

1,021,391.

J. WALDHEIM.
TYPE WRITING MACHINE.
APPLICATION FILED DEC. 5, 1911.

Patented Mar. 26, 1912.

4 SHEETS—SHEET 1.

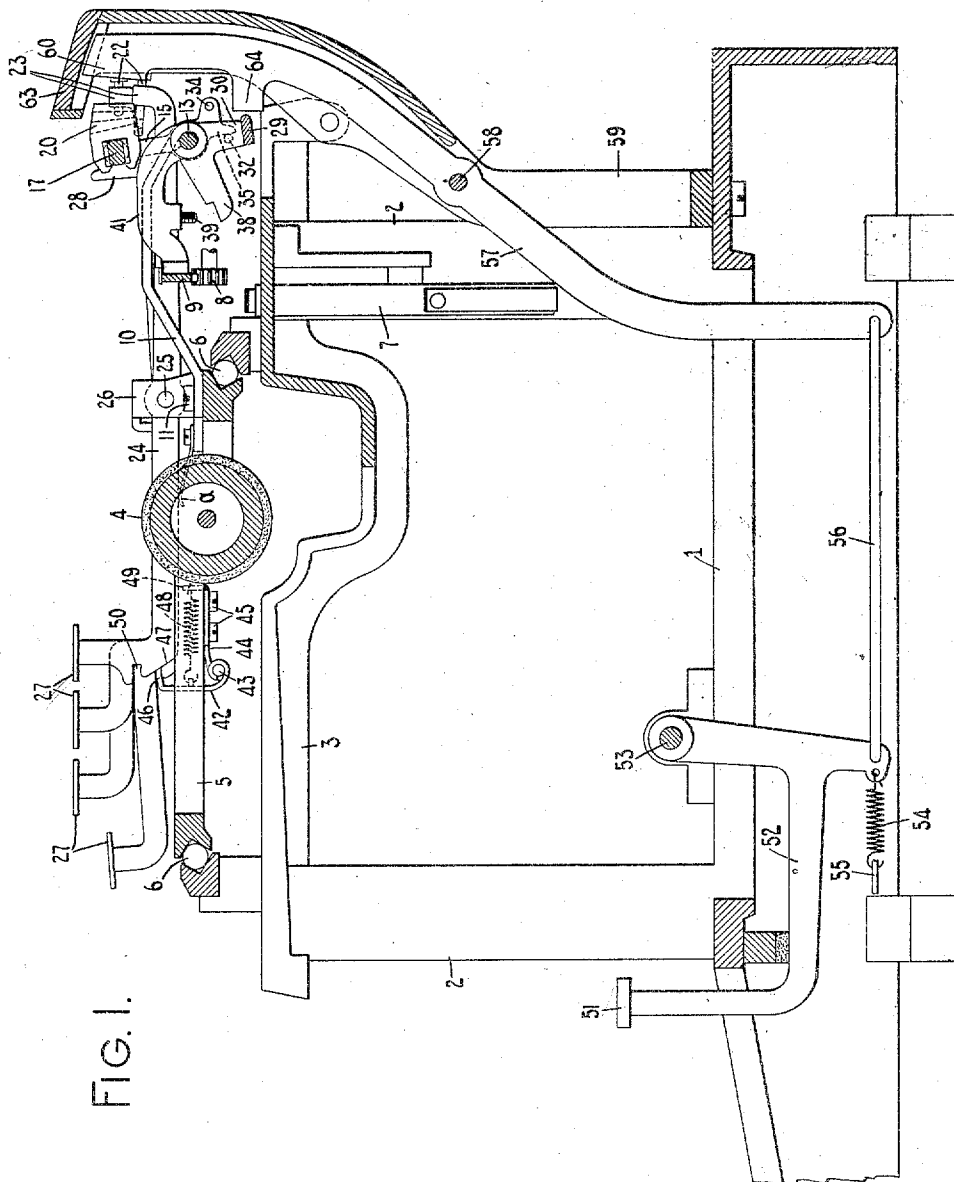


FIG. 1.

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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

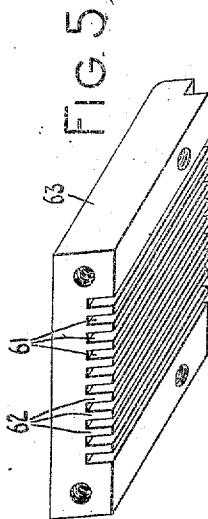
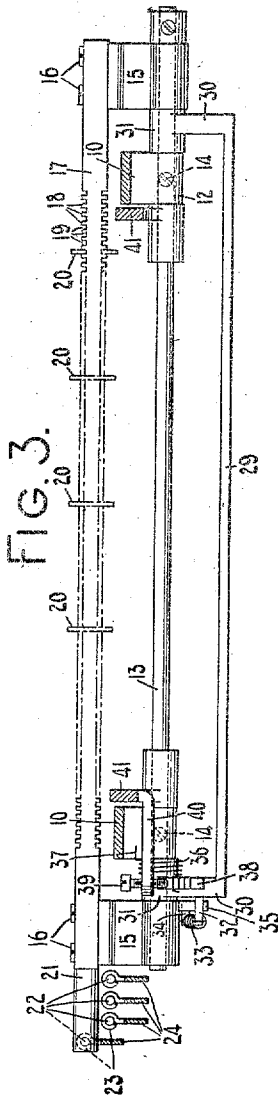


FIG. 4.

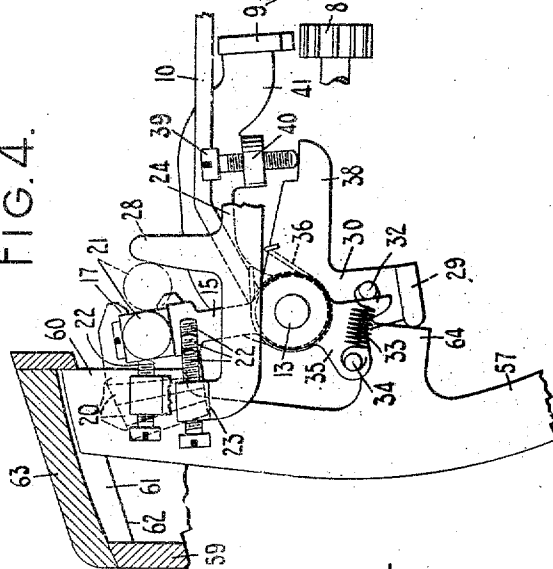
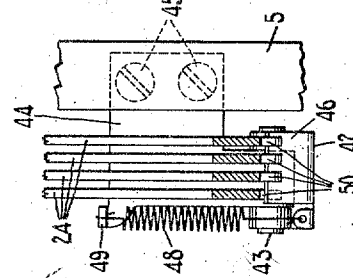


FIG. 6.



