G. A. SEIB.

TYPE WRITING MACHINE.

APPLICATION FILED MAY 8, 1917.

1,273,545.

Patented July 23, 1918.

2 SHEETS—SHEET 1.

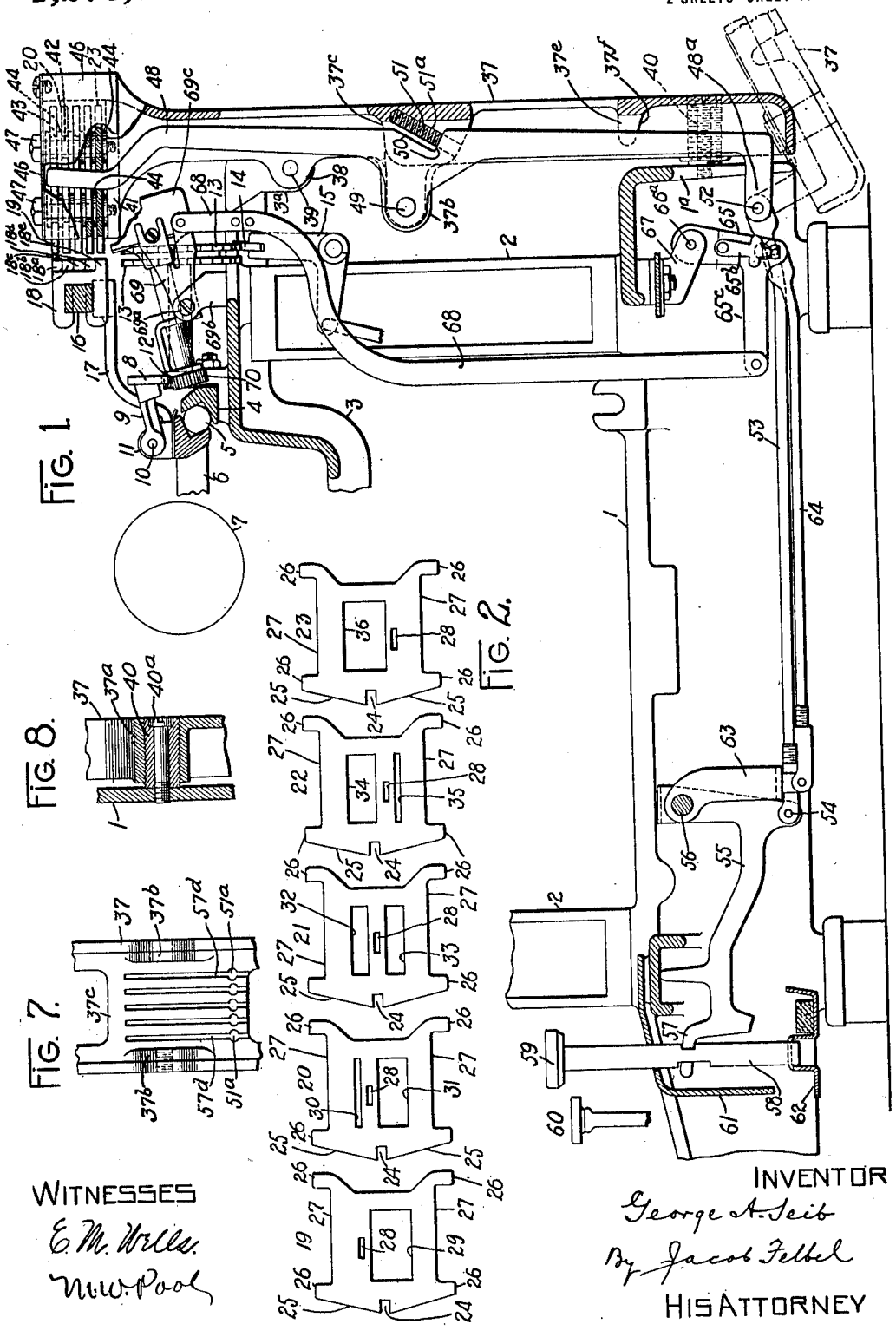


FIG. 1.

FIG. 8.

FIG. 7.

FIG. 2.

WITNESSES

E. M. Wills.

M. W. Pool

INVENTOR

George A. Seib

By Jacob Felbel

HIS ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

G. A. SEIB.

TYPE WRITING MACHINE.

APPLICATION FILED MAY 8, 1917.

1,273,545.

Patented July 23, 1918.

