Dec. 1, 1942. W. F. HELMOND 2,303,878

TYPEWRITING MACHINE

Filed May 31, 1939 4 Sheets-Sheet 1

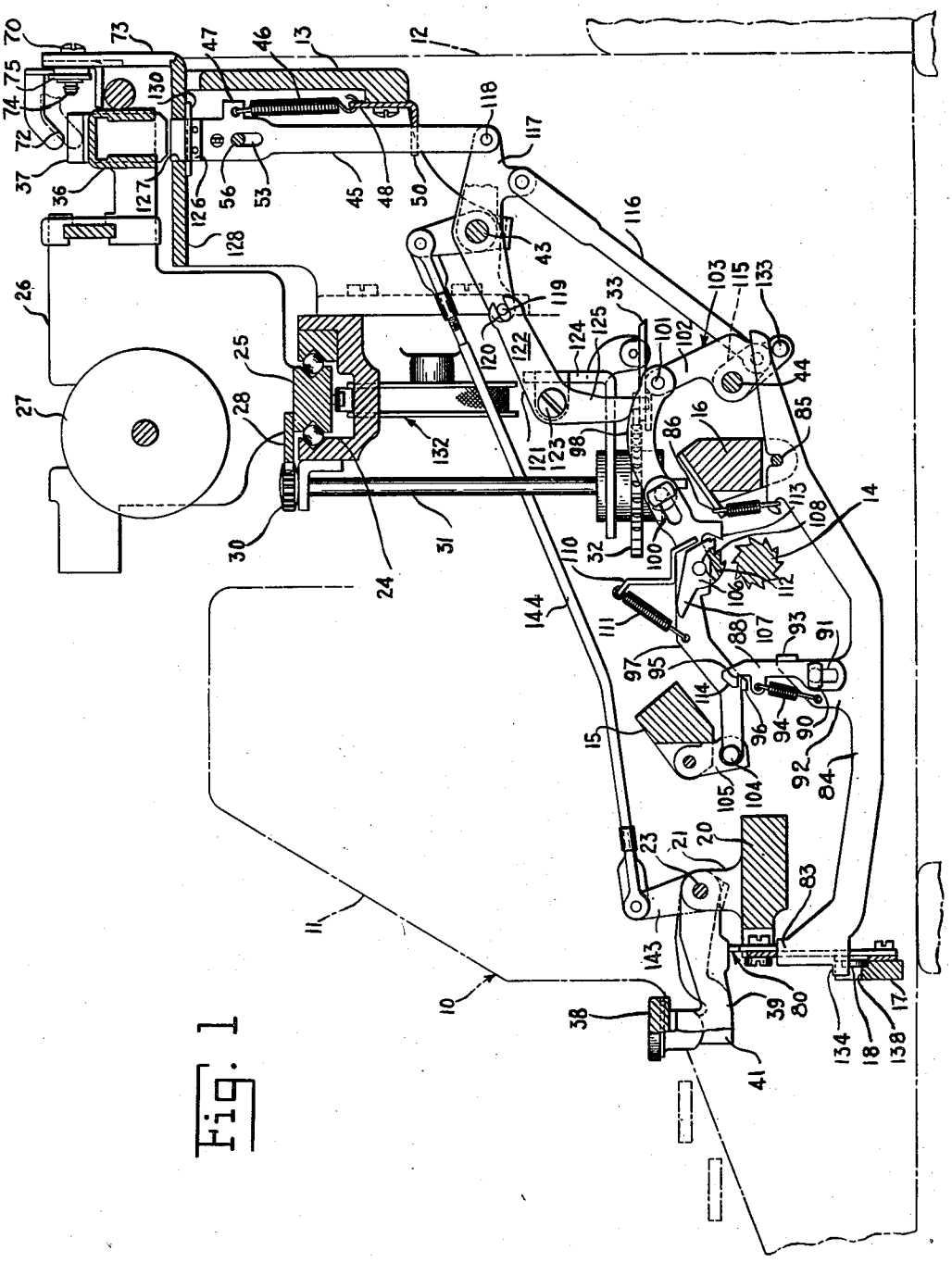


