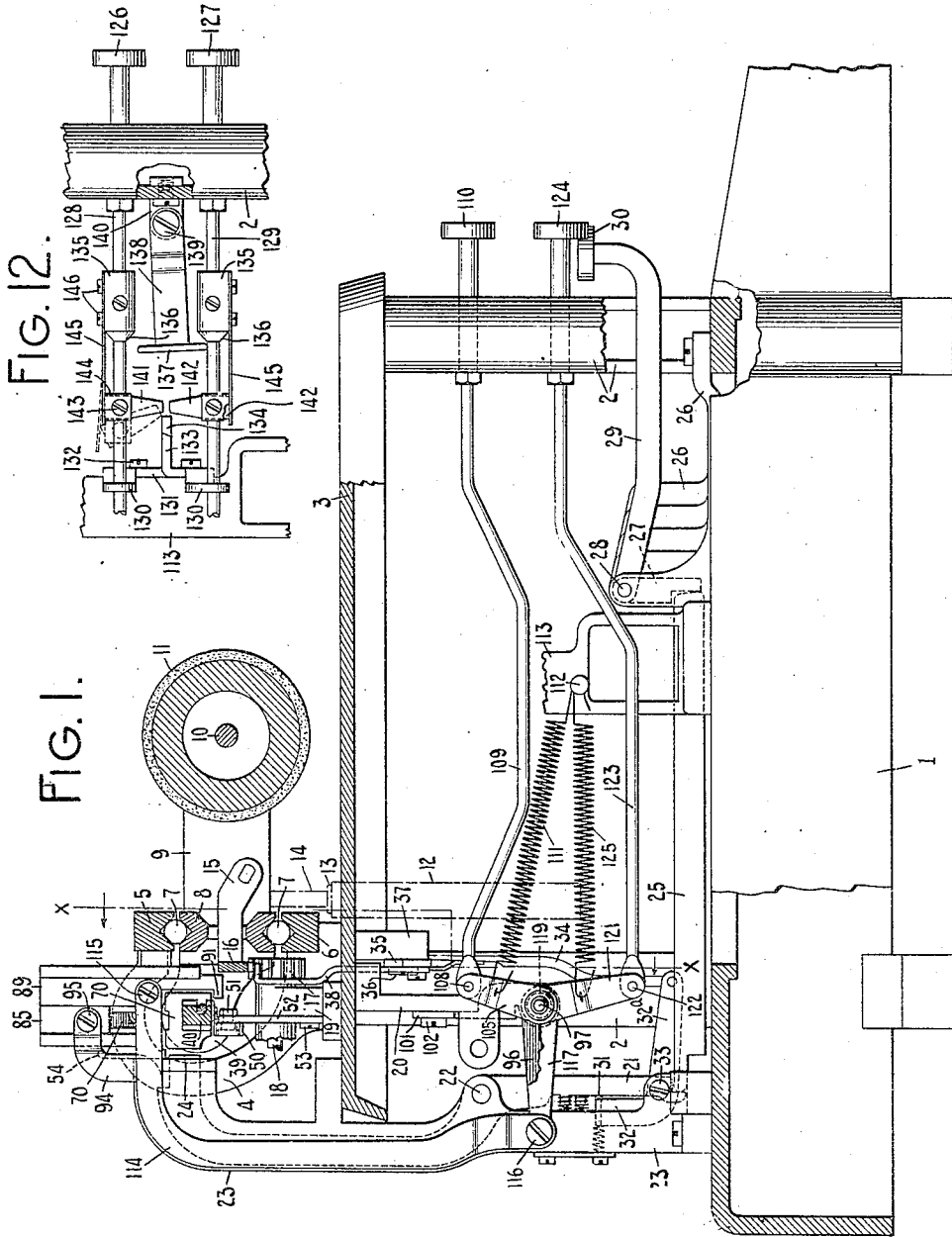


H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 27, 1912.

1,037,076.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

E. M. Wells.

m.w. Pool

INVENTOR:

Herbert H. Steele

By Jacob Felbel

HIS ATTORNEY

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 27, 1912.

1,037,076.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 2.

FIG. 2.

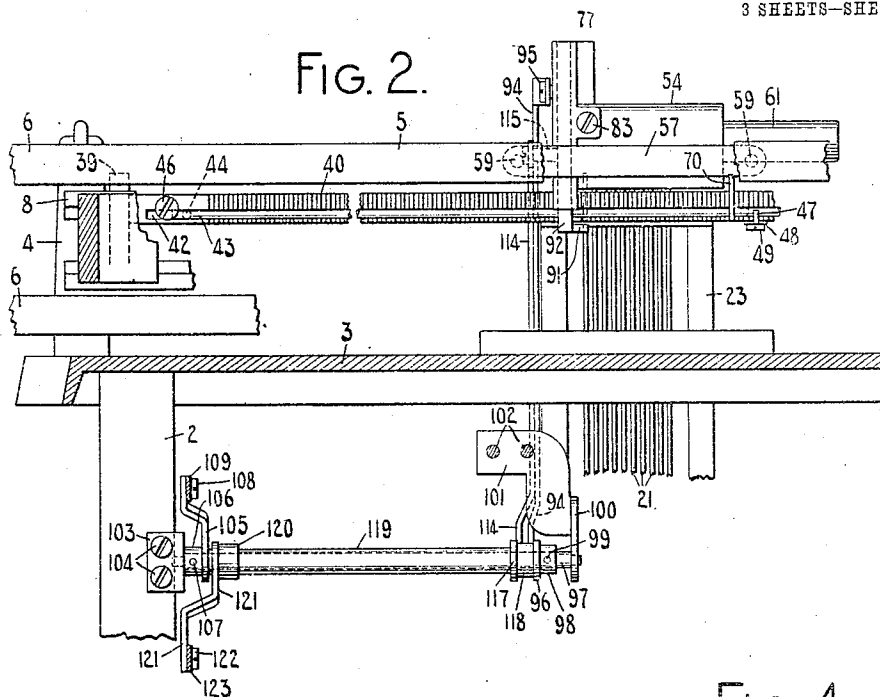
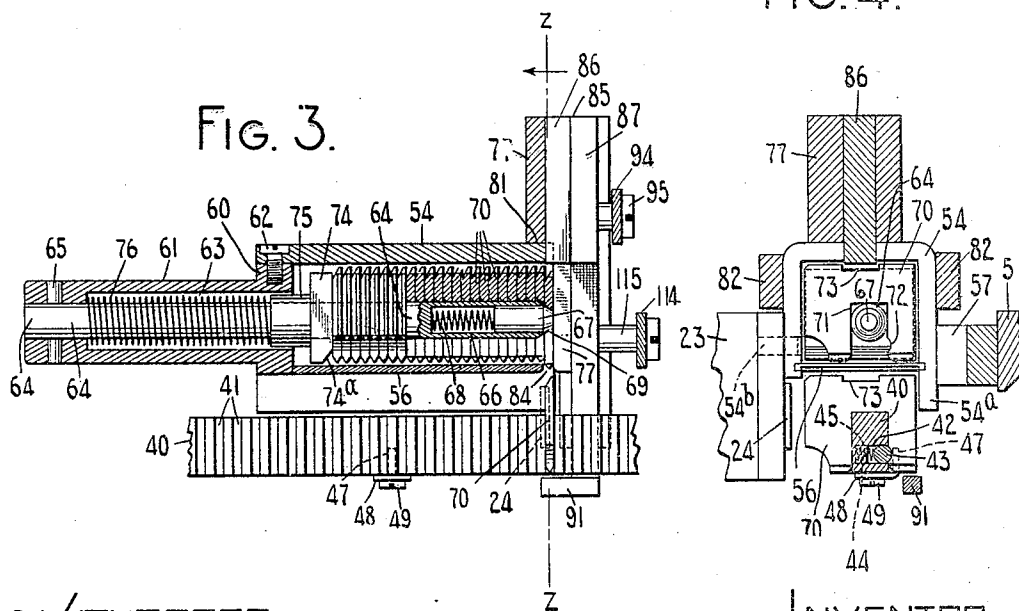


FIG. 4.



