underlying bar cross-head or horizontal plate 50 which preferably is formed integral with vertically arranged side arms 50^a, the plate and arms forming a sort of frame which is pivoted upon a bar 51 that is secured to bracket arms 52 which depend from the frame of the machine. The rear ends of the side bars 50^a of the frame are united by a pivot piece 53 from which extends upwardly a rod or link 54 that projects through apertures in the base plate and top plate of the machine and through a tube 55 which is supported on the top of the base plate. This rod or link 54 has an adjustable collar 56 to serve as an abutment for the upper end of an expansion spring 57; the lower end bears upon the flange 55^a formed at the lower end of the tube 55, as shown at Figs. 1 and 2. At Fig. 5 the spring is broken away. The upper end of the rod or link 54 is threaded at 58 and receives the sleeve 59 forming part of a rack frame or carrier 60 having vertically arranged teeth 61. Jam-nuts 62 may be threaded upon the rod above and below the sleeve 59 of the carrier so as to enable it to be adjusted and held in the proper position. This rack carrier 60 is slotted vertically and longitudinally as at 63 for the reception of a headed screw 64, the threaded stem of which takes into a threaded opening in a bracket 65, which is secured by screws 66 to one of the carriage supporting brackets 41. Another bracket 67 is secured in position in a like manner and both brackets constitute supports or bearings for a stop rod or rock shaft 68. Thus upon reference to Fig. 14, it will be seen that one end of the rock shaft or stop rod 68, which is cylindrical in cross section, is received within a cylindrical opening in the bracket 65 so that it may rotate therein. The opposite end of this rock shaft is provided with a reduced portion 69 which forms a circumferential shoulder 70 that bears against the inner end of an externally threaded sleeve 71. The threads of this sleeve engage internal threads in the bracket 67 so that the sleeve and stop rod may receive a slight longitudinal adjustment. The outer end of the reduced portion of the stop rod has a threaded opening therein which receives the stem of a headed screw 72, and the head of the screw is received within an opening in the knurled head 73 of the sleeve 71 and bears against a shoulder 74 formed by said opening. By these means the rock shaft is free to turn in the sleeve 71 and the opening in the bracket 65 but is prevented from longitudinal movement, though as before stated a slight longitudinal adjustment may be given to the rock shaft by turning the sleeve 71 in its bearings and a jam-nut 75 may be employed to rigidly secure the sleeve in its adjusted position. The left-hand end of the stop rod, in Fig. 14, is apertured for the reception of a stud 76 which projects from one side of a pinion 77 and a pin 78 is passed through openings in the stop rod and stud to secure the pinion and the stop rod together. This pinion 77 meshes with the rack 61, hereinbefore described, so that a vertical movement of the rack to different extents will cause a turning of the stop rod to different extents. The stop rod is serrated at 78^x on opposite sides thereof so as to form teeth and kerfs and the bases of these kerfs are straight or flat as indicated at 79 in Figs. 9 and 16. A column or tabulating stop 80 projects from a segmental stop carrier 81, which is illustrated in detail in Figs. 9 and 10 of the drawings. This stop carrier is forked or bifurcated as at 82 and adapted to co-operate with the walls 79 of the serrations in the stop rod and thus enable the stop and rod to rotate together. It will be understood that when these forks are seated within the serrations, which are letter space distances apart, the stop and its carrier are prevented from moving longitudinally upon the stop rod, and in order to prevent accidental detachment of the stop carrier from the rod, I have provided a C-shaped clamping spring 83, which is secured at its middle by a screw 84 within a C-shaped housing 81^a forming part of the carrier and extending laterally of the forks 82. Said spring embraces a cylindrical portion of the stop rod below its axis and thus tends to hold the stop carrier upon the rod. In order to adjust the stop on the rod 68, it is merely necessary to withdraw the stop carrier laterally against the tension of the spring 83, and re-engage it with the rod at the desired point by inserting the forks 82 into opposite kerfs and causing the spring to embrace the rod, as at Fig. 9. A scale 85 or number of letter spaces which the carriage may make may be provided upon the stop rod to facilitate an adjustment of the tabulating or column stops thereon.