2 SHEETS—SHEET 2.

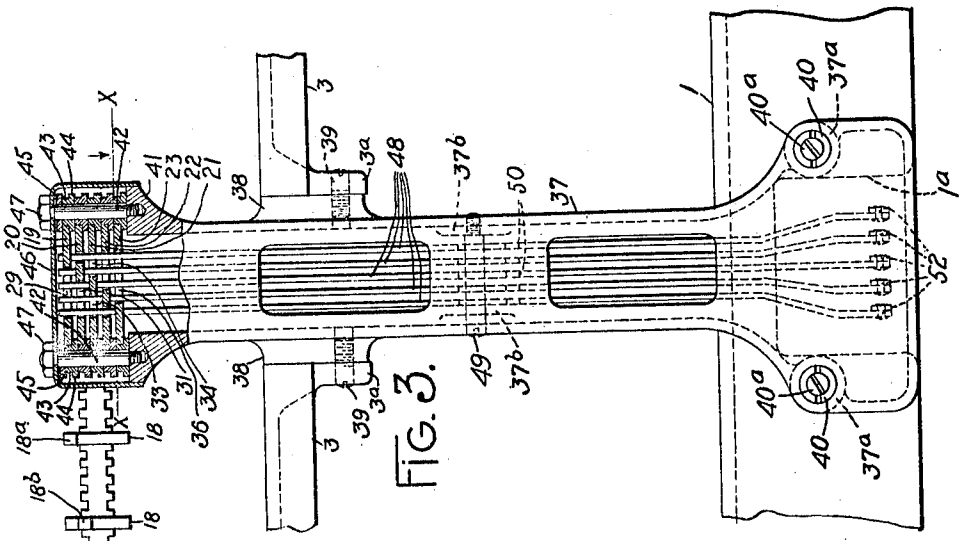


FIG. 3.

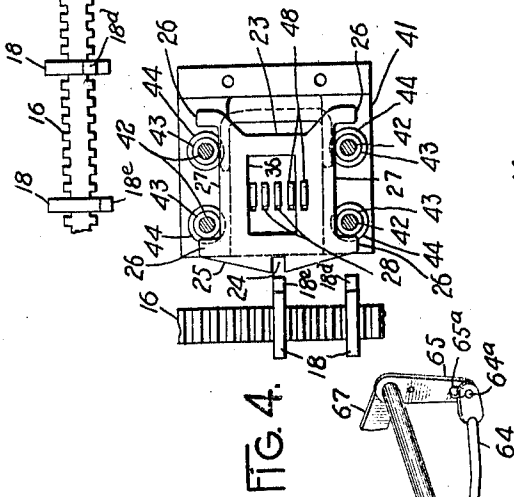


FIG. 4.

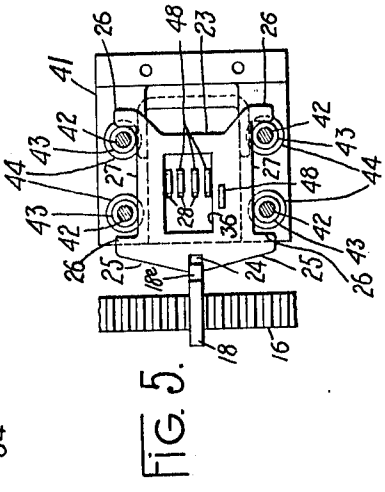


FIG. 5.

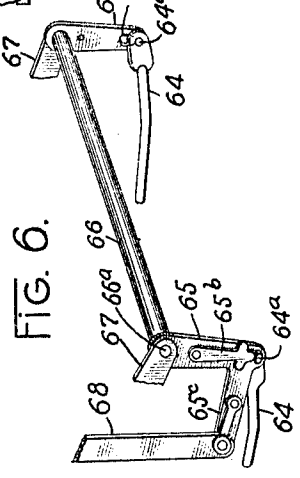


FIG. 6.

WITNESSES

E. M. Wells

Wm. Pool

INVENTOR

George A. Seib

By Jacob Felbel

HIS ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE A. SEIB, OF ILION, NEW YORK, ASSIGNOR TO REMINGTON TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

1,273,545. Specification of Letters Patent. Patented July 23, 1918.

Application filed May 8, 1917. Serial No. 167,313.

To all whom it may concern:

Be it known that I, GEORGE A. SEIB, citizen of the United States, and resident of Ilion, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My present invention relates to tabulating mechanism for typewriting machines, and its principal object is to provide new and improved reversible tabulating mechanism which is adapted to select columns during movements of the carriage in both directions. More specifically, the object of my present invention is to improve the construction disclosed in my prior Patent No. 1,132,286, granted March 16, 1915.

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

In the accompanying drawings which illustrate the preferred form of my invention applied to a No. 10 Remington typewriting machine,

Figure 1 is a fragmentary front to rear vertical sectional view of said machine.

Fig. 2 is a plan view of a set of my improved column selecting stops.

Fig. 3 is a fragmentary rear elevation, partly in section, of my improved tabulating mechanism.

Fig. 4 is a fragmentary horizontal sectional view, taken on a plane indicated by the dotted line x—x in Fig. 3.

Fig. 5 is a view corresponding to Fig. 4 but showing some of the parts in different relationships.

Fig. 6 is a perspective view on a reduced scale, showing part of the carriage releasing mechanism.

Fig. 7 is a fragmentary face view of the central portion of the detachable tabulator frame.

Fig. 8 is a vertical sectional view of one of the devices for securing said tabulator frame to the main frame of the machine.