WITNESSES.

E. M. Wells.
m.w. tool

INVENTOR.

Herbert H. Steele
By Jacob Feld
HIS ATTORNEY

H. H. STEELE.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 27, 1912

1,037,076.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 3.

FIG. 5.

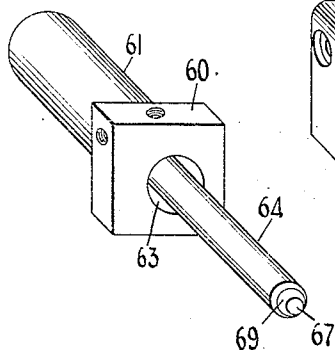


FIG. 6.

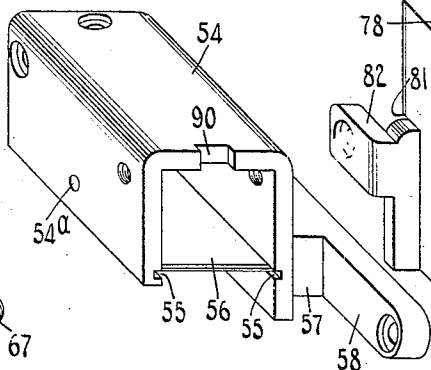


FIG. 7.

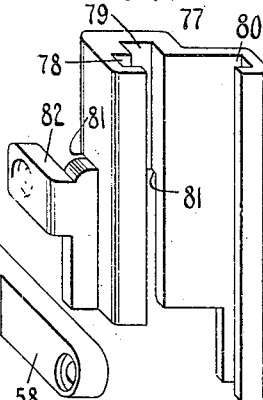


FIG. 8.

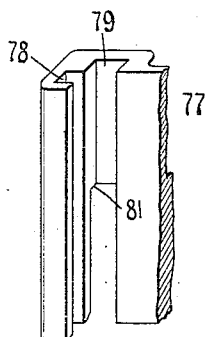


FIG. 9.

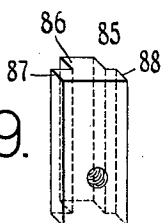


FIG. 10.

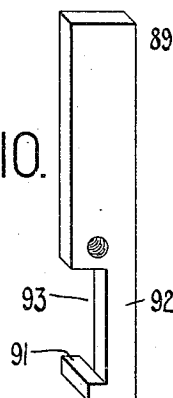
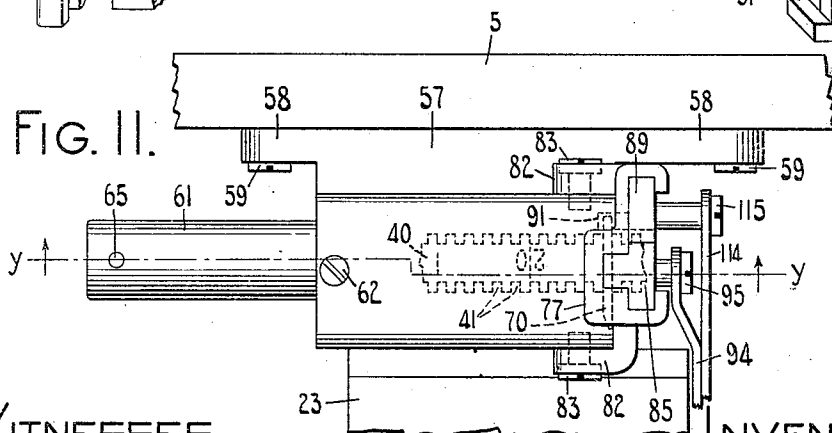


FIG. 11.



WITNESSES:

E. M. Wells.

m.w. Pool

INVENTOR:

Herbert H. Steele

By Jacob Feldt

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

HERBERT H. STEELE, OF MARCELLUS, NEW YORK, ASSIGNOR TO THE MONARCH TYPE-WRITER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,037,076.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed March 27, 1912. Serial No. 686,575.

To all whom it may concern:

Be it known that I, HERBERT H. STEELE, citizen of the United States, and resident of Marcellus, in the county of Onondaga 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 to key set tabulating mechanism for typewriting machines and its general object is to provide improved mechanism of the character specified.

More specifically my invention relates to key set tabulating mechanism embodying a stop magazine and devices for at will ejecting stops from the magazine and adjusting them at predetermined points lengthwise of the platen, so that they will cooperate with other stops to arrest the carriage at predetermined tabulating positions; and also for at will retracting the key set stops within the magazine, so that the stop bar or receiving element may be expeditiously "cleared." Key set tabulating mechanism of this general description is disclosed in the patent to John Waldheim, No. 974,318, granted November 1, 1910, and my present invention is an improvement in various respects on the patented construction.

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 claims.

My invention as illustrated in the accompanying drawing is embodied in a No. 3 wide-carriage Monarch typewriting machine but said invention may be readily adapted, in whole or in part, to other styles of writing machines.

In the drawings, Figure 1 is a fragmentary side elevation, partly in section, of a Monarch typewriting machine embodying my invention, parts of the machine being omitted and parts broken away. Fig. 2 is a vertical sectional view taken on planes indicated by the broken dotted line $x-x$ in Fig. 1 and looking in the direction of the arrows at said line, some of the parts shown in Fig. 1 being broken away and other parts being omitted from Fig. 2. Fig. 3 is a vertical sectional view taken longitudinally through the stop magazine, the planes on which the view is taken being indicated by the broken

dotted line $y-y$ in Fig. 11. Fig. 4 is a vertical sectional view taken on the plane indicated by the dotted line $z-z$ in Fig. 3. Figs. 5 to 10, inclusive, are perspective views of detached parts hereinafter more specifically described. Fig. 11 is a fragmentary top plan view of the stop magazine and associate parts. Fig. 12 is a fragmentary side elevation of a modification.