The various tabular key levers 42 are limited in their downward movement by stop pins or screws 86 which are held in or threaded in openings in a plate 87 that is supported by depending arms 88 from the base of the machine. It will be observed that these various stop pins 86 extend to different heights and thus variably limit the depression of the different denominational key levers 42. These key levers 42 are adapted to bear upon a cross-bar 89 which is connected at its ends to a yoke or frame 90 that is pivoted upon the rod 51, heretofore described. One side of this yoke or frame 90 is extended rearwardly to form an arm 91 to which is pivoted at 92 a link or rod 93 which is preferably a two-part link; the separate parts of which are threaded at 94 with right and left-hand screw-threads, that co-operate with a turn buckle 95 in order to shorten or lengthen the link. The upper end of this link is pivoted at 96 to a horizontal lever 97 that is pivoted at 98 to a stud 99 which projects from the under-face of the top plate 2 of the machine. To the inner end of this lever is pivoted at 100 a feed rack disengaging piece or yoke 101, which is bifurcated at its upper end

to form arms 102 that are turned at right angles to the length thereof at the ends, as indicated at 103, to form bearing pieces that project beneath the carriage feed rack 31.

From the foregoing description, it will be understood that a depression of any of the tabular or denominational keys will not only effect a depression of the cross bar or plate 50 through the contact of the part 46 therewith but that such depression will likewise cause a downward movement of the yoke 90, thus drawing down one end of the lever 97 and elevating the opposite end thereof, which causes the disengaging yoke or piece 101 to be elevated and the carriage feed rack 31 to be lifted from its pinion 30. The yoke or rack lifter 101 is guided during this vertical movement thereof by its arms 102 engaging within recesses 104 formed in the bearing 29 of the feed pinion shaft 28, as illustrated in Fig. 21. Depression of the various denominational key levers will variably depress the cross plate or bar 50 or move it down different distances according to the key lever operated by reason of the location or arrangement of the contact pieces 46 at various distances from the pivot 51 of the pivoted cross plate 50, and by reason of the fact that the depth of depression of the different denominational keys is controlled or variably limited by the setting of the cooperating stops 86, of which there is one for each said key lever. The effect of this varying depression of the cross plate 50 is to impart to the stop rod (through the link 54, rack 61 and pinion 74) a differential or variable turning movement or oscillation in order to bring the tabulating stop thereon into the path of the desired denominational stop carried by the carriage. The stop 80, in turning with the stop rod, moves in a plane that extends fore and aft of the machine so that the impact against the stop is received lengthwise against the rod and does not tend to move the stop from the position to which it has been turned. A bracket 105 is secured by screws 106 (Fig. 15) to the carriage rack bar 37 and this bracket is formed or provided with a tubular or hollow cylindrical stop carrier 107 and provided interiorly with a series of radially-arranged denominational stops 108. These stops are also segmentally or circularly and spirally arranged, as indicated in Figs. 6, 7, 8 and 16 of the drawings, and are situated a letter space distance apart in their spiral arrangement or considered longitudinally of the tube 107. Eight of these concentrically arranged stops are shown, there being one for each denominational key employed. This cylindrical stop carrier surrounds the stop rod and the tabular stop as shown in Fig. 16 and during the movement of the carriage when the tabulating mechanism is not in operation, the tabular stop 80 on the rod 68 will not arrest the carriage, because it stands normally in a position where it cannot be struck by one of the denominational stops 108. By referring to Fig. 16, it will be observed that the said stops 108 do not extend completely around the inside of the tube or carrier 107 and hence that there is a blank space 108× at the forward portion of the tube for the accommodation of the stop 80 which normally projects forwardly as shown in full lines in said figure. It will therefore be seen that in the back and forth travel of the carriage when the sleeve passes over the stop device on the rod 68 there is nothing for the stop 80 to be struck by and hence it will fail to arrest the carriage. When, however, a tabular or denominational key is depressed, it will cause a corresponding depression of the rack 61, which will result in the stop rod being turned in its bearings, thus moving the column stop 80 from the full line position shown in Fig. 16 to, we will assume, the dotted line position represented in the same figure, and at which time the tabulating stop extends in the path of one of the denominational stops, said denominational stop depending upon the particular tabular key which has been depressed. It will be seen that at or about the end of the turning of the stop 80 to the selected position, the lever 97 is vibrated and the carriage feed rack disengaged from its pinion, and the carriage is free to be propelled in the direction of its feed by the ordinary spring drum 109 and strap 110 secured to said drum at 111 and connected to the carriage at 112 by hooking upon an arm 113 depending from the carriage in the usual way. A separate denominational key is provided for each denominational position and is effective to move the tabulating stop 80 into the path of the corresponding denominational stop. Thus, for instance, the tabular key which is shown provided with a decimal point is adapted to turn the stop rod and the tabulating stop 80 thereon into the path of the last of the segmentally arranged denominational stops and of course to simultaneously release the carriage, whereas the "units" denominational key will turn the stop rod so as to move the tabulating stop 80 into the path of the next to the last denominational stop 108, and so on throughout the remaining tabular keys.

