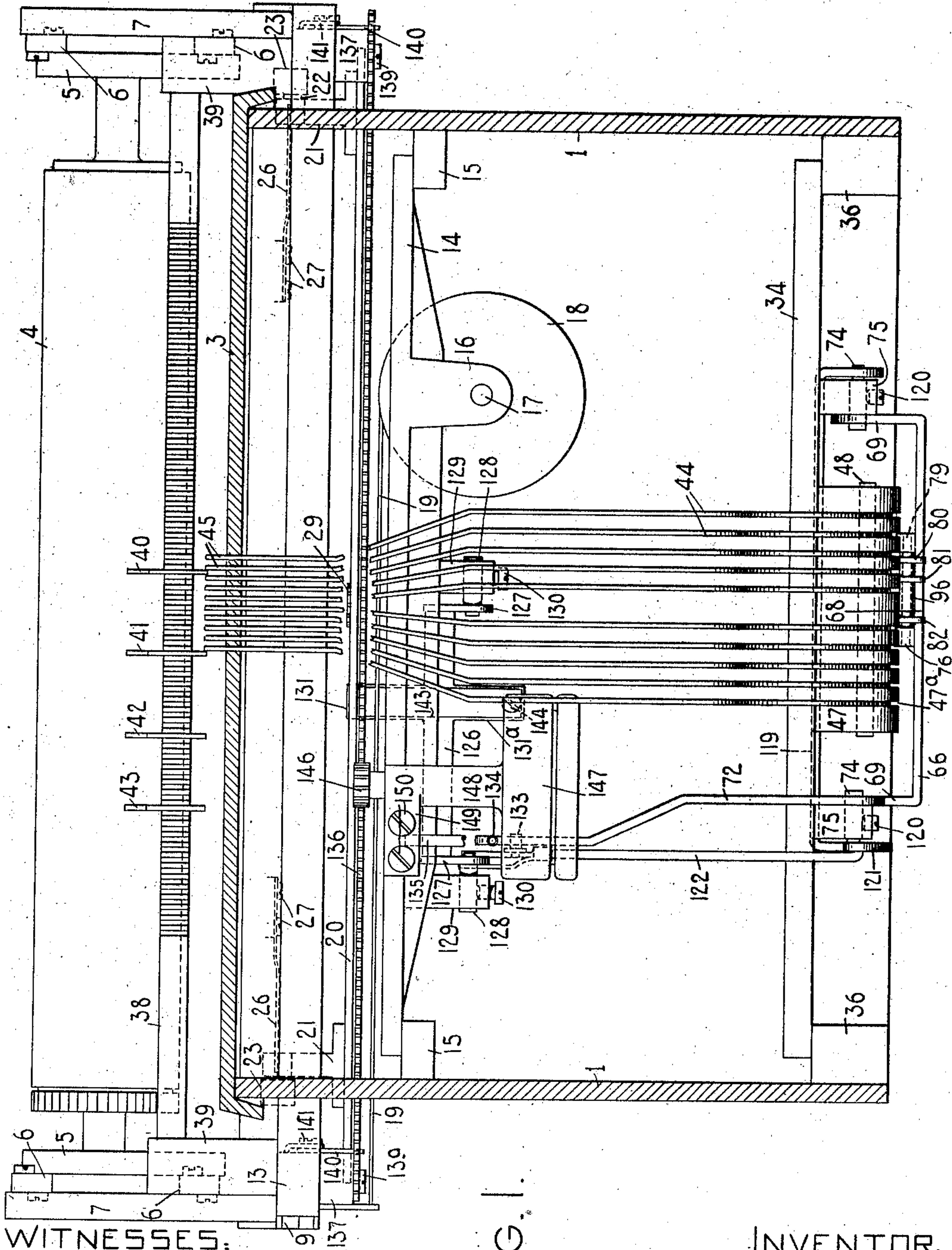


999,347.

A. W. SMITH.  
TYPE WRITING MACHINE.  
APPLICATION FILED JUNE 19, 1908.

Patented Aug. 1, 1911.

4 SHEETS-SHEET 1.



WITNESSES:

J. B. Reeves  
M. W. Pool

FIG. 1.

INVENTOR:

Arthur W. Smith  
By Jacob F. Fild  
HIS ATTORNEY

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4 SHEETS-SHEET 2.

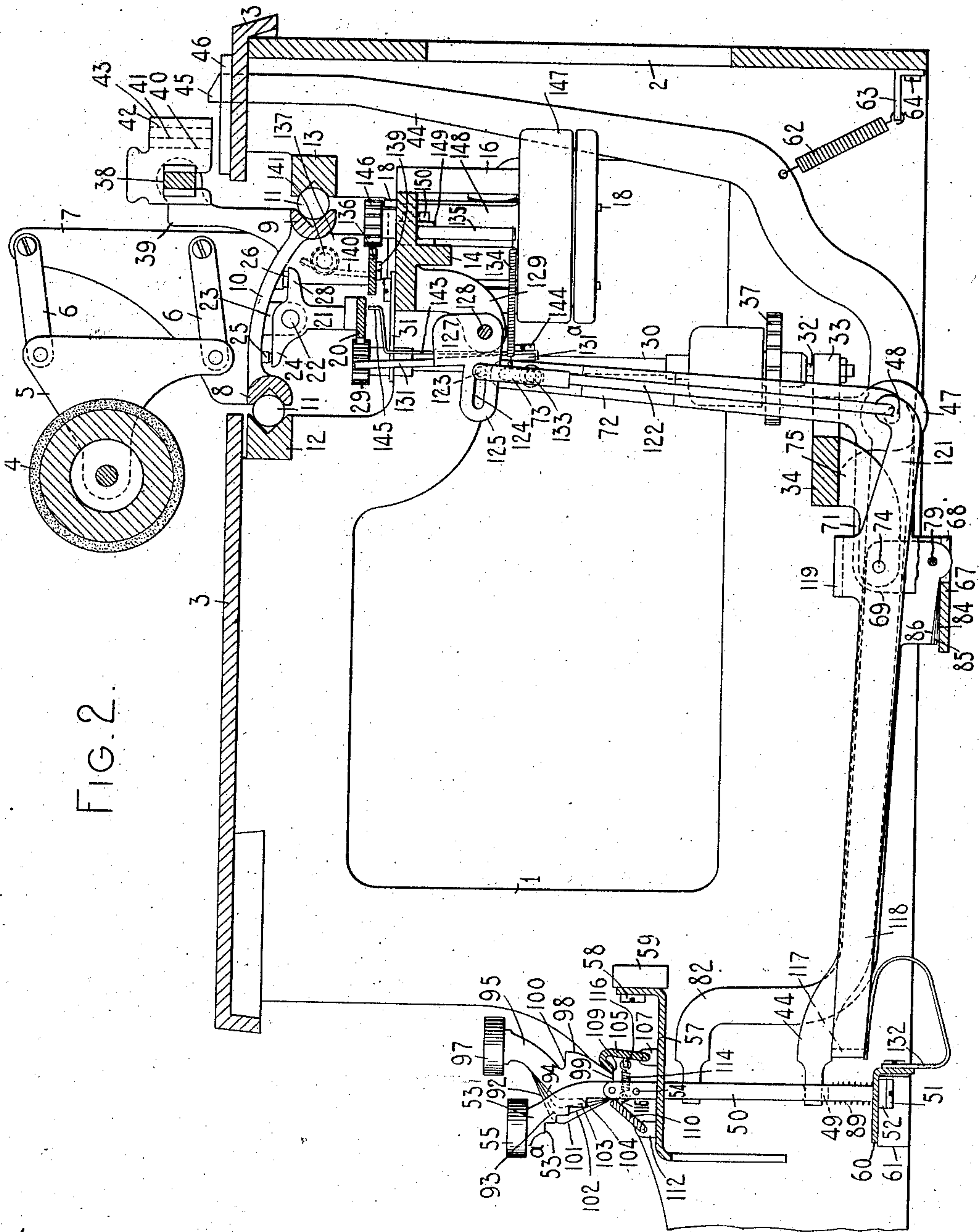


FIG. 2.

WITNESSES:

J. B. Reeves.  
M. W. Pool

INVENTOR:

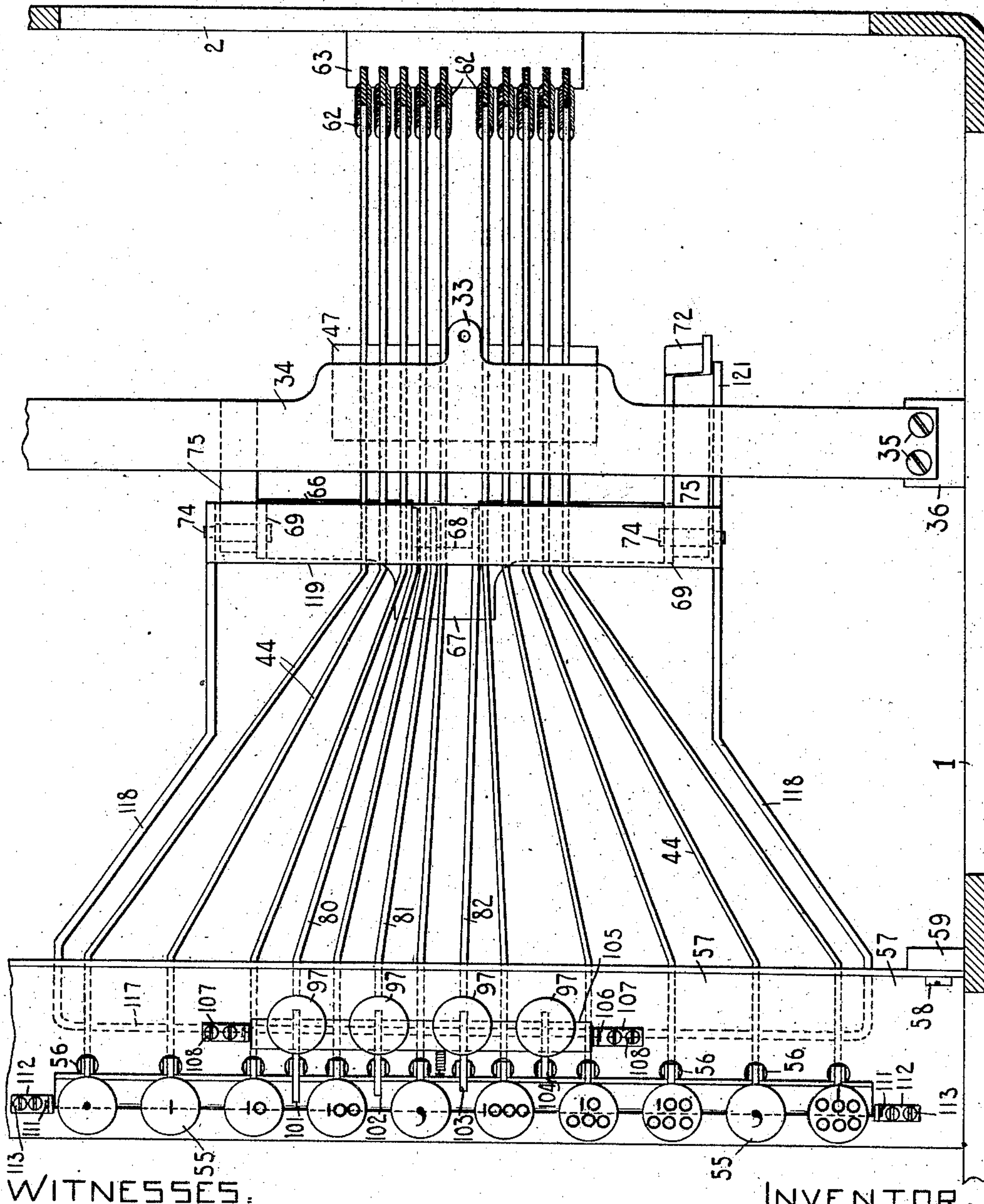
Arthur W. Smith  
By Jacob Selbel  
HIS ATTORNEY



999,347.

Patented Aug. 1, 1911.

4 SHEETS-SHEET 3.



WITNESSES.

INVENTOR.

*J. B. Reeves*

*M. W. Pool*

FIG. 3.

*Arthur W. Smith*

*By Jacob F. Field*

HIS ATTORNEY

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TYPE WRITING MACHINE.  
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4 SHEETS—SHEET 4.

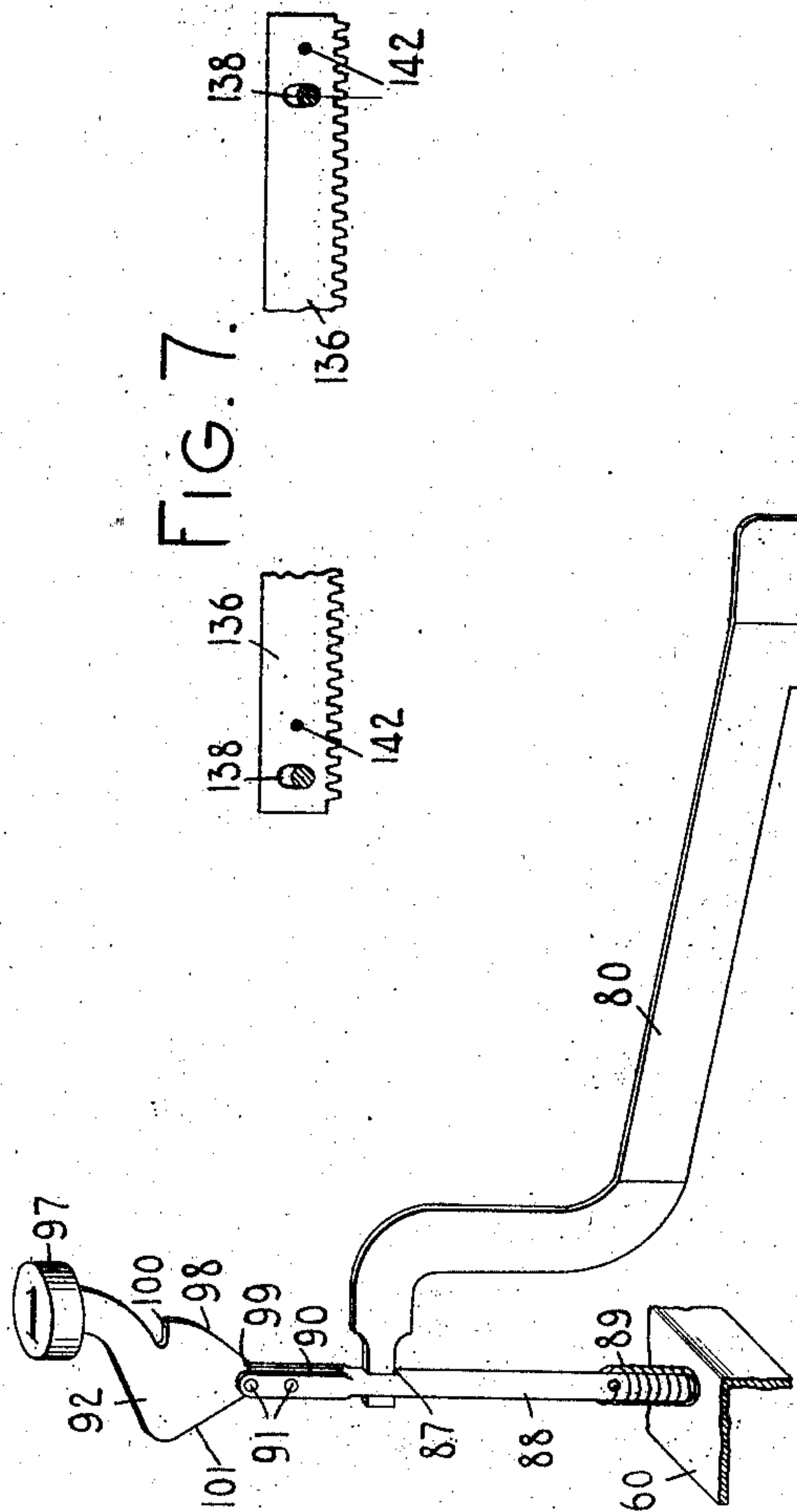


FIG. 4.

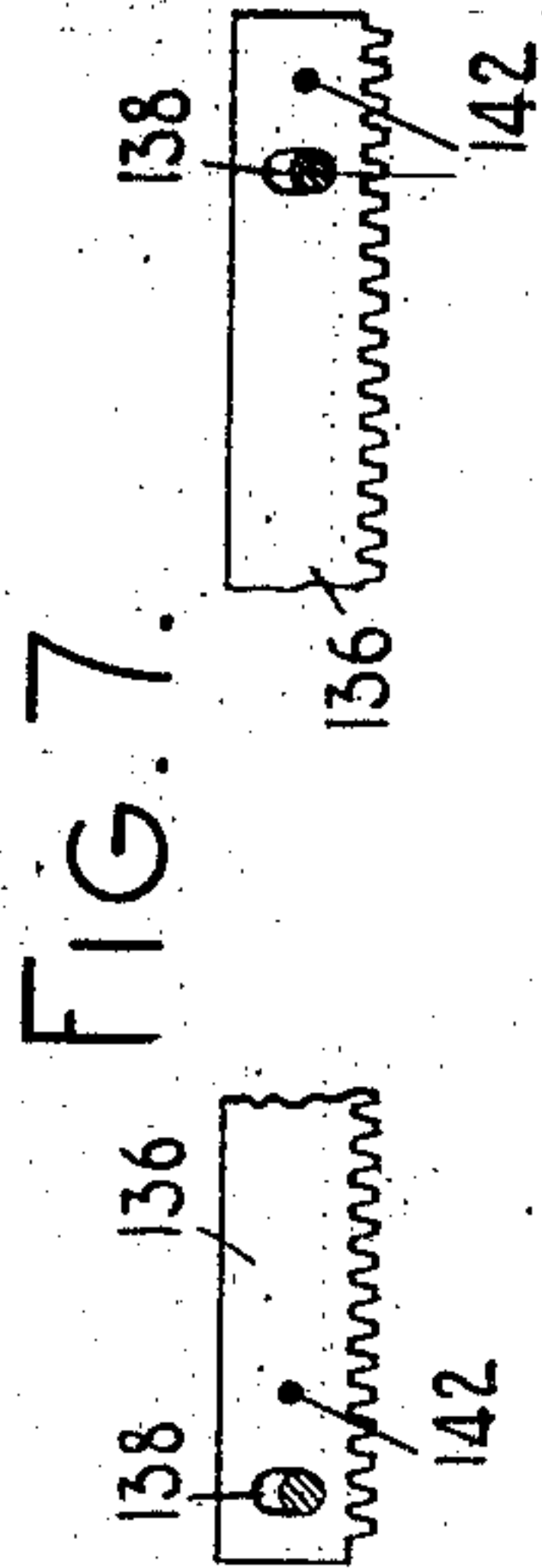


FIG. 7.