As shown in Fig. 1 the main frame comprises a base 1, posts 2 and a top plate 3, said top plate supporting goose-neck standards 4 to which are secured fixed grooved track-ways 5 and 6, the latter cooperating through anti-friction rollers 7 with the slide or rear bar 8 of a platen carrier or carriage, which further includes forwardly extending end bars 9. Said end bars provide bearings for the axle 10 of a rotary platen 11 with the front face of which cooperate printing instrumentalities of the usual or other suitable description, not shown. The carriage is constantly urged leftward by a spring drum or motor 12 which is connected by a strap 13 with an arm 14 depending from the carriage. Pivoted to the end bars 9 are arms 15 which support a carriage feed rack 16 that is normally maintained in spring-pressed engagement with a feed pinion 17 secured to the front end of a shaft 18 which bears in a bracket 19 secured to the top plate 3. As is well understood the shaft 18 is operatively connected to an escapement wheel which cooperates with escapement dogs mounted on a dog rocker pivotally supported on a bracket 20 depending from the top plate, said dog rocker being actuated from a universal bar which underlies the printing key levers of the machine. The escapement devices last referred to are omitted from the drawings but are preferably of the usual character shown in the Monarch typewriter.

In carrying out my present invention I preferably employ denominational tabulating mechanism of the character used in the Monarch machine. Said mechanism comprises a set of upright denominational stop levers 21 pivotally supported at 22 in an upright frame 23 rigidly secured to the rear portion of the main frame of the machine. The upper end portions of the levers 21 are curved forward, terminating in denominational stops proper 24, said stops being arranged a letter space distance apart length-

wise of the carriage and being adapted when actuated or projected horizontally forward to cooperate with column stops hereinafter to be described. The actuating devices for the stop levers 21 comprise slide bars 25 which bear at their rear end portions on part of the frame 23 and are adapted to push against the lower arms of the levers 21. The forward ends of the bars 25 bear slidably in a detachable supporting frame 26 and are adapted to be actuated by arms 27 which are secured to and depend from short rock shafts 28 bearing in upright portions of the frame 26. Fixed to the rock shafts 28 are denominational key levers 29 provided at their forward ends with keys 30. When a denominational key 30 is actuated it rocks the associate shaft 28, causing the crank arm 27 to slide the bar 25 rearward, swinging the associate lever 21 on its pivot 22 and projecting the stop 24 into the path of the column stops.

The actuation of one of the stop levers 21 operates the carriage releasing devices, said devices comprising a universal bar or bail, the bar portion 31 being arranged transversely of and behind the lower arms of the levers 21 and the laterally disposed end portions 32 being pivoted at 33 to the frame 23. One of the parts or arms 32 has an extension 32^a which is pivotally connected to the lower end of an upright link 34, the upper end of said link being connected to one arm of a lever 35 pivoted at 36 to a stationary bracket 37, the other arm of the lever 35 being connected to a lifter 38 which at its upper end has horizontal portions or shoes underlying the feed rack 16. The construction is such that when the universal bar 31 is swung rearward it operates through the train of connecting devices to raise the lifter 38 and swing the feed rack upward, separating it from the feed pinion 17 and permitting the carriage to be drawn rapidly leftward by the spring motor 12. The usual restoring springs are provided for restoring the releasing devices and the denominational stop levers and their actuating devices to normal position when the keys 30 are released after actuation.

Projecting rearward from the slide bar 8 are arms 39 which provide a support for a column stop bar 40, said bar being toothed at its front and rear faces, the notches 41 between the teeth being a letter space distance apart and being adapted to receive column stops. The stop bar 40 is of ordinary construction but is provided with novel stop retaining devices illustrated in Figs. 1 to 4. To accommodate these devices the front face of the bar is formed with a longitudinal groove 42 which receives a rod 43 circular in cross section. Said rod is constantly pressed forward by springs 44 seated in depressions 45 in the rod, there being

preferably three of these springs, two near the ends and one midway between. Said springs tend to force the rod 43 out of its seat 42 but this is prevented by headed screws 46, one near each end of the rod and by a central restraining finger 47 which overlies one of the teeth of the stop bar and is so narrow that it does not encroach on the neighboring notches and so prevent the adjustment of stops therein. The finger 47 is part of an angular bracket 48, the body portion of which extends beneath the rod and is secured thereto by a screw 49. To prevent the middle portion of the stop bar from springing downward when a column stop is pushed down thereon as hereinafter described, an underlying support is provided comprising a roller 50 which is positioned just below the under face of the stop bar. Said roller is mounted upon a shouldered screw 51 threaded into the upper end of a stationary arm 52 which is adapted to pass over and around the barrel of the bracket 19 and at its lower end is secured to said bracket by a screw 53.

The column stop magazine, container or box 54, which is shown detached in Fig. 6, is bent or shaped to form an inverted trough-like housing which is grooved at its inner faces as indicated at 55 to receive a detachable slide or floor plate 56. The box is rigid on a bracket piece 57 provided with ears 58 which are secured by screws 59 to the rear face of the upper guide rail 5. Thus the box magazine 54 is rigidly secured to the frame of the machine in such position that it overhangs or overlies the stop bar 40. The rear vertical wall of the box 54 is formed with a hole 54^a which engages a pin 54^b fixed to and projecting forward from the head of the tabulator frame 23. Thus an additional support for the box is provided at its rear side. The right-hand end of the box 54 is closed by the squared head 60 of a barrel-like device 61 shown detached in Fig. 5. Screws 62 maintain the box or housing 54 and barrel 61 in rigid relationship. The barrel is bored out as indicated at 63 and the bore receives a rod or stop support 64 which extends longitudinally through the barrel and through the box 54 and is secured in place by a cross pin 65 passing through the closed outer end of the barrel and through said rod (Fig. 3). The free or left-hand end of the rod 64 is provided with a depression 66 which receives a spring plunger or end plug 67 which is constantly pressed outward by a coiled spring 68. The outer end of the plunger is beveled or coned as indicated at 69 and the edge of the rod 64 is correspondingly beveled.

Stored or housed in the magazine or box 54 as best shown in Figs. 3 and 4 is a set or series of column stops 70. Each column stop

may be described generally as a rectangular plate of such size as to fit loosely within the rectangular box 54, the internal cross dimensions of which are slightly greater than the corresponding dimensions of the stop. Each stop is formed with a notch 71 which enables it to fit over and rest on the supporting rod 64. The forward edge of each notch 71 is provided with a slight depression 72 to cooperate with the retaining rod 43 when the stop is ejected on to the stop bar 40 as hereinafter described. The upper edge of each stop is beveled or inclined from right to left or, as viewed from the rear in Fig. 3, from left to right, while the lower edge of each stop is pointed or formed with a double bevel, as shown. At the top each stop is formed with a notch or recess 73 to cooperate with an ejector or slide hereinafter described. The magazine may be adapted to receive any desired number of column stops, that illustrated herein accommodating some twenty-five stops. These stops are strung together face to face on the rod or support 64 and are forced along the rod toward the end of the magazine by devices comprising a follower which consists of a head 74 beveled at its lower end as indicated at 74^a and an integral hub portion 75, the follower being slidably mounted on the rod 64 and urged leftward or toward the mouth of the magazine by a spring 76 coiled around the rod 64 within the barrel 61. The left-hand end of the magazine or box 54 is closed by a closure or guide member which is shown detached in Fig. 7 and is designated as a whole by the numeral 77. Said member is formed with vertical guide-ways or grooves 78, 79 and 80 and is undercut as indicated at 81 to fit over the top and left-hand face of the box 54. Lateral ears 82, integral with the member 78, embrace the sides of the magazine and receive screws 83 which fixedly secure said member 77 to said magazine. When in place as in Fig. 3 the inner face of the member 77 provides a closure or end for the magazine and the outermost stop is maintained pressed against said closure by the spring 76. If the pressure is relaxed or if the stops are jarred somewhat the outer stop 70 may slip down slightly on the coned end of the plug or plunger 67 as illustrated in Fig. 3, which plug or retaining device thus insures the retention of the stop in the magazine. As shown in said figure the floor plate 56 terminates a short distance inward from the outer face of the body of the box 54 and cooperates with the inner wall of the member 77 to provide a slot, opening or passage-way 84 through which the column stops may pass out of and into the magazine. This slot-way is of a width slightly greater than the width of the stops 70 and its lower end has a somewhat wider mouth which is formed by