Referring first to Fig. 1, the main frame of the machine is shown as comprising a base 1, posts 2 and a top plate 3, above which are fixed trackways, only the rear one, 4, however, being shown. Said trackways cooperate through anti-friction balls 5 with a carriage 6 in which is mounted a platen 7, diagrammatically shown herein. Coöperative with the front face of the platen are type bars, not shown, of the usual Remington construction. A releasable feed rack 8 is carried by arms 9 fulcrumed at 10 on ears 11 fixed to the rear part of the carriage. Said feed rack normally meshes with a feed pinion 12 that is operatively connected with escapement wheels 13, said wheels coöperating with a feed dog 14 mounted on a rocker 15 that is operative in the usual way by the printing key levers.

The tabulating mechanism comprises a stop bar 16 mounted on angular arms 17 secured to the rear part of the carriage and extending rearward therefrom. Said stop bar is toothed on its upper and lower faces to provide notches a letter space distance apart, which notches are adapted to receive a plurality of adjustable column stops 18, there being five such stops in the present instance, as shown in Figs. 1 and 3. These column stops are generally similar in construction, being notched to straddle or fit over the stop bar from the rear but differ from each other in that each is provided with a rearward projection, lug or stop proper, these projections being at different heights for the different stops. Thus the stop lug 18^a of the left-hand column stop 18 of the series (considered from the front of the machine) is at the top of said column stop, while the stop lug 18^e of the right-hand stop of the series is at the lower end of said stop, and the stop lugs 18^b, 18^c and 18^d of the intermediate column stops are in horizontal planes between the lugs 18^a and 18^e, these planes being successively lower than the plane of the upper stop lug. In other words, the stop lugs are arranged in a series of steps at progressively varying heights.

Coöperative with the column stops are a set of five frame stops, one for each column stop. The chief features of my present invention reside in the construction, mounting and control of these frame stops. Said frame stops are in the form of plates or slides shaped as best shown in Fig. 2, wherein the plates are numbered respectively 19, 20, 21, 22 and 23, the stop plate 19 being the topmost one of the set, the stop plate 23 being the bottom stop, and the other three being successive intermediate stops. Gen-

erally, these stops or plates are similar in construction, each comprising a notch 24 in its front face that is adapted to coöperate with its associate stop lug on the column stop. From this notch the front edges 25 incline rearward, to equal extents, providing two cam faces. At its sides each stop plate is provided with laterally projecting lugs 26, there being a pair of such lugs at each side, one at the front and one at the rear, the side 27 between each pair having a plane face. Also each stop plate is provided with a slot 28 which is adapted for cooperation with an actuating lever hereinafter described. These slots are differently located for each stop, as will be understood from an inspection of Fig. 2. In each instance the slot 28 is about midway between the front and rear ends of the stop, but said slots are progressively disposed widthwise. Thus the slot 28 in the top stop plate 19 is near the left-hand side of the stop while the slot 28 in the bottom stop plate 23 is near the right-hand side. The middle stop plate 21 has its slot 28 about central, while the slot 28 in the stop 20 is between the central position and the outside left-hand position of the stop 19, the slot 28 of the stop plate 22 being similarly disposed at the right of the central slot 28. In other words, the construction is such that when the stop plates are superposed one above the other the series of slots will be out of line vertically with each other, providing a set of slots side by side, if they be regarded as in a single horizontal plane; but when the plates are all assembled in a pile as in Fig. 3 these slots 28 have a stepped arrangement diagonally of the series. In addition to the engaging slots 28 each stop plate is provided with one or more additional slots or openings to afford passage for the actuating levers of the other stops. Thus the top stop plate 19 has a wide slot 29 at the right of the slot 28; the stop plate 20 has a narrow slot 30 at the left of its slot 28 and a wider slot 31 at the right thereof; the middle stop plate 21 has two equal slots 32 and 33 at opposite sides of its slot 28; the stop plate 22 has a slot 34 at the left and a narrower slot 35 at the right of its slot 28; while the bottom stop plate 23 has a single wide slot 36 at the left of its slot 28. These various slots not only lighten the stop plates but also prevent mutual interference between the stop plates and the actuating levers. It will be observed that these slots vary progressively in width from top to bottom and also reversely from bottom to top; that is to say, the slots considered from top to bottom decrease in width, 29 being wider than 31; 31 than 33; and 33 than 35; while in reverse direction the slot 36 is wider than the slot 34 which in turn is wider than 32, 30 being narrower still than 32.

