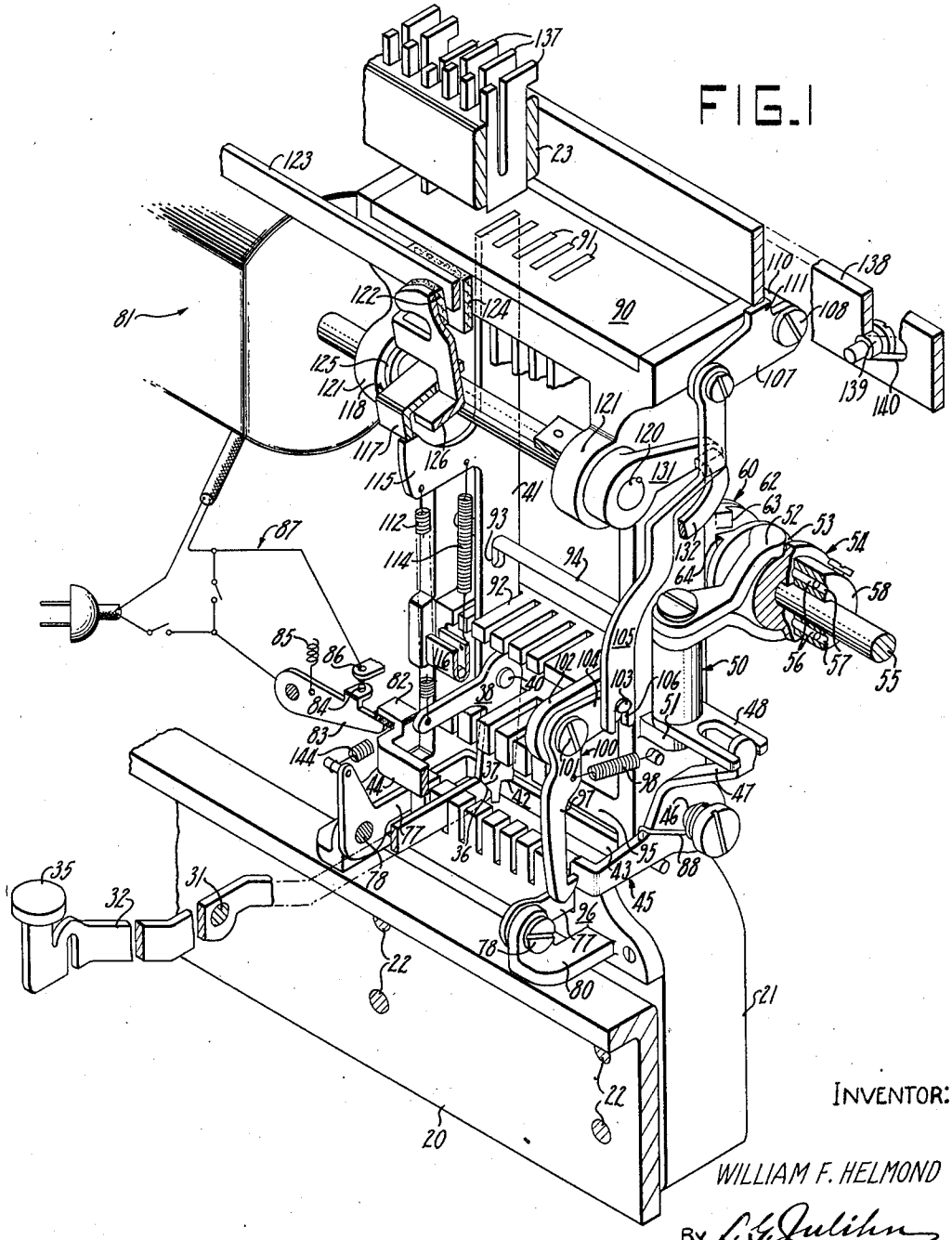
Dec. 17, 1940. W. F. HELMOND 2,225,450

TYPEWRITING MACHINE

Filed Dec. 30, 1938 4 Sheets-Sheet 1

FIG. 1



INVENTOR:

WILLIAM F. HELMOND

BY L. G. Julihn

ATTORNEY.