Fig. 1

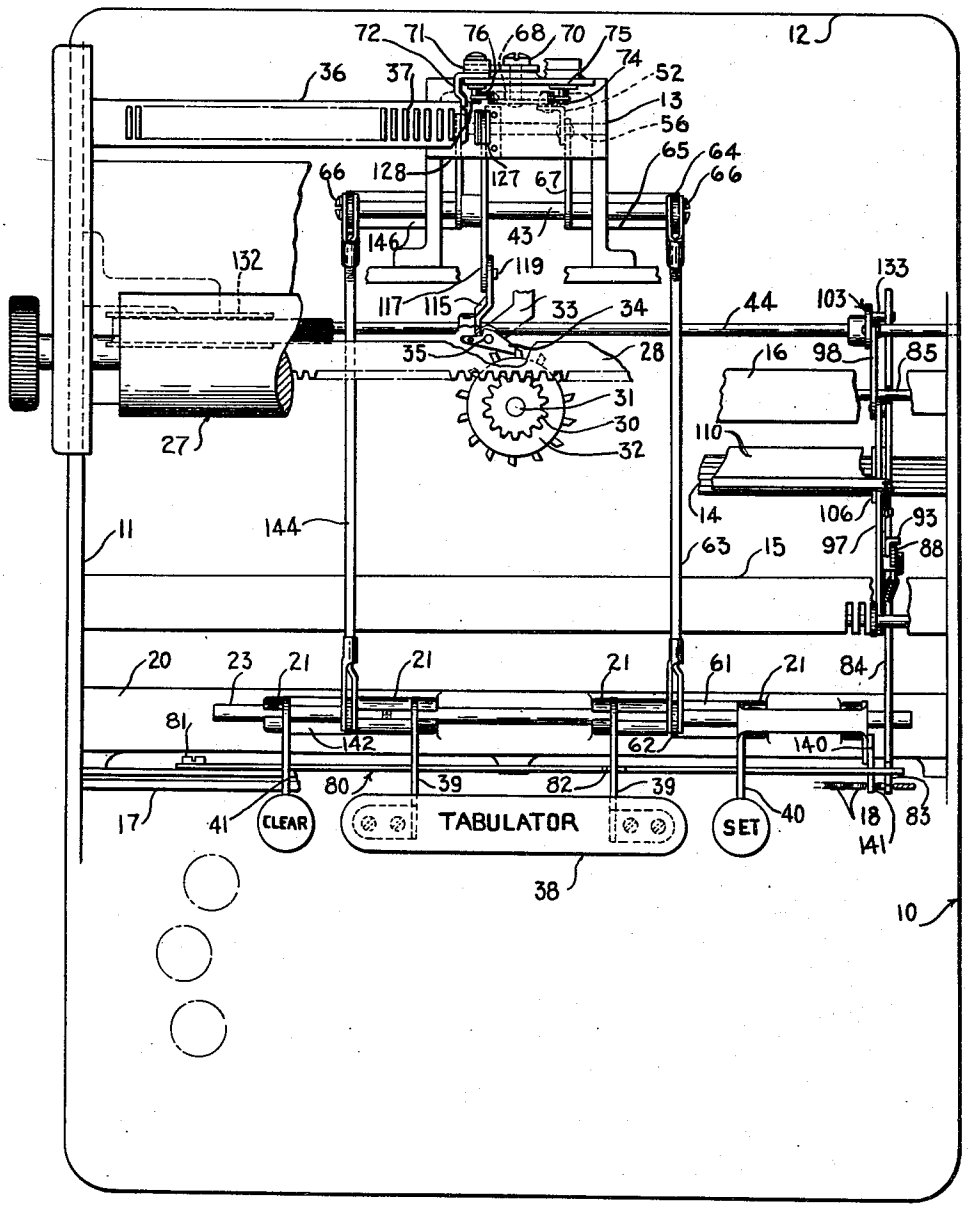
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Fig. 2