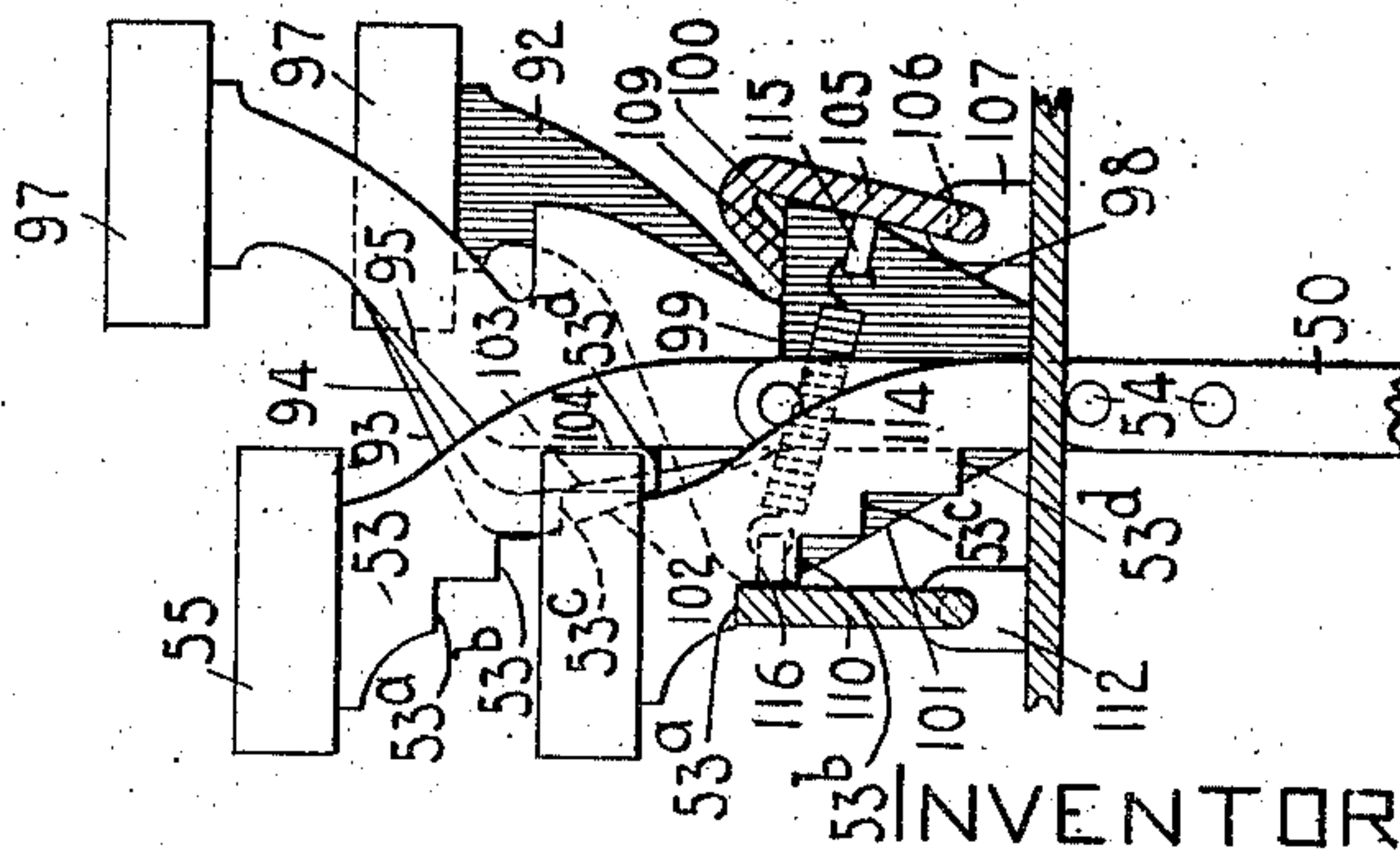


FIG. 6.

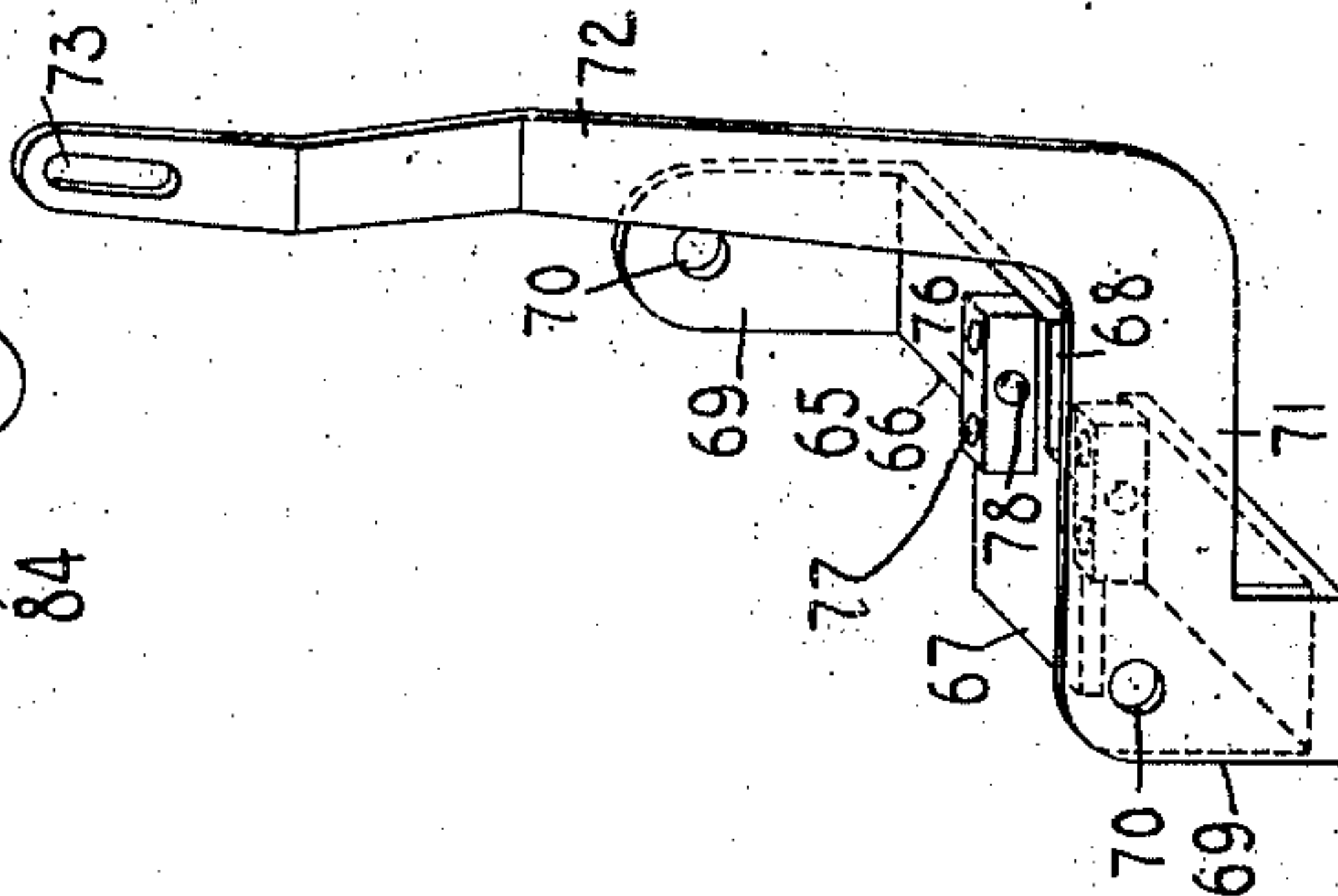


FIG. 5.

WITNESSES:

J. B. Reeves  
M. W. Pool

INVENTOR:

Arthur W. Smith  
By Jacob Feld  
HIS ATTORNEY



## UNITED STATES PATENT OFFICE.

ARTHUR W. SMITH, OF NEW YORK, N. Y., ASSIGNOR TO YOST WRITING MACHINE COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

999,347.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed June 19, 1909. Serial No. 503,093.

*To all whom it may concern:*

Be it known that I, ARTHUR W. SMITH, citizen of the United States, and resident of the borough of Manhattan, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates more particularly to tabulating devices for typewriting machines.

One object of the invention is to provide improved column selecting mechanism which may be set so that when the traveling element or carriage is released from its feed devices said element will be arrested by the engagement of the selected column stop with the cooperating stop member, all the column stops which may be intermediate the selected column stop and the cooperating stop member being skipped or passed.

Another object is to combine such column selecting mechanism with a denominational stop mechanism so as to arrest the run of the traveling element or carriage at any one of a plurality of adjacent letter space positions in a selected columnar field, the denominational stop members being positively arrested when they have reached their operative positions.

Another object is to provide improved retarding mechanism for the traveling element or carriage; and, more particularly, improved means for connecting the retarder contrivance with the carriage.

To the above and other ends my invention consists in the features of construction, combinations of devices and arrangements of parts hereinafter described and particularly pointed out in the appended claims.

The invention will be explained in connection with the accompanying drawings which illustrate one form of said invention and wherein

Figure 1 is a front to rear vertical sectional view of a Yost visible typewriting machine embodying my invention. Fig. 2 is a transverse vertical sectional view of the machine looked at from the rear. Fig. 3 is a horizontal sectional view showing the lower portion of the machine and parts of my invention in place thereon. Fig. 4 is a perspective view of part of the column se-

lecting mechanism. Fig. 5 is a perspective view showing details of the invention. Fig. 6 is a vertical sectional view illustrating the column selecting and denominational keys and associate parts. Fig. 7 is a fragmentary plan view, partly in section, of a tabulator rack.

In various of the views parts are omitted and parts broken away.

I have shown my invention as applied to a Yost visible typewriting machine, but it will be understood that said invention may be adapted to various styles of writing machines.