beveling the opposite lower edges of the floor plate 56 and the member 77. Said slot-way 84 is arranged so that it is substantially in register with the left-hand or decimal denominational stop 21 so that when a column stop is ejected from the magazine and forced on the column stop bar, it will occupy the same position that would be occupied by a column stop that had just cooperated with the decimal denomination stop to arrest the carriage.

As is clearly shown in Fig. 4 the stop magazine is arranged directly above the column stop bar 40 so that the slot-way 84 is above the top of said stop bar and at a distance from it less than the height of one of the column stops so that when the column stops are ejected through the slot they will engage with the underlying notches 41 in the stop bar before passing entirely out of the magazine through the slot 84. The ejector by which the column stops are caused to pass out of the magazine and forced on to the column stop bar is a block-like slide 85 shown detached in Fig. 9 and provided with a central lateral rib 86 and oppositely disposed ribs 87 and 88 at right angles to the rib 86. The rib 86 fits into and is guided by the groove or slot 79 in the member 77 while the rib 87 fits into the groove or guide-way 78 at the rear of said member. The forward face of the rib 88 slidably cooperates with the rear face of a retractor or slide 89, shown detached in Fig. 10, the forward portion of said retractor fitting into the guiding groove 80. The construction is such that while the slide 85 may move freely when actuated it is restricted closely by its guiding devices to a vertical path. The left-hand end of the magazine 54 is provided with a notch or slot-way 90 which registers with the groove 79 and affords a passage for the slide 85 and particularly for the rib portion 86 thereof. The inner face of said rib portion will slide over the bottom of the notch 90 and also over the edge of the floor plate 56 when the slide is reciprocated or moved up and down by devices hereinafter described. Normally the slide 85 is maintained in the positions shown in Figs. 3 and 4 at the top of the member 77 and so that the bottom face of the slide is above the underlying column stop; but when the slide is pushed or drawn downward the bottom face of the rib portion 86 will engage in the notch 73 of the outermost column stop and will force said column stop vertically downward out of the magazine through the slotway 84 and on to the stop bar 40, the notch 71 enabling the stop to straddle the stop bar and fit into the appropriate notches 41 therein. The fit of the rib 86 in the notch 73 is comparatively close and the parts will cooperate to guide the downwardly moving stop in a straight

course and to prevent wobbling of said stop. During its passage downward over the stop bar the forward edge of the notch 71 will force the retaining rod 43 slightly rearward but as soon as the depression 72 comes opposite said rod, the rod will swing outward again and engage with the depression to hold or retain the stop on the stop bar 40 as shown in Fig. 4. The retaining devices are quite efficient in operation but owing to the fact that the surface of the rod 43 is rounded as is also the edge of the depression 72, said devices will readily engage and disengage, increasing the facility with which locking and unlocking is accomplished, and lessening the liability of sticking which occurs in locking devices having straight or angularly disposed faces. The operation above described may be repeated until the desired number of column stops have been properly set in position on the column stop bar.

The retractor 89 is arranged at the forward side of the stop bar and when in normal position extends down below said stop bar (Fig. 1), terminating at its lower end in a lug toe-piece for engaging portion 91 which underlies portions of the column stops on the stop bar 40 when said stops are brought into register with the part 91. The part 91 and the body of the retractor 89 are connected by a narrow portion or neck 92 and an opening or slot-way 93 is thus provided between the body portion of the retractor and the part 91 through which opening the set column stops are adapted to pass freely during to and fro traveling movements of the carriage. The retractor 89 is adapted to be slid up or lifted from normal position by means hereinafter described in order to cooperate with the set column stops and force them upward back into the magazine in order to "clear" the column stop bar. During the retracting operation the member 89 slides in the guideway 80, which controls it at the front and sides, and against the ejector 85, the rib 88 whereof prevents rearward displacement of the member 89.

The ejector 85 is operated by key controlled devices comprising an angular link 94 (Figs. 1, 2, 3 and 11), the upper end of which is pivotally connected by a shouldered screw 95 with the ejector 85, said link being off-set slightly leftward and curving irregularly, as best shown in Fig. 1, but extending generally downward at the left and alongside of the tabulator frame 23. The link 94 is pivotally connected at its lower end with a crank arm 96 which extends horizontally rearward from a rock shaft 97 and is provided with a hub 98 which fits over the rock shaft and is pinned thereto at 99. The rock shaft 97 is reduced at its right-hand end and the reduced portion bears in a

forwardly turned ear 100 of a bracket 101 which is secured by screws 102 to the bracket 20. From the bracket ear 100 the rock shaft 97 extends horizontally leftward and is reduced at its left-hand end, the reduced portion bearing in an angular bracket 103 secured by screws 104 to the left-hand rear post 2. Extending upward from the left-hand end portion of said rock shaft is a crank arm 105 provided with a hub 106 which is pinned at 107 to the rock shaft. The crank arm 105 is off-set near its upper end and is pivotally connected at 108 to the rear end of a push rod 109, which push rod is irregularly bent but extends forward in a generally horizontal direction, bearing at its front end in the left-hand front post 2 and terminating forward thereof in a key or button 110. The crank arm 105 is connected by a draw spring 111 with a pin 112 extending laterally outward from the left-hand post 113 which guides the shiftable type bar segment of the Monarch machine. The spring 111 operates as a restoring spring to restore the parts to the normal or Fig. 1 position after the key 110 has been pushed in to lower the slide 85 and thereafter released. It will be apparent that the pushing in or actuation of the key 110 operates through the rod 109 and crank arm 105 to turn the rock shaft 97 in its bearings, swinging down the crank arm 96 and pulling down the link 94, which in turn operates to slide the ejector 85 downward to eject one of the column stops from the magazine and position or set it on the stop rod.