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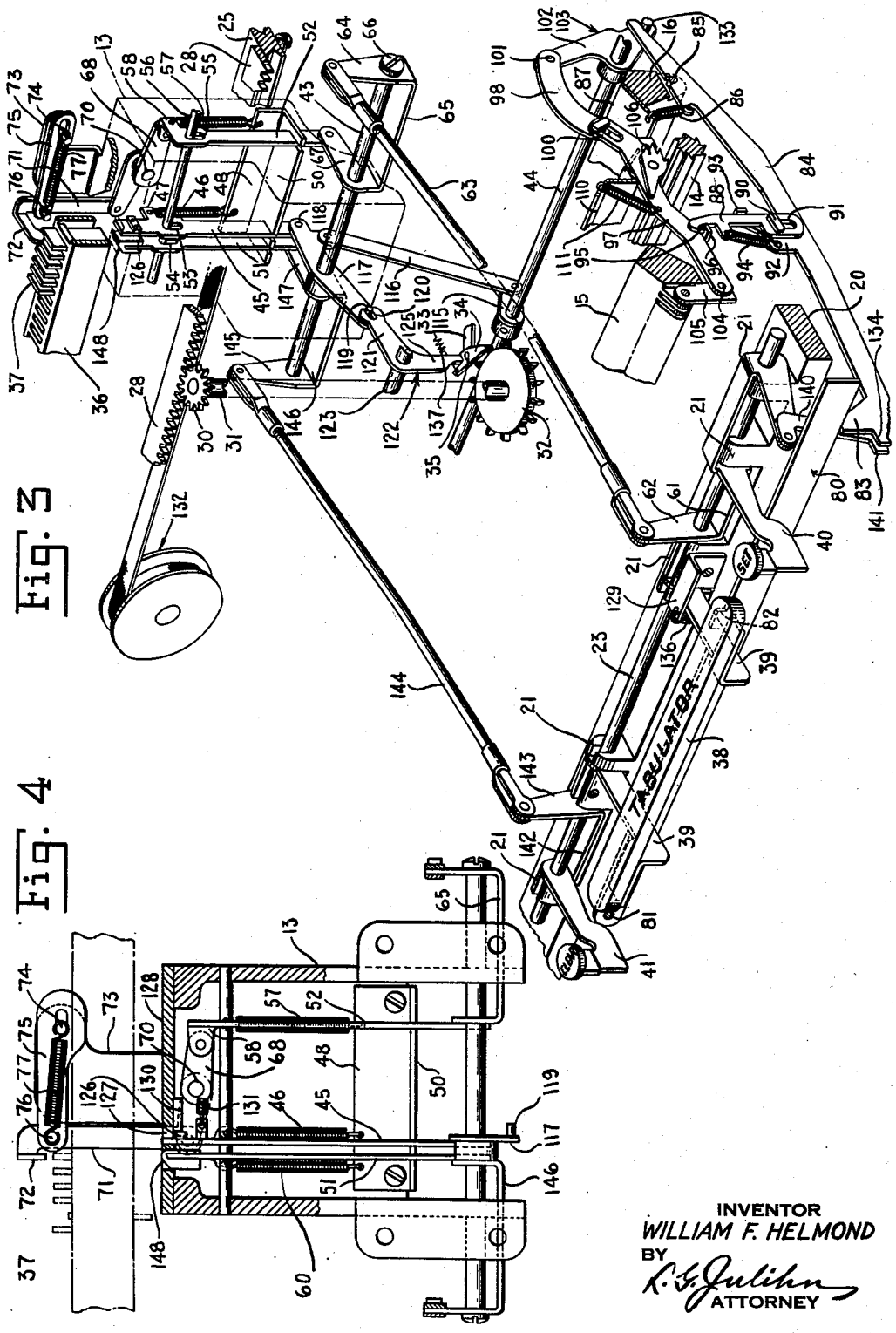