Referring first to Figs. 1, 2 and 3 of the drawings, the main frame of the machine is shown as comprising side plates 1, a slotted plate 2 connecting said side plates at the rear, and a two-part top plate 3. Type bars (not shown) are adapted to cooperate with the front face of a platen 4 mounted in a frame or carrier 5 which is connected by links 6 with the side plates 7 of a carriage truck which with the carrier 5 composes the carriage or traveling element. Said truck further comprises a base portion connecting the plates 7 and composed of oppositely grooved guide rails 8 and 9 and connecting webs 10. The guide rails cooperate with anti-friction balls 11, said balls likewise cooperating with fixed grooved track-ways 12 and 13 arranged at opposite sides of a transverse depression in the upper part of the machine frame. A cross bar or bracket 14, secured to lugs 15 projecting inward from the side plates 1, has a depending lug 16 on which is pivoted at 17 a power device or spring drum 18, said drum being connected with the carriage truck by a strap 19. The movements of the carriage in letter space direction are controlled by the carriage feed ing or escapement devices which comprise a swinging rack 20. Said rack is arranged beneath the carriage truck and extends longitudinally thereof, being supported on T-shaped arms 21 pivoted at 22 on lugs 23 depending from the base of the truck, one at each end thereof. At its upper end each arm 21 is provided with a forward extension 24 which is normally maintained in contact with a stop 25 by a horizontally disposed leaf spring 26, said leaf spring being secured by screws 27 to the truck base and pressing down at its free end on a rearward



extension 28 integral with the arm 21. Normally the feed rack 20 meshes with a feed pinion 29 secured at the top of a vertically disposed shaft 30, said shaft being supported near its upper end by a plate 31 fixed to a cross arm 14 and bearing on its lower end on a pivot pin 32 secured to a lug 33 projecting rearwardly from the middle of a cross bar 34, said bar being secured by screws 35 to lugs 36 integral with the side plates 1. Operatively connected with the shaft 30 near its lower end is a toothed escapement wheel 37 cooperating with which are escapement elements or dogs (not shown). The carriage feeding devices coact in a known manner to cause letter space movements of the carriage and platen in printing direction when the printing keys are operated.

The manner above described of supporting the rack 20 is new but the other parts hereinbefore set forth are or may be old and preferably are like the corresponding parts in the Yost visible machine.

The tabulating mechanism comprises a toothed stop bar 38 of ordinary construction supported on standards 39 rising from the rear of the carriage truck. Adjustably supported on the stop bar 38 are a plurality of column stops. In the drawings four of such stops are shown and beginning at the left-hand are numbered respectively 40, 41, 42 and 43. As will be understood from Fig. 2 the column stops are stepped; that is, their operative faces project different extents from their support, the stop 40 projecting the shortest distance, the stop 41 projecting a somewhat greater distance, the stop 42 a corresponding distance beyond the stop 41 and the stop 43 an equal distance beyond the stop 42. In other words, the steps or differences in length of the working faces of the stops are progressive, each step being equal to the preceding step. Adapted to cooperate with the column stops are a series or set of denominational stop levers 44. The stops proper 45 are in the present case the upper ends of the levers 44 and project upward above a slotted guide plate 46 which is secured to the rear portion of the top plate 3 and maintains the stops 45 a letter space distance apart. As appears from Fig. 2 the stops 45 normally are disposed in the rear of the series of stepped column stops, and are so arranged that when projected forward they will cooperate with one or another of the column stops, depending on the extent of forward movement to which said stops 45 are subjected. The stop levers 44 are bell cranks each having a vertically disposed rear portion which extends downward from the stop end 45 and then curves forward, passing through a guiding slot or kerf 47<sup>a</sup> formed in a lug 47 integral with and extending downward from the

cross bar 34. From its guide slot each lever 44 extends horizontally forward with a slight upward inclination and near its forward end is curved slightly upward, terminating in a comparatively narrow end portion. There are ten stop levers 44 shown in the drawings, but of course a greater or less number may be employed. As will be understood from a consideration of Fig. 1, the levers 44 extend straight downward parallel with each other and a letter space distance apart for a short distance below the top plate and then are bent or offset laterally outward, the five right-hand lever arms inclining toward the right-hand side of the machine and the five left-hand lever arms inclining toward the left-hand side of the machine. Below the inclined portions the lever arms again extend straight downward and parallel, being a considerable distance apart so that the horizontal portions which pass through the guide slots 47<sup>a</sup> are separated enough to provide a considerable amount of stock between each slot in the lug 47. Supported in said lug 47 is a rod 48 on which the levers 44 are pivotally supported. From Fig. 3 it will be observed that some distance forward of their pivots the horizontal portions of the levers 44 fan outward so that their forward end portions are quite widely separated. These forward end portions are each confined in a vertical slotway 49 formed in a key stem 50. The key stem is vertically disposed and at its lower end terminates in a head 51 which supports a washer 52 of leather or the like. Fitting into the slot 49 in the stem is a key plate 53, said key plate being secured to the stem by rivets 54 and terminating at its lower end just above the forward end portion of the associate lever 44 as shown by dotted lines in Fig. 2. The key plates incline upward and forward from their stems, and the forward edge of each key plate is cut away to provide a set of stepped stop faces spaced equally apart. Four of such stop faces are shown on each key plate in the present instance, and beginning at the top and progressing downward and rearward are marked respectively 53<sup>a</sup>, 53<sup>b</sup>, 53<sup>c</sup>, and 53<sup>d</sup> (Figs. 2 and 6). The function of the stop faces is to assist in positively arresting the denominational stops in desired operating positions, as subsequently explained more at length. The key plate terminates at its stop in a key or finger button 55. There are ten of these keys arranged in a row as shown in Fig. 3 and appropriately marked with punctuation marks and with numbers indicating denominations. The set of denominational keys forms a bank in rear of the regular keyboard and slightly elevated above the last bank of keys in said keyboard. Near their upper ends the key stems pass through and are guided by holes 56 formed at regular



lar intervals in the horizontal portion of an angular plate 57, said plate terminating at its rear in a vertical flange which at its ends receives screws 58, said screws securing the plate to lugs 59 projecting inward from the side plates 1. The plate 57 serves both as a guide for the key stems, a cover for certain of the parts which are arranged below and behind said plate and also as a support for various devices presently to be described. The lower ends of the key stems 50 pass through and are guided by holes formed in an angular guide plate 60, said plate extending from side to side of the machine and being secured at its ends to lugs 61 integral with and projecting inward from the side plates 1. The denomination levers 44 are maintained in normal position, as shown in Fig. 2, each by a coiled spring 62, one end of which is secured to the associate lever 44 and the other end to a bracket 63 fixed by screws 64 to the frame plate 2. When in normal position the rear edge of the stop 45 on each lever or blade 44 is at the rear of its slot in the guide plate 46, while the washer 52 on the associate key stem is maintained in contact with the under face of the horizontal portion of the guide plate 60.

It will be understood that each of the denominational keys when depressed will project its associate denominational stop 45 forward into the path of the column stops. The carriage is automatically released by the operation of the denomination keys and means are provided for variably timing the carriage release so that it may take place after the actuated denominational stop has entered and is in the field or path of the selected column stop. Separate and independent means are provided for positively arresting the denominational stops after they have been projected into the path of the desired column stop. This is a highly important feature, as hitherto, owing to the fineness of the adjustments required, it has frequently happened where stepped column stops are employed and the denominational stops are variably movable, that the actuated denominational stop has been projected either a greater or less distance than the desired distance, causing a faulty operation of the mechanism.

The means set forth in the preceding paragraph include a U-shaped bail or member 65 which is shown detached in Fig. 5 and also appears in Figs. 1 to 3. The member 65 comprises a horizontal plate-like portion 66 having a forwardly projecting platform or lip 67 at its middle and a cut-out or slot 68 in its rear face behind the platform 67. Ears 69 upturned at the ends of the plate 66 are formed with bearing openings 70. A horizontal extension 71 projects rearward from the right-hand ear 69 and from the rear of said extension an arm 72 extends

vertically upward and is bent at different points in its length so that it is off-set outward or toward the right. At the top of said arm 72 is formed an elongated slot 73 which coöperates with carriage releasing devices presently to be described. The bearing openings 70 engage pivots 74 supported on ears 75, said ears being integral with the cross bar or bracket 34 and curving downward and forward therefrom. When pivoted on the pivots 74 the base of the member 65 underlies the horizontal portions of the denominational levers 44 forward of the pivots 48 thereof. At each side of the slot 68 a bearing block 76 is mounted on the base bar 66 and is secured thereto by screws 77. The blocks are formed with holes 78 which receive a rod 79 whereon a plurality of column selecting levers are pivoted. Three of such levers are shown in the drawings and numbered respectively from left to right 80, 81 and 82. The column selecting levers while generally resembling each other, differ in certain respects. Each of said levers is formed at its rear end with a hole 83 through which the pivot rod 79 passes. Below the hole 83 the lever is rounded, the rounded portion being received in the slot 68. Forward of the rounded portion the lower edge of each lever is formed with an upwardly inclined actuating edge. As appears clearly from Fig. 2, the degree of inclination of the actuating edges differs. The edge 84 of the lever 80 has the least inclination from the horizontal, the edge 85 of the lever 81 has a greater degree of inclination, and the edge 86 of the lever 82 a still greater degree. The actuating edges normally lie above the top face of the platform or lip 67 and the degree of inclination of the three actuating edges upward from this face is progressive. Forward of the actuating edges the levers are cut-away so as to provide body portions of normal width, the body portions extending horizontally forward and also inclining laterally to different extents. Near the front, the body portions turn vertically upward and then again project horizontally forward, terminating in a narrow finger which, as clearly shown in Fig. 4, engages in a slot 87 formed in a key stem 88. The lower end portion of each key stem passes through a guide opening in the plate 60 and is provided with a head similar to the heads of the denominational key stems. Each key stem 88 is maintained in normal position by a coiled spring 89 which presses at its lower end against the top of the plate 60 and is secured at its upper end in a hole in the key stem. The upper end portion of each key stem passes through a guide opening in the plate 57 and is bifurcated to provide a slot-way 90 which receives a key plate, the lower end portion of said key plate being fixed to



the stem by rivets 91. The key plates of the first, second and third column selecting keys are numbered respectively 92, 93 and 94. In addition there is or may be provided a fourth key plate 95 corresponding to a fourth column, said key plate being secured like the other key plates to a spring-pressed key stem 88. The key stem 88 of the fourth column key, however, is not connected with a column selecting lever, there being only three such levers. As shown in Fig. 3 the three column selecting levers are arranged alternately with denominational levers so that the key stems 88 and key plates secured thereto project upward between the front end portions of these denominational levers which are near the middle of the machine. The key plate 95 and its key stem are similarly arranged in the space between the two denominational levers next to that occupied by the key plate 94 and its key stem. At the front, the column selecting levers are maintained properly spaced apart by their key stems which in turn are controlled by the guide plates 60 and 57. At the rear, the column selecting levers are spaced apart by spacing sleeves 96 surrounding the pivot rods 79 (Fig. 1).