WITNESSES:

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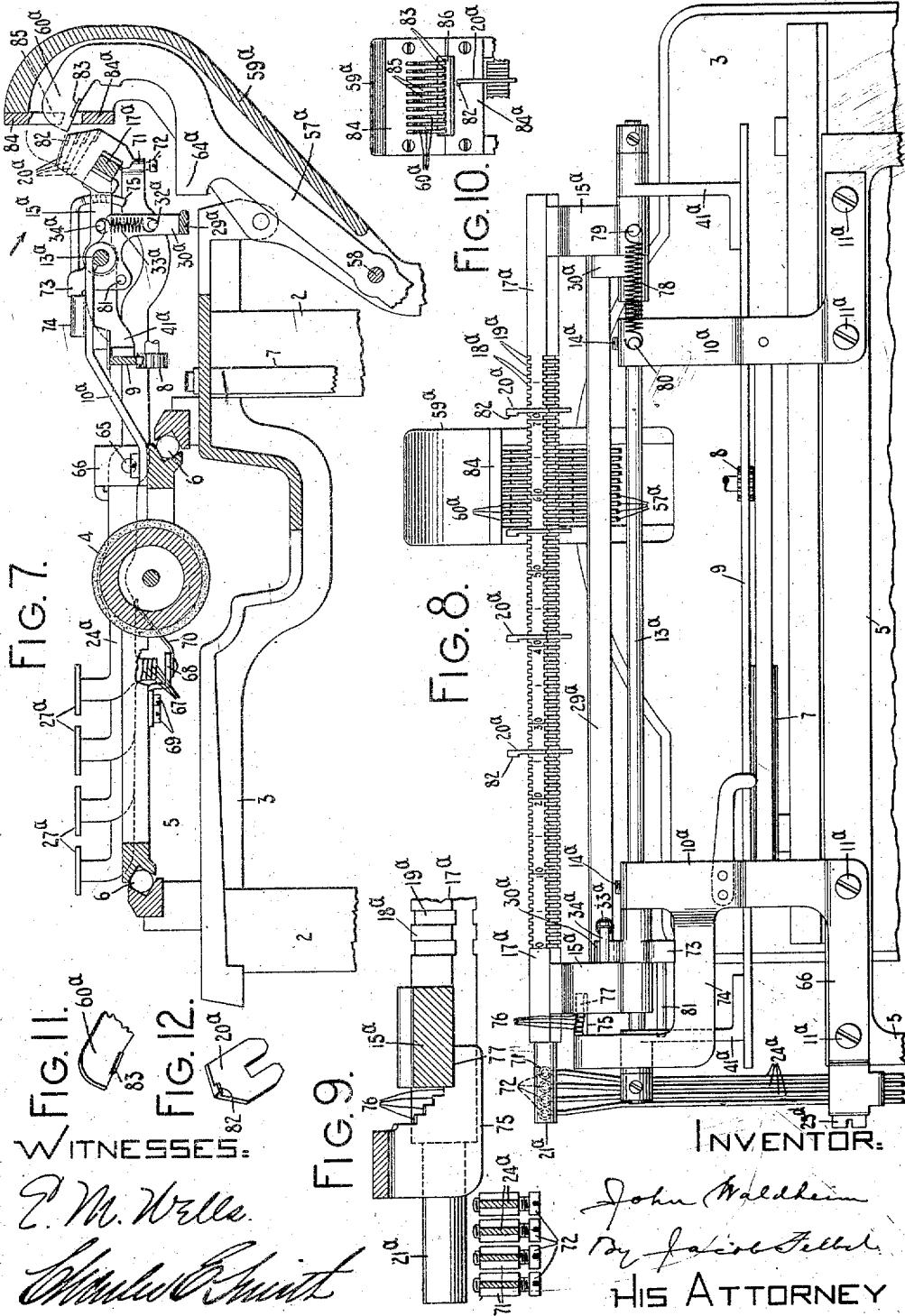
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4 SHEETS—SHEET 4.

1,021,391.



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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

1,021,391.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed December 5, 1911. Serial No. 663,982.

To all whom it may concern:

Be it known that I, JOHN WALDHEIM, citizen of the United States, and resident of Newark, 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 more particularly to tabulating mechanism.

The main objects of my invention, generally stated, are to provide comparatively simple and efficient tabulating mechanism by which any desired columnar position can be selected at will, and by which any desired denominational position in a column may be selected so that the carriage may, after a single run, be arrested at any desired columnar field or at any desired denominational position within any selected columnar field.

A further object of my invention, generally stated, is to provide comparatively simple and efficient means whereby parts of the tabulating mechanism may be locked in the position to which they may be set or moved under control of a tabulator key and to automatically release the locking means.

To the above and other ends which will hereinafter appear, my invention consists in the features of construction, arrangements of parts, and combinations of devices to be set forth in the following specification and particularly pointed out in the appended claims.

In the accompanying drawings wherein like reference characters indicate corresponding parts in the various views. Figure 1 is a fragmentary, central, vertical, fore and aft sectional view of a typewriting machine embodying my present invention. Fig. 2 is a plan view of the same with parts broken away and parts in section. Fig. 3 is a detail, fragmentary front elevation, with parts in section, of a portion of the tabulating mechanism. Fig. 4 is a fragmentary side elevation of the same on a larger scale; the view showing the parts in the actuated positions and including additional associated parts and showing some of these parts in section. Fig. 5 is a perspective view of the guide for the denominational stops. Fig. 6 is a detail fragmentary plan view, with parts in section, of the locking means for

the column selecting keys. Fig. 7 is a view which corresponds to the upper portion of Fig. 1 but shows a modified form of the construction. Fig. 8 is a view which corresponds to a rear portion of Fig. 2 but which shows a modified form of construction. Fig. 9 is a fragmentary detail front elevation with parts in section of a portion of the locking and positioning means for the column selecting mechanism, the parts being shown on an enlarged scale. Fig. 10 is a fragmentary detail view of a column stop and the coöperative denominational stop, the parts appearing as viewed from the direction of the arrow in Fig. 7. Fig. 11 is a detail fragmentary perspective view of one of the denominational stops. Fig. 12 is a detail perspective view of one of the column stops.

In the accompanying drawings I have shown only so much of the typewriting machine as may be necessary to arrive at an understanding of my invention.

I have shown my invention embodied in the present instance in a No. 11 Remington machine, except in so far as the tabulating mechanism of that machine may be modified or replaced by features of my present invention, and except in so far as that machine may be modified to effect an embodiment of my present invention therein. Moreover, some of the parts of the typewriting machine are conventionally represented in order to simplify the showing. It should be understood, however, that the invention may be embodied in various styles of typewriting machines, and that various changes may be made in the construction to facilitate such embodiment.

The typewriting machine illustrated in the present instance has a frame which comprises a base 1, corner posts 2 and a top plate 3. The usual type bars (not shown) are mounted to swing upwardly and rearwardly against the front face of the cylindrical platen 4 which is mounted in a carriage 5 supported on anti-friction balls or rollers 6 to travel from side to side of the machine over the top plate; the carriage being moved in the direction of its feed by a spring drum 7 connected to the carriage in the usual manner. The carriage is under control of the usual escapement mechanism which includes a feed pinion 8 with which meshes a feed rack 9 carried by the car-

riage. The feed rack is adapted to be released from the feed pinion at tabulating operation in a manner to be hereinafter described, so as to release the carriage from the control of the escapement mechanism to afford a free travel of the carriage until it is arrested by the tabulating mechanism.

