

J. WALDHEIM.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 9, 1912.

1,036,388.

Patented Aug. 20, 1912.

3 SHEETS—SHEET 1.

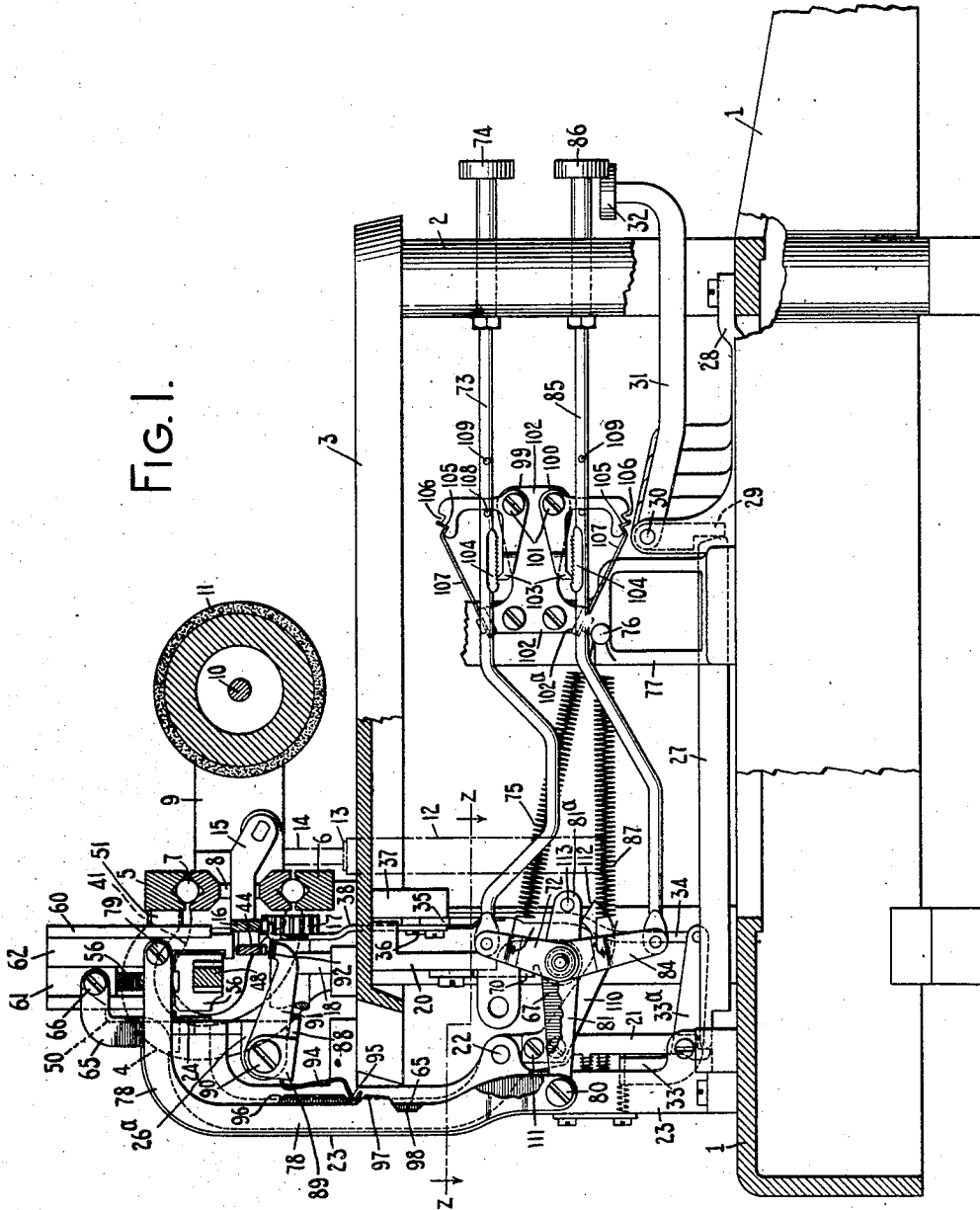


FIG. 1.

WITNESSES:

E. M. Wells
m. w. p.

INVENTOR:

John Waldheim
By Jacob Kell
HIS ATTORNEY

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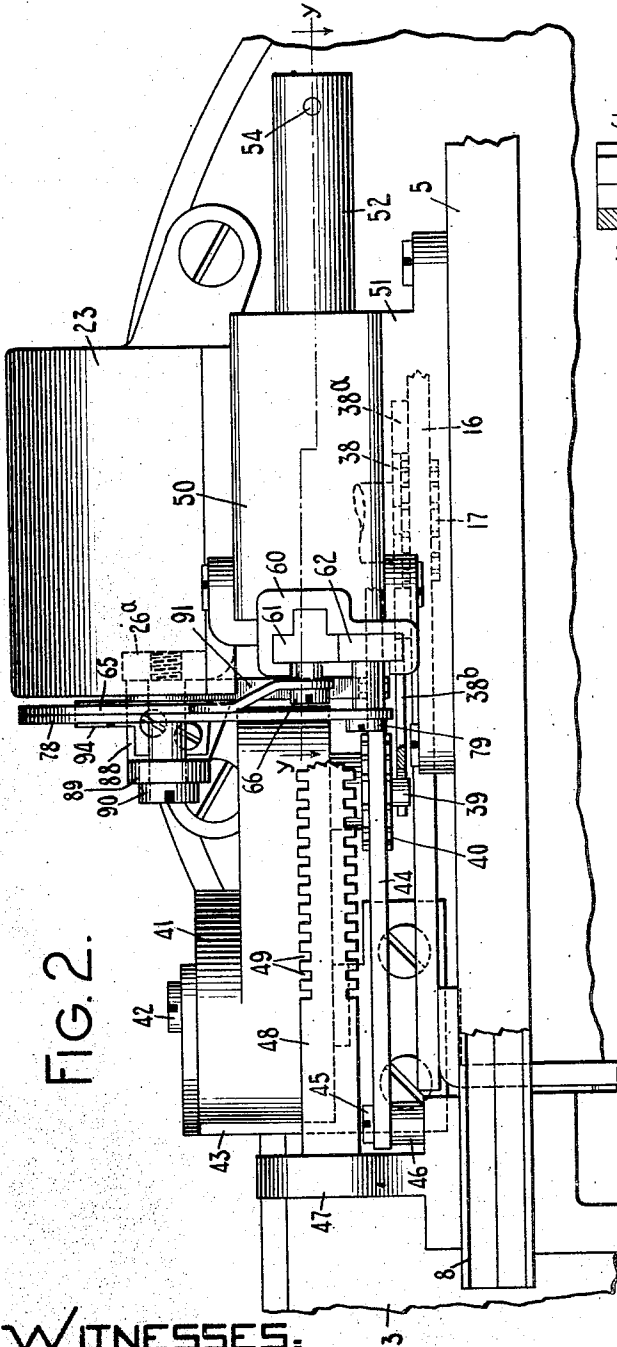


FIG. 2.