Dec. 17, 1940. W. F. HELMOND 2,225,450

TYPEWRITING MACHINE

Filed Dec. 30, 1938 4 Sheets-Sheet 2

FIG. 2

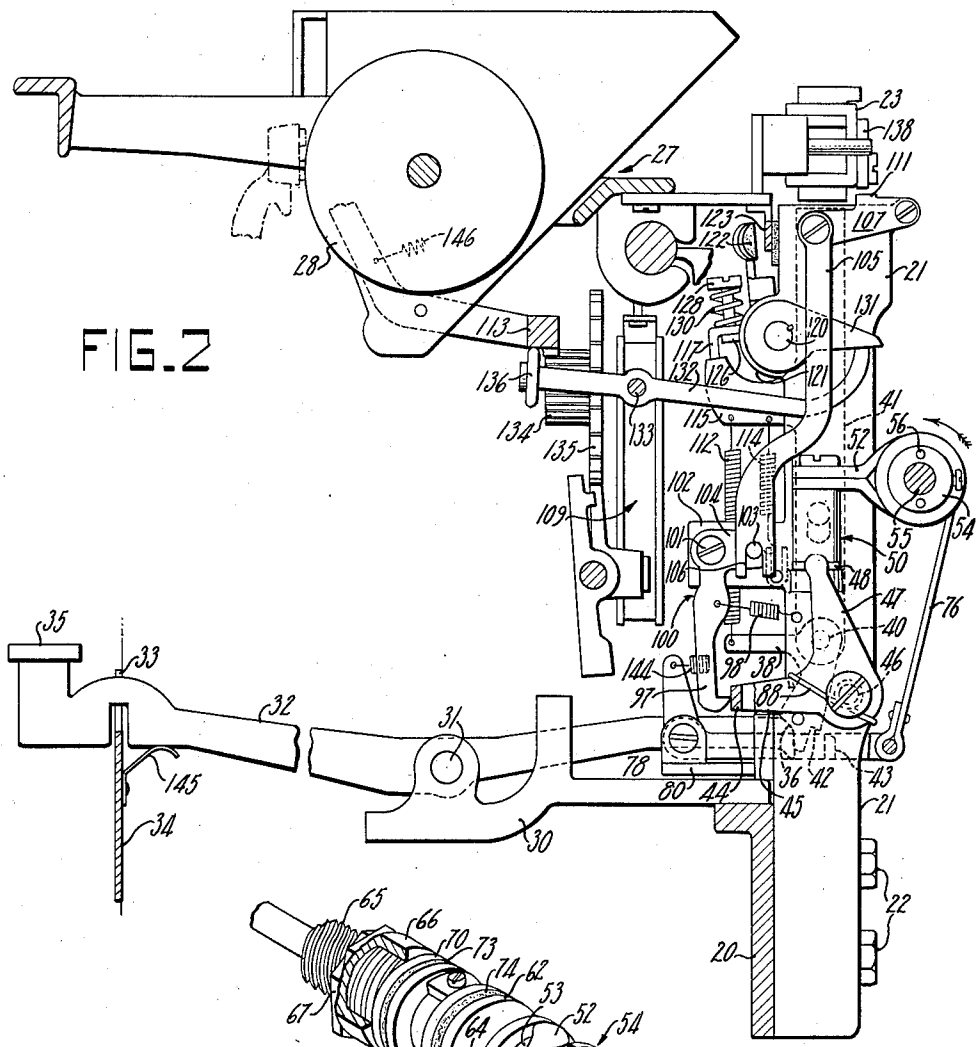
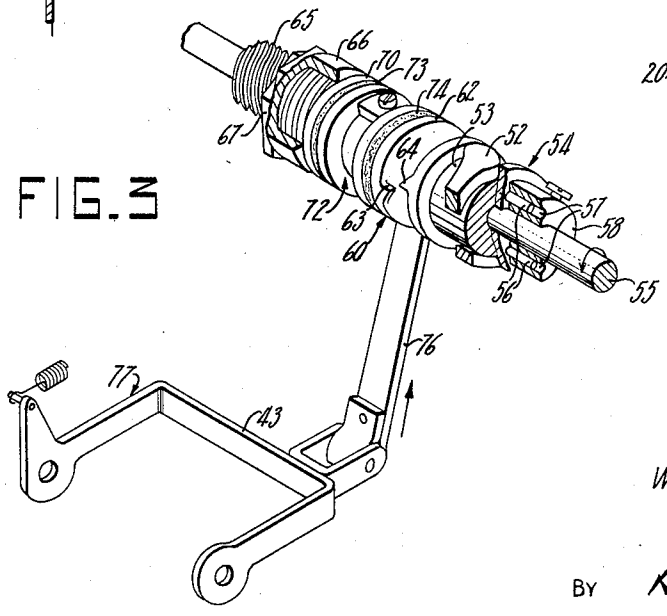


FIG. 3



INVENTOR:
WILLIAM F. HELMOND

BY F. G. Julihn
ATTORNEY.