Referring first more particularly to Figs. 1 to 6, inclusive, and to the column selecting mechanism disclosed therein, it will be seen that brackets 10 are secured to the rear cross bar of the carriage by screws 11. These brackets include rearwardly extending arms formed with bearing portions 12 at the rear ends thereof to receive a shaft 13 fixed against rotative movement on the supporting arms by set screws 14. This shaft extends throughout, or substantially throughout, the length of the carriage and beyond the brackets 10. Arms 15 are pivoted on the shaft 13 near the ends thereof and extend upwardly from the shaft and are fixed at their upper ends by screws 16 to a column stop bar 17. This column stop bar is preferably provided with teeth 18 on opposite sides thereof to provide interdental spaces 19 in which bifurcated sheet metal column stops 20 are adapted to be received; adjacent interdental spaces 19 being located a letter space distance apart. From an inspection of Fig. 2 it will be observed that from left to right the column stops extend at gradually increasing distances from the rear side of the column stop bar. The manner of mounting the column stop bar on the shaft 13 enables the bar to swing about the shaft 13 as a center to any one of a number of different positions depending on the actuation of the column selecting keys as will hereinafter more clearly appear. Thus it will be seen that the left-hand end of the column stop bar is made cylindrical as indicated at 21 for co-operation with a series of screw stops or arresting devices 22. Each of these stops is received in an internally threaded bearing 23 in the end of a lever 24 which extends fore and aft of the machine and is mounted to turn on a screw pivot 25, received at its tapped end in an upwardly extending arm 26 on the left-hand bracket 10. The key levers 24 are arranged parallel with each other and extend along the left hand side bar of the carriage and terminate at different distances at the forward ends thereof. Each of these column selecting key levers is provided with a finger key or button 27 which bears an indicating mark such, for instance, as the numerals "1," "2," "3" or "4" and a spring 28 for each key lever restores it to normal position. From an inspection of Figs. 2 and 4 it will be seen that the forward ends of the screw stops 22 are arranged at different distances from the key levers that carry them so that the stops have

a graduated arrangement. Moreover, it will be understood that these screw stops, with one exception, are normally maintained in the lowermost position where they are out of the path of the swinging movement of the column stop bar around the shaft 13. When, however, a column selecting key 27 is depressed the rear end of the associated key lever is elevated to move the screw stop 22 carried thereby into the path of the cylindrical extension 21 on the column stop bar, as indicated in Fig. 4. The stop which has thus been elevated is in the path of the extension on the column stop bar and limits the rearward swinging movement thereof from the position shown in dotted lines in Fig. 4 to some such position as that shown in full lines in said figure, depending, of course, on which of the screw stops has been moved into the path of the column stop bar. Each of the key levers 24 is also provided with an upwardly extending arm or finger 28 which is at all times maintained in position to cooperate with the cylindrical end 21 of the column stop bar to limit the forward swinging movement of said stop bar as indicated in Figs. 2 and 4. The column stop bar is normally maintained in contact with the stop members 28 as will presently appear. A universal releasing device or bar 29 (see Figs. 3 and 4) extends substantially throughout the length of the carriage and is provided with arms 30 at the ends thereof; each of said arms having a bearing 31 which surrounds the shaft 13 to loosely support the universal bar or bail on said shaft. A pin 32 projects from one of the arms 30 providing means for connecting one end of a contractile spring 33 to the universal bar 29. The opposite end of said spring is connected to a pin 34 which projects from a depending arm 35 carried by one of the arms 15 which supports the column stop bar. The depending arm 35 normally bears against the pin 32, being held against it by the spring 33, thus connecting the universal bar and the column stop bar to move together. A coiled spring 36 surrounds the left-hand bearing 31 of the universal bar (see Fig. 3) and one end of this spring is connected to one of the brackets 10 as indicated at 37, the opposite end of said spring being connected to a forwardly extending projection 38 on the left-hand supporting arm 30. The pressure of this spring is exerted to normally maintain the parts disposed as they appear in Figs. 1 and 2 with the column stop bar in the forward position with the end 21 thereof bearing against the stops 28 on the column selecting key levers.

From an inspection of Figs. 3 and 4 it will be seen that the forwardly projecting arm 38 extends beneath a set screw 39 received in a threaded opening in a laterally extending

arm 40 which projects from the left-hand arm 41 of the two arms by which the feed rack 9 is pivotally supported on the shaft 13. It will be understood therefore that when the universal bar 29 is moved forwardly to the position shown in Fig. 4 the arm 38 will engage the screw 39 and will elevate the feed rack 9, thus disengaging it from the feed pinion 8 to free the carriage from control of the escapement mechanism. This same movement of the universal bar 29 is effective to move the column stop bar from the forward position rearwardly until the extension 21 thereon engages one of the screw stops 22 which has been interposed in its path of movement, as indicated in Fig. 4. The spring 33, which connects the universal bar 29 and the column stop bar, is effective to bring about this rearward swinging movement of the latter when the universal bar is moved forwardly against the pressure of its returning spring 36 as indicated in Fig. 4. If the column stop bar is arrested in its swinging movement toward the rear of the machine by one of the stops 22 before the universal bar 29 has completed its forward movement and before the feed rack 9 has been released, then a continued forward movement of the universal bar may be effected, as indicated in Fig. 4, to bring about the release of the carriage, the universal bar at this time moving independently of the column stop bar and against the pressure of the spring 36. When the pressure which actuated the universal bar to move it in the manner indicated has been released the spring 33 is effective to restore the normal relation between the universal and column stop bars and the spring 36 is effective to return the universal bar and the column stop bar to the normal position. The return movement of the parts is limited by the extension 21 on the column stop bar engaging the stop arms 28.

I preferably employ means for holding the screw stops 22 in the positions to which they may be set by the actuation of the column selecting keys 27. These means in the present instance comprise a locking plate or device 42 pivoted at 43 on a bracket plate 44 secured to the left-hand end bar of the carriage by screws 45. The upper end of the locking plate is bent rearwardly as at 46 to form an engaging portion which cooperates with inclined edges or cams 47 formed on the column selecting key levers 24. A contractile spring 48 is connected at one end to the locking plate and at its opposite end to an upwardly extending ear 49 on the bracket plate 44. The pull of the spring is exerted to turn the locking plate on its pivot and to move the upper engaging end of the locking plate toward the rear of the machine. Each of the selecting key levers 24 is provided with the same character of in-

clined face 47 and the upper end of each incline terminates at a locking notch 50 formed in the key lever. When the released column selecting key levers are in the normal position the inclined faces 47 thereon extend to the same height and the locking notches 50 on the different key levers are all in alignment. The width of the locking plate is such that the engaging portion or edge 46 thereof is adapted to bear against the inclined edges on all four of the column selecting key levers. The construction and arrangement of the parts is such therefore that a depression of a column selecting key is effective to cam forward the upper end of the locking plate until the bent end 46 thereof registers with the locking notch 50 in the depressed lever. The spring 48 is then effective to force the engaging portion 46 of the locking plate in the locking notch 50 as shown in Fig. 1 and prevent a return movement of the depressed column selecting key. The depression of the key 27 is, as hereinbefore indicated, effective to elevate the rear end of the lever to a position where it is interposed in the path of the extension 21 on the column stop bar, so as to limit the rearward swinging movement of the latter. The column selecting key having been locked in the depressed position and the stop 22 carried thereby having been locked in its set position, the hands of the operator are free to effect such other actuation of the parts as may be necessary to complete the tabulating operation or to bring about a movement of the universal bar 29 as hereinbefore indicated.