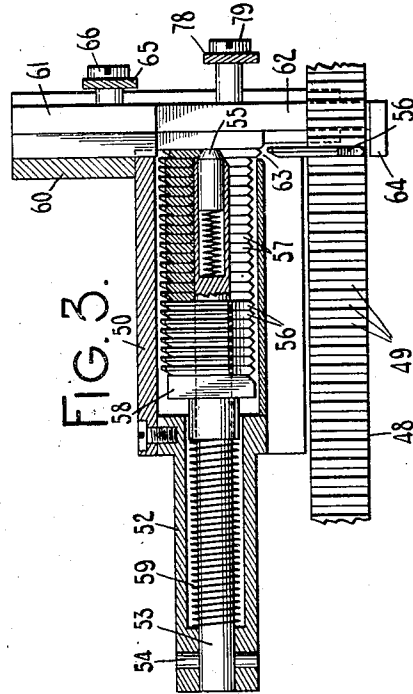


FIG. 3.

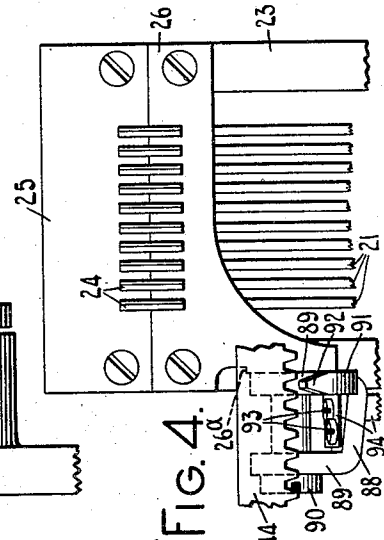


FIG. 4.

WITNESSES:

E. M. Miller
M. W. Pool

INVENTOR:

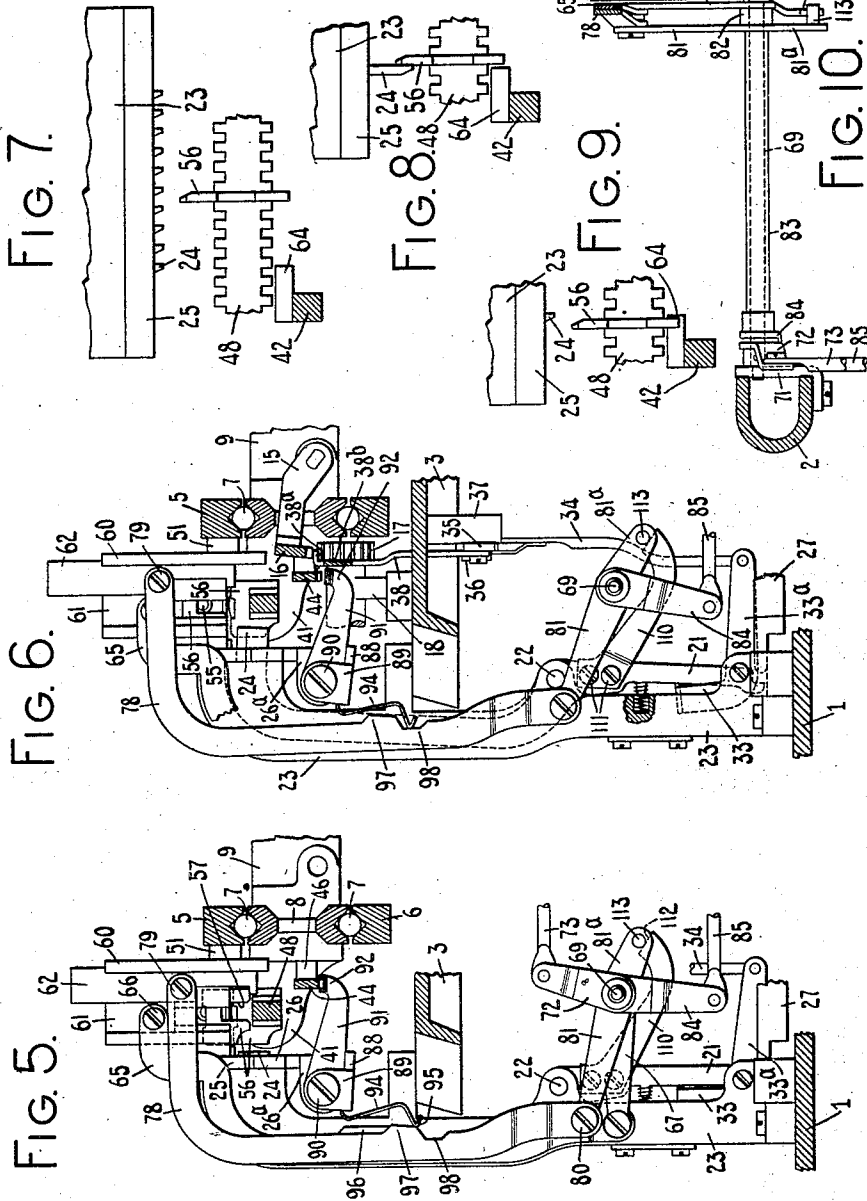
John Waldheim
By Jacob F. Felt
HIS ATTORNEY

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3 SHEETS—SHEET 3.



WITNESSES:

E. M. Wells
m.w. for

INVENTOR:

John Waldheim
By Jacob Feller

HIS ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN WALDHEIM, OF NEWARK, NEW JERSEY, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

1,036,388.

Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed April 9, 1912. Serial No. 689,474.

To all whom it may concern:

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

My invention relates to key set tabulating mechanism for typewriting machines and its general object is to provide improved mechanism of the character specified.