Dec. 17, 1940. W. F. HELMOND 2,225,450

TYPEWRITING MACHINE

Filed Dec. 30, 1938 4 Sheets-Sheet 3

FIG. 4

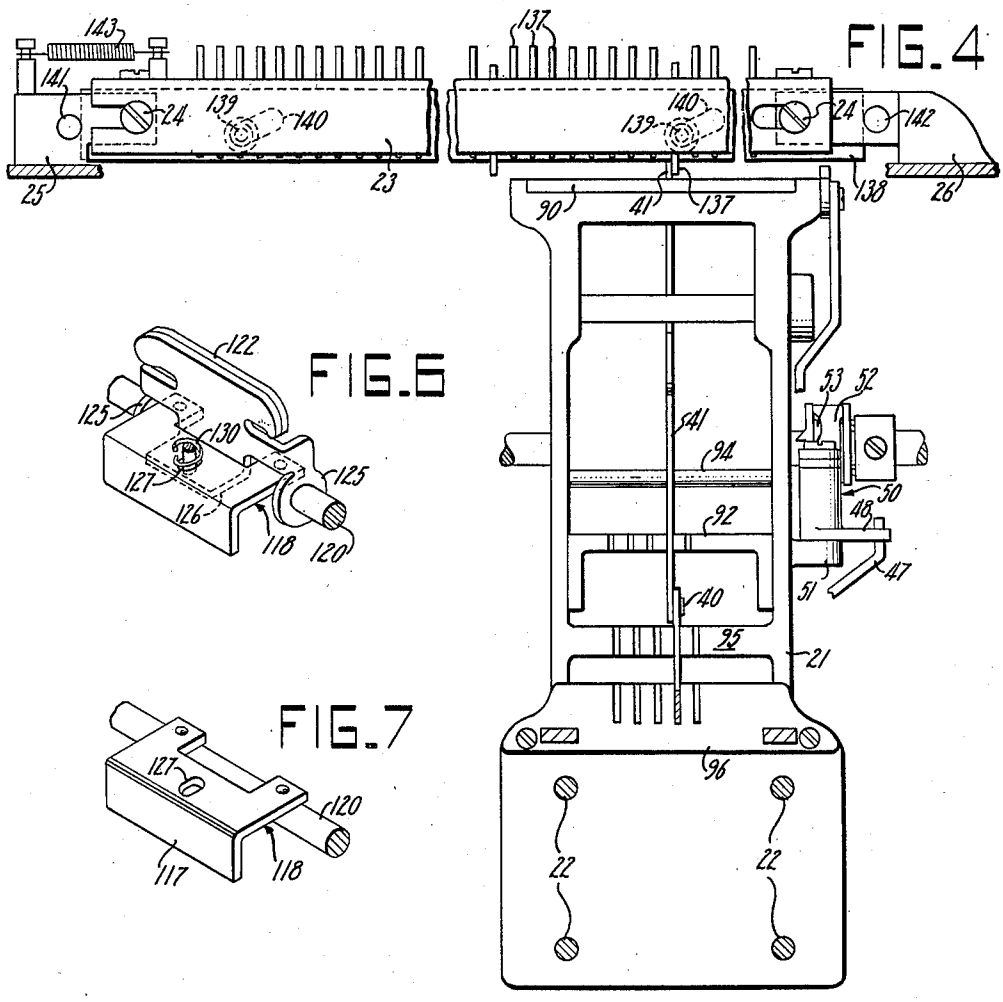
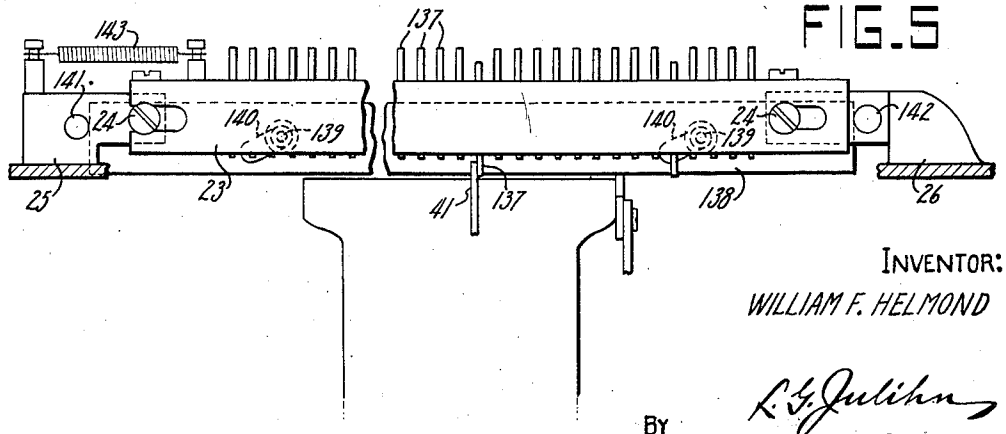


FIG. 6

FIG. 7

FIG. 5



INVENTOR:
WILLIAM F. HELMOND

BY L. G. Julihn

ATTORNEY.