The stop plates are mounted one above the other in the head or top portion of a vertical frame 37 arranged at the rear of the main frame and detachably secured thereto. Near its top the frame 37 is provided with lugs or thickened portions 38 that fit into a depression in the rear of the top plate 3 and between lugs 3^a depending from the sides of said depression (Fig. 3). Screws 39 passing sidewise through the lugs 3^a and into the thickened portions 38 secure the frame 37 to the top plate. These screws are headless. The construction is such that unnecessary strain on the lugs 3^a is eliminated and the liability of the lugs to break off under a sudden jarring, such as sometimes occurs in shipping the machines, is minimized. Near the lower end of the frame 37 other devices are provided for attaching it to the base 1. The lower attaching devices comprise exteriorly threaded bushings 40, which are threaded into tapped holes formed in thickened portions 37^a of the frame 37 (see especially Fig. 8). These bushings are provided with nicks so that they may be readily adjusted by means of a suitable tool. The rear face of the base 1 is not machined, nor is the front face of the lower portion of the frame 37, and if these parts were brought into direct contact it would not be possible in practice to obtain an even or close engagement of the frame 37 with the frame or base 1, but on the contrary in nearly all cases the frame 37 would be skewed. The screw bushings 40 provide adjustable abutments which may be turned in through the frame 37 independently of each other until proper contact with the base 1 is obtained. The bushings 40 are drilled and countersunk to receive headed screws 40^a, these screws passing loosely through the bushings and being threaded into tapped holes in the base 1, thus firmly securing the lower portion of the frame 37 to said base. It will be understood that the screws are not secured in place until after the bushings 40 have been adjusted. The frame 37 is generally U-shaped in cross-section, being open at its front side. Its top or upper portion is somewhat thickened (Fig. 3) and it spreads both laterally and forwardly, providing a sort of head portion 41 the top of which is machined so that its face is in a horizontal plane and slightly below the bottoms of the column stops 18 which are forward of the front portion of said head 41. At each side of the head is arranged a pair of vertical posts 42 disposed one in front of the other, these posts being screwed down into the top of the head and providing supports for sets of roller bearings. These bearings are in the form of flanged disks or rollers 43, the flanges 44 being below the body portions or bearing portions proper of the disks. The

disks or rollers are stimply strung on the posts and bear on each other, the bottom one supporting all of the others. There are five disks or roller bearings on each post. In other words there are five sets of bearings, each set comprising four bearings in the same horizontal plane which four coöperate to guide and support one of the slides or stop plates 19—23. This will be clearly understood from an inspection of Figs. 1 and 3. The bottom slide 23 is supported on the flanges of the bottom set of disks 43, and its parallel side edges 27 coöperate with the body portions of the bottom disks during to-and-fro sliding movements of said stop plate 23, these sliding movements being limited by the lugs 26 which act as stops in coöperation with the associate disks or roller bearings 43. Similarly the other stop plates of the set are guided and supported by their associate roller bearings, each stop plate being confined between the flanges of its own bearings and the flanges of the bearings next above, these flanges preventing displacement of the stop plates vertically. Also the flanges serve as separators, holding each stop plate in the pile separated from its fellows, the friction in operation being consequently much less than if the faces of the plates contacted with and rubbed on each other. On the tops of the top set of bearings 43 is arranged a set of plain disks 45. A cover, hood or housing 46 is arranged over the whole set of stop plates and extends downward over the sides of the rear head 41, this cover being secured in place by nuts 47 which are screwed on the upper reduced threaded ends of the posts 42. The front side of the hood 46 is open so as to permit the stop plates to be slid or projected forward rectilinearly for coöperation with the lugs on their associate column stops. The stop plates are so arranged that the top plate 19 is in the same horizontal plane as the top lug 18^a, while the underlying plates 20, 21, 22 and 23 are respectively in the planes of the stop lugs 18^b, 18^c, 18^d, 18^e, the result being that when the stop plates are selectively projected their notches 24 will coöperate with the stop lugs of associate column stops only; intervening column stops being skipped or passed. The individual, independent guides or bearing devices or disks 43 promote easy and accurate operation of the stop plates.

For selectively actuating the stop plates, trains of key controlled devices are provided, each train comprising an upright lever member 48, the set of lever members being arranged side by side and pivoted on a rod 49 supported by ears 37^b projecting forward from the middle portion of the sides of the frame 37, which frame houses the set. One end of the rod 49 is reduced and threaded and the other end is provided with a nick so that the rod is in effect a screw having a cylindrical body or bearing portion, the threaded end engaging in a tapped hole in the left-hand ear 37^b. At about the same level as the ears 37^b the rear part of the frame 37 has a forwardly projecting enlarged or thickened portion 37^c, which, as best shown in Figs. 1 and 7, is formed with vertical cuts or kerfs 37^d in which the levers 48 are housed and by which they are guided. The upper end portion of each actuating lever 48 is curved forward and upward, each lever coöperating with one of the notches 28 and passing freely through slots in the other stop plates. This will be plain from an inspection of Figs. 1 and 3. Thus the left-hand lever 48 (which is the right-hand one of the set when viewed from the rear as in Fig. 3) passes freely up through the slots 36, 34, 32 and 30, and operatively engages with the slot 28 in the top stop plate 19. Similarly the next lever 48 passes freely upward through the slots 36, 34 and 32, engaging in the slot 28 in the stop plate 20; and so on with the other levers 48, the right-hand lever 48 engaging operatively in the slot 28 of the lowermost stop plate 23 and passing freely upward through the slots 35, 33, 31 and 29. This construction provides for interchangeability of the levers 48, all the members of the set being alike in form. Back of their pivots the levers 48 are notched, as indicated at 50, for coöperation with restoring springs 51, which are housed in the frame 37. Said springs are seated in holes indicated at 51^a which holes are drilled at an inclination upward and rearward through the enlargement 37^c (Figs. 1 and 7), the axes of these holes coinciding with planes passing through the middle of the kerfs 37^d. It may be noted that as a matter of construction the holes are drilled before the kerfs are cut. The springs 51 are confined between the closed upper ends of the holes 51^a and faces of the notches 50. By reason of this construction it is unnecessary to hook or secure the end portions of the springs to anchor them or attach them to the parts on which they act. At their lower ends the levers 48 pass through parallel guide slots or kerfs indicated at 37^e, cut in a forwardly projecting rib 37^f on the frame 37. The lower end portions 48^a of the upright levers project horizontally forward through a rectangular opening indicated at 1^a that is cut in the rear of the base 1. The ends 48^a are pivotally connected at 52 with forwardly extending horizontally disposed links 53. There are five of these pivotal points 52 and they all lie in the same transverse horizontal straight line or axis as will be clearly understood by reference to Fig. 3. The forward ends of the links 53 are pivotally connected at 54 with angular levers 55 mounted on a stationary pivot rod 56 and