More particularly my invention relates to key set tabulating mechanism of the stop magazine style and has for one of its objects to provide devices for preventing the blocking or arresting of the carriage and of other parts by reason of faulty or incomplete ejection of the stops from the magazine to the stop bar or retraction from the stop bar to the magazine.

Another object is to provide improved devices for retracting the stops and clearing the stop bar through the operation of a single key which operates to release the carriage and position the stops for retraction and also to retract the stops within the magazine after such position.

Key set tabulating mechanism of the stop magazine style is disclosed in my prior Patent No. 974,318, granted November 1st, 1910 and also in the application of Herbert H. Steele, Serial No. 686,575, filed March 27th, 1912, and my present invention is an improvement in various respects on the prior constructions aforesaid.

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.

One form of my invention is illustrated in the accompanying drawings as embodied in a No. 3 wide carriage Monarch typewriting machine but said invention may be 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 fragmentary plan view of the rear upper

portion of said machine. Fig. 3 is a vertical sectional view, taken on planes indicated by the broken dotted line $y-y$ in Fig. 2 and looking in the direction of the arrows at said line. Fig. 4 is a fragmentary front elevation of the denominational stops, the mounting thereof and associate parts. Figs. 5 and 6 are operating views corresponding in part to Fig. 1 but showing various elements in different relationships. Figs. 7, 8 and 9 are fragmentary plan views illustrating various stages of stop positioning and retracting operations. Fig. 10 is a horizontal sectional view taken on the planes indicated by the broken dotted line $z-z$ in Fig. 1.

As appears from Fig. 1 the main frame comprises a base 1, posts 2 and a top plate 3, the latter supporting goose-neck standards 4 to which are secured fixed rails or grooved trackways 5 and 6, said trackways cooperating through anti-friction rollers 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 whereof cooperate printing instrumentalities not shown herein but which may be of the usual or other suitable description. 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 mounted on a stationary bracket 18 and, as is common in the Monarch machine, 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 rocker being actuated from a universal bar which underlies the printing key levers and spacing levers of the machine.

The drawings illustrate denominational tabulating mechanism of the style common to the Monarch typewriter, said mechanism comprising 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 maintained a letter space distance apart by notched guide plates 25 and 26 which are screwed to the front upper portion of the frame 23 (Fig. 4). The stops 24 when actuated are projected horizontally forward and cooperate with column stops hereinafter described. The actuating devices for the stop levers 21 comprise slide bars 27 which bear at their rear end portions upon the lower part of the frame 23 and are adapted to push against the lower arms of the levers 21 (Fig. 1). The forward ends of the arms 27 bear slidably in a detachable supporting frame 28 and are adapted to be actuated by arms 29 which are secured to and depend from short rock shafts 30 bearing in upright portions of the frame 28. Fixed to the rock shaft 30 are denominational key levers 31 provided at their forward ends with keys 32. When a denominational key 32 is actuated it rocks the associate shaft 30, causing the arm 29 to slide the bar 27 rearward, swinging the associate lever 21 on the pivot 22 and projecting the stop 24 into the path of the column stop. The actuation of any one of the stop levers 21 operates carriage releasing devices, said devices comprising a universal bar or bail 33 pivoted on the frame 23 and having an extension 33^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 38^a underlying the feed rack 16. The construction is such that when the universal bail 33 is swung rearward it operates through the train of connecting devices to raise the lifter 38 and swing the feed rack 16 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 32 are released after actuation. The lifter 38 is provided with a leftwardly extending arm 38^b which is slotted at its end to embrace a pin or short shaft 39 on which is mounted a pinion 40 comprised in a retarding mechanism of the Monarch style which further includes a box-like frame 41 pivotally supported at 42 in a bracket 43 screwed to the top plate (Fig. 2). Retarding devices proper contained in the box 41 and connected to the pinion 40 need not be further described. The pinion 40 underlies a toothed rack 44 which is fixedly secured by

screws 45 to lugs 46 projecting rearward from the carriage. When the lifter 38 is raised the arm 38^b thereof acts on the shaft 39 to swing the retarder box or container 41 on its pivot and lifts the pinion 40 into mesh with the rack 44 fixed to the carriage. Thus the carriage when freed for a tabulating run is connected through the rack 44 and pinion 40 with the retarding mechanism, and the tabulating run is thereby regulated.

Projecting rearward from the slide bar 8 are arms 47 which provide a support for a column stop bar 48, said bar being toothed at its front and rear faces, the notches 49 between the teeth being a letter space distance apart and being adapted to receive the column stops when projected from an overhanging stop magazine or container 50 secured to a bracket 51 which is fixed to the upper guide rail 5. At its right-hand end the magazine is provided with a cylindrical extension or barrel 52 (Figs. 2 and 3) through which extends a stop support or rod 53 secured rigidly in place by a cross pin 54 passing through the closed end of the barrel. The left-hand end of the rod carries a spring plunger 55, the outer end of which is beveled or coned. Stored in the magazine 50 is a set or series of plate-like column stops 56 notched as indicated at 57 to fit over the rod 53 by which they are supported, the top and bottom edges of each stop being beveled as shown. The column stops are strung together face to face on the rod 53 and are forced along said rod toward the end of the magazine by a follower 58 which is slidably mounted on the rod and is passed by a coiled spring 59 surrounding the rod and contained within the barrel 52. The right-hand end of the magazine is closed by an upright guide member 60 suitably secured in place and which is provided with vertical grooves or guide ways to accommodate slidable blocks 61 and 62, the former being the stop ejector and the latter the stop retractor. The ejector is slidable downward to force the column stops successively downward past the plunger 55 and through a slot-way 63 on to the stop bar 48, while the retractor which extends down below the stop bar and terminates in a head 64 operates when lifted to push column stops when in retracting position upward through the slot 63 and into the magazine from which they previously had been ejected by the ejector 61.