From certain aspects of my invention any suitable tabulating and carriage release mechanism may be combined with the column stop and column selecting mechanism described above. However, I have shown in Figs. 1 to 6, inclusive, a denominational stop mechanism, combined with the column stop devices in such a manner that the carriage may be arrested after a single run in any selected denominational position in any selected columnar field. This denominational stop mechanism will now be described.

A series of denominational keys 51 are provided on angular denominational key levers 52 mounted to turn on a pivot rod 53 secured to the base of the machine. Each angular key lever is connected to a contractile spring 54 connected at one end to the lever and at its opposite end to a bar 55 secured to the base of the machine. A push link 56 is connected at one end to the angular denominational key lever and at its opposite end to an upwardly extending denominational stop lever 57 of the first order. The last mentioned levers are pivoted at 58 in a tabulator frame 59 secured by suitable means to the frame of the machine. The upper end portions 60 of the levers 57 con-

stitute denominational stops, these stops each being adapted to be projected forwardly an unvarying distance from the position shown in Fig. 1 to that indicated in Fig. 4 upon the depression of the associated denominational key 51 and all denominational stops are adapted to move forward a uniform distance. The upper ends of the stop levers 57 are received in interdental spaces or grooves 61 between teeth 62 formed on a plate or block 63 which is secured to the tabulator frame at the upper end thereof. The upper ends of the levers are adapted to slide in the interdental spaces 61 and to be supported against lateral movement and be guided by the teeth 62. Any suitable number of denominational stops, or stop levers 57, and keys for actuating them may be provided, ten of such stops and keys being shown in the present instance. Each of the denominational stop levers 57 is provided with a forwardly extending projection or arm 64 which is normally free from contact with the universal releasing bar 29, but which is adapted to cooperate with said universal bar when the denominational stop is projected forwardly to operative position, as shown in Fig. 4, and to actuate the carriage release mechanism and swing the column stop bar back to operative position against the stop 22 which has been interposed in the path thereof, as hereinbefore described. The release of the carriage effected by the depression of the denominational key in the manner described enables the carriage to be moved in the direction of its feed by the spring drum until a column stop 20 cooperates with the denominational stop which has been projected forwardly. The particular column stop which will co-act with the projected denominational stop depends on which column selecting key 27 has been depressed. If for example the first key 27 bearing the numeral "1" is depressed then the left-hand arresting stop 22, as the parts appear in Fig. 2, is elevated into the path of the column stop bar and the column stop bar will be moved to its farthest position toward the rear of the machine when the denominational key is depressed, as shown in Fig. 4. This movement of the column stop bar is effective to move the left-hand or shortest column stop to a position where the projected denominational stop will co-act therewith and if the carriage be at the extreme right-hand position the carriage will be arrested by the first column stop. If the second column selecting key 27 bearing the numeral "2" be depressed the variably movable column stop bar will be moved rearwardly to the position where the second column stop is adapted to engage the projected denominational stop. If the fourth key 27 bearing the numeral "4" be

depressed the associated arresting stop 22 will be elevated and a subsequent depression of a denominational key will be ineffective to move the column stop bar rearwardly, since the movement of this stop 22 to operative position brings it in contact with the column stop bar while the latter is maintained in normal position. The depression of the denominational key is however effective to move the universal bar against the pull of the spring 33, while the column stop bar and the depending arm 35 connected therewith are held against swinging movement. It follows therefore that the feed rack will be released in the usual manner at the depression of a denominational key, although no swinging movement of the column stop bar will be effected at this time. The reason that there is no swinging movement of the column stop bar effected for the fourth key 27 is that the fourth or right-hand column stop 20 is long enough at the engaging portion thereof to project into co-operative relation with a projected denominational stop and it is therefore unnecessary to move the column stop bar rearwardly to bring such column stop to operative position, or to a position where it is adapted to cooperate with a projected denominational stop.

Should the operator desire to write continuously at different denominational positions in a single column, say, for example, the first column, it is merely necessary to depress the column selecting key 27 bearing the numeral "1". This key will be automatically locked in the actuated position by the locking device 42, and a stop 22 controlled by this key will remain indefinitely in the operative position to engage the column stop bar at each actuation of a denominational key, so that the carriage may be arrested at different denominational positions but always within the first column. Should the operator desire to write first within the first column and then in the third column and at different denominational positions in these two columns it is merely necessary to first depress the column selecting key bearing the numeral "1" and then depress the appropriate denominational key, when the carriage at a single run will move to the proper denominational position within the first columnar field. The third column selecting key may then be depressed and the act of depressing this key automatically cams the locking plate 42 forwardly to release it from the notch 50 in the previously depressed column selecting key lever, thereby automatically releasing the first key and enabling it to be restored to normal position under the pressure of its restoring spring *a*. The stop 22 on the first actuated key lever will therefore be removed from the

path of the column stop bar and the stop 22 on the second actuated key lever will be moved into the path of the column stop bar. A subsequent actuation of a denominational key will cause the carriage to be arrested after a single run in the selected denominational position within the second columnar field, and so on.

Should the operator desire to use the tabulator merely as a column selecting mechanism it is necessary to depress the requisite column selecting key in the manner hereinbefore described and to depress the decimal denominational key, thereby arresting the carriage after a single run in the proper columnar position. Should the operator, on the other hand, desire to move successively from one column to the next at all times beginning with the first column it is merely necessary to depress the first column selecting key bearing the numeral "1" which enables the column stop bar to receive its greatest extent of rearward movement. When the column stop bar is swung rearwardly under control of the stop 22 of the first column selecting key, all of the column stops 20 will be positioned so as to co-act with any projected denominational stop, when the latter is moved forward by its denominational key, and the carriage may move successively from one column stop to the next and to any denominational position within each columnar field as determined by the depression of the particular denominational key.

By making the stops 22 individually adjustable in the column selecting key levers which carry them, a nice adjustment of the stops may be effected to properly determine the requisite extent of variable swinging movement which may be given to the column stop bar, in order to bring the appropriate column stop into coöperative relation with a projected denominational stop. By providing an adjustable contact or screw 39 the feed rack may be properly disengaged from the feed pinion and the parts nicely regulated to effect such disengagement by the actuation of the universal bar 29.