Key controlled devices are provided for operating the retractor 89, said devices comprising an angular link 114 which is pivotally connected at its upper, forward end by an elongated shoulder screw 115 with the retractor 89 (Figs. 1, 2, 3 and 11). The link 114 extends rearward and thence curves downward at the left of the link 94, said link 114 being slightly off-set outward at its lower end portion and being pivotally connected at 116 with a crank arm 117 extending rearward parallel with and alongside of the crank arm 96. The crank arm 117 is provided with a hub 118 which fits over and is secured to the right-hand end portion of a sleeve 119, said sleeve surrounding and bearing loosely on the rock shaft 97 and being confined between the crank arms 96 and 105. The left-hand end portion of the sleeve 119 has secured to it the hub portion 120 of a crank arm 121, said crank arm extending downward from the sleeve and being pivotally connected at 122 with a push rod 123 which extends forward below the push rod 109 and bears at its forward end in the left-hand front post 2, said push rod 123 being provided forward of the post with a key or button 124. A coiled restoring spring 125 is connected to the crank arm 130

121 and to the pin or anchor 112. When the key 124 is actuated or pushed rearward it operates through the rod 123 and crank 121 to rotate the sleeve 119 on the rock shaft 97, which remains motionless during this turning operation of the sleeve. The rotary movement of the sleeve is transmitted through the crank arm 117 to the link 114, the link being thus raised and operating to lift the retractor 89, causing the engaging portion 91 thereof to cooperate with the column stops which are brought in register therewith, detaching the column stops from the stop bar 40 one by one and lifting them upward through the slot 84 and into the magazine. It will be understood that, as stated, the turning of the sleeve 119, when the key 124 is operated, does not affect the rock shaft 97 and connected parts; and it will also be understood that when the rock shaft is turned by the operation of the key 110 the sleeve 119 and the connected parts will not be affected. The crank arms 96 and 105 together with the shaft 97 constitute a bell crank having an elongated hub portion which fits in the hub portion of a corresponding bell crank comprising the sleeve 119 and the crank arms 117 and 121.

In using my invention to set the column stops for tabulating operations in connection with any particular form of work it may be assumed that the stop bar 40 is clear or bare of stops and that a blank form of the usual sort having ruled columns is in place on the platen. In the first place the operator moves the carriage to bring the decimal position in the first column on the work sheet opposite the printing point on the platen. Then the key 110, which preferably is provided with suitable indicating marks on its front face such as the words "Stop-set", is pushed in, causing the ejector 85 to slide vertically downward in its guides as has been described. The ejector engages the underlying column stop 70 which is the right-hand stop in Fig. 3 and forces it downward through the slot 84, the stop overcoming the spring 68 and forcing the retaining plunger or plug 67 back in the opening 66. As has been stated the end of the plunger 67 is coned, and the upper edge of the notch 71 in the stop is correspondingly beveled so that through the stop the retractor exerts a camming action on the plunger 67 and makes its retraction within the opening 66 comparatively easy. The ejected column stop will be forced down upon the stop bar 40 and held thereon by the spring pressed retaining rod 43 as has been described. After the stop has been ejected from the magazine and as soon as the ejector has returned to normal position the entire set of remaining stops will be forced outward along the supporting rod 64 by the spring 76 acting on the follower 74

until the outermost stop is brought into contact with the adjacent face or wall of the member 77. It will be found that the ejected column stop has been set or adjusted on the stop bar 40 at a point indicated by the usual scale on the top of the stop bar (Fig. 11) which corresponds with the point indicated by the usual scale and pointer (not shown) at the front of the platen. In other words, the column stop after ejection from the magazine and adjustment on the stop bar 40, occupies the same position or lies in the same fore and aft plane as it would occupy if it had cooperated in tabulating operation with the decimal denominational stop 24 to arrest the carriage; that is to say, if the carriage were arrested at the end of the tabulating run by the cooperation of the horizontally projected decimal stop 24 with a column stop adjusted on the stop bar 40 and then the tabulator key were released and the stop 24 retracted, the carriage after a slight additional leftward movement which takes place while the rack 16 and pinion 17 are fully reengaging, would occupy the desired tabulating position, and the column stop which had co-acted with the decimal stop to arrest the carriage in said position would then be in the position of the ejected and set column stop shown in Fig. 3. This result is brought about by reason of the fact that the entrance or slot in the overhanging magazine is in substantial alinement with the decimal denominational stop, and the resulting advantages are of considerable importance since any need of mental calculation is positioning the carriage before ejecting and setting the column stop, due to an off-set relationship between the magazine opening and the decimal denominational stop as in prior constructions, is avoided.

The first column stop having been ejected and set as explained the carriage is then moved until the next column on the work sheet is brought in register with the printing point, after which the key 110 is again operated to eject and set the next column stop; and this operation is repeated until a column stop has been properly adjusted on the stop bar for each column on the work sheet. The capacity of the device shown in the drawings is twenty-five columns but of course the size of the magazine may be increased to provide for additional column stops for a greater number of columns. When the last column stop has been ejected it will be understood that the head 74 of the follower will underlie the rib 86 of the ejector and if thereafter the operator should attempt to actuate the "stop set" key 110 the ejector will engage with the top of the head 74 and will be arrested thereby, thus preventing a full actuation of the key 110 and notifying the operator that all of the

column stops have been ejected and set. It will be understood that in ejecting and setting the column stops on the stop bar 40, downward bending or springing of said stop bar will be prevented by the roller 50 which is arranged near the middle of the machine and under the stop magazine. Also the forward side of the box 54 extends downward below the floor plate 56 as indicated at 54^a so that the forward edges of the column stops on the stop bar lie close to the rear face of said extension 54^a and will cooperate with said extension to prevent bending or springing of the column stop bar in a direction toward the front of the machine.

After the column stops have been adjusted as described the tabulating operations may proceed in the usual manner, the tabulating keys 30 being operated to project the denominational stops 24 horizontally forward into the path of the column stops which will co-act to arrest the carriage in the usual way at the desired tabulating positions, the printing keys being operated to fill in the items in the various columns as is common.

When it is desired to remove the column stops from the stop bar or to "clear" the bar preliminary to resetting the stops for a different character of tabulating work or for any other purpose, the operator proceeds as follows: The carriage is first pushed to the extreme right-hand position and then the left-hand or decimal key 30 is operated, projecting the decimal stop 24 forward and releasing the carriage which will then run freely toward the left until the first of the column stops that is set on the stop bar contacts with the decimal stop 24. The key 30 is then released, resulting in the retraction of the decimal stop 24 to the normal position and the final arrest of the carriage with the first column stop in the position shown in Fig. 3, from which it will be observed that the column stop is directly beneath and in register with the slot 84 and that it is also above the engaging portion 91 of the retractor 89. The operator next presses in the key, 124, the front of which is preferably provided with suitable indicating marks such as the word "Clear." The actuation of said key 124 operates as described to lift the retractor 89 in its bearings, causing the engaging portion 91 to engage with the first or registering column stop and raise the same vertically upward, forcing the rod 43 inward until a column stop passes it. As said column stop is slid upward off the stop bar 40 the upper end portion will pass through the slot 84. Assuming that at this time there are other column stops in the magazine, the beveled upper edge of the column stop that is being retracted from the stop bar and into the magazine will engage with the lower beveled edge of the outermost of the stops within the magazine and

exerting a camming action thereon will force the stops within the magazine inward along the supporting rod 64 and against the spring 76. When the upwardly moving column stop engages at its upper edge with the plunger 67 it will cam the plunger inward against the spring 68, but as soon as said stop has passed the plunger, the plunger will snap outward again to the Fig. 3 position, thereby holding said stop in the magazine. The operation above described is repeated for each of the succeeding stops on the stop bar 40; that is, the operator first actuates the decimal key to release the carriage and bring the next column stop to the Fig. 3 position, after which the "Clear" key 124 is actuated to lift said column stop from the stop bar 40 and retract it through the slot 84 within the magazine. It will be understood that if at the beginning of the clearing operation all of the column stops are on the stop bar 40 the magazine will be empty and the follower head 74 will be over the opening 84. In such case when the first column stop is retracted, its upper beveled edge will cooperate with the beveled edge 74^a of the follower head and will force or cam the follower back in the magazine to make room for the reëntering column stop.