having forwardly extending fingers 57 which engage in slots in upright key stems 58. These key stems are provided at their tops with column selecting keys 59, which are arranged in a row above and back of the keys 60 of the regular keyboard. The key stems 58 are mounted to slide up and down in stationary guide plates 61 and 62.

The levers 55 are also adapted to actuate the carriage releasing mechanism, said mechanism comprising a U-shaped bail 63 having downward extending side arms which are pivoted at their upper ends on the pivot rod 56. The cross bar of the bail is arranged behind the levers 55 and is operated by them. Near its opposite end said cross bar is connected by parallel rearwardly extending links 64 (Fig. 6) with crank arms 65 fixed to and extending downward from the end portions of a rock shaft 66, said rock shaft being provided with projections 66^a that bear in stationary brackets 67. The connection between the links 64 and the arms 65 permits of ready detachment of the links. The lower ends of the arms 65 are formed with key-hole slots 65^a which are engaged by headed pins 64^a projecting laterally outward from the links 64. The heads of these pins are cut off at the top and bottom sides so that the heads are of oblong shape, permitting them when vertical to pass through the key-hole slots 65^a. This is done before connecting the forward ends of the links 64 and while holding said links vertical. After being thus inserted the links are swung forward and the pins 64^a drop to the bottoms or narrow ends of the slots 65^a through which the heads of the pins 64^a cannot now pass. Flat locking springs 65^b, secured to the outer faces of the arms 65, normally prevent the pins 64^a from rising in the slots 65^a. By pulling the lower free ends of the locking springs 65^b outward away from the faces of the arms 65 the pins 64^a are freed so that the links 64 may be disconnected. The right-hand arm 65 is provided near its lower end with a forward extension 65^c to which is pivotally connected the lower end of an angular link 68, the upper end of said link being connected with a lever frame 69 pivoted at 69^a on a stationary bracket 69^b (Fig. 1). Said lever frame supports both a retarding device 69^c and also a releasing pinion 70. Said pinion underlies the feed rack 8 and is adapted when one of the tabulating or column selecting keys 59 is operated to swing said releasing pinion 70 upward to release said feed rack from engagement with the feed pinion 12. More specifically, when a key 59 is actuated its associate lever 55 will operate to swing rearward the bail 63, the movement of the bail being transmitted by the parallel links 64 to the crank arms 65 and rock shaft 66 and through the extension 65^c and link 68 to the lever frame 69 and pinion 70. The construction provides that motion will be transmitted to the link 68 as well when the left-hand one of the set of keys 59 is actuated as when the left-hand one of the set of keys 59 is actuated as when the right-hand one of said keys is actuated, although the right-hand key is more nearly in a direct line forward of said extension 65^c than is the left-hand key 59, which left-hand key is considerably at one side.

It will be apparent that when one of the keys 59 is depressed, its movement will be transmitted through the train of devices comprising the associate lever 55, link 53 and lever 48 to the connected slide or frame stop which will be projected or slid forward into the path of the associate column stop lug so as to coöperate with the latter to arrest the carriage following its release. The forward projection of the selected frame stop or slide will not affect any of the other frame stops, as has been explained; and it will also be apparent that if thereby any column stop or stops to the right of the projected frame stop and in advance of the column stop that is in the same horizontal plane with said projected stop, such advance column stops will be skipped or passed. Also it is plain that this applies whether the movement of the carriage is from right to left as is usual in tabulating, or from left to right in reverse direction. Assuming the movement is from right to left it will be understood that the carriage will, when released, move freely to the left until the stop lug of the selected column stop, say, for example, the lug 18^e, contacts with the left-hand cam face 25 of the projected slide 23, which it will do some distance to the left of the notch 24. As the motion of the carriage continues the stop plate 23 will be cammed or forced slightly backward against the pressure exerted upon the depressed key 59, there being enough resiliency in the parts between said key and the stop plate to permit such backward camming of said stop plate without appreciably affecting the key. As soon as the stop lug 18^e enters the notch 24 the stop plate 23 will snap forward until arrested by the contact of the stop lugs 26 with the bearings 43. The parts at this time will be in the position illustrated in Fig. 5.