On account of the spiral arrangement of the denominational stops, or of their offseting one from the other progressively as they extend round inside of the tube, their operative faces lie in parallel vertical planes, taken transversely through the tube, which are equidistant and at a letter space distance apart, as indicated by the dotted lines *a* at Fig. 8, and hence these stops 108 are adapted to cause the arrest of the carriage at different denominational positions, depending upon the amount of rotation or oscillation given to the stop 80 or to its angular position on the rod at the completion of its oscillatory movement, the stop 80 (in any position which it may occupy or be set longitudinally on the rod) swinging always in the same vertical plane that extends fore and aft of the machine but to different extents or to different angular positions. Thus if it be desired to write "10," the denominational key bearing the inscription "10" is actuated and the column stop 80 is turned rearwardly in the direction of the arrow in Fig. 16 to what may be called its third position, (said stop being adapted to be turned to eight different positions) and in this position it will be brought into the plane or path of movement of the relatively fixed third denominational stop on the carriage (counting from decimal stop) and hence when the carriage is released and said denominational stop strikes the stop 80, the carriage will be arrested and in the proper denominational position for the immediate writing in of the numeral "1" of the "10" to be written. The denomination key having been released upon the stoppage of the carriage, the carriage may of course continue its step-by-step feed movement as the numeral type keys are actuated to enable the operator to typewrite the amount to be written.

In further explanation, let us say that the column stop 80 is set at the point "60" on the scale of the column stop rod so as to define or determine the right-hand side or limit of the column to be written. Now if the decimal key be depressed, the carriage will be released and arrested at the sixtieth position of the carriage or when this part of the platen is in register with the printing point. If, however, the units key be depressed, the carriage will be arrested one step or letter space in advance of said sixtieth position; if the tens key be depressed, the carriage will be arrested two spaces in advance of said position and so on up to the highest denominational key, which in this case is millions, and when the last mentioned key is actuated the carriage will be arrested seven spaces in advance of the point "60" or at "53" on the carriage scale, so that when the amount "1000000" has been written in, the sixtieth point on the right-hand side of the column will then be brought in alinement with the common printing center. Thus the carriage has a greater length of jump or travel when the lower denomination keys are actuated than when the higher ones are used, for if the carriage be at "40" when the units key is actuated the carriage will skip from "40" to "59," whereas if the millions key be employed, the carriage will skip only from "40" to "53." Hence the denomination stops 108 are arranged with the units at the left-hand end of the spiral or the left-hand end of the tube, and the millions at the right-hand end thereof, the carriage being arranged in this instance to travel from right to left considered from the front of the machine.

At Fig. 16, I have indicated the values of the different stops by placing marks corresponding thereto in radial alinement therewith and from this it will be observed that the stop 80 is turned one step to arrest the carriage at the decimal position, twice as far to arrest the carriage at the units position, and so on around to its eighth position in order to arrest the carriage at the millions place. In practice the carriage is not released until the stop 80 has been whirled around into the path of the proper denominational stop, but the release mechanism is started in action just before the completion of the rotation of the stop 80.

It will be observed at Figs. 6 and 8 that the active or stopping faces of the teeth of the stops 108 are plane but that their backs and sides are beveled or tapering and so as to reduce their thickness or width at the points or free ends, while leaving them sufficiently wide and firm bases to withstand the shocks or blows to which they are subjected. By tapering or beveling the backs of the said stops or teeth a wider space is created between the face of one tooth and the back of an adjacent tooth at and near the free ends of the teeth and this space is made sufficiently wide to enable the free beveled end of the column stop tooth 80 (which is preferably beveled in an opposite direction to the beveling on the stops 108) to swing through between two adjacent teeth and thus avoid or escape any of the teeth 108 when swinging around to the selected position in the event that at the time the tabulating mechanism is to be actuated the tube carrying the denomination stops is over or surrounding the column stop and which latter might be arrested or blocked but for this provision or feature of construction.

The plate 50 and its supporting bars may be considered as a universal frame since it is actuated by each denomination key lever; and the cross-bar 89 and its supporting arms may likewise be considered as a universal frame for the same reason, the first mentioned frame acting always on the column stop bar to turn it through different distances and the last mentioned frame acting always on the feed rack to disengage it from its pinion when any denomination key is depressed. The extent of depression of the universal frame 50, 50^a is regulated or determined by the extent to which the key lever 42 in action may be depressed, the said key-levers having each a different extent of depression, and this is predetermined by the setting of the screw-stops 86; for example, the stop 86 which limits the downward movement of the denomination key representing units is higher than the stop which controls the descent of the key representing thousands and hence when the former key is actuated it is depressed less than the thousands key and in turn depresses the universal frame to a less extent and through it and its connections turn the column stop 80 through a smaller arc than when the thousands key is operated. Preferably the series of denomination key levers 42 are guided at near their forward ends by a comb 42^a rising from the plate 87. Preferably also each denomination key lever 42 is formed or provided on its underside with a projection 42^b for operating the universal frame that connects with the carriage release and these projections or lips 42^b may be of different lengths and so as to strike the cross-bar 89 of said frame at different times in the depressions of the different levers and so as to release the carriage at the proper time, it being desirable as before explained, that the carriage be not released until the column stop has been turned around into the path of the selected denominational stop. But for the provision of these different sized lips or projections 42^b the carriage might be prematurely released during the operation of one of the keys having the greater depression. It will therefore be seen that it is a feature of my invention to variably release the carriage or release it at different times by different denomination keys, though the carriage is always released at the same time relative to the interpositioning of the tabulating stop 80 in the path of a denominational stop, irrespective of the denominational stop with which the stop 80 co-operates.