In Figs. 7 to 10 inclusive I have shown a modified form of construction which I will now describe. The same reference numerals will be employed to indicate corresponding parts of the typewriting machine disclosed in the preceding figures, and as far as possible parts of the tabulator mechanism which corresponds to those embodied in the previously described construction will be indicated by the same reference numerals, with the addition thereto of the exponent *a*. The column selecting key levers 24^a in this modified form of construction are pivoted at 65 to a bracket 66 secured to the rear cross bar of the carriage

5. These key levers are constructed in the same general manner as the corresponding column selecting key levers of the previously described construction and are provided with keys 27^a having indices such as the numerals "1", "2", "3", "4" thereon. Each key lever 24^a is provided with a depending projection or stop 67, the projections for the different key levers being graduated or varying in length as indicated in Fig. 7, so that variable extents of movement may be given to the different key levers at the rear ends thereof, it being understood that these stops 67 co-act with an arresting stop 68 secured to the left-hand end bar of the frame of the machine by a screw 69. Returning springs 70 are connected to the arresting bracket or stop 68, each of the springs co-acting with a column selecting lever forward of its pivot. The various column selecting levers extend rearwardly from the pivot 65 a uniform distance and each lever is provided with an interiorly threaded bearing 71 for the reception of an adjustable contact device 72 in the nature of a screw received in the threaded bearing 71 in the lever. The upper end of each screw is adapted to engage the cylindrical extension 21^a on a column stop bar 17^a. The column stop bar is fixed to arms 15^a which are pivoted to turn on a shaft 13^a fixed by set screws 14^a in bearings in brackets 10^a, which latter are secured to the rear cross bar of the carriage by screws 11^a. The left-hand bracket 10^a constitutes a part of the bracket 66 hereinbefore referred to. The arms 15^a are mounted for a limited sliding movement longitudinally of the shaft 13^a as well as for a turning movement thereon, for purposes which will hereinafter more clearly appear. The column stop bar is provided with teeth on opposite sides thereof, as in the previously described construction, for the reception of bifurcated column stops 20^a in the interdental spaces between the teeth on the bar.

From an inspection of Fig. 7 it will be seen that the column stops extend upwardly and rearwardly from the column stop bar varying distances so that the graduated column stops, such as those previously described, are provided; the shortest of said stops being arranged to the left and the longest of said stops being arranged to the right on the column stop bar. The universal bar 29^a extends throughout or substantially throughout the length of the carriage and is connected at its ends to arms 30^a, said arms being pivotally supported on the shaft 13^a. The left-hand arm 30^a is provided with a pin 32^a to which one end of a contractile spring 33^a is connected. The opposite end of this spring is connected to a pin 34^a which projects from the left-hand arm 15^a which supports a column stop bar 17^a.

As will be seen from an inspection of Figs. 7 and 8, the pin 34^a extends over the left-hand arm 30^a of the universal bar 29^a. The pin 34^a therefore in addition to providing means for attachment of one end of the spring 33^a also constitutes a stop with which the left-hand arm 30^a coöperates to limit the relative movement between the left-hand arm 30^a and the left-hand arm 15^a. The spring 33^a normally maintains the two stops in contact, as shown in Fig. 7, in order to tend to normally maintain a fixed relation between the universal releasing bar 29^a and the column stop bar. A stop arm or abutment 73 is also formed on the left-hand arm 30^a for engagement with an extension 74 on the left-hand bracket arm 10^a. These contact members therefore limit the rearward swinging movement of the universal bar 29^a. The extension 74 is projected rearwardly and is formed with a depending engaging member 75 provided with a series of stepped stops 76 and 77, the latter being the lowermost stop. The member 75 with its stepped stops is arranged in the path of movement of the left-hand arm 15^a, it having been heretofore explained that this as well as the companion arm 15^a is mounted for a sliding movement longitudinally of the shaft 13^a, as well as for a swinging movement thereon. A contractile spring 78 is connected to a pin 79 at one end, this pin extending upwardly from the right-hand arm 15^a. The opposite end of the spring is connected to a pin 80 which projects upwardly from the right-hand bracket 10^a. The pull of this spring is therefore exerted to effect a limited longitudinal movement of the arms 15^a, and the column stop bar carried thereby, to the left relatively to the carriage and relatively to the shaft 13^a by which said members are carried. The stepped stops on the member 75 limit the swinging movement of the arms 15^a and the column stop bar, as well as the movement thereof longitudinally of the shaft 13^a, as will presently appear. The lowermost stepped stop 77 is the one on which the left-hand arm 15^a is normally supported against the pull of the spring 78 as indicated in Figs. 8 and 9. When, however, a selecting key 27^a is depressed, the contact device 72 carried by the associated key lever engages the extension 21^a of the column stop bar and swings the column stop bar around the shaft 13^a as a center, the extent of swinging movement depending on the particular column selecting key which has been depressed. A swinging movement of the column stop bar, thus effected, swings the arms 15^a with it, thus freeing the left-hand arm 15^a from the lowermost stop 76 and carrying the arm to a position where it is adapted to engage one or another of the stops 76. As soon as the left-hand arm is disengaged from the lowermost stop in the

manner indicated, the spring 78 becomes effective to shift the column stop bar with its arms 15^a to the left relatively to the carriage, thereby bringing about an engagement between the left-hand arm 15^a and the appropriate stop 76. The engaged arm 15^a will retain the column stop bar in the position to which it has been swung around the shaft 13^a although a slight longitudinal displacement of the column stop bar has been effected. The column stop bar is thus automatically locked in the position to which it has been set by the depression of one of the column selecting keys. A release of the locking means is automatically effected at the first tabulating operation as will herein-after appear.

Denominational stop levers 57^a are provided with denominational stops 60^a at the upper end thereof and a depression of a denominational key, such as the denominational keys hereinbefore described, is effective to project the associated denominational stop forwardly as indicated in dotted lines in Fig. 7. Each of the levers 57^a is provided with a forwardly extending projection 64^a adapted to coöperate with the universal bar 29^a at any point in the travel of the carriage.