Various changes may be made without departing from my invention; parts of said invention may be used without other parts; and parts may be added which are designed to improve the construction and operation. For example, devices may be provided in association with the stop setting and clearing mechanisms, which after the operation of either the setting key or clearing key will prevent the actuation of the other of said keys; and also "full stroke" devices may be provided which insure the actuation of said keys to their fullest extent and their return thereafter to full normal position, thus preventing the blocking of the carriage, when released or fed, by a partially ejected or partially retracted column stop, and the consequent distortion of parts.

The features of the improvements last above specified are shown in the construction illustrated in Fig. 12 wherein the stop setting key is designated as 126 and the stop clearing key as 127. These keys are respectively secured to the forward ends of push rods 128 and 129 which correspond to the respective rods 109 and 123 of the first described construction. The rods 128 and 129 bear at their forward ends in the left-hand front post 2 and take additional bearings in ears 130 on the bracket 131 which is secured by screws 132 to the frame post 113. The bracket 131 is provided intermediate the bearing ears with a forwardly projecting arm 133 which terminates in an off-set portion 134. Screwed or otherwise secured to each of the push rods is a collar

or enlargement 135 terminating at the rear in a coned face 136. The coned faces are adapted to cooperate with the lower and upper edges of a locking plate 137 which is offset laterally from an arm 138 located between the push rods and pivotally supported at its forward end at 139 on an angular bracket 140 which is screwed or otherwise secured to the front post 2. Assuming that the key 126 be actuated, the associate collar 135 will be brought over the upper edge of the pivoted locking plate 137. It will be clear that so long as the key 126 is maintained pushed in, the collar will prevent the locking plate from rising. Consequently if it be attempted to push in the key 127 the coned end 136 of the associate collar will engage with the lower edge of the locking plate which will stop rearward movement and prevent an operative actuation of the key 127. On the other hand, if a clearing or retracting operation is being effected, the actuation of the key 127 will operate through the collar 135 to lift or swing upward the locking plate 137 so that its upper edge will be fixed in the path of the collar on the rod 128 and will prevent the operation of the key 126 until the restoration of the key 127 to normal position permits the locking plate to drop downward to the normal position shown in Fig. 12.

The "full stroke" devices comprise levers 141 and 142 which are pivoted on blocks 144 fixed by screws 143 to the push rods 128 and 129. The levers project oppositely from their supports and toward each other, the ends of the arms being curved and adapted to cooperate with the upper and lower faces of the stationary off-set 134. The opposite arms of the levers terminate in flattened faces which are normally engaged by the free ends of leaf springs 145 secured by screws 146 to the associated collars 135. The springs maintain the levers normally in the positions illustrated in Fig. 12. If, however, one of the keys, say 126, is pushed in, the lower end of its lever 141 will engage with the top face of the off-set 134, causing the pawl to swing on its pivot as illustrated by the dotted lines, flexing the spring 145, as shown. Thereafter as the actuation of the key 126 is continued the lever will drag over the face of the off-set. Should the key 126 be released before its full stroke is completed the lever 141 would exert a blocking or wedge-like effect between the off-set and the push rod and prevent the parts from returning to normal position. Before the restoring operation can begin it will be necessary fully to complete the inward stroke of the key 126, at which time the lever will snap off the off-set 134. On the other hand, after the restoring operation commences the lever will

swing on its pivot in the opposite direction and will engage with the off-set 134 to prevent a second actuation of the key 126 until said key has completed its forward movement, enabling the lever under the action of its spring to snap off or disengage from the off-set and return to the normal position illustrated in full lines. The lever 142, it will be understood, cooperates in the same way with the lower face of the off-set 134.

The column or tabulator stop *per se* and the devices for retaining or locking the same on the stop bar are not claimed herein but are made the subject-matter of a divisional application filed July 6th, 1912, Sr. No. 707,976.

It will be observed that by my present invention there is provided the combination with a carriage or traveling element and a frame or stationary element, of a plurality or set of tabulator or column stops which are normally in inoperative position on one of said elements, and means for moving said tabulator stops one at a time to operative position on the other of said elements where the tabulator stops are adapted to engage with cooperating stops to arrest the carriage; that said means moves the tabulator stops from one of said elements to the other in a plane which is substantially in register with the plane of the cooperating stop; and that in the present instance the stops are normally located on a stationary part and are housed or arranged in a magazine or container strung or mounted on a support or bar which is rigid within said container and has a spring plunger or retaining device which prevents the stops from dropping out of the container through a slot therein, the container being located over the stop bar which is on the traveling carriage, and the stops of course tending through the force of gravity to drop down out of the container on to the stop bar.

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

1. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a plurality of tabulator stops in inoperative position on one of said elements, means for moving said tabulator stops one at a time to operative position on the other of said elements, and a cooperating stop, said means moving said tabulator stops from one element to the other in a plane which is substantially in register with said cooperating stop.

2. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a plurality of tabulator stops, a container for said stops mounted on one of said elements, a cooperating

ing stop, and means for ejecting said tabulator stops one at a time from said container in a plane that is substantially in register with the plane in which said cooperating stop moves.

3. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a plurality of tabulator stops normally in inoperative position on said stationary element, a cooperative stop, and means for moving said tabulator stops one at a time to operative position on said carriage in a plane which is substantially in register with said cooperating stop.

4. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a plurality of tabulator stops in inoperative position on one of said elements, means for moving said tabulator stops one at a time to operative position on the other of said elements, and a set of key controlled denominational stops, said means moving said tabulator stops from one element to the other in a plane which is substantially in register with the plane in which the decimal denomination stop is moved.

5. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a plurality of tabulator stops, a container for said stops mounted on one of said elements, a set of key controlled denominational stops, and means for ejecting said tabulating stops one at a time from said container in a plane that is substantially coincident with a plane in which the decimal denominational stop is moved.

6. In a typewriting machine and tabulating mechanism, the combination of a carriage, a plurality of column stops normally on the machine frame, a set of key controlled denomination stops, and key controlled means for moving said column stops one at a time from the machine frame to an operative position on the carriage, said column stops when so moving being contained in a plane which is substantially coincident with the plane in which the decimal denomination stop moves.