Each key plate is provided with a finger button or key 97. From an inspection of Figs. 2 and 3 it will be seen that the set of column keys 97 are in a row behind and slightly above the set of denominational keys 55. The tops of the column keys 77 may be and preferably are marked with indices to show the column to which they appertain. Such marking appears on the key 97 shown in Fig. 4; but in Fig. 3 the markings are omitted from the tops of the keys for the sake of clearness.

Each of the key plates of the column selecting mechanism is formed at its rear with a curved edge or cam 98. Each cam 98 terminates at the bottom in a horizontal stop face 99 adjacent to the key stem 88. From the stop face 99 the cam face curves upward and rearward and then extends substantially vertically for a short distance, terminating at its upper end in a horizontal locking face or edge 100. At its front side all the column key plates except the fourth are formed with cam faces or curved edges which are inclined oppositely from the rear cam faces. The rear cam faces are all alike but the front cam faces incline at different angles from the vertical, the difference being a progressive one as will be best understood from a consideration of Figs. 2, 3 and 6. The cam face 101 at the front of the key plate 92 is curved forward to the greatest extent from the vertical. The cam face 102 at the front of the key plate 93 has a less degree of forward inclination than the cam face 101 while the cam face 103 on the key plate 94 in turn is nearer the

vertical than the immediately preceding cam face. The front edge of the fourth column key plate is vertical and does not act as a cam. The rear cam faces 98 are adapted to cooperate with a locking plate 105 which extends lengthwise above the plate 57 behind the column selecting key plates and is provided at its ends with lateral studs 106 which are pivotally supported in bearing openings in angular plates 107 secured by screws 108 to the top plate 57 (Figs. 2, 3 and 4). The locking plate 105 is vertically disposed and at its top is curved or bent over forward and downward, thus providing an engaging lip which terminates in a locking face 109. Forward of the key stems 50 and extending above the plate 57 lengthwise thereof and beyond the end denominational keys, is a stop plate 110 which is provided at its ends with lateral studs 111 seated in bearing openings in angular brackets 112 secured by screws 113 to the plate 57 (Figs. 2, 3 and 6). The plate 110 is movable by the cams 101, 102 and 103 to different positions to co-act with the stepped stop faces at the front of the denominational key plates. The pivoted plates 105 and 110 are connected by a coiled spring 114, said spring being horizontally disposed and at its rear hooking into an eye 115 projecting forward from the front face of the plate 105, the front end of the spring 114 hooking into a similar eye 116 projecting rearward from the locking plate 110. The spring 114 tends constantly to draw the plates 105 and 110 together or swing them toward each other on their pivots. The result is that as shown in Fig. 2 the plate 105 is normally maintained in contact with the cam edges 98 on the column selecting key plates, while the plate 110 is normally maintained in contact with the front of the key stems 50 and 88 and just below the cam edges at the front sides of the column selecting key plates.

The member 65 and the column selecting levers are adapted to set variably the carriage releasing devices in order to regulate the timing of the carriage release to correspond with the variable operation of the denominational stop devices. The carriage releasing devices comprise a universal bar 117 which underlies the front end portions of the denominational stop levers and is adapted to be actuated by each of said levers. The universal bar 117 is, as will be understood from Figs. 1, 2 and 3, a part of a pivotally supported universal bar frame which further comprises angular side arms 118 connected at their rear ends by a cross plate 119. The universal bar frame is pivoted on the pins 74, the outer end portions of said pins being reduced to provide supports for said frame. The cross plate 119



overlies the two sets of tabulator levers and is bent downward at its ends to connect with the side arms 118. The pivot pins 74 are retained in place on the ears 75 by set screws 120. By loosening the set screws the pivot pins 74 may be removed, enabling both the member 65 and also the universal bar frame to be dismounted. The right-hand side arm 118 of the universal bar frame has a rearward extension 121 with which is pivotally connected the lower end of an upwardly extending link 122. Said link at its top is provided with a lateral stud 123 which engages in a horizontal slot 124 in an ear 125 extending forward from the left-hand end portion of a U-shaped releasing frame which further comprises a cross bar 126 and laterally bent ears 127 (Figs. 1 and 2). The ears 127 are formed with holes which are engaged by shouldered pins 128 supported on lugs 129 which curve downward and forward from the under side of the bracket 14. The pivot pins 128 are adjustably secured in place by set screws 130. The cross bar 126 of the releasing frame is provided with transverse fingers 131 and 131<sup>a</sup>. The finger 131 extends upward slightly above the feed rack 20, normally lying somewhat forward of said rack as shown in Fig. 2; while the finger 131<sup>a</sup> extends downward from the cross bar in line with the finger 131. The depression of any denominational key 55 and the actuation of the connected denominational lever 44 rocks the universal bar frame, raises the link 122 and swings the releasing frame upward on its pivots 128, thus bringing the finger 131 against the feed rack 20 and swinging the latter rearward on its pivots 22, overcoming the springs 26 and causing the teeth of the feed rack to disengage from the feed pinion 29, thereby permitting the carriage and platen to be drawn freely leftward by the spring drum. After the arrest of the carriage and the release of the actuated denominational key, the denominational devices will be restored to normal position by the spring 62 while the universal bar frame, releasing frame and the link connecting them will be restored to normal position by springs 132 secured to the rear vertical face of the plate 60. The feed rack 20 will concurrently be restored into mesh with the feed pinion 29 by the springs 26.

By variably setting the actuating stud 123 carried by the link 122 at different points along the slot 124 the timing of the carriage release may be varied. This variable setting of the stud 123 is brought about by actuations of the arm 72 by the column keys. The slot 73 at the upper end of said arm 72 is engaged by a stud or pin 133 extending laterally from the link 122 somewhat below the stud 123. Normally the stud 123

is retained at the rear end of the slot 124 by reason of the fact that the arm 72 is constantly impelled rearward by a coiled spring 134, the front end of which is secured to the arm 72, the rear end being secured to a pin 135 depending from the bracket 14. The spring 134 acts on the stud 123 through the link 122, pin 133, slot 73 and arm 72. It will further be apparent that said spring acts through the arm 72 on the entire member 65 with which said arm 72 is integral and normally maintains said member in the position shown in Fig. 2.

Referring to the action of the column keys 97 in positioning the stud 123 at different points along the slot 124, it will be apparent that when any one of the column keys, except the fourth, is depressed it will first operate on its associate lever 82 to swing said lever downward on the pivot rod 79. During the first part of this downward movement of the lever 82, the frame 65 on which it is supported will remain motionless. When, however, the lever has been swung far enough to bring its inclined actuating edge into contact with the platform 67, the supporting frame 65 will be taken up and thereafter will participate in the motion of the lever 82, said frame rocking on its pivots 74 and causing a forward swing of the arm 72. Said arm 72 through the pin and slot connection 133, 73 will operate to swing the link 122 forward about its point of connection with the extension 121 as a center, thereby moving the stud 123 forward along the slot-way 124 in the releasing frame, said frame remaining motionless during the setting operation of the link 122. It will be apparent that the extent of forward movement of the stud 123 will depend on the extent of forward swing of the arm 72 and that this in turn will vary according as the first, second or third column key is actuated. When the number one column key is actuated it will move comparatively a short distance only before the actuating edge 84 contacts with the platform 67 and picks up the member 65. When the number two column key is actuated the lost motion before the actuating edge 85 picks up the member 65 will be twice as great; while when the number three column key is actuated the lost motion between the actuating edge 86 and the platform 65 will be three times as great as in the first instance. From what has been said, then it will be clear that when the number one column key is actuated, the stud 123 will be moved forward in the slot-way 124 three times as far as it will be when the number three column key is actuated; and that when the number two column key is actuated the stud 123 will be moved forward twice as far as when the number three key is actuated. It will furthermore be un-



derstood that when the stud 123 is in normal position at the rear of the slot 124, said stud will be nearest the center of motion of the releasing frame, which center passes through the pivot pins 128; and that consequently a greater motion will be communicated to the releasing frame carrying the finger 121 when the stud 123 is moved upward by the rocking of the universal bar frame than will be communicated to the said frame by an equal extent of upward movement of said stud when said stud is set farther from the center of motion passing through the pivots 128. For example, if the stud 123 is set at the rear of the slot and one of the denominational keys is actuated, the releasing finger 131 will move quickly into contact with the rack 20 and will swing said rack out of mesh with the pivot 129 soon after the actuated denominational stop 45 has begun to move forward from normal position and while said stop 45 is in the path of the fourth column stop 43 and prior to said stop 45 entering the path of the third column stop 42. Supposing on the other hand that the stud 122 has been set at the front end of the slot 124 by the actuation of the number one column key 97, then the releasing of the carriage, brought about through upward movement communicated to the stud 123 from an actuated denominational key 55, will take place much more slowly and not until the actuated denominational stop has moved forward across the path or field of the fourth, third and second column stops and into the field of the first column stop 40. Following the same principle, if the link 122 and stud 123 be set intermediate their rearmost and foremost positions lengthwise of the slot-way 124, then a subsequent actuation of a denominational key will effect the release of the carriage after the actuated denominational stop has entered the field of the corresponding column stop (whether that stop be the second or third column stop) and while said denominational stop is still in said field. It will be understood that during the carriage releasing operation the stud 133 on the link 122 will move upward in and be guided by the slot 73, while on the return of the parts to normal position the stud 133 will move downward in the slot 73 to its normal position near the lower end of said slot. During releasing operations the arm 72 is motionless so that the slot 73 serves as a relatively fixed guideway for the stud 133 and the link 122 and thereby maintains the stud 123 set in its predetermined relationship with the slot 124.