Key controlled devices for operating the ejector and retractor comprise an angular link 65 which is pivotally connected at 66 to the ejector 61, the lower end of said link being pivotally connected with a crank arm 67 which, as shown in Fig. 10, has a hub 68 pinned to the right-hand end of a rock shaft 69 bearing in stationary brackets 70 and 71. Secured to the left-hand end of

said rock shaft is an upwardly extending crank arm 72 which is operated by a forwardly extending push rod 73, the latter bearing in the left-hand front post 2 and being provided with a key 74 which, when pushed in, operates the train of mechanism just described to slide the ejector 61 downward and eject the column stop from the magazine on to the column stop bar (Fig. 15). A draw spring 75, connected at one end to the crank arm 72 and at the other end to a stud 76 on a stationary post 77, operates to restore the parts to normal position after an ejecting operation. The retractor 62 is operated by a similar train of mechanism comprising an angular link 78 pivotally connected at 79 to the retractor and extending downward alongside of the link 65, the lower end of said link 78 being pivotally connected at 80 with a crank arm 81 which, as shown in Fig. 10, has a hub portion 82 which is fixed to the right-hand end of a sleeve 83 surrounding and bearing on the shaft 69 and confined between the crank arms 67 and 72. The left-hand end of the sleeve has mounted on it a downwardly extending crank arm 84 which is operated by a forwardly extending push rod 85, the latter underlying the rod 73 and bearing near its forward end in the left-hand front post 2, said rod 85 being provided with a key 86 which is operative to lift the retractor 62 for stop retracting purposes. The retracting devices are provided with a restoring spring 87 secured at one end to the crank arm 84 and at the opposite end anchored to the stud 76.

With the exception of the lifter extension 88^b and parts controlled thereby, the stop magazine, setting and retracting mechanism as thus far described corresponds with the construction disclosed in the Steele application aforesaid.

In the stop ejecting operation, if the key 74 be only part-way pressed in, the stop will be only partially ejected, the lower part engaging with the stop bar 48 on the carriage while the upper part still remains in the magazine. Under such conditions, if the carriage be released its movement will be obstructed by the partially ejected stop and the carriage will be jammed or wedged, thus preventing movement until the partially ejected stop can be either wholly ejected or else pushed back entirely into the magazine. Also the stop, which is thrown out of a vertical plane and engaged with both the stop bar and magazine, may become distorted. Under an incomplete operation of the retracting key 86 the same troubles and defects may arise due to a partially retracted stop. Even when "full stroke" devices are associated with the key operated stop ejecting and retracting mechanism, the same defects may arise since the full-stroke devices

do not insure that the operator must fully actuate the keys but only that the keys cannot be actuated a second time before the completion of the first actuation.

One of the objects of my present invention is to overcome the specified defects and I accomplish this result by providing locking devices which cooperate with the carriage to lock it against movement at the beginning of an ejecting or retracting operation and to maintain it thus locked until the operation is so far completed that the stop that is being shifted has been entirely separated from the part from which it is being moved. Consequently if, when the operation, in the respect just stated, is only partially completed, the operator should attempt to release the carriage for an additional leftward movement either by a tabulating operation or by operating the usual release key, or should actuate the space bar, the carriage would not respond since it would be held by the locking or restraining devices. Said locking devices in the present instance are designed for cooperation with the retarder rack 44 and comprise a U-shaped frame or member 88 which, as shown in Figs. 2 and 4, has parallel ears 89 pivoted on a shoulder screw 90 which is secured to an ear 26^a bent rearward from the left-hand side of the guide plate 26 and projecting laterally leftward therefrom. The right-hand ear 89 has a forward extension or finger 91 which terminates in an upwardly directed portion or locking tooth 92 which is beveled or sharpened to cooperate with the notches between the teeth of the rack 44 which the tooth or pawl 92 underlies and from which it is normally separated as shown in Figs. 1 and 4, owing to the action of gravity on the member 88. Secured to the base of the member or locking device 88 by screws 93 is a spring finger or arm 94 which is bent to extend downward behind the member 88 and in front of the links 65 and 78, said member near its lower end being provided with a bend or bight 95 which constitutes a rounded nose for cooperation with lugs or cam pieces 96 and 97 connected to and preferably integral with the respective links 65 and 78 and designed for cooperation with the nose 95.

The cam 96 is comparatively long and terminates at the top and bottom in cam edges which are inclined to the front edge, the latter being substantially vertical and parallel with the front edge of the link 65 and acting somewhat like a dwell. Normally the cam 96 is above the nose 95 but so situated that as soon as the downward movement of the link 65 begins the cam will begin to cooperate with the nose 95 to swing the member 88 on its pivot 90 and bring the locking tooth 92 into engagement with the rack 44. The member 88 and the spring arm 94, together constitute a lever member of the first

order, one arm 94 of said member being preferably of spring metal so that it may yield, affording lost motion between it and the other part of the lever member, insuring that while the tooth 92 shall fully engage with the rack 44, the arm 94 may yield so as not to interfere with the actuation of the links 65 and 78. Said lever member is preferably controlled normally by gravity which maintains it in the normal position indicated in Fig. 1 with the nose 95 resting against the front edges of the links 65 and 78 and between the cams thereon. The cam 97 on the link 78 is short compared with the cam 96 and is normally located just below the nose 95 as shown in Fig. 1. Below the cam 97 the link 78 is cut out or notched, as indicated at 98. It will be understood that when the link 78 is moved upward during a retracting operation the cam 97 will engage with the nose 95 and swing the lever member on its pivot 90 as before to bring the tooth 92 into locking engagement with the rack 44.

Full stroke devices are preferably provided for cooperation with the push rods 73 and 85, said devices, as shown in Fig. 1, comprising oppositely disposed angular levers or bell cranks 99 and 100 pivoted at 101 on a plate 102 fixed to the frame post 77. The rearwardly extending horizontally disposed arms of the bell cranks terminate in teeth 103 which are adapted for cooperation with a series of ratchet teeth constituting a rack 104 on the rods or reciprocating parts 73 and 85. The vertically disposed arms of the bell cranks are provided with enlargements having notches 105 and 106 which cooperate with the locking ends of detent springs 107 secured to ears 102^a on the plate or bracket 102. Pins or devices 108 and 109 on the push rods cooperate with the upright bell crank arms to set the bell cranks. The operation of the two full-stroke mechanisms is the same so that the description of the upper one comprising the bell crank 99 will apply to both. Normally the bell crank 99 is positioned as in Fig. 1, the pin 108 being in engagement with the rear face of the upright lever arm, the detent 107 being engaged with the notch 105 and the pawl tooth 103 engaged with the rack 104. When the operator pushes in the key 74 the teeth of the rack 104 will slide over the teeth 103 and will prevent the retraction of the rod until the rod 73 has substantially completed its full stroke at which time the pin 109 will engage with the upright lever arm and will turn the bell crank on its pivot, swinging the pawl 103 out of engagement with the rack 104 and causing the detent spring 107 to engage with the notch 106 to maintain said pawl disengaged. The rod 73 and connected parts are now free to return to normal position. As

the normal position is approached, the pin 108 engages with the upright arm of the bell crank and swings it back to the Fig. 1 position, causing the tooth 103 to reengage with the rack 104.