7. In a typewriting machine and tabulating mechanism, the combination with a carriage, of a traveling element, and a frame or stationary element, of a column stop bar on one of said elements, a magazine mounted on the other of said elements and overhanging said column stop bar, said magazine being provided with an opening, column stops in said magazine, reciprocating means for moving said column stops downward through said opening to seat on said stop bar, and a cooperating stop movable in a

horizontal plane for cooperation with the column stops on said stop bar.

8. In a typewriting machine and tabulating mechanism, the combination of a stop bar, a magazine overhanging said stop bar, column stops in said magazine, means for moving said column stops vertically downward out of said magazine on to said stop bar, and key controlled horizontally movable denomination stops.

9. In a typewriting machine and tabulating mechanism, the combination of a carriage having a stop bar thereon, a magazine on the machine frame overhanging said stop bar, column stops in said magazine, means for moving said column stops vertically downward out of said magazine on to said stop bar, and key controlled horizontally movable denomination stops.

10. In a typewriting machine and tabulating mechanism, the combination of a column stop bar, a stop magazine overhanging said stop bar, column stops in said magazine, a stop ejector, a stop retractor, key controlled means for reciprocating the ejector and retractor up and down at the front and upper sides of said bar, cooperating stops, and means for moving said cooperating stops back and forth horizontally behind said bar.

11. In a typewriting machine and tabulating mechanism, the combination with a carriage having a stop bar thereon, a magazine on the machine frame overhanging said stop bar, column stops in said magazine, means for moving said column stops vertically downward out of said magazine on to said stop bar, and key controlled horizontally movable denomination stops, the column stops as they are ejected moving in a plane which is substantially in register with the plane in which the decimal denomination stop is moved.

12. In a typewriting machine and tabulating mechanism, the combination of a column stop bar, a magazine arranged over said stop bar and having an extension at the forward side thereof, column stops within said magazine, means for ejecting said column stops from said magazine on to said stop bar, and cooperating stops arranged at the rear side of said stop bar and movable toward and away therefrom, said extension cooperating with the stops on said stop bar to prevent forward springing of said stop bar.

13. In a typewriting machine and tabulating mechanism, the combination of a column stop bar, a magazine arranged over said stop bar and having an extension at the forward side thereof, column stops within said magazine, means for ejecting said column stops from said magazine on to said stop bar, cooperating stops arranged at the rear side of said stop bar and movable to-

ward and away therefrom, said extension cooperating with the stops on said stop bar to prevent forward springing of said stop bar, and a roller underlying said stop bar and cooperating therewith to prevent downward springing of the bar when the stops are ejected thereon.

14. In a typewriting machine and tabulating mechanism, the combination of a rectangular column stop magazine, rectangular column stops therein, a spring operating to press said stops toward one end of the magazine, said spring being contained within a cylindrical extension of said stop magazine, ejecting devices for said stops mounted on said magazine, and stops cooperating with said first named stops after the same have been ejected.

15. In a typewriting machine and tabulating mechanism, the combination with a carriage or traveling element and a frame or stationary element, of a stop bar on one of said elements, a container on the other element overhanging said stop bar, a plurality of stops within said container, a support for said stops within said container, means for moving said stops off said support and ejecting them from said container on to said stop bar, and a key controlled cooperating stop for cooperating with the stops on said stop bar.

16. In a typewriting machine and tabulating mechanism, the combination with a stop bar, a stop magazine, stops on said magazine, means for retaining said stops in said magazine, means for overcoming said retaining means and ejecting said stops from said magazine on to said stop bar, and a key controlled stop for cooperating with the stops on said stop bar.

17. In a typewriting machine and tabulating mechanism, the combination of a stop housing, stops within said housing, a support inside said housing on which said stops are strung, said support having a movable end portion, key operated means operative on said stops to remove them from said support, a stop bar on which said stops are adapted to be adjusted, and a stop cooperative with the adjusted stops.

18. In a typewriting machine and tabulating mechanism, the combination of a stop housing, stops within said housing, a supporting rod within said housing on which said stops are strung, a spring pressed end plug in said rod adapted to cooperate with the end of said housing, an ejector for removing said stops one by one from the supporting rod, said plug being automatically retracted during such removal, a stop bar on which said ejected stops may be adjusted, and a cooperating stop for engaging the adjusted stops.

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

housing, stops within said housing, a supporting rod within said housing on which said stops are strung, a spring pressed end plug in said rod having a coned end portion adapted to cooperate with the end of said housing, an ejector for removing said stops one by one from the supporting rod, said plug being automatically retracted during such removal, a stop bar on which said ejected stops may be adjusted, a cooperating stop for engaging the adjusted stops, and a retractor for returning the stops to said supporting rod.

20. In a typewriting machine and tabulating mechanism, the combination of a stop container, a stop support within said container, stops on said support, a follower on said support, a spring for pressing said follower against said stop, means for ejecting said stops from said container, and a key controlled stop for cooperating with the ejected stops.

21. In a typewriting machine and tabulating mechanism, the combination of a stop container, a stop support within said container, stops on said support, a spring-pressed follower on said support, means for ejecting said stops from said container, said follower operating to prevent actuation of said ejecting means after all of the stops have been ejected, and a key controlled stop for cooperating with the ejected stops.

22. In a typewriting machine and tabulating mechanism, the combination of a stop bar, an overhanging stop container, stops therein, a spring pressed follower behind said stops, a downwardly movable key controlled stop ejector, said follower preventing downward movement of said ejector after all of the stops have been ejected, and a key controlled stop for cooperating with the ejected stops.

23. In a typewriting machine and tabulating mechanism, the combination of a stop container, a stop rod rigidly supported within said container, a set of stops slidably supported on said rod, a follower block provided with a hub portion slidably supported on said rod, a spring cooperative with said follower block, a stop ejector, and a key controlled stop for cooperating with the ejected stops.

24. In a typewriting machine and tabulating mechanism, the combination of a stop container, a stop rod rigidly supported within said container, a set of stops slidably supported on said rod, a follower block provided with a hub portion slidably supported on said rod, a spring cooperative with said follower block, a stop ejector, a key controlled stop for cooperating with the ejected stop, and a spring pressed plunger on said stop rod that is caused to retreat within said stop rod when said stop ejector is operated.

25. In a typewriting machine and tabulat-

ing mechanism, the combination with a traveling element or carriage and a stationary element or frame, of a plurality of tabulator stops, means for retaining said stops in inoperative position on one of said elements, means for overcoming said retaining means and moving said tabulator stops one at a time to operative position on the other of said elements, means on said other element to retain said tabulator stops in operative position, and a cooperating stop.

26. In a typewriting machine and tabulating mechanism, the combination with a traveling element or carriage, and a stationary frame, of a plurality of tabulator stops, a cooperating stop, a spring pressed device for retaining said tabulator stops in inoperative position on one of said elements, means for moving said tabulator stops to operative position on the other of said elements, and a spring pressed device for retaining said tabulator stops on said other element.

27. In a typewriting machine and tabulating mechanism, the combination of a carriage, a stop bar thereon, tabulator stops, a cooperating stop, a stop container located on the frame of the machine above said stop bar, means for preventing said tabulator stops from falling down out of said container, a stop ejector, and means on said stop bar for retaining said stops thereon.