Fig. 3

Fig. 4

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Fig. 5

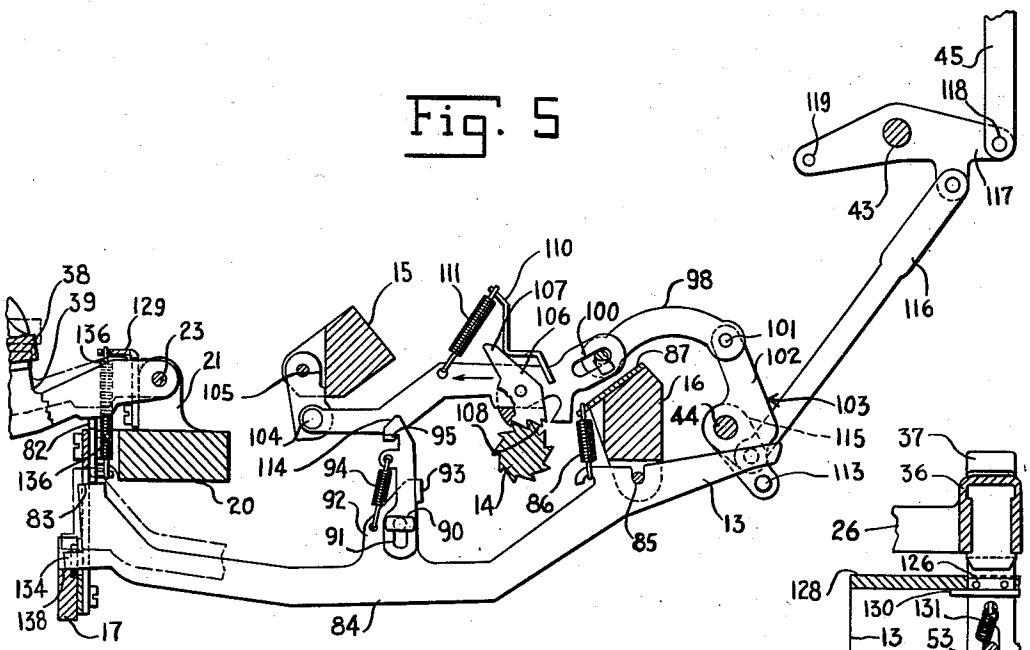
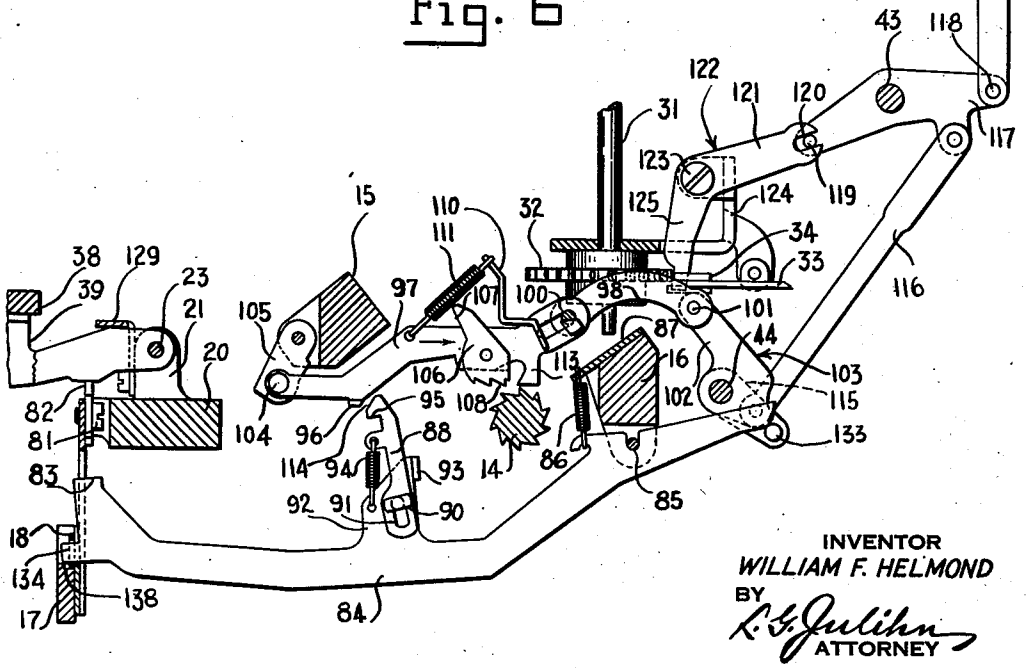


Fig. 6



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TYPEWRITING MACHINE

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6 Claims. (Cl. 197—176)

This invention relates to typewriting machines particularly of the fully power-driven type, and with regard to certain more specific features thereof to power-operated tabulating mechanism.