In the operation of setting the column stops for any particular form of tabulating work it may be assumed that the stop bar 48 is bare of stops and that a work sheet or blank having ruled columns is adjusted to the platen. First the operator moves the carriage to bring the proper position in the first column on the work sheet opposite the printing point on the platen. Then the ejector key 74 is pushed in, causing the ejector 61 to slide vertically downward and engage the underlying column stop 56, forcing it downward through the slot 63, the stop forcing the retaining plunger 55 backward in its seat in the rod 53. Under a proper operation the ejected column stop will be forced down upon the stop bar 48 and, preferably held thereon by retaining devices (not shown). Suppose that through inadvertence the operator does not press the key 74 inward to its full extent but only partially, leaving the column stop only partially ejected, its upper end portion remaining within the magazine while its lower end is engaged with the stop bar 48. Of course, owing to the full-stroke mechanism, the key 74 will remain part-way pushed in, it being prevented from being restored to normal position by the pawl tooth 103 which co-acts with the ratchet teeth 104 to lock the parts. The operator, however, may not observe that the key 74 has failed to return to normal position, and assuming that the stop has been completely ejected, may attempt to release the carriage for the purpose of bringing it to the proper position for the setting of the next column stop. The carriage, however, will be locked against movement at this time by reason of the fact that the cam 96, as soon as the link 65 begins to move the ejector 61 downward, acts on the nose 95 to swing the locking lever member on its pivot 90 and cause the tooth 92 to swing up into locking engagement with the rack 44 fixed to the carriage. The length of the cam 96 is such that it will remain in operative engagement with the nose 95 during the full downward stroke of the link 65 and cannot be disengaged to release the locking member 88, 94 until the parts return to the normal position indicated in Fig. 1. Since the full stroke devices, however, prevent such return until after the full stroke of the key 74 has been completed, it will be seen that the only way to unlock the carriage and free it from the control of the locking tooth 92 is to complete the actuation of the key 74 so that the pin 109 may release the rack or ratchet 104 from the tooth 103. It will be seen that my invention thus insures a proper actuation

of the stop ejecting mechanism in each instance by the provision of locking means which hold the carriage against movement from the beginning of the ejecting operation until the ejection is completed by the removal of the stop from the magazine; also it will be observed that the locking devices are combined in such a way with the full stroke devices that they constitute indicating mechanism for the latter, bringing to the notice of the operator, when he fails to properly actuate the key, that the full-stroke devices are in operation. On the other hand, the full-stroke devices operate to maintain the locking device or tooth 92 in operative position until the column stop has been properly ejected, so that they cannot act as a drag or detent to prevent free movement of the carriage.

The column stop having been properly ejected from the magazine and pushed down in place on the stop bar, the ejector 61 will return to normal position and all of the remaining column stops will be forced together outward along the supporting rod 53 by the spring pressed follower 58 until the outermost stop is brought into contact with the adjacent face of the member 60. It will be found that the ejected stop has thus been set on the stop bar at a point corresponding with the point indicated by the usual scale and pointer at the front of the platen, this setting being due to the fact that the magazine slot-way 63 is in substantial alinement with the left-hand or denominational stop 24, thus obviating the need of mental calculation in the proper positioning of the carriage prior to the ejection and setting of the column stops. After the first column stop has thus been set, the carriage is released and moved leftward until the next column on the work sheet or blank is brought in register with the printing point, whereupon the key 74 is again operated to eject and set the next column stop, this operation being repeated until a column stop has been properly adjusted on the stop bar for each column on the work sheet.

After the column stops have been adjusted as described the tabulating operations in the course of filling in the blank may proceed as usual, the tabulator keys 32 being operated to project the denomination 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 tabulator positions, the printing keys being operated to fill in the items in the various columns as is common.

Prior to resetting the column stops for a different character of tabulator work or for any other purpose, it is necessary as a preliminary to remove the column stops from the stop bar or "clear" it, as the expression is. Heretofore in stop clearing operations

it has been necessary to operate a plurality of keys and one of the objects of my invention is to provide means for enabling the clearing operation of the entire group of stops from the stop bar to the magazine by actuations of a single key which in the present instance is the key 86. As herein exemplified the means aforesaid comprise an arm 110 (Figs. 1, 5, 6 and 10) which is secured by screws 111 to the left-hand or decimal denominational stop lever 21, although it is to be understood that if preferable the arm 110 may be formed integral with said decimal lever. The arm 110 extends forward and downward, being off-set toward the left as shown in Fig. 10, and at its forward end curves upward, terminating in an inclined face 112 which underlies and is adapted to cooperate with a pin or stud 113 which extends laterally from the forward end of an arm 81^a which is an extension of the arm 81 and is preferably formed integral with said arm and with the hub 82, the arm 81^a extending forward from said hub and being secured through it to the sleeve 83 so that when the sleeve 83 is turned as a result of the actuation of the key 86, the arm 81^a will swing downward, causing the stud 113, acting against the face 112, to actuate the arm 110 and swing the decimal lever 21 upon its pivot, projecting the decimal stop 24 and releasing the carriage. It will be understood that the projection of the stop and the release of the carriage occur concurrently with the lifting of the retractor 62; and also that the actuation of the decimal lever 21 by the key 86 is independent of the slide bar 27 associated with the lever 21, said slide bar, together with the arm 29 and key lever 31 remaining unaffected by such operation of the lever 21.