The stop lug 18^e is embraced between the walls of the engaging or locking notch 24, and the left-hand face of the stop lug is in contact with the left-hand face or wall of said notch, which face or wall acts as an arresting device. If the key 59 be now released the parts controlled by it will return to normal position, the single restoring spring 51 being effective during such return movement both on the lever 48 and the slid-

able stop plate 23 positively operated thereby. A similar operation of the parts will take place at each subsequent column selecting operation during the run of the carriage from right to left. With the carriage at or near the left-hand side, if it be desired to arrest it at any desired column during the return movement, the operator as before impresses the selected key 59, projecting the associate slidable stop and releasing the carriage. The carriage, however, is restrained from moving toward the left by the disengaged hand of the operator who pushes the carriage against the pull of the motor back toward the right. This brings the stop lug of the selected column stop into engagement with the left-hand cam face 25 of the projected slidable stop, said lug coöperating with said face to cam or force the slidable stop rearward until the stop lug comes opposite the notch 24, whereupon the slidable stop will snap forward and the notch will embrace the sides of the stop lug as in Fig. 5, the right-hand wall of the notch acting as an arresting device. The key 59 is thereupon released. The timing is such that before the locking notch 24 frees the column stop lug the feed rack 8 will have engaged with the feed pinion 12, thus restoring the carriage to the control of the escapement devices. Thereafter the entry in the column is written as in ordinary right to left tabulating or column selecting. The above described operation may be repeated each time it is desired to effect a reverse tabulating or column selecting. As is well understood, reverse tabulating or column selecting may be conveniently employed in listing work or the like.

It will be observed that my present invention is an improvement on my prior construction in that the column selecting stops slide into and out of forward or operative position instead of rotating about the axis of a fulcrum pin. The present construction gives more nearly direct control of the projected stop by the finger key, reducing to a minimum the shock felt by the finger of the operator when the carriage stop strikes the projected stop. The slidable stops are positively connected with and controlled by their actuating levers in both forward and rearward movements, thus dispensing with a return spring for the slidable stop necessary with the former construction. Uniformity of operation is also promoted, the operation of the slidable stops being substantially the same both for ordinary tabulating and for reverse tabulating.

The tabulator supporting frame 37 has advantages over prior constructions. By reason of the pivotal mounting of said frame on the screws 39 as well as of the adjustability of the screw bushings 40 the frame may be adjusted or swung on the screws 39 as pivots so as to bring the set of frame stops 19 to 23 in proper relationship to the column stops. Thus before the screws 40^a are threaded into place it will be understood that by screwing in slightly on the bushings 40, after they have been brought into contact with the rear face of the base 1 at the sides of the opening 1^a, the frame 37 at its lower portion will move rearward correspondingly away from the face of the base, and the upper end of the frame 37 will be swung correspondingly forward about the centers 39, bringing the frame stops that much closer to the path of movement of the column stops. Similarly by unthreading the bushings 40 slightly and then pressing the lower end of the frame 37 forward until contact is made with the frame or base 1, the frame stops will be swung correspondingly rearward away from the path of the column stops. After this adjustment the frame 37 is fixed by screwing in the screws 40^a. As a result of this construction nice adjustment of the relationship between the frame stops and their associate column stops is provided for. Furthermore, the construction and mounting of the tabulator frame 37 provides for its ready displacement when ever it is desired to get at the back of the machine, as for adjusting the escapement devices, and such displacement is had without disconnecting the levers 48 from their links 53. All that it is necessary to do is to unscrew the screws 39 and the screws 40^a after which the frame 37 may be laid or swung back to a nearly horizontal position if desired, the swinging taking place about the line containing the pivotal points 52 as an axis. The dotted lines in Fig. 1 indicate the frame in a swung-back position and make it plain that the rear portion of the machine is at such time entirely exposed. To accomplish this result in prior constructions it was necessary to disconnect the lower ends of the tabulator levers from the trains of devices connecting them with the tabulator keys, this requiring a number of operations corresponding with the number of tabulator levers in the set. Such disconnections are avoided by the present construction.

Various changes may be made without departing from 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 carriage, a plurality of column stops, a plurality of coöperating stops mounted to slide at right angles to the path of movement of the travel of the carriage, each coöperating stop being provided with an engaging notch and being engageable at each side of said notch by one of said column stops to slide said coöperating stop in return direction

after it has been actuated, and key operated means for selectively actuating said slidable coöperating stops.

2. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops, a plurality of coöperating stops mounted to slide at right angles to the path of movement of the travel of the carriage each coöperating stop being provided with an engaging notch and being engageable at each side of said notch by one of said column stops to slide said coöperating stop in return direction after it has been actuated, roller bearings for said slidable stops, stop lugs on said slidable stops coöperative with said roller bearings, and key operated means for selectively actuating said coöperating stops.

3. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops, a plurality of slidable coöperating stops each provided with an engaging notch and being engageable at each side of said notch by one of said column stops to slide said coöperating stop in return direction after it has been actuated, actuating levers each engaging with a slot in one of said slidable stops and passing freely through slots in the other slidable stops, and key operated devices for actuating said levers.

4. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops, a plurality of slidable coöperating stops, roller bearings for said slidable stops, some of said roller bearings supporting others of said roller bearings, and key operated levers for actuating said slidable stops.

5. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops, a plurality of coöperating stops mounted to slide at right angles to the path of movement of the travel of the carriage, posts, bearing disks on said posts, certain of said bearing disks supporting others of said bearing disks, the disks providing roller bearings for said slidable stops, and means for selectively actuating said slidable stops.

6. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a plurality of column stops, a plurality of slidable coöperating stops, roller bearings for said slidable stops, said roller bearings comprising flanged disks, the disks comprising bearing portions engageable with the sides of said slidable stops and the flanges of said disks preventing up and down displacement of said slidable stops; and key operated means for selectively actuating said slidable stops.

7. In a typewriting machine and in tabulating mechanism, the combination of a carriage; a plurality of column stops thereon; a plurality of coöperating stops mounted in horizontal planes one above the other, each coöperating stop being provided at its front face with a central notch from which at the right and left cam faces incline equally toward the rear and further comprising parallel side engageing portions terminating in laterally projecting stop lugs; and means for actuating said slidable stops.

8. In a typewriting machine and in tabulating mechanism, the combination of a carriage; a plurality of column stops; a plurality of slidable coöperating stops each provided at its front face with a central notch from which cam faces incline equally toward the rear at the right and left sides and further comprising parallel side edges terminating in laterally projecting stop lugs; and means for actuating said slidable stops, said means comprising a set of upright levers each engaging in a slot in one of said slidable stops and passing freely through slots in the other slidable stops of the set.

9. In a typewriting machine and in tabulating mechanism, the combination of a carriage; a plurality of column stops thereon; a plurality of slidable coöperating stops arranged in horizontal planes one above the other; trains of actuating devices for said stops, each train comprising a lever for positively actuating said stop in its advance and also in its return movement; and springs, one for each lever, each spring also being effective to restore one of said stops.

10. In a typewriting machine and in tabulating mechanism, the combination of a carriage, a stop, a slidable coöperative stop plate, roller bearings at each side of said stop plate, and an actuating device effective on said slidable stop plate between said roller bearings.

11. In a typewriting machine and in tabulating mechanism, the combination of a carriage, column stops, slidable coöperative stop plates, roller bearings for said slidable stop plates, said bearings being provided with means to space said stop plates apart and keep them from moving toward one another, and means for actuating said stop plates.

12. In a typewriting machine and in tabulating mechanism, the combination of a carriage, column stops, key actuated slidable coöperating stop plates arranged horizontally one above the other, and independent spacing and guiding devices coöperative with the side edges of said stop plates.

13. In a tabulating mechanism, the combination of a set of superposed tabulator stop plates, and a set of actuating devices passing therethrough, each actuating device being adapted to operate only one of said stop plates.

14. In a tabulating mechanism, the com-

bination of a set of tabulator stop plates arranged to slide rectilinearly one above the other, and a set of actuating devices therefor, one for each stop plate, said actuating devices being engageable with said stop plates at different points widthwise of said stop plates, whereby each actuating device may operate its own stop plate without operating another stop plate or being interfered thereby.

15. In a tabulating mechanism, the combination of a set of superposed tabulator stop plates, a set of superposed supporting and guiding devices arranged on each side of said set of stop plates, and a set of actuating devices for said set of stop plates.

16. In a tabulating mechanism, the combination of a set of superposed rectilinearly slidable stop plates, a set of flanged rollers arranged on each side of said set of stop plates for supporting and guiding the same, and a set of actuating devices, one for each stop plate.

17. In a tabulating mechanism, the combination of two sets of superposed flanged rollers, a set of superposed tabulator stop plates arranged between and supported and guided by said two sets of flanged rollers, and means for actuating said stop plates individually.

18. In a tabulating mechanism, the combination of a set of superposed stop plates, means for supporting and guiding each stop plate for independent rectilinear motion, and a set of actuating devices, one for each stop plate.

19. In a tabulating mechanism, the combination of a set of superposed stop plates, means for supporting and guiding each stop plate for independent rectilinear motion, means on said plates to limit said rectilinear movements, and actuating devices, one for each of said stop plates.

20. In a tabulating mechanism, the combination of a set of superposed slidable stop plates, each plate having at each side a straight edge and a projection extending laterally beyond the ends of said straight edges, a set of flanged rollers on each side of said plates, the flanges of adjacent rollers forming grooves within which said straight edges move, and a set of actuating devices, one for each stop plate.