Of course there may be as many column stops 80 employed as may be desired and they may be adjusted at different points on the rod in accordance with the character of the work in hand. Two such stops are shown.

In Figs. 18, 19 and 20, I have shown in connection with my novel tabulating mechanism means for preventing the rebound of the carriage after the stopping members have come into contact but in so far as this part of my invention is concerned, the said anti-carriage-rebounding means may be employed in connection with various other styles or constructions of column stop and tabulating mechanisms. In the construction represented in these figures, the stop rod 86^a, instead of being fixed against longitudinal movement in both directions, as in the construction hereinbefore described, has a slight movement in the direction of its length and this is effected by providing a space between the circumferential abutment 70^a

formed by the reduced bearing portion 69ª on the rod and the inner end of the externally screw-threaded sleeve 71ª. In this construction the head 72ᵇ of the screw 72ª is extended outside of and beyond the knurled head 73ª on the sleeve 71ª, and co-operating with this head 72ᵇ is a yoke 113 that is carried by the free end of a lever 114 which is pivoted at 115 to a bracket 115ª and a spring 116 exerts a pressure on said lever in the direction of the arrow in Fig. 18. Pivoted to this lever at 117 intermediate of its ends is a link 118 which has its opposite end pivoted at 119 to an engaging piece or lever 120 which is pivoted at 121 to the bearing 29 of the feed pinion shaft. The forward or free end of this engaging piece or lever is adapted to bear against and co-operate with the side of the feed rack 31 and thus check or prevent a rebound of the carriage and assure its maintenance at the position where it is arrested by the tabulating mechanism.

When a tabular key is depressed the released carriage is drawn by its spring drum in the direction of its feed with considerable speed until one of the denominational stops reaches contact with the tabulating stop 80 which has been interposed in its path. The impact of the carriage, or of the denominational stop carried thereby, against the interposed tabulating stop will cause the stop rod to receive a slight longitudinal movement toward the left. This movement will be transmitted through the lever 114 to the link 118 and by said link to the arresting piece, brake or dog 120 whose inner end will be swung into contact with one side of the feed rack and pressing thereon, thus prevent a rebound of the carriage. As will be seen at Fig. 18, the dog is normally out of contact with the side of the rack 31 and occupies such an angular position in reference thereto that when its point is swung towards the right by the impact of the carriage, said point approaches and binds or clamps against the outer side of the feed rack somewhat after the fashion of a cam or eccentric. When the carriage is moved to the right or the tabulating key released by the operator, the tabulating stop will no longer be under compression of the carriage spring, by reason of the fact that the tabulating and denominational stops are no longer in contact and the spring 116 is at this time effective to move the stop rod towards the right to the normal position and at the same time release the holding dog 120 from contact with the carriage feed rack.

It will be observed that the device shown and described for preventing the rebound of the carriage is automatic in its action and that the greater the force of impact of the carriage against the tabulating stop, the greater will be the hindering force of the pressure device 120 against the side of the feed rack. It will likewise be understood that the shock of the impact of the carriage against the tabulating stop is not resisted by a fixed abutment but it is distributed and the force of the impact is employed to effect the actuation of the mechanism for preventing a rebound of the carriage. This mechanism is of value in tabulating devices wherein ordinarily the carriage is liable to rebound one, two, three or even four letter space distances and the feed rack will often engage its pinion before the carriage has an opportunity to recover from the rebound and to settle against the tabulating stop, so that the carriage instead of being arrested at a predetermined point will be arrested at one, two, three or four letter space distances to the right of such point. The operator ordinarily will not perceive this defect until the writing has been done, when, too late, it will be found that the figures of the columns are thrown out of alinement or proper denominational position. By my present invention, these difficulties are entirely obviated and a simple and efficient device is provided to prevent a rebound of the carriage. As far as this part of my invention is concerned, very many different changes may be made in the means for holding the carriage or resisting its rebounding action without departing from the spirit of my invention and it will be understood that the dog or other pressure device 120 which is moved into position by the impact of the co-operating stops may be otherwise formed and may engage some other part of the carriage than the feed rack, which in the present machine is employed merely because it is convenient to use it instead of applying a separate and independent bar to the carriage or using some other part of the carriage in lieu thereof. This mechanism may also be used in tabulating devices where there are no denominational stops but only column stops.