As a preliminary to the stop retracting or clearing operation the carriage is first pushed to the extreme rightward limit of its travel. Let it be assumed that this brings the first or proximate column stop 56 on the stop bar 48 to the position shown in Fig. 7. Thereupon the operator actuates the key 86, projecting the decimal stop 24 and releasing the carriage so that it will run leftward until the proximate column stop 56 engages with the projected decimal stop 24 as shown in Fig. 8. The actuation of the key 86 is also effected to lift the retracting head 64 but as shown in Fig. 8 the head is slightly to the left of the projected decimal stop 24 so that the column stop may co-act with said decimal stop without interference from the head 64. During the first stage of the actuation of the key 86 the carriage will be locked against traveling movement by reason of the action of the cam 97 and the nose 95; but the cam is short and passes upward out of engagement with said nose during the latter part of the key

actuation so that the carriage is free from the control of the locking tooth. This feature will be more fully discussed later on. After the two stops 56 and 24 co-act to arrest the carriage the operator releases the key 86, permitting it and the connected parts to return to normal position and retracting the decimal stop 24 so that the carriage as usual may move slightly leftward, bringing the proximate column stop 56 to the position shown in Fig. 9, which locates said stop 56 over the retracting head 64 and in position to be retracted thereby. Next the operator again actuates the key 86 and during this actuation the link 78 as it rises, effectively operates the slide or retractor 62, causing the head 64 to engage with the column stop 56, lifting the same, disconnecting it from the stop bar 48 and forcing it within the stop magazine.

During the lifting or retracting operation the cam 97 acts against the nose 95 to swing the locking tooth 92 into engagement with the rack 44 to lock the carriage against traveling movement and the parts are so proportioned and related that said cam remains effective until the stop 56 has been entirely disconnected from the stop bar. This will be understood by reference to Fig. 5 which shows the stop lifted off the stop bar and also shows the nose 95 at this time at the lower end of the cam 97 and just about to ride off the same and into the notch or depression 98. This latter step occurs during the further actuation of the key 86. As soon as the nose 95 leaves the cam 97, the locking tooth 92 releases the rack 44 as shown in Fig. 6, permitting the carriage to run leftward during the further upward movement of the column stop 56 and the lifting action of the retracting head 64. This leftward movement of the carriage continues until it is arrested by the co-action of the next succeeding or second column stop 56 with the decimal stop 24 which, it will be recalled, is in operative position at this time. Consequently if on the completion of the retracting operation the operator releases the key 86, the parts will be restored to normal position and said second column stop will be brought to the Fig. 9 position ready to be retracted when the key 86 is again actuated. The operations above outlined are continued until the stop bar 48 has been entirely cleared. It will be understood that this clearing operation is caused by a series of successive actuations of a single key 86; that during the first stage of any key actuation the carriage is locked against movement and continues locked until the column stop that is being retracted is entirely removed from the column stop bar, doing away with all danger of jamming the carriage and bending the stop; that thereafter during the succeeding stage of the same key

actuation the stop will be further retracted until it is entirely within the magazine; that during this further retraction the carriage will be automatically released and will run freely leftward until arrested by the co-action of the decimal stop with the next succeeding column stop; that at a single actuation of the key 86 a concurrent action results in the projection of the decimal denominational stop, the locking of the carriage, the retraction of a column stop, the unlocking of the carriage and the free run thereof until it is arrested by the co-action of the next succeeding column stop with the projected denominational stop; that the invention provides in combination, a traveling element, a carriage, a stationary element, frame or fixed part on which the magazine for the column or tabulator stops is mounted, means for shifting the tabulator stop from either one of these elements to the other, and means for locking the traveling element against movement until the stop has been shifted or completely removed from the element by which it was first supported, whether that element be the traveling one or the one that is relatively fixed or stationary; that the means for shifting a tabulator stop from one element to the other is controlled by a key, which same key also controls means for locking the traveling element against movement; that in the present instance said key is at the front of the machine in the vicinity of the keyboard; that the carriage locking means is connected with the stop shifting means; that the locking devices are brought into use or rendered effective automatically and when a tabulator stop is shifted; that the tabulator stop is shifted or ejected from the stationary element on to a traveling stop bar or stop receiving element provided with a series of teeth on stop receiving means; that said stop bar travels in unison with the carriage, and in the present instance is rigid thereon; that said stop may be retracted or moved from said stop bar back to its support on the stationary part or frame; that the shiftable tabulator stop or column stop when on the traveling carriage is adapted to engage with a key controlled coöperating stop mounted permanently on the frame of the machine; that the two stops coöperate, when the carriage is released, to arrest it at a predetermined point; that locking devices including the locking tooth 92 are provided, which devices are independent of said two stops and may be actuated to lock the carriage at said predetermined point; that locking devices are provided which constitute means for preventing relative movement between the stop bar or stop receiving element and a stop support container or magazine, said stop bar and said stop support or container constituting two relatively movable parts either of

which is adapted to receive and support one or more tabulator or column stops; and that means are provided controlled by a single key for shifting the tabulator stop from the stop bar to a stop support or container and for positioning a second tabulator stop relatively to said support in position to be subsequently shifted from said stop bar to said support.

Various changes may be made without departing from the spirit of my invention.

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

1. In a typewriting machine and in tabulating mechanism, the combination of a traveling element, a stationary element, a tabulator stop, means for shifting said tabulator stop from one of said elements to the other, and means for locking the traveling element until the stop has been shifted from the element by which it was first supported.

2. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a tabulator stop supported on one of the parts first named, means for shifting said tabulator stop to the other part, and means for automatically locking the carriage until the stop has been shifted from the part that first supported it.

3. In a typewriting machine and in tabulating mechanism, the combination of a traveling element, a stationary element, a tabulator stop, means controlled by a key for shifting said tabulator stop from one element to the other, and means controlled by the same key for locking the traveling element against movement.

4. In a typewriting machine and in tabulating mechanism, the combination of a traveling element, a stationary element, a tabulator stop, means controlled by a key at the front of the machine for shifting said tabulator stop from one of said elements to the other, and means controlled by the same key for locking the traveling element.

5. In a typewriting machine and in tabulating mechanism, the combination of a traveling element, a stationary element, a tabulator stop, means controlled by a key for shifting said tabulator stop from one element to the other, and means controlled by the same key for locking the traveling element against movement, the locking means remaining effective until the stop is completely removed from the element on which it was originally supported.

6. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tabulator stop, means for shifting said stop from the frame of the machine to the carriage, and means connected with said first named means for locking the carriage against traveling movement.

7. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tabulator stop, means for shifting said stop from the frame of the machine to the carriage, a carriage lock, and means for automatically rendering said lock effective.

8. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means for shifting said stop from one of said elements to the other, and means operative by said first named means for locking said carriage element.

9. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a tabulator stop, means controlled by a key in the keyboard for shifting said stop from the frame of the machine to the carriage, a carriage lock, and means controlled by said key for actuating said lock.

10. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means operative by a key for shifting said stop from one element to the other, means operative by a second key for re-shifting said stop back again, a carriage lock, and means operative by each of said keys for rendering said lock effective.

11. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means for shifting said stop from one of said elements to the other, a locking bar on the carriage element, a coöperative locking device on the frame element, and means controlled by said first named means for bringing said locking device and said locking bar into operative relationship to lock said carriage element.

12. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means for shifting said stop from one of said elements to the other, a rack bar on the carriage element, a locking device pivoted on the frame element and coöperative with the teeth of said rack bar, and means controlled by said first named means for moving said device into engagement with said rack bar to lock the carriage element.

13. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means for shifting said stop from one of said elements to the other, a carriage feed rack, a rack bar on the carriage separate from said feed rack, a locking device on said frame element, and means controlled by said shifting means for moving said locking device into operative engagement with said rack bar to lock the carriage.

14. In a typewriting machine and in tabulating mechanism, the combination of a frame element, a carriage element, a tabulator stop, means for shifting said stop from one of said elements to the other, a carriage feed rack, a rack bar on the carriage separate from said feed rack, a locking device on said frame element, and means controlled by said shifting means for moving said locking device into operative engagement with said rack bar to lock the carriage.

- lating mechanism, the combination of a carriage, a relatively fixed part, a tabulator stop, means for shifting said tabulator stop from one of the two first named parts to the other, a locking bar on the carriage, and a device coöperative with the locking bar, said device being pivotally mounted on the frame of the machine and having a yielding arm co-active with said means.
- 15 15. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a tabulator stop, means for shifting said tabulator stop from one of the two first named parts to the other, a cam movable by said means, and a carriage locking device pivoted on the frame of the machine and comprising a flexible spring arm co-active with said cam.
- 20 16. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a tabulator stop of one of the first named parts, means for shifting said tabulator stop to the other of said parts, a cam movable by said means, a rack bar on the carriage, and a lever pivoted on the frame and provided at one arm with a pawl coöperative with said rack bar, the other arm of said lever comprising a yielding portion co-active with said cam.
- 25 17. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a tabulator stop on one of the first named parts, means for shifting said tabulator stop to the other of said parts, a cam movable by said means, a rack bar on the carriage, and a gravity lever comprising a tooth coöperative with said rack bar and a yielding arm coöperative with said cam.
- 30 18. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a column stop, a stop bar with which the column stop is adapted to engage, said stop bar and column stop being mounted for movement relative to one another during the carriage travel, shifting means for shifting said column stop into engagement with the stop bar, and means controlled by said shifting means for locking the carriage.
- 35 19. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a column stop, a stop bar with which the column stop is adapted to engage, said stop bar and column stop being mounted for movement relative to one another during the carriage travel, means for moving the stop to disengage it from said stop bar, and means controlled by said last named means to lock the carriage against traveling movement.
- 40 20. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a stop bar thereon, a column stop on the frame of the machine, shifting means for shifting the column stop off the frame and into engagement with said stop bar on the carriage, and locking means for the carriage operated by said shifting means.
- 45 21. In a typewriting machine and in tabulating mechanism, the combination of a carriage, an element which travels in unison therewith, a column stop, key controlled means for shifting said column stop from the frame of the machine to said element, and means operated by said key controlled means for locking said element against movement.
- 50 22. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops movable individually into and out of operative position, key controlled means for moving said stops singly at will into and out of operative position, and means controlled by said key controlled means for locking the carriage against movement.
- 55 23. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a stop magazine on one of the first named parts, a plurality of tabulator stops in said magazine, means for forcing said stops from said magazine to the other of said parts, and means operative by said last named means for locking the carriage.
- 60 24. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a stop magazine on the frame of the machine, a plurality of column stops on said magazine, a stop bar on the carriage, shifting means for forcing the stops separately out of the magazine and into engagement with said stop bar, and means connected with said shifting means for locking the carriage.
- 65 25. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a stop magazine on the frame of the machine, a plurality of column stops on said magazine, a stop bar on the carriage, shifting means for forcing the stops separately out of the magazine and into engagement with said stop bar, retracting means for forcing the stops off the stop bar and back into the magazine, and locking means for the carriage, said locking means being operative both by said shifting means and by said retracting means.
- 70 26. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a relatively fixed part, a stop magazine on one of the first named parts and from which only one stop at a time can be effected, stop ejecting means, stop receiving means on the other part arranged at different points along the same, the different stop engaging means and the point of ejectment of the stops being brought into register by

the travel of the carriage, and means for positively detaining the carriage in such registering position.

27. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a stop thereon, a cooperating stop on the frame of the machine, key controlled means for releasing the carriage and causing said stops to co-act to arrest the carriage at a predetermined point, locking devices independent of said stops, and means for actuating said devices to lock the carriage at said predetermined point.

28. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a traveling element, a frame or stationary element, a plurality of tabulating stops normally in inoperative position on said stationary element, a cooperative stop, 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, and means for holding the carriage positively locked during the stop receiving operation.

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

30. In a tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a carriage; a stop ejector; a key; a train of actuating devices between said key and said ejector 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; a locking device for the carriage; and connections between said locking device and said key.

31. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a carriage; a stop ejector; a key; a train of actuating devices between said key and said ejector comprising a link; a carriage locking device; and a cam on said link for actuating said device.

32. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a stop ejector; a key; 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;

a rack bar on said carriage; a locking lever on the frame; and a cam connected with said link for actuating said locking lever.

33. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a carriage; a rack thereon; a stop ejector; a stop retractor; keys; trains of connections between said keys and said ejector and retractor, each train comprising a slide rod, a bell crank and a link; a carriage locking lever cooperative with said rack; and cams connected with said links for operating said carriage locking lever.

34. In tabulating mechanism for typewriting machines and in stop ejecting devices therefor, the combination of a stop magazine, a carriage, a stop ejector, key actuated devices for controlling the same, full-stroke devices for said key actuated devices, and locking devices for the carriage, the full-stroke devices operating to maintain the locking devices in operation until a stop has been completely ejected from said magazine.