The movement of the link 122 and stud 123 to different points along the slot-way 124 and the consequent timing of the release having been explained, the manner of retaining or setting said link and said stud in

the positions to which they have been moved may be referred to. The setting means comprise the spring-controlled locking plate 105 and the co-acting cams 98 and stop faces 100 on the column key plates. When one of the column keys 97 is depressed to swing the stud 123 lengthwise of the slot 124 in the manner already described, the associate cam 98 acting against the forwardly extending lip on the plate 105, will swing said plate rearward on its pivot against the pull of the spring 114. The rearward swing of the plate will continue until the upper end of the cam 98 passes below the stop face 109 on said plate, whereupon said plate will snap forward under the pull of its spring 114 over the stop face 100 on the actuated key plate. At substantially the same time the stop face 99 will contact with the top of the plate 57, thereby arresting downward movement of said key plate. Since the key plate cannot at this time move upward, owing to the co-action between the stop faces 109 and 100, it will be clear that it will be locked or retained in depressed or abnormal position, and that the parts controlled thereby, including the link 122 and stud 123 will be set or locked in abnormal position also. As long as the depressed column key 97 and associate parts are retained locked in abnormal position it will be understood that actuation of any of the denominational keys will operate to release the carriage and arrest the same in the corresponding denominational position in the particular column with which the depressed and locked column key 97 is associated; that is to say, if the third column key has been depressed and locked and thereafter a denominational key is operated, the carriage will be released and arrested in the appropriate denominational position in the third column. After the numbers or other characters have been printed in the third column, if the carriage be retracted toward the right and subsequently one of the denominational keys be operated, the carriage will be released and arrested at the corresponding denominational position in the third column. This construction, it will be apparent, is a convenient one where, as frequently occurs, a successive series of numbers of the same or different denominations is to be printed in the same column, for it enables this sort of work to be done by manipulating the denominational keys and the printing keys after only a single preliminary operation of the appropriate column key. The actuated column key will be retained locked in depressed position until another of the column keys is actuated. When such actuation takes place the associate cam 98 will swing the locking plate 105 rearward on its pivots, carrying the locking face 109 out of the path of the co-acting locking face 100, whereupon the depressed column key and



connected parts will be restored to normal position by the action of the restoring springs including the spring 89 and the spring 134. Thereafter the locking plate 105 will again snap forward to lock the newly actuated column key, key plate and connected parts in abnormal positions.

The operation of the separate and independent means for positively arresting the denominational stop mechanism in variable positions whereby the denominational stops 45 are positively arrested independently of the carriage releasing or other devices in position to cooperate with selected column stops, will now be explained. Said separate and independent means includes the arresting device or stop plate 110, the series of stepped stop faces on the denominational key plates (which stop faces co-act with said stop plate 110) and the cam edges on the front of the column key plates (which cam edges variably position the stop plate 110). As has been described, the front edge of the fourth column key plate 95 is vertical. Consequently when the fourth column key is depressed the locking plate 110 will not be affected, the result being that a subsequent actuation of one of the denominational keys 55 will cause the associate stop face 53<sup>a</sup> to contact with the top of the plate 110 and arrest positively the denominational key and connected parts. The parts are so constructed and related that when this positive arrest takes place the actuated denominational stop 45 will be in the field of the fourth column stop and will be positively arrested in said field in position to co-act with the fourth column stop 43 and with no other column stop. On the other hand, if the first column key be actuated the cam 101 at the front of the corresponding key plate will act against the upper part of the locking plate 110 and will cam or swing said locking plate forward on its pivots. The swinging movement will continue until the upper end of the cam 101 is reached, at which time the top of the plate 110 will be in its final arresting position directly beneath the stop face 53<sup>a</sup> on the denominational key plates. At the same time that this forward swinging of the stop plate 110 is taking place the locking plate 105 is being swung rearward and the result will be that the stop plate 110 will reach the limit of its forward movement at the same time that the locking or detaining device or plate 105 snaps forward to lock the number one column key plate in depressed position. It will be seen that this locking of the key plate will operate to set the stop plate 110 in the desired abnormal position so that when subsequently a denominational key is actuated it will be arrested by the co-action of the associate stop face 53<sup>a</sup> with said stop plate 110. When this arrest of the parts takes

place the actuated denominational stop 45 will have been moved forward into the field of the number one column stop 40 and will consequently be positively arrested in the field of said column stop 40.

From what has been said it will be understood that the locking of the number two or number three column key in depressed position will operate to set the arresting device or plate 110 in the path respectively of either the stop face 53<sup>b</sup> or the stop face 53<sup>c</sup> with the result that subsequent actuation of any denominational key 55 will end with the positive arrest of said key and actuated parts up to and including the associate denominational stop 45, said stop being arrested in the field of the appropriate column stop. It will further be apparent that the positive arrest of the denominational stops in the fields or paths of one or another of the column stops is effected entirely independently of the releasing devices, notwithstanding the fact that the releasing of the carriage is brought about automatically by the operation of the denominational keys and after the releasing devices may have been previously set to time the release by the operation of one or another of the first three column keys. The actuation of the fourth column key does not operate directly either to set the releasing devices, including the stud 123, or to set the stop plate 110. But indirectly the fourth column key does operate on these parts for the reason that the actuation of the fourth column key will serve to release both the stud 123 and the stop plate 110 from positions in which these parts may be set as a result of the prior actuation and locking down of one of the first three column stops.

Associated with my improved tabulating mechanism I have shown novel carriage retarding devices which may be employed with various styles of tabulating mechanism other than that shown, or in other connections where they may be of service. The novel retarding devices have to do more especially with the connections between the retarder proper and the carriage. Said connections comprise a toothed retarding bar or rack 136 which preferably is entirely separate and distinct from the carriage feed rack or other carriage feeding devices. As will be understood from Figs. 1, 2 and 7 the bar 136 is arranged lengthwise of the carriage truck and beneath the same, being slidably connected with lugs 137 depending from the carriage truck near the ends thereof. The bar 136 is provided near its ends with transverse slots 138 which receive headed screws 139, said screws passing upward freely through said slots and entering tapped holes in the bottom faces of the lug 137. By this construction the rack bar is confined between the heads of the screws 139 and the bottoms



of the lugs 137 and is capable of a limited sliding movement on said screws transverse of the direction of the carriage travel. Coiled springs 140 supported on screws 141 secured in the lugs 137, each have one end fast in the associate lug 137. The other end of each spring 140 extends downward through a hole 142 in the rack bar. The construction is such that the springs 140 tend constantly to press the slidable rack bar 136 forward and with the rear ends of the slots 138 against the shanks of the screws 139. The contact of the last two parts determines the normal position of the rack bar 136, said normal position being illustrated in Fig. 2. From this figure it will be seen that the tabulator rack bar 136 is arranged in rear of and slightly below the feed rack 20 and that the teeth of the bar 136 are at its rear side and oppositely disposed from the teeth on the feed rack 20. The bar 136 is adapted to be actuated by a spring finger 143 which is secured by a screw 144 to the rear face of the finger 131<sup>a</sup> at the lower end thereof. Said spring finger extends upward behind the fingers 131<sup>a</sup> and 131 and near its top is bent rearwardly under the feed rack 20, terminating in a short vertical engaging portion 145 which normally lies a short distance in front of the forward edge of the rack bar 136. When the carriage releasing devices are operated by any of the denominational keys 55, the upper end portion of the spring finger 143 moves rearward, bringing the engaging end 145 against the bar 136, and as the motion continues forces said bar to slide rearward against the pressure of its springs 140. The construction and mounting of the spring finger is such as to permit of some extent of lost motion after the end 145 has contacted with the rack bar 136 before rearward movement of said rack bar begins. By this lost motion construction the necessity of a finely adjusted relationship between the carriage releasing devices and the connections to the retarder is avoided. The teeth of the rack bar 136 are normally disconnected from, but are adapted to mesh with, the teeth of a pinion 146, said pinion being connected in any desired way with the retarder devices proper. In the present case the retarding devices proper are arranged in a cylindrical box or casing 147 having an elongated vertical hub 148. Said hub, as clearly appears in Fig. 1, is provided at its top with a lateral off-set 149 which receives headed screws 150, said screws entering the rear of the cross bar or bracket 14, and thereby rigidly securing the casing 147 to said cross bar and thus to the machine frame. The pinion 146 is or may be secured at the top of a shaft which bears in the hub 148, whence it appears that the pinion has a rigid bearing and a fixed axis of rotation. It is not deemed necessary

to my present purpose to describe in detail a particular form of retarding mechanism proper. Preferably devices of the character shown in my pending application Serial No. 303,654 filed March 1, 1906 may be employed; but any other desired style of retarder may be made use of and arranged to be connected with the carriage in the manner illustrated and above described. From what has been said it will be apparent that when the rack bar 136 is slid rearward during the carriage releasing operation the teeth of said rack bar will be brought into mesh with the rigidly supported pinion 146 and a connection between the carriage and the retarding devices proper thereby effected, so that when the release occurs and the carriage starts to run leftward it will do so under the control of the retarding mechanism. After the carriage has been arrested and the actuated denominational key released, the spring finger 143 will swing back to normal position along with the releasing frame on which it is supported, thereby permitting the rack bar 136 to be restored to normal position by its spring 140.