Should the operator desire to select a given denominational position within, say, the second columnar field it is merely necessary to depress the second column selecting key bearing the index numeral "2." This is effective to swing the column stop bar upwardly a height corresponding to the key which has been depressed. This extent of swinging movement of the column stop bar is effective to bring the second of the column stops 20^a to a position where it is in coöperative relation with any of the denominational stops when the latter are projected to operative position. As soon as the column stop bar has been moved upwardly in the manner described, a longitudinal movement of the column stop bar to the left under the pull of the spring 78 is effective to bring about an engagement between the left-hand arm 15^a and the appropriate locking stop 76 in order to lock the column stop bar in the position to which it has been moved by the depression of the column selecting key. The movement of the denominational stop lever, to effect a movement of a denominational stop to operative position in the manner just described, is also effective to swing the universal bar 29^a forwardly through the engagement of the projection 64^a therewith. A forward movement of the universal bar 29^a is thus effected against the pull of the spring 33^a, to cause the universal bar and the arms 30^a thereof to move forward independently of the arms 15^a. From an inspection of Fig. 8 it will be observed that a pin 81 extends laterally

from the left-hand arm 30^a and is received beneath the left-hand arm 41^a which pivotally supports the feed rack 9 on the shaft 13^a. It will be understood therefore that when the universal bar 29^a is moved forwardly in the manner just described, the pin 81 will engage the associated arm 41^a of the feed rack, thus lifting the feed rack out of engagement with the feed pinion 8. This release of the carriage from control of the escapement mechanism takes place at the depression of a denominational key and after the column selecting key has been actuated in the manner described. The carriage having been released the carriage will be moved under the power of its spring drum until the projected denominational stop engages the second column stop from the left on the column stop bar. The carriage after a single run will therefore be arrested in the desired denominational position determined by the depression of the denominational key and in the selected columnar field which is determined by the depression of a column selecting key 27^a. In the present instance this will be the second column, it having been assumed that the second column selecting key bearing the index numeral "2" has been depressed.

When the column stop is engaged by the projected denominational stop the column stop bar will be arrested although the carriage will continue to move a limited distance independently of the column stop bar by reason of the sliding connection between the column stop bar and its supporting shaft 13^a. At this time the power of the carriage spring is effective to overcome the pull of the spring 78 which connects the column stop bar with the carriage. The effect of this relative movement between the carriage and the column stop bar is to disengage the left-hand arm 15^a from the stop 76 by which the column stop bar was locked in its set position and the restoration of the left-hand arm 15^a to its normal position relatively to the member 75 under the pull of the springs 23^a and 78 is thus effected. In short, the locking means is automatically released to restore the column stop bar to normal position both longitudinally of the shaft 13^a and around the shaft.

It will be understood that if pressure be maintained on the denominational key the carriage release mechanism will be maintained in the released position at a time when the column stop bar is automatically restored to its normal position, and a clearance would therefore be effected between the engaged column stop and the projected denominational stop, so that the carriage would run free to the end of its travel and the carriage would not be arrested in its proper position. In order to overcome this I have provided on each column stop a lat-

erally extending flange or lug 82 which projects from the left-hand face thereof along its upper edge. A corresponding laterally projecting flange 83 is formed along the bottom edge of each of the denominational stops on the right-hand face thereof. It will be understood therefore that when a denominational stop is projected to the operative position its flange 83 will be in a position to engage beneath the flange 82 on the column stop with which the denominational stop co-acts. This engagement between the flanges 82 and 83 is effective to prevent a restoration of the column stop bar in its pivotal movement around the shaft 13^a until the withdrawal of the projection 64^a from the universal bar, to bring about a reestablishment of the connection between the feed rack 9 and the feed pinion 8. This assures a placing of the carriage under the control of the feed mechanism after a tabulating operation before the denominational stop is withdrawn from engagement with the selected column stop. After an engagement of the feed rack with its pinion has been effected, during the movement of the denominational stop back to normal position, the flange 83 on the denominational stop is withdrawn from beneath the co-acting flange 82 on the column stop and the column stop bar is then free to be turned down into engagement with the stop 77 which arrests the turning movement of the column stop bar back to its normal position.

A guide plate 84 is preferably formed, as indicated in Fig. 10, for cooperation with the denominational stops to maintain them properly spaced apart and to afford a support to resist impact of the column stops against said denominational stops. From an inspection of Figs. 7 and 10 it will be seen that the plate 84 is provided with a series of depending teeth 85 between which the upper portions of the denominational stops are received, whereas the enlarged opening 86 in the plate and in the companion plate 84^a is adapted to receive laterally projecting flanges 83 on the denominational stops.

In the construction shown in Figs. 1 to 6 some one of the column selecting keys is always locked in the actuated position, thereby assuring that the column selecting mechanism is set to render the tabulator operative. The particular columnar position of arrest is readily determined by an inspection of the key locked in the depressed position.

In the construction shown in Figs. 7 to 12 it is necessary to actuate a column selecting key first, otherwise the column stops will be maintained out of the path of a projected denominational stop as indicated in dotted lines in Fig. 7 and the carriage would run free throughout its travel with-

out effecting a tabulating operation, thereby warning the operator that it is necessary to actuate a column selecting key.

From the foregoing description it will be understood that in each of the constructions shown there is a variable extent of relative movement between the graduated column stops and the coöperative tabulator or denominational stops; that the extent of such variable movement determines the columnar position of arrest of the carriage; that both the column stops and denominational stops move toward each other in their relative movements into coöperative relation; that the variable relative movement between the stops is in this same direction; that column selecting means are provided to determine the extent of such variable movement; that stops are employed to arrest a differentially movable part of the column selecting mechanism; that at the actuation of the column selecting mechanism parts are automatically locked in the operative or selected position; that such parts are afterward automatically released; that both the column selecting keys and the denominational keys have a uniform, or substantially uniform, extent of movement notwithstanding that differential extents of movement of the column stop bar are controlled by the column selecting keys; that the denominational stops have a uniform extent of movement which is unvariable; that the column selecting keys are carried by the carriage, whereas the denominational keys are arranged in the keyboard of the machine; that a tabulating operation does not take place at the actuation of a column selecting key but that the actuation of a denominational key in each instance is effective to release the carriage and effect a tabulating operation; that each column selecting key controls a different columnar position of arrest of the carriage; that in the construction shown in Figs. 1 to 6 one of the column selecting keys will at all times be locked down so that the column stop mechanism will always be operative; that in this same construction each column selecting key controls a different arresting stop 22; and that the column stop bar, the arms which carry it, etc., constitute a frame that is variably movable by a denominational stop and is arrested in its variable movement by arresting means or stops 22 controlled by the column selecting keys.

It should be understood that various changes may be made without departing from the spirit of my invention, as is evidenced, for example, by the structures disclosed in two companion applications, Serial Nos. 663,983 and 663,984 filed of even date herewith, features whereof are covered by some of the claims in the present case. Moreover, some parts may be used without others.

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 series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column and denominational stops having variable extents of relative movement toward and away from each other, key controlled column selecting means which may be set at will to determine the extent of variable relative movement that may be effected between the column and denominational stops, keys having a uniform extent of movement, and means controlled by said keys for moving said denominational stops individually to operative position and to arrest the carriage at various columnar positions as determined by the setting of said key controlled column selecting means.

2. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column stops having variable extents of movement toward and away from the denominational stops, key controlled column selecting means which may be set at will to determine the extent of variable relative movement that may be given to the column stops, keys having a uniform extent of movement, means controlled by said keys for moving said denominational stops individually to operative position to bring any desired denominational stop into co-operative relation with a given column stop as determined by the previous actuation of the key controlled column selecting means, and carriage releasing means controlled by an actuation of the key controlled means for moving the denominational stops.

3. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column and denominational stops having variable extents of relative movement toward and away from each other, a series of independently operable column selecting keys, means controlled by said keys to determine the extent of relative variable movement that may be effected between the column and denominational stops, and a series of independently operable denominational keys having a uniform extent of movement for moving said denominational stops individually into operative position and for arresting the carriage at various columnar positions as determined by the column selecting key which has been actuated.

4. In a typewriting machine and in tabu-

lating mechanism, the combination of a carriage, a series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column and denominational stops having variable extents of relative movement toward and away from each other, a series of independently operable column selecting keys having a uniform extent of movement, means which may be set by said keys to determine the extent of relative movement that may be effected between the column and denominational stops, and a series of individually operable denominational keys having a uniform extent of movement for moving said denominational stops to operative position and for arresting the carriage at various columnar positions as determined by the column selecting key which has been actuated.

5. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column and denominational stops mounted for movement toward and away from each other and having variable extents of relative movement toward and away from each other, key controlled column selecting means which may be set at will to determine the extent of relative variable movement that may be effected between the column and denominational stops, and key controlled means for moving said denominational stops individually to operative position.

6. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a series of independently adjustable graduated column stops, a series of independently operable denominational stops, said column and denominational stops having variable extents of relative movement toward and away from each other, a series of column selecting keys which may be set at will, means controlled by said column selecting keys to determine the extent of relative variable movement that may be effected between the column and denominational stops, automatically operating means for locking each column selecting key and the parts controlled thereby in the actuated positions, means for releasing the column selecting key and the parts controlled thereby on a subsequent actuation of another of said column selecting keys, a series of independently operable denominational keys having a uniform extent of movement for moving said denominational stops individually to operative position and for arresting the carriage at various columnar positions as determined by the column selecting key which has been actuated.

7. In a typewriting machine, the combi-

nation of a carriage, graduated column stops, a cooperative tabulator stop, said column stops being variably movable toward and away from the tabulator stop, key controlled arresting means for limiting the extent of such variable movement, and keys for effecting a variable movement of the graduated column stops and for bringing the tabulator and column stops into cooperative relation.

8. In a typewriting machine, the combination of a carriage, graduated column stops, a cooperative tabulator stop, said column and cooperative stops being relatively and variably movable toward and away from each other, key controlled arresting means for limiting the extent of such relative variable movement, automatically operating means for locking said key controlled arresting means in the set position, keys having a uniform extent of movement, and means controlled by said keys for effecting a relative movement between the stops toward each other to bring them into cooperative relation.

9. In a typewriting machine, the combination of a carriage, a series of graduated column stops variably movable to determine the columnar position of arrest of the carriage, key controlled means for determining the extent of variable movement that may be given to said column stops, a series of denominational stops which have a uniform extent of movement to bring each of said denominational stops into cooperative relation with a particular column stop determined by the extent of variable movement of the column stops, and keys for selecting said denominational stops for use and for moving them into cooperative relation with the column stop selected for use.

10. In a typewriting machine, the combination of a carriage, a series of graduated column stops variably movable to determine the columnar position of arrest of the carriage, key controlled means for determining the extent of variable movement that may be given to said column stops, automatically operating means for locking said key controlled determining means in the set position, automatically operating means for subsequently releasing said locking means, a series of denominational stops which have a uniform extent of movement to bring each of said denominational stops into cooperative relation with a particular column stop determined by the extent of variable movement of the column stops, and keys for selecting said denominational stops for use and for moving them into cooperative relation with the column stop selected for use.

11. In a typewriting machine, the combination of a carriage, a set of individually adjustable graduated column stops, a set of

denominational stops, the column stops being movable toward the denominational stops and the denominational stops being movable toward the column stops; one set of said stops being movable variable distances toward the other, key controlled means for controlling the extent of such variable movement, and separate keys for moving the stops into coöperative relation.

12. In a typewriting machine, the combination of a carriage, a set of individually adjustable graduated column stops, a set of denominational stops, the column stops being movable toward the denominational stops and the denominational stops being movable toward the column stops, one set of said stops being movable variable distances toward the other, key controlled means for controlling the extent of such variable movement, automatically operating means for locking said key controlled means in set position and for subsequently releasing the locking means, and separate keys for moving the stops into coöperative relation.

13. In a typewriting machine, the combination of a carriage, a set of denominational stops, denominational keys at the keyboard of the machine for actuating said denominational stops, a set of graduated column stops, a set of column selecting keys on the carriage, and means controlled thereby for variably controlling the relation between the column stops and denominational stops so that each denominational stop may be rendered coöperative with a given column stop depending on which column selecting key is actuated.

14. In a typewriting machine, the combination of a carriage, a set of denominational stops, denominational keys at the keyboard of the machine for actuating said denominational stops, a set of graduated column stops, a set of column selecting keys on the carriage, means controlled thereby for variably controlling the relation between the column stops and denominational stops so that each denominational stop may be rendered coöperative with a given column stop depending on which column selecting key is actuated, and carriage releasing means for the tabulator which are actuated only on the operation of a denominational key.

15. In a typewriting machine and tabulating mechanism, the combination of a carriage, a series of key controlled denominational stops each movable an unvarying distance and all movable to a like extent, a series of graduated column stops, and key controlled means for varying the positions of the column stops relatively to said denominational stops to determine which column stops may be rendered effective for coöperation with said denominational stops.

16. In a typewriting machine and tabulating mechanism, the combination of a car-

riage, column stops, a coöperative stop, and key controlled means for effecting a movement of the coöperative stop and the column stops toward each other and into coöperative relation.

17. In a typewriting machine and tabulating mechanism, the combination of a carriage, graduated column stops, a coöperative stop, key controlled means for effecting a movement of the coöperative stop and the column stops toward each other and into coöperative relation, and key controlled means for causing a variation in the extent of such movement to be effected.

18. In a typewriting machine and tabulating mechanism, the combination of a carriage, graduated column stops, a coöperative stop, key controlled means for effecting a movement of the coöperative stop and the column stops toward each other and into coöperative relation, key controlled means for causing a variation in the extent of such movement to be effected, and automatically operating means for locking said last mentioned key controlled means in operative position.

19. In a typewriting machine and tabulating mechanism, the combination of a carriage, graduated column stops, a coöperative stop, key controlled means for effecting a movement of the coöperative stop and the column stops toward each other and into coöperative relation, a series of keys, means controlled thereby for causing a variation in the extent of such movement to be effected, automatically operating means for locking said last mentioned key controlled means in operative position, and means for releasing said locking means on the next subsequent operation of one of said series of keys.

20. In a typewriting machine, the combination of a carriage, and tabulating mechanism comprising a series of column stops, a variably movable frame, the movement of which determines the relative movement effected between the column and denominational stops and determines the columnar position of arrest of the carriage, key controlled stops for limiting the extent of movement that may be given to said frame, and separate key controlled means for effecting a relative movement between the denominational and column stops.

21. In a typewriting machine, the combination of a carriage, a column stop bar, column stops of varying lengths carried by and independently adjustable to different positions along said bar, a coöperative stop, and key actuated means for effecting a variable extent of transverse movement of said column stop bar and for actuating said coöperative stop.