35. In tabulating mechanism for typewriting machines comprising stop retracting devices, the combination of a carriage, a stop retractor, key actuated devices for controlling the same, full-stroke devices for said key actuated devices, and locking devices for the carriage, the full-stroke devices operating to maintain the locking devices in operation until a stop has been completely retracted from the part by which it was supported.

36. In tabulating mechanism for typewriting machines comprising stop retracting devices, the combination of a carriage, a stop retractor, key actuated devices for controlling the same and releasing the carriage, full-stroke devices for said key actuating devices, and locking devices for the carriage, the full-stroke devices operating to maintain the locking devices in operation until a stop has been completely retracted from the part by which it was supported, said locking devices then becoming automatically ineffective so that the carriage is free to run to a predetermined point.

37. In tabulating mechanism for typewriting machines comprising stop ejecting and retracting devices, the combination of a stop ejector; a stop retractor; two keys; trains of connections between said keys on the one hand and said ejector and said retractor on the other, each train comprising a reciprocatory part; and sets of full-stroke devices associated with said keys, each set comprising a locking lever cooperative with said reciprocatory part, detent devices for said levers, and devices on said reciprocatory part for rendering said lever operative and inoperative.

38. In tabulating mechanism for type-

writing machines comprising stop ejecting and retracting devices, the combination of a stop ejector; a stop retractor; two keys; trains of connections between said keys on the one hand and said ejector and said retractor on the other, each train comprising a reciprocatory part; and sets of full-stroke devices associated with said keys, each set comprising a locking lever pivoted on a fixed part and movable to operative and inoperative positions by devices on said reciprocatory part.

39. In tabulating mechanism for type-writing machines comprising stop ejecting and retracting devices, the combination of a stop ejector; a stop retractor; two keys; trains of connections between said keys on the one hand and said ejector and said retractor on the other, each train comprising a reciprocatory part; and sets of full-stroke devices associated with said keys, each set comprising a bell crank provided with a locking tooth which coöperates with ratchet teeth on said reciprocatory part, a spring detent for maintaining said bell crank in operative and inoperative positions, and projections on said reciprocatory part for moving said bell crank into and out of operative relationship with said reciprocatory part.

40. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, carriage releasing devices, a column stop, a coöperative stop, a stop retractor, key controlled devices for actuating the same, and means connecting said key controlled devices with said coöperating stop and with said carriage releasing devices.

41. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, a column stop, a coöperative stop, means including a key for actuating said coöperating stop and releasing said carriage, a stop retractor, key controlled devices for actuating said stop retractor and also for actuating said coöperating stop and releasing the carriage independently of said key.

42. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, carriage releasing devices, a column stop, a coöperating stop lever, a stop retractor, key controlled devices for actuating said stop retractor, releasing said carriage and moving said stop lever to operative position.

43. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, carriage releasing devices, a column stop, a coöperative stop lever provided with an extension, a stop retractor, key controlled devices for actuating said retractor, said devices comprising a slide rod, a link, a con-

necting bell crank, and an extension on said bell crank for actuating said extension on said stop lever.

44. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, carriage releasing devices, a column stop, a coöperative stop, a stop retractor, key controlled devices for actuating the same comprising a link, a cam on said link, connecting means for connecting said key controlled devices with said coöperating stop and with said carriage releasing devices, and a carriage lock operative by said cam, said lock automatically releasing the carriage when the column stop has been retracted therefrom so that the releasing devices are effective to permit the carriage to run freely to a predetermined point.

45. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, a column stop, a coöperative stop, a stop retractor, and devices controlled by a single key for projecting said coöperative stop, for releasing said carriage, and for actuating said stop retractor.

46. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, a column stop, a coöperative stop, a stop retractor, carriage locking devices, and means operative by a single key for locking said carriage, for actuating said retractor, for projecting said coöperative stop and for releasing said carriage.

47. In tabulating mechanism for type-writing machines comprising stop retracting devices, the combination of a carriage, a feed rack movably mounted on the carriage, a fixed rack on the carriage, a column stop, a coöperative stop, a stop retractor, a locking device coöperative with said fixed rack, and devices controlled by a single key for moving said locking device into coöperation with said fixed rack, for actuating said retractor, for projecting said coöperative stop, for freeing said locking device so that it may separate from said fixed rack and for lifting said movable rack to release the carriage.

48. In tabulating mechanism for type-writing machines, the combination of a carriage, a column stop, a coöperative stop, carriage locking devices, and means operated by a single key for locking said carriage for projecting said coöperative stop and for releasing the carriage.

49. In tabulating mechanism for type-writing machines, the combination of a carriage, a feed rack movably mounted on the carriage, a fixed rack on the carriage, a column stop, a coöperative stop, a locking device coöperative with said fixed rack, and devices controlled by a single key for mov-

ing said locking device into coöperation with said fixed rack, for projecting said coöperative stop, for freeing said locking device so that it may separate from said fixed rack and for lifting said movable rack to release the carriage.

50. In a typewriting machine and tabulating mechanism, the combination of a tabulator stop, a tabulator stop support, a stop bar, said stop bar and said stop support being relatively movable, means for shifting said tabulator stop from one of said stop support and stop bar parts to the other, and means for preventing relative movement between said stop bar and stop support parts during the shifting movement of said tabulator stop.

51. In a typewriting machine and tabulating mechanism, the combination of a tabulator stop, two relatively movable parts each adapted to support said stop independently of the other at different times, means for shifting said stop from one part to the other, and means for preventing relative movement between said parts while said stop is being shifted.

52. In a typewriting machine and tabulating mechanism, the combination of a plurality of tabulator stops, a first stop sup-

porting part, a second stop supporting part, said parts being relatively movable and each adapted to support tabulator stops independently of the other, and means controlled by a single key for shifting a tabulator stop from said second part to said first part and for positioning another tabulator stop relatively to said first part at a place where it is subsequently to be shifted to said first part from said second part.

53. In a typewriting machine and tabulating mechanism, the combination of tabulator stops, a tabulator stop support, a stop bar, and means controlled by a single key for shifting said stop from said stop bar to said support and for positioning a second tabulator stop relatively to said stop support at a point where it is to be subsequently shifted from said stop bar to said stop support.

Signed at the borough of Manhattan, city of New York, in the county of New York, and State of New York, this 8th day of April A. D. 1912.

JOHN WALDHEIM.

Witnesses:

CHARLES E. SMITH,
E. M. WELLS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."