My improved carriage retarding devices possess several advantages over retarding devices hitherto employed. The provision of a retarding rack separate from the carriage feed rack avoids wear and liability of breakage of the teeth of the feed rack from being connected and disconnected to the carriage retarding devices. Furthermore, by employing a movable retarding rack of the character shown and adapted to be connected with a pinion or other device corresponding with the pinion 146, I am enabled to avoid the necessity of moving the comparatively heavy retarding devices proper and thus reduce the energy necessary to be expended in bringing the retarding mechanism into operation.

It will be seen that by my present invention I combine with the carriage releasing means, means independent of said releasing means for variably arresting certain of the tabulator stops when they are actuated and at the end of their movement; that said arresting means comprises an arresting device; that means are provided for moving said arresting device to any one of a plurality of operative positions; that means are provided for locking said arresting device in its operative positions; that the arresting means including said arresting device remains quiescent during the actuation of the tabulator stops; that the arresting means is contactive with different portions of the stop actuating mechanism to arrest variably the actuated tabulator stops; that the arresting device itself is in the form of a bar or plate pivotally mounted on the frame of the machine; that it is controlled by means for turning it variable extents on its pivot; that the con-



trolling means is actuated by keys; that said controlling means include a cam mechanism; that said cam mechanism includes a series of progressive cams; that the arresting device and controlling mechanism including said cams are adapted to be locked or detained in abnormal positions; that the locking or detaining means includes a locking bar or plate, said locking bar being pivotally supported on the frame of the machine; that said cams are on key plates; that said key plates are controlled in the present instance by column keys; that said key plates are further provided with devices or cams for actuating said locking bar; that said locking bar and said arresting bar are constantly urged toward each other by a connecting spring; that the arresting bar operates with predetermined stepped stop faces on key plates controlled by denominational keys, said arresting plate being moved for this purpose to predetermined arresting positions; that said arresting bar is set, locked or detained in predetermined positions by said locking bar or plate; that both sets of cams are controlled by the column keys, one of the sets being progressively arranged while the cams of the other set are all alike; that the carriage feeding devices comprise a spring-pressed feed rack and an intermeshing horizontally disposed feed pinion; that the releasing means comprise a pivoted finger movable to swing said rack rearward out of mesh with said pinion; that said releasing devices further comprise a pivoted universal bar frame, a pivoted releasing frame, of which said releasing finger is a part, and a link connecting the two frames; that means are provided for variably actuating the releasing devices, which means are separate from the arresting means for the actuated tabulator stops; that means are provided for variably timing the operation of the releasing means, which variable timing means are separate from the tabulator stop actuating means; that means including a key are provided for variably actuating certain of the tabulator stops; that there are mechanical connections between said key and the carriage releasing device or finger; that there are means for varying said connections so that substantially the same extent of movement is imparted to said releasing devices for varying extents of movement of said key; that in the present instance said key may be any one of a set of denominational keys; that the varying means include devices for variably setting said link at different predetermined points lengthwise of a slot formed in an arm integral with the releasing frame which carries the releasing finger; that the column keys control levers provided with progressively arranged inclined actuating faces or actuators; that a movable frame is provided which is variably

movable by said actuating faces or actuators; that said movable frame is pivotally mounted; that said column key levers are pivoted on said pivoted movable frame; that said frame is operative on said link with which it is connected by a pin and slot connection; that a carriage retarding mechanism is provided comprising a retarder which is fixed to the frame of the machine below the top plate thereof; that a retarder rack coöperates with said retarder, said rack being independent of the carriage feeding devices; that said rack is spring-pressed and is slidably supported on said carriage underneath the same by screws which pass through the slots in said rack; and that the teeth of said retarder rack are oppositely directed from the teeth of the carriage feed rack.

It will be apparent that various parts of my invention may be used without other parts. For example, the column selecting mechanism may be employed with a single coöperating stop instead of a set of denominational stops.

Various changes in construction and arrangement may be made without departing from the scope of my invention.

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

1. In a typewriting machine, the combination of a carriage, carriage releasing means, coöperating tabulator stops, and means independent of said releasing means for variably arresting certain of said stops when actuated.

2. In a typewriting machine, the combination of a carriage, carriage releasing means, coöperating tabulator stops, an arresting device operating independently of said releasing means for variably arresting certain of said stops, and means for locking said arresting device in any one of a plurality of operative positions.

3. In a typewriting machine, the combination of a carriage, carriage releasing means, coöperating tabulator stops, and means for variably arresting certain of said stops when actuated, said arresting means remaining quiescent during actuation of the stops.

4. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops to move them into position to coöperate with other of said stops, and means variably setttable to contact with different portions of said mechanism to arrest variably the actuated tabulator stops.

5. In a typewriting machine, the combination of a carriage, carriage releasing means, coöperating tabulator stops, and an arresting device movable to different set positions to arrest variably certain of said tabulator stops, the movement of the movable stops and their arrest taking place while said device is stationary in abnormal position.



6. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, and an arresting device mounted on the frame of the machine and adjustable to arrest variably certain of said tabulator stops.

7. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops to move them into position to cooperate with other of said stops, and a pivoted arresting device rotatable to different positions to arrest variably certain of said tabulator stops.

8. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, a pivoted arresting device, and key controlled means for turning said device variable extents on its pivot and for setting it in operative position to arrest variably certain of said tabulator stops.

9. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, an arresting device, and key-controlled cam mechanism for moving said device variable extents to arrest variably certain of said tabulator stops independently of said releasing means.

10. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, a pivoted arresting device, key controlled cam mechanism for turning said device variable extents on its pivot to arrest variably certain of said tabulator stops, and locking means for said cam mechanism.

11. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, an arresting device, a locking plate, and a key controlled cam member for actuating said locking plate and for moving said device to its final arresting position, said cam member being locked by said locking plate in such arresting position.

12. In a typewriting machine, the combination of a carriage, carriage releasing means, cooperating tabulator stops, an arresting device, a locking device, and a key controlled cam member which moves said arresting device to final arresting position and is locked by said locking device so as to maintain said arresting device set in final arresting position.

13. In a typewriting machine, the combination of a carriage, carriage releasing means, a plurality of column stops, a key controlled cooperative stop, and means independent of said releasing means for vari-

ably arresting positively said cooperative stop when actuated.

14. In a typewriting machine, the combination of a carriage, carriage releasing means, a plurality of column stops, a key controlled cooperative stop, and means for variably arresting said cooperative stop when said stop is moved by its key, said arresting means remaining quiescent during the actuation of said cooperative stop.

15. In a typewriting machine, the combination of a carriage, carriage releasing means, a plurality of column stops, an angular lever provided at one end with a stop cooperative with said column stops, a key plate connected with the opposite end of said lever, an arresting device, and means for variably adjusting said arresting device to cooperate variably with said key plate.

16. In a typewriting machine, the combination with a carriage, carriage releasing means, a plurality of column stops, an angular lever provided at one end with a stop cooperative with said column stops, a key plate connected with the opposite end of said lever, a pivoted arresting bar, and means for swinging said bar to any one of a plurality of predetermined positions to engage with said key plate at different points when said key plate is operated to actuate said cooperating stop.

17. In a typewriting machine, the combination with a carriage, carriage releasing means, a plurality of column stops, an angular lever provided at one end with a stop cooperative with said column stops, a key plate connected with the opposite end of said lever, a pivoted arresting bar, means for swinging said bar to any one of a plurality of predetermined positions to engage with said key plate at different points when said key plate is operated to actuate said cooperating stop, and a spring-pressed locking plate for maintaining said key plate in abnormal position.

18. In a typewriting machine, the combination of a carriage, carriage releasing means, cooperating tabulator stops, means for actuating certain of said stops comprising a key plate provided with a plurality of stepped stop faces, and an arresting device adjustable to cooperate with predetermined stop faces on said key plate.

19. In a typewriting machine, the combination of a carriage, carriage releasing means, cooperating tabulator stops, means for actuating certain of said stops comprising a key plate provided with a set of stepped stop faces, a pivoted arresting bar, and means for setting said bar in positions to be engaged by a predetermined stop face on said key plate.

20. In a typewriting machine, the combination of a carriage, carriage releasing



means, tabulator stops, mechanism for actuating certain of said stops, an arresting device, and a plurality of key controlled cams operative to move said stop device to variable extents to different arresting positions, each cam operating to move said device a predetermined extent to a particular arresting position.

21. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, an arresting device, a plurality of key controlled cams operative to move said arresting device variable extents, each cam operating to move said device to a predetermined arresting position, and means for locking said cams so as to set said arresting device in positions of arrest.

22. In a typewriting machine, the combination of a carriage, carriage releasing means, tabulator stops, mechanism for actuating certain of said stops, an arresting device, a plurality of key controlled cams operative to move said arresting device variable extents, each cam operating to move said device to a predetermined arresting position, and means for locking said cams, the locked cam being releasable by the actuation of another of said cams.