Dec. 17, 1940. W. F. HELMOND 2,225,450

TYPEWRITING MACHINE

Filed Dec. 30, 1938 4 Sheets-Sheet 4

FIG. 8

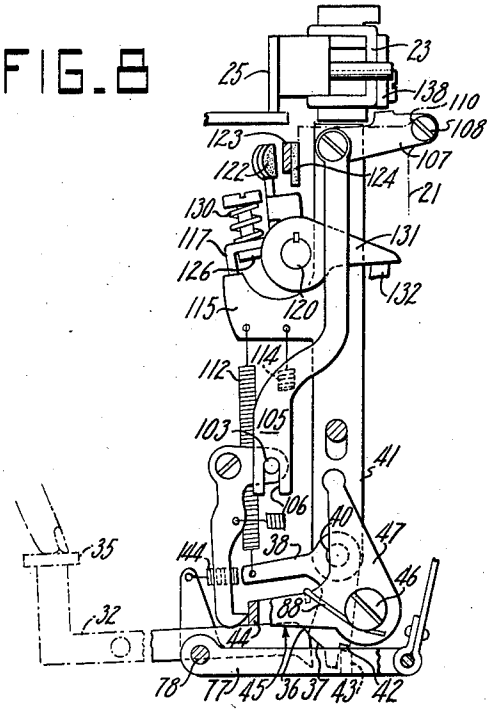


FIG. 9

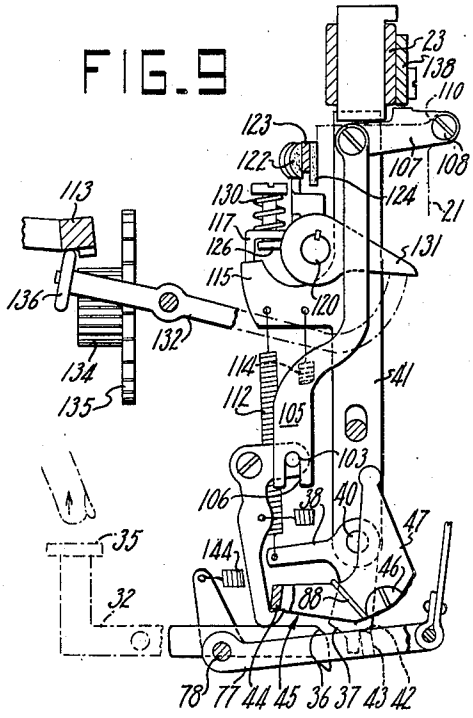


FIG. 10

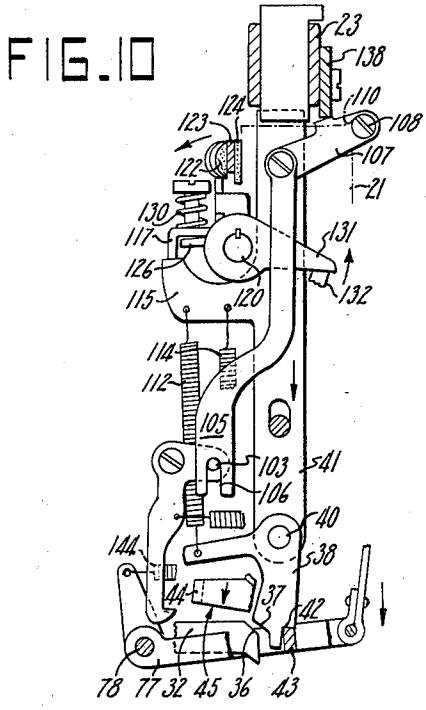
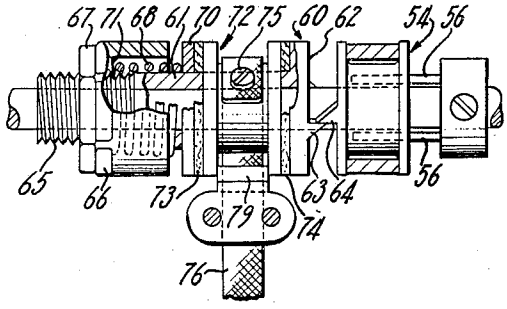


FIG. 11



INVENTOR:
WILLIAM F. HELMOND

BY L. G. Julihn

ATTORNEY.

Patented Dec. 17, 1940 2,225,450

UNITED STATES PATENT OFFICE

2,225,450

TYPEWRITING MACHINE

William F. Helmond, West Hartford, Conn., assignor to Underwood Elliott Fisher Company, New York, N. Y., a corporation of Delaware

Application December 30, 1938, Serial No. 248,503

12 Claims. (Cl. 197—178)

This invention relates to typewriting machines and with regard to certain more specific features thereof to tabulating mechanism and more particularly denominational tabulating devices.

It is an object of the invention to provide a simple, compact, inexpensive and reliably operative tabulating mechanism controlled in operation by power agencies in the typewriter to thus reduce the effort and minimize the fatigue of the operator, to generally speed up the operation of the machine and activate automatically the stops and related mechanism for releasing, controlling and arresting the paper carriage, so that by depression and subsequent release of a key, requiring very little effort, a tabulating cycle or step is automatically instituted and carried through.

It is a further object of the invention to provide a plurality of movable stops for arresting tabulating movement of the carriage at varying denominational positions, selecting the particular denominational stop by depression of one of a series of keys to thus introduce a power factor to the mechanism to move the particular denominational stop to operative stop position, release the letter-space rack for free movement of the carriage, and subsequently release the stop to return it to normal position.

A further object of the invention is to provide an electric motor drive, which may be continuous or intermittent in general character, and to provide for the temporary coupling of this power agency to the tabulating mechanism in such fashion that the parts are protected against injury as they are moved to their terminal positions. Quietness in operation is an incidental result of the operation of the mechanism designed to accomplish this object.

A still further object of the invention is to relate a brake mechanism with the power drive in such manner that the braking pressure is derived continuously from the power drive and is uniform in successive operations.

In certain aspects the present invention is applicable to machines employing a single stop for the engagement of any of a plurality of stops on the carriage, and in other aspects it involves a mechanism employing a series of denominational stops. Although the preferred form of the invention hereinafter described, and shown in the accompanying drawings, involves the use of the electric power in moving the parts of the mechanism to tabulating position and spring means to restore the parts, it will be obvious that several features of the invention are applicable to mechanism wherein the parts are both moved to and restored from operative position under the influence of the electric power-driven agency.