22. In a typewriting machine, the combination of a carriage, a column stop bar

mounted for transverse movement to variable extents, key controlled stops for limiting the variable transverse movement of the column stop bar, column stops of varying lengths on said column stop bar, a co-operative stop, and key controlled means for moving the stop bar and said co-operative stop toward and away from each other.

23. In a typewriting machine, the combination of a carriage, a transversely movable column stop bar, column stops carried thereby, a co-operative stop, and key actuated means for effecting a movement of the column stop bar and said co-operative stop toward and away from each other.

24. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of independently operable denominational stops, and key controlled means for effecting such variable movement of the column stop bar and for actuating said denominational stops.

25. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of independently operable denominational stops, and key controlled means for moving the column stop bar variably toward the denominational stops and for simultaneously moving a denominational stop toward said column stop bar, said denominational stops having a uniform extent of movement.

26. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, a series of independently operable denomination stops, and key controlled means for moving the column stop bar variably toward said denomination stops and for simultaneously moving a denomination stop toward said column stop bar.

27. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, key controlled means for controlling said arresting stops, a tabulator stop, and key controlled means for effecting a variable movement between said column stop bar and said tabulator stop to bring the different column stops and the tabulator stop into co-operative relation.

28. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement,

column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, a series of keys for controlling said arresting stops, each key controlling a separate arresting stop, a tabulator stop, and key controlled means for effecting a variable movement between said column stop bar and said tabulator stop to bring the different column stops and the tabulator stop into co-operative relation.

29. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, key controlled means for controlling said arresting stops, automatically operating means for locking said arresting stops in operative position, a tabulator stop, and key controlled means for effecting a variable movement between said column stop bar and said tabulator stop to bring the different column stops and the tabulator stop into co-operative relation.

30. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, a series of keys for controlling said arresting stops, each key controlling a separate arresting stop, automatically operating means for locking any of said arresting stops in operative position and for releasing a previously locked arresting stop, a movement of one arresting stop to operative position effecting a release of a previously locked arresting stop, a tabulator stop, and key controlled means for effecting a variable movement between said column stop bar and said tabulator stop to bring the different column stops and the tabulator stop into co-operative relation.

31. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, a series of keys for controlling said arresting stops, each key controlling a separate arresting stop, a series of independently operable denomination stops, and key controlled means for moving the column stop bar variably toward said denomination stops and for simultaneously moving a denomination stop toward said column stop bar.

32. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by

said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, key controlled means for controlling said arresting stops, automatically operating means for locking said arresting stops in operative position, a series of independently operable denomination stops, and key controlled means for moving the column stop bar variably toward said denomination stops and for simultaneously moving a denomination stop toward said column stop bar.

33. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of said column stop bar, a series of keys for controlling said arresting stops, each key controlling a separate arresting stop, automatically operating means for locking any of said arresting stops in operative position and for releasing a previously locked arresting stop, a movement of one arresting stop to operative position effecting a release of a previously locked arresting stop, a series of independently operable denomination stops, and key controlled means for moving the column stop bar variably toward said denomination stops and for simultaneously moving a denomination stop toward said column stop bar.

34. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, means for locking the column stop bar in any of the said variable positions to which it may be moved, a co-operative tabulator stop, and key controlled means for controlling the relative movement between said column stop bar and said tabulator stop to bring a column stop and the tabulator stop into coöperative relation.

35. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, means for arresting the column stop bar in any of the said variable positions to which it may be moved, a coöperative tabulator stop, and key controlled means for simultaneously moving the column stop bar and said tabulator stop toward each other to bring a column stop and the tabulator stop into coöperative relation.

36. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, means for arresting the column stop bar in any of the said variable positions to which it may be moved, a series of independently operable denomina-

tion stops, and key controlled means for controlling the relative movement between said column stop bar and each of said denomination stops to bring a column stop and a denomination stop into coöperative relation.

37. In a typewriting machine, the combination of a carriage, a key controlled column stop bar mounted for bodily transverse movement, column stops carried thereby, and a key actuated denomination stop movable toward and away from the column stops.

38. In a typewriting machine, the combination of a carriage, a column stop bar mounted for bodily transverse movement, column stops carried thereby, a series of independently operable denomination stops, a series of keys, and means whereby each of said keys is operative to move the column stop bar and a denomination stop toward and away from each other and into and out of coöperative relation.

39. In a typewriting machine, the combination of a carriage, a column stop bar mounted for bodily transverse movement, column stops carried thereby, a series of arresting stops operable to variably arrest the transverse movement of the column stop bar, and a series of keys each controlling one of said arresting stops.

40. In a typewriting machine, the combination of a carriage, graduated column stops, denominational stops, the column and denominational stops receiving variable extents of relative movement toward and away from one another to determine the selection of the columnar position of arrest of the carriage and to bring the stops into coöperative relation, keys having a uniform extent of movement, and means controlled by said keys for controlling the relation between the column and denominational stops in the manner specified.

41. In a typewriting machine, the combination of a carriage, a set of denominational stops, denominational keys for actuating said denominational stops, a set of graduated column stops, a set of column selecting keys, and means on the carriage controlled by the column selecting keys for varying the relation between the column stops and denominational stops so that each denominational stop may be rendered coöperative with a given column stop depending on which column selecting key is actuated.

42. In a typewriting machine, the combination of a carriage, a set of denominational stops, denominational keys for actuating said denominational stops, a set of graduated column stops, a set of column selecting keys, means on the carriage controlled by the column selecting keys for varying the relation between the column stops and denominational stops so that each denominational stop may be rendered coöperative

with a given column stop depending on which column selecting key is actuated, and carriage releasing means for the tabulator which are actuated only on the operation of a denominational key.

43. In a typewriting machine, the combination of a carriage, column stops of varying lengths carried by said carriage and mounted for variable movement thereon, a series of stops for arresting the variable movement of the column stops, means for controlling said arresting stops, a tabulator stop, and key controlled means for effecting a variable movement between said column stops and said tabulator stop to bring the different column stops and the tabulator stop into coöperation.

44. In a typewriting machine, the combination of a carriage, a column stop bar mounted for variable transverse movement, column stops of varying lengths carried by said column stop bar, a series of arresting stops for arresting the variable movement of the column stop bar, means for controlling said arresting stops, means for locking said

arresting stops in the operative position, and means for releasing said locking means.

45. In a typewriting machine, the combination of a carriage; and column selecting mechanism comprising a variably movable member, a set of key actuated members each carrying a separate stop which coöperates with said variably movable member to arrest it and limit its variable movement to operative position, and a spring actuated locking device coöperative with said key actuated members to lock them individually in the operative position, the movement of one of said key actuated members to operative position effecting a release of the previously actuated and locked key actuated member.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 4th day of December A. D. 1911.

JOHN WALDHEIM.

Witnesses:

CHARLES E. SMITH,
M. F. HANNWEBER.