28. In a typewriting machine and tabulating mechanism, the combination of a stop magazine, stops therein, a stop bar, a key controlled ejector for ejecting said stops one at a time from said magazine on to said stop bar, a key controlled retractor for retracting said stops from said stop bar into said ejector and said retractor, and a stop cooperative with the ejected stops.

29. In a typewriting machine and tabulating mechanism, the combination of a stop magazine, column stops therein, a column stop bar, a stop ejector, a stop retractor, key controlled mechanism for slidably reciprocating said ejector and said retractor, devices for guiding said ejector and retractor side by side and in contactive engagement with each other, and a stop cooperative with said column stops after adjustment on the stop bar.

30. In a typewriting machine and tabulating mechanism, the combination of a traveling carriage, a stop bar thereon, a stop magazine located above said stop bar, stops therein, a key controlled ejector located above said stop bar, a key controlled retractor having its engaging portion normally located below said stop bar, and a stop cooperative with the ejected stops.

31. In a typewriting machine and tabulating mechanism, the combination of a traveling carriage, a stop bar thereon, a stop magazine located above said stop bar, stops

therein, a key controlled ejector located above said stop bar, a key controlled retractor having its engaging portion normally located below said stop bar, a stationary guiding bracket for guiding said ejector and said retractor side by side in slidable engagement with each other, and a stop cooperative with the ejected stops.

32. In a typewriting machine and tabulating mechanism, the combination of a carriage, a stop bar thereon, a stop magazine, stops therein, a guide bracket, a key controlled block slidably mounted in said bracket and operative to eject said stops from said magazine, a second key controlled block also slidably mounted in said bracket and operative to retract said stops, and a stop cooperative with the ejected stops.

33. In a typewriting machine and tabulating mechanism, the combination of a carriage, a stop bar thereon, a stop magazine, stops therein, a key controlled block slidably mounted and operative to eject said stops from said magazine, a second key controlled block also slidably mounted and operative to retract said stops, and a stop cooperative with the ejected stops, the two blocks slidably engaging with each other.

34. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of stops each provided with a notch or depression, and an ejector having an engaging portion which fits into said notch and operates to assist in guiding the stops during ejecting operations.

35. In tabulating mechanism for typewriting machines, and in stop ejecting devices therefor, the combination of a stop ejector, a key, and a train of actuating devices between said key and said ejector, said train comprising a slide rod connected to said key, a link connected to said ejector, and a bell crank between said slide rod and said link.

36. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a stop ejector, a stop retractor, keys, and trains of connections between said keys and said ejector and retractor, each train comprising a slide rod, a bell crank and a link.

37. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a stop ejector, a stop retractor, keys, and trains of connections between said keys and said ejector and retractor, each train comprising a slide rod, a bell crank lever and a link, the bell crank levers having elongated hub portions and one of said hub portions fitting within and providing a bearing for the other hub portion.

38. In tabulating mechanism for typewriting machines and in stop ejecting de-

vices therefor, the combination of a stop ejector, a key, connections between said key and said ejector comprising a slidable part, and full-stroke devices for said key, said full-stroke devices comprising a spring pressed lever on said slidable part having a rounded end, and a stationary surface with which the rounded end of said lever is adapted to engage.

39. In a tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a stop ejector, a key, connections between said key and said ejector comprising a slidable part, and full-stroke devices for said key, said full-stroke devices comprising a lever pivoted on said slidable part, one arm of said lever terminating in a flat face and the other arm in a rounded face, a spring cooperating with said flat face to retain the lever in normal position, and a fixed part with the face of which the rounded end of said lever is adapted to cooperate.

40. In a tabulating mechanism for typewriting machines and in stop ejecting and retracting devices therefor, the combination of a stop ejector, a stop retractor, two keys, trains of connections between said keys and said ejector and said retractor, each train comprising a reciprocatory part, and sets of full-stroke devices associated with said keys, each set comprising a lever pivoted to one of said reciprocatory parts, one arm of said lever terminating in a flat face and the other arm in a rounded face, a spring cooperating with said flat face to retain the lever in normal position, and a fixed part with opposite faces of which the rounded faces of said levers are adapted to cooperate.

41. In a tabulating mechanism for typewriting machines and in stop ejecting and retracting devices therefor, the combination of a stop ejector, a stop retractor, two keys, trains of connections between said keys and said ejector and said retractor, each train comprising a reciprocatory part, and sets of full-stroke devices associated with said keys, each set comprising a lever pivoted to one of said reciprocatory parts, one arm of said lever terminating in a flat face and the other arm in a rounded end, a spring cooperating with said flat face to retain the lever in normal position, a fixed part with opposite faces of which the rounded ends of said levers are adapted to cooperate, and key locking devices cooperative with said reciprocatory parts and comprising a pivotally supported plate which, when one of said parts is operated, prevents an actuation of the other of said reciprocatory parts.

42. In a typewriting machine and in tabulating mechanism, the combination of a column stop bar, a magazine arranged to overhang said bar, a plurality of column stops arranged within said magazine, a vertically movable ejector adapted to place said column stops one at a time on said bar, and a vertically movable retractor adapted to restore said stops one at a time within said magazine, the relationship of said ejector and said retractor to the column stops and to the magazine being such that the ejector works upon the top of the stop about centrally of its width while the retractor works at the bottom of the stop and at one side only thereof.

43. In a typewriting machine and in tabulating mechanism, the combination of a column stop bar, a magazine structure arranged to overhang said bar, column stops in said magazine, an ejecting slide mounted on the magazine structure above said stop bar and operative to slide downward to eject the column stops from the magazine on to the stop bar, and a retracting slide also mounted on the magazine structure and provided with a toe piece arranged beneath the stop bar, said retracting slide being adapted to slide upwardly to cause said toe piece to restore said stops within said magazine.

44. In a typewriting machine and in tabulating mechanism, the combination of a column stop bar, a magazine structure arranged to overhang said bar, column stops in said magazine, an ejecting slide mounted on the magazine structure above said stop bar, a retracting slide also mounted on a magazine structure and provided with a toe piece arranged beneath the stop bar, and key actuated levers connected to said slides to move them in opposite directions by movements of their keys in the same direction.

45. In a typewriting machine and in tabulating mechanism, the combination of a column stop bar, a column stop magazine, a plurality of column stops therein and each provided with a centrally arranged notch, an ejecting device arranged to register with said notches as the column stops are successively brought into ejecting position, and means for automatically feeding said column stops to such ejecting position.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 25th day of March, A. D. 1912.

HERBERT H. STEELE.

Witnesses:

H. BARRY,
BERNICE E. FOX.

Correction in Letters Patent No. 1,037,076.

It is hereby certified that in Letters Patent No. 1,037,076, granted August 27, 1912, upon the application of Herbert H. Steele, of Marcellus, New York, for an improvement in "Type-Writing Machines," errors appear in the printed specification requiring correction as follows: Page 4, line 27, after the word "lug" insert a comma; and same page and line, for the word "for" read *or*; page 10, after line 39, insert the words *said magazine, a single guiding device for*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of October, A. D., 1912.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.