Other objects of the invention will be particularly pointed out in, or obvious from, the following description of the construction and mode of operation of a preferred form of the invention.

In the accompanying drawings—

Fig. 1 is a view in perspective of the improved tabulating mechanism.

Fig. 2 is a view in fore-and-aft cross section of a typewriter showing the mechanism shown in Fig. 1 with additional related parts.

Fig. 3 is a view in perspective of the electric-motor-driven shaft with controlling friction clutch.

Fig. 4 is a view looking toward the rear of the machine showing the tabulator-blade frame or magazine and certain of the carriage parts which are cooperative therewith. In this view the tabulating stops are shown at the instant of banking engagement.

Fig. 5 is a view similar to Fig. 4, indicating the positions assumed by the parts at the end of the banking engagement of the carriage with the stop in the frame.

Fig. 6 is a view in perspective of the brake shoe associated with its mounting.

Fig. 7 is a perspective of the mounting for the brake shoe.

Fig. 8 is a diagrammatic view showing the positions assumed by the parts at an early stage in the depression of one of the denominational tabulator keys.

Fig. 9 is a view similar to Fig. 8, showing the positions assumed by the parts after the key has been fully depressed and released.

Fig. 10 is a view similar to Figs. 8 and 9, showing the positions assumed by the parts after the carriage has fully banked against a raised stop on the frame and just prior to return of the tabulating mechanism parts by their respective springs. The arrows in this figure indicate that the associated parts are in motion toward normal position when the latch is thrown out, as shown in this figure.

Fig. 11 is a cross sectional view along a part of the motor-driven-shaft with parts broken away to show certain details of the clutch mechanism.

Referring now more in detail to the drawings, the rear wall of a typewriter base frame is indicated at 20. To the wall a tabulator frame or magazine 21 is detachably secured as indicated at 22. The magazine 21 rises to a plane closely underlying a tabulator-stop-rack 23 slidably mounted as indicated at 24 (see Figs. 4 and 5) on op-

posite end brackets 25 and 26 of a movable carriage frame 27 which journals a cylindrical platen 28.

The typewriter main frame structure includes a bracket 30 (Fig. 2) carrying a rod 31 extending transversely of the machine to serve as a pivotal mounting for a tabulator lever 32. In the form of the invention shown in the drawings there are a series of levers 32 constituting a denominational tabulator control, each lever being guided at its forward end in a slot 33 of a frame comb 34 and being provided at its outer end with a key 35. The rear ends of levers 32 are provided with cam faces 36 normally engageable with cam faces 37 respectively on bell crank levers 38, each of which is pivoted at 40 respectively in a blade or reed 41 of which there are a number in the magazine 21 corresponding to the number of denominational levers 32.

The ends of the bell crank levers 38 which have the cam faces 37 have also shoulders 42 which are adapted to be brought selectively into position over a universal bar 43 upon the first stage of depression of any one of the denominational tabulator keys 35. In a later stage of depression of any key 35 its operated lever 32 picks up, at the rear of pivot 31, a cross bar 44 of a bail 45 which is journaled on the magazine 21 at 46. The bail has an upstanding arm 47 at one side, the end of which engages a yoke 48 of a clutch shifting member 50 pivotally mounted on a lug 51 projecting from a side wall of the magazine. The clutch member 50 includes an operating yoke 52 positioned in a channel 53 of a slidable clutch part 54 rotatably held for movement with a drive shaft 55 by a series of pins 56 engaging in holes 57 of a collar 58 fixed on said shaft.

From the foregoing it will be noted that as any denominational tabulator key 35 is depressed it will cam its associated bell crank lever 38 rearwardly around pivot 40 and set it in position over universal bar 43. Further depression of the key causes the lever 32 to pick up the cross bar 44 of bail 45 and rotate the clutch shifting member 50 to slide clutch part 54 into engagement with a complemental clutch part 60.

The complemental clutch part 60 comprises a sleeve 61 having at its inner end a flange 62 and clutch teeth 63 adapted for engagement with oppositely faced teeth 64 on clutch part 54. At the outer end of sleeve 61 there is a threaded section 65 upon which is threaded a cup 66 and a lock nut 67. A coil spring 68 surrounding sleeve 61 bears against a disk 70, loose on the sleeve and the spring reacts against the inner end wall 71 of cup 66. A drum 72 is rotatively mounted on sleeve 61 and held between flange 62 of the sleeve and disk 70 for rotative movement with the sleeve through the medium of friction disks 73 and 74. The drum has secured to it at 75 one end of a tape 76 and when the clutch parts are engaged for rotation of sleeve 61 the tape is wound up slightly on the drum to elevate the rear end of a bail 77 by moving it around a pivot 78 on a bracket 80 secured to a forward face of magazine 21. To prevent axial movement of clutch part 60 a retaining member 79 fixed to the magazine extends between the flanges of drum 72. (See Fig. 11.)

Bail 77 provides the universal bar 43, heretofore referred to, over which pawl 42 of bell crank 38 has been moved by the initial depression of key 35. Lifting of bail 77 therefore lifts the particular reed or blade 41 to which bell crank 38 is pivoted.