21. In a tabulating mechanism, the combination of a set of superposed laterally guided and independently supported stop plates provided with registering openings progressively increasing in width, and a set of actuating devices passing through said openings whereby any selected stop plate may be slid back and forth without simultaneously moving any of the other stop plates of the set.

22. In a tabulating mechanism, the combination of a set of superposed stop plates having each an opening as 28, said opening being formed at substantially the same locality longitudinally of each plate but at progressively different localities considered widthwise of the plates so that when said plates are superposed the said openings 28 are arranged in set-like fashion in a common row transversely of the set of plates, a set of actuating levers arranged side by side transversely of said plates and each lever engaging one of said openings 28.

23. In a tabulating mechanism, the combination of a set of superposed stop plates having each an opening as 28, said opening being formed at substantially the same locality longitudinally of each plate but at progressively different localities considered widthwise of the plates so that when said plates are superposed the said openings 28 are arranged in set-like fashion in a common row transversely of the set of plates, a set of actuating levers arranged side by side transversely of said plates and each lever engaging one of said openings 28, said plates being cut out laterally of said openings 28 to varying extents for the passage therethrough of those levers that are connected respectively to other plates of the set whereby any lever and its associate plate may be moved without interfering with or being interfered by any of the other plates of the set.

24. In a tabulating mechanism, a set of tabulator stop plates formed with the slots 28, and longitudinally arranged slots at the sides of said slots 28.

25. In a tabulating mechanism, a set of tabulator stop plates formed with slots 28 and also formed with other slots at the sides of the slots 28, said other slots varying progressively in width.

26. In tabulating mechanism, the combination of a set of tabulator stop plates formed with stops 28 and also formed with other slots varying progressively in width, and key actuated devices coöperative with said slots 28 to actuate said stop plates, certain of said devices passing through said other slots.

27. In tabulating mechanism, the combination of a set of tabulator stop plates formed with a set of substantially equal slots and also formed with two other sets of slots, said two other sets varying progressively in width in opposite directions, and key actuated operating devices engaging with said equal slots, certain of said devices passing through said two other sets of slots.

28. In a tabulating mechanism, a stop plate having openings for actuating levers, a centrally arranged notch as 24, and a cam face as 25 on each side of said notch.

29. In a tabulating mechanism, a stop plate having openings for actuating levers, a centrally arranged notch as 24, a cam face

as 25 on each side of said notch, and two lugs 26 on each side of said stop plate.

30. In a tabulating mechanism, the combination of a set of column stops arranged to travel in different horizontal planes, a set of superposed slidable stop plates, and a set of actuating devices passing therethrough, each actuating device being adapted to operate only one of said stop plates.

31. In tabulating mechanism for typewriting machines having a releasable carriage, means for releasing said carriage operative by the tabulator keys, said means comprising a releasing device and mechanism for operating it including a bail, a rock shaft, crank arms thereon and connecting links, said crank arms and said links being disconnectibly connected by devices comprising pins having oblong heads and engaging in key-hole slots, and locking springs normally coöperative with said oblong heads.

32. Tabulating mechanism for typewriting machines comprising a stop lever, a key, connections between said key and said stop lever, a guide, and a restoring spring for said lever, said restoring spring being confined in an opening in said guide and abutting against a notch formed in said lever.

33. Tabulating mechanism for typewriting machines comprising one or more stops, a tabulator frame on which said stops are mounted, said frame being pivotally connected to the main frame of the machine and means for affording adjustment of said tabulator frame about its pivotal center.

34. In tabulating mechanism for typewriting machines, the combination of a tabulator frame, means for detachably securing said frame to the main frame of the machine, stops on said tabulator frame, levers connected with said stops and also mounted on said tabulator frame, keys on the main frame, and connecting devices between said keys and said levers, the construction being such that when the securing means are rendered inoperative said tabulator frame may be moved or swung away from the main frame of the machine about an axis passing through the points of connection of said levers with said connecting devices.

35. In tabulating mechanism for typewriting machines, the combination of an upright tabulator frame, means for securing the same to the main frame of the machine, upright tabulator levers mounted on said tabulator frame, keys therefor on the main frame, connecting devices between said keys and said levers, said connecting devices being pivotally attached at their rear ends to the lower ends of said levers whereby upon removal or release of the securing means, the tabulator frame and its levers may be swung down about the said pivotal points of attachment.

36. In tabulating mechanism for typewriting machines, the combination of an upright tabulating frame pivotally mounted between its ends, a set of upright tabulator levers pivotally mounted between their ends in said frame, key actuated means for said levers comprising horizontal links, the rear ends of which are pivotally connected to the lower ends of said levers and in a straight line whereby when the pivot of the tabulator frame is removed the frame and the levers as a whole may be swung down about the pivotal points of connection of said links.

Signed at Ilion, in the county of Herkimer and State of New York, this 4th day of May, A. D. 1917.

GEORGE A. SEIB.

Witnesses:
LINNIE F. BURNETT,
MARY C. GLEASON.

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