23. In a typewriting machine, the combination of a carriage, carriage releasing means, a set of column stops, a cooperating stop, means for actuating said cooperating stop, and means for variably arresting said cooperating stop in position to cooperate with predetermined column stops, said means comprising an arresting device, and a plurality of key controlled cams operated to move said device, each cam being different in shape from the other cams.

24. In a typewriting machine and in a tabulating mechanism, the combination of a set of column stops, a cooperating stop, means for actuating the same, a set of column keys, two sets of cams controlled by said keys, an arresting device cooperative with said means and controlled by one of said sets of cams, and a locking device controlled by the other set.

25. In a typewriting machine and in a tabulating mechanism, the combination of a series of stepped column stops, a cooperating stop, means for actuating the same, a set of column keys, two sets of cams controlled by said keys, one of said sets being progressively arranged, an arresting plate cooperative with said mechanism and controlled by the progressive cams, and a locking plate controlled by the other set of cams.

26. In a typewriting machine and in a tabulating mechanism, the combination of a series of stepped column stops, a cooperating stop, means for actuating the same com-

prising a key plate provided with stepped stop faces, a set of column keys, two sets of cams controlled by said keys, one of said sets being progressively arranged, an arresting plate controlled by said progressive cams and cooperative with said stepped stop faces, and a locking plate controlled by the other set of cams.

27. In a typewriting machine and in a tabulating mechanism, the combination of a series of column stops, a set of cooperating denominational stops, means for actuating said denominational stops, a set of column keys, two sets of cams controlled by said keys, an arresting device cooperative with said means and controlled by one of said sets of cams, and a locking device controlled by the other set of cams.

28. In a typewriting machine and in a tabulating mechanism, the combination of a series of stepped column stops, cooperating denominational stops, means for actuating said denominational stops including stepped key plates, a set of column keys, progressively arranged cams controlled by said keys, and an arresting bar movable to different extents by said cams and cooperative with said stepped key plates.

29. In a typewriting machine and in a tabulating mechanism, the combination of a series of stepped column stops, a set of cooperating denominational stops, means for actuating said denominational stops comprising stepped key plates, a set of column keys, two sets of cams controlled by said column keys, one of said sets being progressively arranged, an arresting bar controlled by said progressive cams and cooperative with said stepped key plates, and a locking device controlled by the other set of cams.

30. In a typewriting machine, the combination of a carriage, carriage feeding devices comprising a spring-pressed feed rack supported on arms depending from and pivoted at the under side of said carriage, a horizontally disposed feed pinion with which said rack normally meshes, cooperating tabulator stops, and means for actuating certain of said stops and releasing said carriage comprising a lever, a pivoted universal bar frame, a pivoted releasing frame comprising a finger engageable with said rack to move it rearward, and a link connecting the two frames.

31. In a typewriting machine, the combination of a carriage, carriage releasing devices, cooperating tabulator stops, means for moving certain of said stops to varying operative positions and positively arresting the same, and separate means for correspondingly actuating said carriage releasing devices.

32. In a typewriting machine, the combination of a carriage, carriage releasing de-



vices, cooperating tabulator stops, means for moving certain of said stops to varying operative positions and positively arresting the same, and separate means for variably timing the operation of said releasing means.

33. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing device, mechanical connections between said device and said key, and means for varying said connections so as to impart substantially the same extent of movement to said device for varying extents of movement of said key.

34. In a typewriting machine, the combination of a carriage, carriage feeding devices including a separable rack and pinion, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing lever, a finger for separating said rack and pinion, connections between said finger and said key, and means for varying said connections so as to impart substantially the same extent of movement to said finger for varying extents of movement of said key.

35. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means for variably actuating the same including a set of denominational keys, a carriage releasing device, connections between said device and said keys, and means for varying said connections so as to impart substantially the same extent of movement to said device for varying extents of movement of each of said denominational keys.

36. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing frame, a link connected with said frame, connections between said link and said key, and means for varying the normal position of said link so as to impart substantially the same extent of movement to said frame for varying extents of movement of said key.

37. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing frame, a link connected with said frame, a second frame with which said link is also connected, said key controlling said second frame, and means for adjusting said link so as to impart substantially the same extent of movement to said releasing frame for varying extents of movement of said key.

38. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means including a set of denominational keys for variably actuating

said denominational stops, said means including a set of denominational keys, a carriage releasing device, a universal bar operative by said denominational keys, connections between said universal bar and said device, and means for varying said connections so as to impart substantially the same extent of movement to said device for varying extents of movement of said denominational keys.

39. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means including a set of denominational keys for variably actuating said denominational stops, said means including a set of denominational keys, a carriage releasing frame, a universal bar operative by said denominational keys, connections including a link between said universal bar and said frame, and means for varying the normal relationship between said frame and said link.

40. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing device, connections between said device and said key, column keys, levers controlled thereby and provided with progressively arranged actuating faces, and a movable frame variably movable by said actuating faces, said frame being operative on said connections.

41. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing device, connections between said device and said key, column keys, levers controlled thereby and provided with progressively arranged actuating faces, and a frame on which said levers are mounted and which they actuate, said frame being operative on said connections.

42. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing device including a link between said device and said key, a set of column keys, levers provided with progressively disposed actuators and operative on said column keys, and a movable frame supporting said levers, said levers operating to move said frame, said frame being connected with said link.

43. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing device including a link between said device and said key, a set of column keys, levers provided with progressively disposed actuators and operative by said column keys, and a movable frame supporting said levers,



said levers operating to move said frame, said frame having an arm which has a pin and slot connection with said link.

44. In a typewriting machine, the combination of a carriage, tabulator stops, means including a key for variably actuating certain of said stops, a carriage releasing frame comprising a slotted arm, connections between said device and said lever comprising a link engaging the slot in said arm, and key controlled means for varying the point of engagement of said link along the slot in said arm so as to impart substantially the same extent of movement to said frame for varying extents of movement of said key.

45. In a typewriting machine, the combination of a carriage, column stops, denominational stops, variably movable controlling mechanism for said denominational stops including a set of denominational keys, column selecting keys, and releasing devices including a link pivoted at one end to one of said releasing devices and having a pin and slot connection at the other end with another of said releasing devices, said link being settable by said column keys and being movable from different set positions by said denominational keys.

46. In a typewriting machine, the combination of a carriage, carriage feeding devices comprising a feed rack and a feed pinion with which said rack normally meshes, cooperating tabulator stops, means for actuating certain of said stops including a lever, a universal bar frame, a releasing frame comprising a finger engageable with said rack, a link connecting the two frames, and means for setting said link to act variably on said releasing frame.

47. In a typewriting machine, the combination of a carriage, carriage feeding devices comprising a feed rack and a feed pinion with which said rack normally meshes, cooperating tabulator stops, means for actuating certain of said stops including a lever, a universal bar frame, a releasing frame comprising a finger engageable with said rack, a link connecting the two frames, and means for setting said link to act variably on said releasing frame, said last recited means comprising a set of key controlled cams.

48. In a typewriting machine, the combination of a carriage, carriage feeding devices comprising a spring-pressed feed rack supported on pivoted arms depending from the under side of said carriage, a feed pinion with which said rack normally meshes, cooperating tabulator stops, means for actuating certain of said stops including a lever, a pivoted universal bar frame, a pivoted releasing frame comprising a finger engageable with said rack to move it rearward and a link connecting the two frames, and means

for setting said link to act variably on said releasing frame, said last recited means comprising a pivoted member connected with said link and a set of key controlled cams for variably moving said member.

49. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means for variably actuating said denominational stops, said means including a set of denominational keys, a carriage releasing frame, a universal bar operative by said denominational keys, connections including a link between said universal bar and said frame, and means for varying the normal relationship between said frame and said link, said last recited means comprising a progressively arranged series of key controlled actuators.

50. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means for variably actuating said denominational stops, said means including a set of denominational keys, a carriage releasing frame, a universal bar operative by said denominational keys, connections including a link between said universal bar and said frame, and means for varying the normal relationship between said frame and said link; said last recited means comprising a frame, and a set of key controlled actuators supported on said frame and adapted to move the same variably.

51. In a typewriting machine, the combination of a carriage, column stops, denominational stops, means for variably actuating said denominational stops, said means including a set of denominational keys, a carriage releasing frame, a universal bar operative by said denominational keys, connections including a link between said universal bar and said frame, and means for varying the normal relationship between said frame and said link, said last recited means comprising a pivoted frame having a connection with said link, and a set of key controlled actuators pivoted on said pivoted frame and operative to impart progressively varying extents of movement thereto.

52. In a typewriting machine, the combination of a carriage, carriage feeding devices, a retarder fixedly secured to the frame of the machine, a spring-pressed rack slidably supported on said carriage and independent of said carriage feeding devices, and key controlled means for automatically connecting said rack with said retarder.

53. In a typewriting machine, the combination of a carriage, carriage feeding devices, a retarder contrivance including a pinion having a fixed axis of rotation, a retarder rack provided with slots, screws engaging said slots and secured to the carriage, said screws slidably supporting said rack independently of said carriage feed-



ing devices, and means for connecting said rack with said pinion.

54. In a typewriting machine, the combination of a carriage, carriage feeding device including a rack pivotally mounted on said carriage, a retarder contrivance fixed to the machine frame and comprising a pinion, a retarder rack slidably supported on said carriage, key controlled tabulating mechanism, means for moving said retarder rack into engagement with said pinion and

concurrently moving said pivoted feed rack to inoperative position when the tabulating keys are operated.

Signed at the borough of Manhattan, city 15 of New York, in the county of New York, and State of New York, this 18th day of June A. D. 1909.

ARTHUR W. SMITH.

Witnesses:

CHARLES E. SMITH,  
J. B. DEEVES.