While I have shown and described but one embodiment of the various features of my tabulating invention, it should be understood that many detail changes in the construction may be made without departing from the spirit of my invention and that one or more of the features of the invention may be employed without the others. In companion cases filed of even date herewith and bearing Serial Nos. 97,493 and 97,495, some of my improvements are shown carried out in other forms of tabulating mechanism.

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

1. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support, a tabulating stop projecting inwardly from said tabular support, a stop bar which extends longitudinally of the carriage and through said tubular support, a tabulating stop carried by said stop bar, and means for turning one of said stops into and out of the path of the other.

2. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support, a plurality of denominational stops projecting inwardly from said tubular support, a stop bar which extends longitudinally of the carriage and through said tubular support, a tabulating stop carried by said stop bar, and means for turning the denominational stops and the tabulating stop one with relation to the other to different extents to bring the tabulating stop and the various denominational stops into co-operative relation.

3. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support, a tabulating stop projecting inwardly from said tubular support, a stop bar which extends longitudinally of the carriage and through said tubular support, a tabulating stop carried by said stop bar, means for turning one of said stops into and out of the path of the other, and means for automatically effecting a release of the carriage when the stops have been interposed in one anothers path.

4. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support, a plurality of denominational stops projecting inwardly from said tubular support, a stop bar which extends longitudinally of the carriage and through said tubular support, a tabulating stop carried by said stop bar, means for turning the denominational stops and the tabulating stop one with relation to the other to different extents to bring the tabulating stop and the various denominational stops into co-operative relation, and means for automatically effect-

ing a release of the carriage when the stops have been interposed in one anothers path.

5. In a typewriter machine and in tabulating mechanism, the combination of a carriage, a tubular support rigidly connected to said carriage, a plurality of denominational stops projecting inwardly from said tubular support, a rock shaft which extends longitudinally of the carriage, and which projects through said tubular support, a tabulating stop fixed to turn with said rock shaft, and means for turning said rock shaft to different extents to interpose the stop thereon in the paths of the different denominational stops.

6. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support rigidly connected to said carriage, a plurality of denominational stops projecting inwardly and radially from said tubular support, a rock shaft which extends longitudinally of the carriage and projects through said tubular support, a tabulating stop fixed to turn with said rock shaft, means for turning said rock shaft to different extents to interpose the stop thereon into the paths of the different denominational stops, and means for automatically releasing the carriage when the rock shaft is turned to interpose the stop thereon in the path of one of the denominational stops.

7. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a fixed tubular support, a plurality of denominational stops projecting radially and spirally within said tubular support and arranged to provide a space to permit a free movement of the carriage when the tabulator is not in operation, a rock shaft, which extends longitudinally of the carriage and projects through said tubular support, a tabulating stop which turns with said rock shaft and is adjustable longitudinally thereon, and means for turning said rock shaft to different extents to bring the stop thereon into co-operation with the selected denominational stop.

8. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support rigidly connected to said carriage, a plurality of denominational stops projecting inwardly from said tubular support and which are arranged spirally and segmentally so as to provide a space to permit a free movement of the carriage when the tabulator is not operated, a rock shaft which extends longitudinally of the carriage and projects through said tubular support, a tabulating stop which turns with said rock shaft and is adjustable longitudinally thereon, key actuated means for turning said rock shaft to different extents to interpose the stop thereon into the paths of the different denominational stops, and means for automatically releasing the carriage when the rock shaft is turned.

9. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tubular support rigidly connected to said carriage, a plurality of spirally-arranged denominational stops projecting inwardly from said tubular support, a rock shaft which extends longitudinally of the carriage and projects through said tubular support, a tabulating stop fixed to turn with said rock shaft, and a series of keys at the keyboard of the machine for turning said rock shaft to different extents and thus interposing the stop on the rock shaft into the paths of the different denominational stops.

10. In a typewriting machine and tabulating mechanism, the combination of a carriage, a tabulating stop, segmentally and spirally arranged denominational stops which are spaced apart to permit the tabulating and denominational stops to pass one another in a transverse direction, there being a space between the terminal denominational stops to permit a free longitudinal movement of the denominational and tabulating stops past one another during the travel of the carriage when the tabulating mechanism is not in operation, and means for interposing one of said tabulating and denominational stops in the path of the other.

11. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a beveled tabulating stop, a series of radially arranged beveled denominational stops which are spaced apart to permit the denominational and tabulating stops to pass one another, and means for interposing one of said stops in the path of the other.

12. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a beveled tabulating stop, a series of radially arranged beveled denominational stops which are spaced apart to permit the denominational and tabulating stops to pass one another when the tabulating mechanism is being operated, the beveled faces of the denominational stops being disposed opposite to the beveled face on the tabulating stop, there being a space between the terminal denominational stops to enable the tabulating and denominational stops to pass one another when the tabulating mechanism is not in operation.

13. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a series of keys which are movable to different extents, adjustable means for determining the extents of movement of said keys, a tabulating stop with which said keys are connected to bring it into the paths of the denominational stops and to arrest the carriage at different denominational positions.

14. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a series of key-levers which are movable to different extents, a tabulating stop with which said keys co-operate to bring it into the paths of the denominational stops, and to arrest the carriage at different denominational positions, and means for automatically releasing the carriage on the actuation of any of said keys.

15. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a series of key-levers which are movable to different extents, a column stop with which said keys co-operate to bring it into the path of the denominational stops, and means controlled by said key-levers for automatically releasing the carriage after the column stop has been brought into the path of the selected denominational stop, irrespective of the denominational stop selected.

16. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a series of key levers which are movable to different extents, a tabulating stop with which said key levers co-operate, a universal frame or bar which is actuated by all of said key levers, and means controlled by said universal frame or bar for releasing the carriage.

17. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of segmentally arranged denominational stops, a series of keys which are depressible to different extents, and a tabulating stop with which said keys co-operate to bring it into the path of any desired one of the denominational stops.

18. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of segmentally arranged denominational stops, a series of keys which are depressible to different extents, a tabulating stop with which said keys co-operate to bring it into the path of any desired one of the denominational stops, a universal bar which is actuated by each of the various key levers, and means controlled by said universal bar for releasing the carriage.

19. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a series of keys, a series of adjustable stops which variably arrest said keys, a tabulating stop with which said keys co-operate to bring it into the path of any desired one of the denomination stops.

20. In a typewriting machine and tabulating mechanism therefor, the combination of a carriage, a tabulating stop on the carriage, a tabulating stop on the frame of the machine, and means controlled by the contact between said stops for preventing the rebound of the carriage.

21. The combination with a typewriting machine and tabulating mechanism therefor, including a power driven carriage and its escapement mechanism, of means for automatically releasing the carriage from its escapement mechanism when the tabulating mechanism is operated, and means controlled by the impact between the tabulating stops for preventing a rebound of the carriage when the tabulating mechanism is operated.

22. In a typewriting machine and tabulating mechanism, the combination of a carriage, a tabulating stop, a denominational stop, a series of key levers, a universal sub-

lever which is adapted to be actuated by all of said key levers, intervening connections between said tabulating stop and the universal sub-lever for moving said tabulating stop to different extents by the actuation of the different key levers, a universal frame adapted to be actuated by any of said key levers, and means connected to said universal frame for releasing the carriage after the tabulating stop has been moved to the arresting position.

23. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a rock shaft which carries said tabulating stop, a denominational stop device, a series of key levers, a universal sub-lever, intervening connections between said rock shaft and the universal sub-lever for moving said tabulating stop to different extents by the actuation of the different key levers, a universal frame adapted to be actuated by all of said key levers, and means connected to said universal frame for releasing the carriage after the rock shaft has been turned to move the tabulating stop to the arresting position.

24. In a typewriting machine and tabulating mechanism, the combination of a carriage, a tabulating stop, a denominational stop device, a series of key levers, a universal sub-lever, the different key levers being adapted to bear upon said sub-lever at different distances from its fulcrum to vary its extent of movement, intervening connections between said tabulating stop and the universal sub-lever for moving said tabulating stop to different extents by the actuation of the different key levers, a universal frame adapted to be actuated by any of said key levers, and means connected to said universal frame for releasing the carriage after the tabulating stop has been moved to the arresting position.

25. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a rock shaft which carries said tabulating stop, a denominational stop device, a series of key levers, a universal sub-lever, the different key levers being adapted to bear upon said sub-lever at different distances from its fulcrum to vary its extent of movement, intervening connections between said rock shaft, and the universal sub-lever for moving said tabulating stop to different extents by the actuation of the different key levers, a universal frame adapted to be actuated by said key levers, and means connected to said universal frame for releasing the carriage after the rock shaft has been turned to move the tabulating stop to the arresting position.

26. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism therefor, a tabulating stop, a co-operating denominational stop device, a series of key levers depressible to different extents to vary the position of the tabulating stop, and thus arrest the carriage at different denominational positions, and a movable device which is operatively connected to said escapement mechanism and is operable by any of said key levers to release the carriage after the tabulating stop has been moved to the arresting position.

27. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism therefor, a tabulating stop, a rock shaft which carries said tabulating stop, a co-operating denominational stop device, a series of key levers depressible to different extents to turn the rock shaft different distances and thus vary the position of the tabulating stop, to arrest the carriage at different denominational positions, and a movable device which is operatively connected to said escapement mechanism and is operable by any of said key levers to release the carriage after the rock shaft has been turned to bring the tabulating stop to the arresting position.

28. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism therefor, a tabulating stop, a co-operating denominational stop device, a series of key levers depressible to different extents to vary the position of the tabulating stop and the denominational stop device relatively one to the other and thus arrest the carriage at different denominational positions, and a movable device which is operatively connected to said escapement mechanism and is operable by the different key levers at different extents of their movements to release the carriage after the tabulating stop and denominational stop device have been interposed one in the path of the other.

29. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denomination stops, a column stop movable to a plurality of denominational positions, a universal bar connected to said stop, a plurality of denominational key levers all acting on said universal bar to variably move the column stop, and a series of stops to vary the depression of the key levers.

30. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denomination stops, a column stop movable to a plurality of denominational positions, a universal bar connected to said stop, a plurality of denominational key levers all acting on said universal bar to variably move the column stop, the key levers having a common pivot and each having a contact piece, the various contact pieces being located at different distances from the common pivot, and a series of stops one for each key lever and said stops being arranged at different elevations.

31. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism, denomination stops, a tabulating stop, a series of denominational key levers having projections or lips of different lengths, a universal frame operable by said key levers, and connections from the said frame to the escapement mechanism to separate same and release the carriage.

32. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of denominational stops, a co-operating tabulating stop, a rock-shaft which carries said tabulating stop and which is adapted to be rocked to different extents, a pinion carried by said rock shaft, a pivoted universal frame, a link connected to said frame, a rack carried by said link and meshing with said pinion, and a series of key levers which are adapted to bear on said universal frame at different distances from its pivot.

33. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism therefor, tabulating devices for arresting the carriage at different denominational positions, a series of key levers for actuating said tabulating devices and to determine the denominational position at which the carriage is to be arrested, a universal bar which is operable by the different key levers at different extents of their depression and intermediate connections between said universal bar and the escapement whereby the carriage is released after the tabulating devices have been moved to the arresting position.

34. In a typewriting machine and tabulating mechanism, the combination of a carriage, escapement mechanism therefor, tabulating devices for arresting the carriage at different denominational positions, a series of key levers for actuating said tabulating devices, projections which extend from said key levers to varying extents, a pivoted universal bar with which said projections contact during the actuating of the tabulating devices, and a connection from said universal bar to the escapement mechanism, whereby the carriage is released after the tabulating devices have been moved to the arresting position.

35. In a typewriting machine and tabulating mechanism, the combination of a carriage, a pivoted feed rack therefor, an escapement device which co-operates with said feed rack, a rack raiser, tabulating devices, a plurality of key levers for actuating said tabulating devices to arrest the carriage at different denominational positions, a universal bar with which said key levers co-operate, and connections between said rack raiser and universal bar.

36. In a typewriting machine and tabulating mechanism, the combination of a carriage, a pivoted feed rack therefor, escapement mechanism which co-operates with said feed rack, a rack raiser, tabulating devices, a plurality of key levers which are depressible to different extents for actuating said tabulating devices to arrest the carriage at different denominational positions, projections which extend from said key levers to different extents, a universal bar on which said projections are adapted to bear, and connections between said rack raiser and universal bar.

37. In a typewriting machine and tabulating mechanism, the combination of a carriage, a tabulating stop, a

tubular support, spirally arranged denominational stops carried by said tubular support and having intervening spaces which are wide enough to permit the tabulating stop to pass between said denominational stops while within the tubular support, and means for turning the tabulating and denominational stops relatively one to the other.

38. In a typewriting machine and tabulating mechanism, the combination of a carriage, a tabulating stop, a tubular support, and spirally arranged denominational stops, carried by said tubular support and having an intervening space between the terminal denominational stops which is wide enough to permit the denominational stops and tabulating stop to pass one another while the latter is in the normal position.

39. In a typewriting machine and tabulating mechanism, the sombination of a carriage, a tabulating stop, a tubular support, and spirally arranged denominational stops carried by said tubular support and having intervening spaces which are wide enough to permit the tabulating stop to turn between said denominational stops while within the tubular support and having a space between the terminal denominational stops which is wide enough to permit denominational stops and tabulating stop to pass one another while the latter is in the normal position.