The invention has for one of its objects to provide a simple, inexpensive, speedy, and reliably operative mechanism for relieving the operator of a large degree of the manual effort required in setting the frame stops on a typewriter, and releasing the carriage for its tabulating run.

It is another object of the invention to protect the typewriter parts, particularly of the tabulating mechanism and of the carriage escapement against distortion and possible breakage owing to inadvertent or unintended operation of the power devices.

Another object of the invention resides in the provision of improved means for suspending the power actuators used in the tabulating or other operations, and in the provision of an improved throw-off device by which the actuators are reliably disconnected from the power drive without undue shock or noise.

Other objects will be in part obvious and in part pointed out particularly as the description of the invention proceeds.

The invention accordingly consists in the various features of construction, combinations of elements, and arrangements of parts which will be exemplified by the description hereinafter set forth, and the accompanying drawings, and the scope of the application of which will be indicated in the appended claims.

In the drawings wherein is shown one of various possible embodiments of the invention:

Fig. 1 is a view in fore-and-aft cross section of a power-driven typewriter showing the improved power-operated tabular-stop mechanism and the power-actuator suspension.

Fig. 2 is a view in top plan of the mechanism shown in Fig. 1, parts of the structure being broken away to show more clearly the interior construction.

Fig. 3 is a view in perspective of the mechanism shown in Figs. 1 and 2.

Fig. 4 is a view in front elevation partly in section showing the tabulator frame or magazine at the rear of the typewriter and details of the tabulator-stop-setting mechanism and the tabulator-stop-clearing mechanism.

Fig. 5 is a skeletonized view taken in a cross-section fore-and-aft of the machine, illustrative of the engagement of the power-actuator for the tabulator mechanism with the power-driven shaft, and

Fig. 6 is a similar view showing the actuator after it has served its purpose and is about to make its return to normal position.

Referring now more particularly to the drawings, the typewriter frame is indicated at 10 having opposite side walls one of which is indicated at 11, and having a rear wall 12 within which a tabulator frame or magazine 13 is fixed. Journaled in the side walls 11 and driven from an electric motor, not shown, is a fluted drive roller unit 14 adapted to be continuously rotated and intermittently engaged by various actuators for performing different machine operations as is now well understood in the art.

The frame includes a number of cross struts extending between the side walls. One of these constitutes an actuator-forward-end suspension-bar 15, another is a lever-fulcrum support 16, another is a mounting bar 17 for key-lock discs 18, and still another bar 20 provides a mounting by means of ears 21 for a fixed cylindrical rod 23 upon which are mounted various key-levers having to do with the tabulator mechanism.

The frame is also provided with a transverse slideway 24 for a carriage rail 25 at the bottom of the typewriter-carriage 26 which latter carries a conventional platen roll 27. A rack 28 is mounted on the carriage rail 25 and normally is maintained in engagement with a pinion 30 at the upper end of a shaft 31 which at its lower end carries an escapement wheel 32 controlled in its rotation by a dog rocker 33 having the usual fixed and movable dogs, the movable dog being shown at 34 in Fig. 2 as pivoted at 35 on the rocker.

At the rear of the carriage is a tabulator-stop rack 36 having a series of vertically slidable tabulator stops 37 at letter-space distances lengthwise of the carriage. These stops are normally detented in their upper positions and are adapted to be moved to a lower detented stop-engaging position by means which will hereinafter be described. At the rear of the keyboard of the machine there is a tabulator-stop-operating bar 38 pivotally mounted by arms 39 on the rod 23. Also mounted at opposite ends of this rod respectively are a tabulator-stop-setting key-lever 40 and a tabulator-stop-clearance key-lever 41.