The electric motor for driving shaft 55 is indicated at 81 in Fig. 1 of the drawings. In case it is desired to have this motor intermittently energized for each tabulating operation mechanism is provided, as shown also in Fig. 1 of the drawings, comprising an ear 82, projecting laterally from a side of bail 45, which normally holds downwardly a pivoted arm 83 carrying a contact 84. This arm is urged upwardly by a spring 85 and when permitted to move upwardly by movement of bail 45 in response to depression of any of the keys 35 the contact 84 engages with a fixed contact 86 closing an electrical circuit, indicated at 87, for energizing the motor, as will be readily understood. The bail 45 is normally held by a torsion spring 88 with the bail cross bar 44 downwardly as in Figs. 1 and 8 of the drawings, so that the electric circuit will be normally open through contacts 84—86.

The magazine 21 is provided with means for guiding and supporting the stop blades 41. At the top of the magazine a plate 90 is slotted, as indicated at 91 in Fig. 1, to slidably receive the upper ends of blades 41, the side walls of the slots serving to prevent lateral movement of the blade when it is banked against by the carriage. Slightly above the lower ends of blades 41 a comb member 92 is fixed between the uprights of the magazine for guiding the lower ends of the blades. Each of the blades is slotted as indicated at 93 and a pin 94 passing from one upright of the magazine to the other through the slots 93 serves further to guide the blades or reeds 41 and to limit their movement by engagement of the blades at the ends of slots 93, with the pin.

Another cross member 95 on the magazine 21 is comb slotted to guide the bell crank levers 38, and an attached cross plate 96 is comb slotted to guide the rear ends of tabulator key levers 32.

As the bail 45 is lifted in the late stage of depression of one of the keys 35 a spring-pressed latch 97 is moved by its spring 98 into position under the cross bar 44 of the bail, thus holding it elevated and in consequence holding the circuit closed through the electric contacts, and the clutch parts 54 and 60 in engagement. The latch 97 is provided as one arm of a bell crank lever 100 pivoted at 101 on an arm 102 extending forwardly from the magazine 21. As the bell crank lever 100 moves around its pivot to latch cross bar 44, a pin 103 on the other arm 104 of lever 100 rises and in consequence lifts a link 105 which is slotted at 106 at its lower end to engage pin 103. Link 105 is pivoted at its upper end to a link 107 which in turn is pivoted at its other end at 108 on an ear 110 formed on the magazine 21. Link 107 has a lug 111 which is adapted to function in the unlatching of latch 97, as will be more fully hereinafter described.

It will be noted that the extent of the effort on the part of the operator in depressing any one of the keys 35 is only such as is required in the pivoting of its associated lever 32, the camming of the selected bell crank lever 38 rearwardly against the action of a light return spring 112 and the lifting of bail 45 against the action of the light torsion return spring 88. At this point the power comes into operation to complete the stop-setting movement, to apply the brake shoe, and to lift a carriage letter-spacing rack 113. This is all done in consequence of the winding of strap 76 and the lifting of universal bar 43 over which shoulder 42 of a pawl 38 has been positioned, which raises the particular stop reed or blade 41 to which the selected bell crank lever is

pivoted. Blade 41 is lifted against the action of a return spring 114, the upper end of which is attached to a forwardly extending arm 115 of a blade and the lower end of which is fixed to a bar 116 supported on the magazine 21. Each of the arms 115 of blades 41 underlies a flange 117 of a rocker 118 fixed on a shaft 120 journaled in ears 121 on opposite sides of the magazine 21. As any blade is lifted by the power it rocks member 118 and shaft 120 and as the blade approaches the limit of its upward movement under the influence of the power, a brake shoe 122 is caused to engage with a brake bar 123 which extends the width of the spring-propelled traveling carriage. A friction member 124 is fixed on a forward face of the magazine at the rear of bar 123 and by the movement just described frictional resistance is applied to the carriage as it tabulates under the influence of its conventional spring motor 109. The brake shoe 122 is articulated with the rocker 118 by ears 125 loosely surrounding shaft 120 and a forwardly turned flange 126 underlying the body of rocker 118. The latter is slotted (see Figs. 6 and 7) as indicated at 127 to receive a screw 128 under the head of which is a coil spring 130 which bears against rocker 118. The screw provides means for adjusting tension of spring 130.

As any blade is lifted and rocker 118 is moved in a rotary direction, moving with it shaft 120, the friction shoe 122 is urged against bar 123 and in the final movement of lifting of the blade 41 the rocker body 118 proceeds to compress spring 130 so as to introduce the spring effect into the pressure action on shoe 122. Thus the degree of friction on bar 123 may be nicely regulated and will be uniform in all operations.

The shaft 120 has keyed to it an arm 131 which moves rotatively downward as the rocker 118 is lifted. This acts through a lever 132 pivoted in fixed relation to the magazine 21 at 133 to lift the letter-spacing rack 113 from engagement with a pinion 134 fixed to the carriage escapement wheel 135. On the forward end of lever 132 there is a loosely mounted roller 136 for engaging a lower face of the rack and lifting it out of engagement with the pinion into the position shown in Fig. 9 of the drawings.