40. In a typewriting machine and tabulating mechanism, the combination with a carriage and tabulating mechanism, of means which is thrown into action by the impact of the carriage to prevent a rebound thereof.

41. In a typewriting machine and tabulating mechanism, the combination with a carriage and tabulating mechanism, of a pressure device which is moved to the operative position by the impact of the carriage and prevents rebound of the carriage.

42. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop carried thereby, a tabulating stop carried by the frame of the machine and a holding member which is applied to the carriage by the impact of the tabulating stops one against the other and to check the rebound of the carriage.

43. In a typewriting machine, the combination of a power driven carriage, tabulating mechanism, a part of which is moved to arrest the carriage when the tabulating mechanism is actuated, and a pressure device which is operatively connected to said part and is applied to the carriage by the impact on said part.

44. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop carried thereby, a co-operating tabulating stop, a pressure device which is controlled by one of said tabulating stops and which is applied by the impact of one stop against the other to check rebound of the carriage.

45. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a movable stop rod, a tabulating stop carried thereby, and means operatively connected to said stop rod and which engage some part of the carriage to prevent rebound thereof when the said tabulating stops contact.

46. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a movable stop rod, a tabulating stop carried thereby, a pressure device operatively connected to said stop rod and which is applied to prevent a rebound of the carriage when the said tabulating stops contact.

47. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a longitudinally movable stop rod, a tabulating stop carried thereby and adjustable thereon, a brake operatively connected to said stop rod and automatically applied by the longitudinal movement of said stop rod to prevent rebound of the carriage when the said tabulating stops contact.

48. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop carried thereby, a longitudinally movable stop rod which is carried by the frame of the machine and extends longitudinally of the carriage, a tabulating stop carried by said stop rod, a holding device for the carriage which is actuated by the longitudinal movement of said stop rod and to check a rebound of the carriage.

49. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop carried thereby, a longitudinally movable stop rod which is carried by the frame of the machine and extends longitudinally of the carriage, a tabulating stop carried by said stop rod and a brake which is applied to the carriage by the longitudinal movement of said stop rod and to prevent rebound of the carriage.

50. In a typewriting machine, the combination of a power driven carriage, a feed rack carried thereby, tabulating mechanism, and a brake which is adapted to be applied to said feed rack by the impact of the tabulating mechanism.

51. In a typewriting machine, the combination of a power driven carriage, escapement mechanism therefor, a feed rack carried by the carriage, tabulating mechanism including means for releasing the carriage from its escapement mechanism when the tabulator is operated, and means which are forced into engagement with the feed rack by the impact of the tabulating devices and to prevent rebound of the carriage.

52. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a longitudinally movable rock shaft, a co-operating tabulating stop carried by said rock shaft, means for rocking said shaft to move the tabulating stop thereon into a position to co-operate with the first mentioned stop, and means controlled by the impact between the stops to engage the carriage and prevent a rebound thereof.

53. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop, a longitudinally movable rock shaft, a co-operating tabulating stop carried by said rock shaft, means for rocking said shaft to move the tabulating stop thereon into a position to co-operate with the first mentioned stop, and means controlled by the longitudinal movement of the rock shaft for engaging the carriage and preventing a rebound thereof.

54. In a typewriting machine and in tabulating mechanism, the combination of a power driven carriage, a tabulating stop carried thereby, a longitudinally movable rock shaft carried by the frame of the machine, a tabulating stop carried by said rock shaft, key actuated means for turning said rock shaft and for releasing the carriage, and means controlled by the longitudinal movement of the rock shaft for preventing rebound of the carriage.

55. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, escapement mechanism therefor, a tabulating stop carried by the carriage, a longitudinally movable rock shaft carried by the frame of the machine, an adjustable tabulating stop carried by said rock shaft, finger keys at the keyboard of the machine, means controlled by said finger keys for turning said rock shaft and for releasing the carriage, and a brake operatively connected to said rock shaft and controlled by the longitudinal movement thereof for preventing rebound of the carriage.

56. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop thereon, a longitudinally arranged and endwise movable stop bar, a tabulating stop thereon, a rod connected to said bar and a vibratory shoe or dog connected to said rod and adapted to engage a part of said carriage.

57. In a typewriting machine and tabulating mechanism, the combination of a power driven carriage, a tabulating stop thereon, a longitudinally arranged and endwise movable stop bar, a stop thereon, a lever connected to said bar, a shoe or dog adapted to prevent rebound of the carriage, a rod connecting the shoe or dog with said lever, and a returning spring.

Signed at Springfield, in the county of Hampden, and State of Massachusetts, this 6th day of March A. D. 1902.

CARL GABRIELSON.

Witnesses:
J. G. DUNNING,
H. W. MERRITT.