At the rear of the machine is another cylindrical rod 43 fixed in the magazine 13 and upon which there are rockably mounted various motion-transmission devices operable from the arms

39 and key-levers 40 and 41. A rock-shaft 44 is journaled in the side walls of the machine frame and serves in the transmission of movement from the power actuator to a tabulator-counterstop in the form of a blade 45 mounted for shifting as by vertical sliding movement in the magazine 13 and normally held out of tabulator-stop-engaging position by a coil spring 46 the upper end of which is connected to an ear 47 of blade 45, and the lower end of which is connected to an anchor rail 48 secured in the magazine 13. The anchor rail 48 is in the form of an angle iron and its forwardly extending flange 50 is slotted to receive and guide the counterstop-blade 45, a tabulator-stop-clearance blade 51 and a tabulator-stop-setting blade 52. These blades are guided near their lower ends by the flange 50 and are provided respectively with slots 53, 54 and 55 near their upper ends allowing for penetration of the blades by a guide rod 56 suitably fixed in the magazine 13. A coil spring 57 having its upper end connected to an ear 58 on blade 52 and its lower end connected to anchor rail 48 serves to hold blade 52 normally in a lowered position limited by engagement of rod 56 with the upper end of slot 55 in blade 52. Similarly a coil spring 60 holds the stop-clearing blade 51 in lowered position as shown clearly in Fig. 4 of the drawings.

In setting the tabulator stops 37 of the carriage to their lower detented positions the operator moves the carriage to desired position transversely of the frame and depresses the "Tab. Set" key on lever 40. This lever includes a bail 61 (see Figs. 2 and 3) having an arm 62 extending upwardly from rod 23. An adjustable connector 63 connects the upper end of arm 62 with the upper end of an arm 64 of a bail 65 mounted for rocking movement on rod 43 and held in lateral position thereon by stud screw 66 on the end of the rod. The bail has a rearwardly extending arm 67 which connects with blade 52 of the tabulator-stop-setting mechanism. The upper end of blade 52 is connected to a lever 68 which is journaled on a stud 70 fixed in magazine 13. The other end of lever 68 is pivotally connected to a stop-actuating member 71 which has a forwardly extending stop-actuating finger 72. It will be seen that depression of lever 40 by the "Tab. Set" key will rock the bails 61 and 65, raise blade 52 in opposition to its spring 57, move lever 68 on its stud 70 and pull down actuator 71 so that whichever tabulator stop 37 has been located by the operator in position under finger 72 will be depressed. The detenting of the stop 37 in its lower position is not of such relevancy as to need description in this case.

A bracket 73 is fixed on the top of the magazine 13 and has a forwardly extending pin 74 which projects through a slot in one end of a link 75, and the other end of this link is connected to the actuator 71 by a pin 76. A spring 77 connected at its opposite ends to the two pins tends to hold the link against the pin 74 at one end of the slot thus maintaining the actuator 71 normally in a vertical position with its finger 72 directly in line with any one of the tabulator-stops 37 which happens to be presented at the end of a step feed of the carriage. If, for any reason, the finger 72 is entered into any of the spaces between the tabulator stops 37 it may yield as the carriage moves in letter-feed direction without creating undue friction which would prevent spring 57 from restoring the slide 52.

Assuming that several of the tabulator stops 37 on the carriage have been set in the manner just described and the carriage is ready for tabulating operation, the operator depresses tabulator bar 38 the arms 39 of which transversely overlie a bar 80 pivoted on the frame of the machine at 81. The bar is provided with an ear 82 directly under the right-hand arm 39 and in turn transversely overlies an ear 83 on an actuator-moving lever 84 fulcrumed on a wire 85 arranged in the lever-fulcrum support 16. Depression of tabulator bar 38 will therefore move bar 80 downwardly carrying with it lever 84 against the action of a return spring 86 attached between lever 84 and an anchor plate 87 fixed on the fulcrum support 16.