Thus lifting of the selected blade by power to stop-setting position disengages the carriage letter space rack and sets the carriage brake in operation.

The tabulator stop rack 23 is preferably a hollow tube rectangular in cross section and provided with a series of depressible stops 137 set apart letter-space distances in slots in the top and bottom of the tube. Any of these stops may be depressed by forcing it down by hand or by some suitable stop-setting device. At the rear of the stop rack a latch-release bar 138 is mounted on stud screws 139 passing through diagonal slots 140 into the rear wall of the stop rack. This latch-release bar is held against endwise movement relative to the carriage by pins 141 and 142 extending rearwardly from the carriage end brackets 25 and 26 respectively.

The banking and releasing action will be understood by reference to Figs. 4 and 5, and also Fig. 1, of the drawings. Fig. 4 indicates the beginning of the operation of banking the carriage by one of the stops 137 abutting the upper end of an elevated reed or blade 41. In this view the latch-release-bar 138 is in its upper position above and free from the lug 111 on link 107. The carriage, propelled by its spring drum in a tabulating movement, upon engagement of stop 137 with blade 41, proceeds in its direction of travel while the tabulator stop bar 23 is held by the engagement of the stops. This distends a return spring 143 but during this movement latch-release-bar 138 is forced downwardly under the action of studs 139. The bar 138 acts to depress link 107 around its pivot 108 and move downwardly link 105 until it picks up the pin 103 and rocks bell crank lever 100 to release latch 97 from its position under the bar 44 of bail 45. If key 35 has been released and lever 32 restored by a return spring 145, spring 88 will return the bail to normal position thus disengaging the clutch to break the power drive which has been slipping during the tabulating movement of the carriage, as permitted by the friction clutch 54—60.

The return of the bail 45 also breaks the contacts 84—86 deenergizing the motor.

Opening of the clutch or deenergizing of the motor permits a return spring 144 acting on bail 77 to unwind the tape 76 and restore universal bar 43 to its lower position. Return spring 112 removes the pawl 38 from the path of bar 43 and tabulator-reed return-spring 113 restores the selected reed to its normal position. As the reed is returned a return spring 146 re-engages the rack 113 with pinion 134 and in so doing moves lever 132 to raise arm 131 and rotate rocker 118 to disengage the brake 122. Coil spring 130 takes up the separation between rocker 118 and the brake flange 126, and flange 117 of the rocker follows the arm 115 of the stop blade in its downward movement.

If, on the other hand, the key 35 has been held depressed bail 45 will not be returned even though latch 97 is released. Thus the power drive will be continued but the latch cannot be reengaged as it is held away by the effect of depressed latch-release-bar 138 (see Fig. 10) and this bar cannot move upwardly until the power is interrupted allowing stop reed 41 to descend.

In the preferred form of the invention above described and shown in the accompanying drawings, the invention is shown as applied to a typewriter of the standard or impact form. Obviously, however, the invention in its broader aspects may be applied to a typewriter in which the type action operates on the pressure principle and in which typewriters it is customary in manual tabulating to release an escapement dog rather than elevate a letter-space rack and in which friction braking of the carriage tabulating movement does not usually involve the long brake bar used in the standard typewriters.

What is claimed is:

1. Power driven tabulator mechanism comprising, a movable carriage having a stop, a frame, a stop shiftable on said frame, a drive shaft, an actuator for said shiftable stop, a normally open clutch, key controlled means for conditioning the shiftable stop for movement with the actuator and for closing the clutch to move the actuator by the drive shaft and shift the stop to carriage-arresting position, means for holding the clutch closed until the carriage banks against the shifted stop, and a slip-friction-device providing for overrunning of the drive shaft when the shiftable stop has been moved to stop position.

2. Power tabulating mechanism comprising, an escapement-controlled carriage having a stop, a motor-driven shaft, a frame having a shiftable stop, a carriage-braking means, means for releasing the carriage from its escapement-control for tabulating movement, means comprising a

key-operated clutch and a complemental slip-friction-device for connecting said shaft to operate said escapement-control-releasing means and said braking means, and move said shiftable stop into the path of the carriage stop, means for latching the clutch in operated condition irrespective of the release of the key so that said shaft overruns, as permitted by said slip-friction-device, to hold the braking means operative during the tabulating movement, and means operated automatically by the carriage in co-ordination with the banking of the carriage against the frame stop for releasing said latching means.

3. A power operated tabulator mechanism having a movable stop member normally out of stop position, a drive shaft, means to transmit motion from the drive shaft to the stop member including a normally open clutch and a slip-friction device to permit overrunning of the drive shaft when the clutch is engaged and resistance is developed by the stop reaching the limit of its movement to stop position, and key-controlled means to close said clutch.

4. Power tabulating mechanism comprising, a tabulating-carriage having a stop, a frame, a stop movable on said frame, a drive shaft, an actuator for said movable stop, a normally open clutch mechanism, key-controlled means for conditioning the movable stop for movement with the actuator and for closing the clutch mechanism to move the actuator by the drive shaft to move the movable stop to carriage-arresting position, means automatically effective for holding the clutch mechanism closed for keeping the actuator in moved position until the carriage banks against the moved stop, and means operable automatically by the carriage to disable the clutch-holding means in coordination with the banking of the carriage against the moved stop.

5. Power tabulating mechanism comprising, a tabulating-carriage having a stop, a motor driven shaft, a frame having a movable stop, and means to connect said shaft with said movable stop to move the movable stop to stop position, said means including a slip-friction device enabling said shaft to overrun to thereby sustain said movable stop in stop position.

6. Power tabulating mechanism comprising, a tabulating-carriage having a stop, a motor-driven shaft, a frame having a movable stop, and means to connect said shaft with said movable stop to move the movable stop to stop position, said means including a clutch mechanism and a device providing for slippage so that the shaft may overrun to thereby sustain said movable stop in stop position as long as the clutch mechanism remains closed.

7. Power tabulating mechanism comprising, a tabulating-carriage having a stop, a motor-driven shaft, a frame having a movable stop, means to connect said shaft with said movable stop to move said movable stop to stop position, said means including a key, a friction clutch mechanism closable by movement of said key to operated position, means acting automatically to hold the clutch mechanism closed irrespective of return of the key, and means operated by the carriage to disable the holding means in coordination with the banking of the carriage against the frame stop.

8. A power denominational tabulating mechanism comprising, a tabulating-carriage having a stop, a motor-driven shaft, a frame having a plurality of denominational stops, a mover for said denominational stops, key-operated means for selecting and operatively connecting any one of said denominational stops to said mover, and a slip-friction clutch mechanism closable in coordination with operation of said key-operated means to connect said mover to said shaft for resulting projection of the selected stop into the path of the carriage stop, the mover being retained in stop projecting position by the overrunning of the shaft and attendant slip-friction of said clutch mechanism after said stop has reached a predetermined limit of projection.

9. Power denominational tabulating mechanism comprising, a tabulating-carriage, a frame having a plurality of denominational stops individually projectible to carriage-arresting position, a stop-projector, key-mechanism and means operable thereby to select and operatively connect any one of said stops to said stop projector, said key-mechanism being returnable but leaving the selected stop connected to the projector, a slip-friction clutch mechanism closable in coordination with operation of said key-operable-means to connect said projector to said shaft for resulting projection of the selected stop, the slip-friction of said clutch mechanism permitting said shaft to overrun after the stop has been moved to a predetermined limit of projection, latch-means to keep the clutch mechanism closed irrespective of return of the key mechanism, and means operable by the carriage to disable the latch-means in coordination with banking of the carriage against the selected stop.

10. A denominational tabulator mechanism comprising, a tabulating-carriage releasable from escapement-control for resulting tabulating movement, a frame having a plurality of denominational-stops individually projectible to carriage-arresting position, means settable for braking the tabulating-movement of the carriage, a motor-driven shaft, a projector for said frame stops, tabulator-keys respectively for the frame stops, a normally open slip-friction clutch mechanism, means effective in response to operation of any tabulating key to couple its respective frame stop to said projector, means operable in coordination with the coupling of a frame stop to said projector to close said clutch mechanism to connect said projector to said shaft, means operated in coordination with the resulting movement of said projector to stop-projecting position to release the carriage, means operable in coordination with said resulting projector movement to set the braking means in operative position, a latch automatically effective to keep the clutch mechanism closed irrespective of release of an operated tabulator key whereby to maintain said projector in moved position by the force of said shaft, and means operated by the carriage to disable said latch in coordination with the banking of the carriage against the projected stop.

11. A power tabulating mechanism comprising, a tabulating-carriage having a stop, a stop projectible to carriage-arresting position, a power-driven shaft, a tabulating-key, means, including a closable slip-friction clutch mechanism for transmitting stop-projecting movement from said shaft to said projectible stop, said key being operatively connected to said transmitting means so that movement of said key to operated position renders said transmitting means effective and coincidentally closes said clutch mechanism, a latch device automatically becoming effective to keep said transmitting means effective and coincidentally keep said clutch mechanism closed irrespective of return of said key, means providing for limited movement of the carriage after

its stop is arrested by the projected stop, and a latch release bar on the carriage arranged to be actuated by said limited carriage movement to release said latch device.

12. A denominational tabulating mechanism comprising, a releasable tabulating-carriage having a stop, a plurality of denominational stops mounted for individual projection to carriage arresting position, a stop projector, a plurality of coupling elements respectively pivoted on said denominational stops, tabulating key-levers mounted to move said coupling elements respectively into operative connection with said projector, an electric motor, means, including, a closable slip-friction clutch mechanism to connect said motor and projector, clutch-closing means movable to operated position by any key lever for resulting movement of the projector to project the connected stop, a latch device automatically becoming effective to hold the clutch closing means in operated position irrespective of return of the key lever, whereby the force of said motor keeps the connected denominational stop in projected position, carriage braking means arranged to brake the carriage tabulating movement in response to the motor-sustained projection of any denominational stop, means providing for limited movement of the carriage in tabulating direction after its stop is arrested by the projected denominational stop, and means actuated by said limited carriage movement to release said latch device.

WILLIAM F. HELMOND.