Mounted on the lever 84 about midway between the ear 83 and the fulcrum wire 85 is a catch member 88 having provision for a slight range of pivotal and lengthwise movement by means of a pin 90 passing through a slot 91 in the catch member and secured in an ear 92 on lever 84. The ear 92 is provided with a laterally extending limiting stop 93 restricting the clockwise movement of catch member 88 as the same is viewed in Figs. 1, 3, 5 and 6 of the drawings. A spring 94 connected between the ear 92 and the catch member 88 normally pulls the latter down so that it seats at the upper end of its slot 91 on the pin 90. A lip 95 normally overlies a lug 96 extending laterally from an actuator 97 which latter includes a link 98 having a lost motion connection therewith as indicated at 100. The actuator comprising the parts 97 and 98 is floated by means of a pivotal connection of the link 98 at 101 with an upwardly extending arm 102 of a member 103 fixed on rock shaft 44; and by a pivotal connection 104 at its forward end to a link 105 pivoted on the suspension bar 15. The actuator carries a pawl 106 adapted for a slight range of pivotal movement. Normally a weighted part 107 of the pawl maintains it, as shown clearly in Fig. 1, with its teeth 108 in position to engage with the teeth on the drive roller 14. A comb plate 110 is fixed to the machine frame and various actuators including 97 are received and guided by this plate which also serves as an anchor for the actuator-return springs one of which is shown at 111 connected to the actuator 97—98. This spring holds the actuator lifted with its pawl 106 out of engagement with the drive roller and with the lug 96 underlying lip 95 of the catch member 88. It will be seen, therefore, that as tabulator bar 38 is depressed the catch 88 will pull down the actuator between its pivot points 101 and 104 against the action of spring 111 until the lead-in tooth of the pawl engages with a tooth of drive roller 14 in its rotary movement. This engagement causes the pawl to be first slightly moved in a pivotal manner until a lateral face 112 abuts against the under edge of actuator-part 97 (see Fig. 1) from which time the pawl and actuator must move as one in a forward direction by successive engagement of the teeth of the pawl with the teeth of the drive roller. Thus, the suspended actuator is moved forwardly and pivotally on the suspension bar 15 until a throw-off lug 113 on the actuator-part 97 engages the drive roller 14 and lifts the pawl out of engagement. At this point lug 96 has escaped lip 95 of catch member 88 and by the action of the throw-off lug 113 and return spring 111 the actuator is so lifted on its pivotal connection 101 and 104 that as it returns rearward the lug 96 will act against a cam face 114 of catch member 88 and restore it against ear 93.

Eventually, at the end of the tabulating operation, lug 96 is restored under lip 95.

If in the engaging movement of the pawl with the drive roller there should be any edge-abutting of teeth there may be a rejection of the actuator under the force of the drive roller. It is the purpose of the pin-and-slot connection 90—91 and spring 94 to permit continued depression of the tabulator bar and consequently the lever 84 and at the same time allow catch member 88 to be drawn upwardly by such rejection of the actuator without, however, losing its position in relation to the lug 96 on the actuator.

The effect of the forward throw of the actuator is to rock member 103 which is fixed on shaft 44. There is also fixed on this shaft an arm 115 the outer end of which is pivoted to a link 116 which at its upper end is pivoted to another rocker 117 loosely mounted on rod 43. The rear end of this rocker is pivotally connected at 118 to the tabulator-stop blade 45. A forward arm of rocker 117 carries a pin 119 arranged in a slot 120 in an arm 121 of a bell-crank lever 122 loosely mounted on a rod 123 supported in a bracket 124 suitably fixed to the frame of the machine and serving also to journal the escapement-wheel shaft 31. The bell-crank lever 122 has a depending arm 125 adapted to engage a tail of the pivoted escapement dog 34.

It will be seen from the foregoing that rocking of shaft 44 by the power drive of actuator 97 raises blade 45 and at the same time rocks bell-crank lever 122 to move escapement dog 34 out of engagement with the teeth of the escapement wheel 32 and thus disable the escapement control. As shown clearly in Fig. 4, blade 45 has near its upper end a small block 126 which in the upward movement of the blade is adapted to enter an aperture 127 in a top plate 128 of magazine 13. The top plate 128 has fixed on its under face a small block 130 the end of which projects slightly beyond the edge of the aperture 127 so that when the blade is elevated a spring 131 having one end attached to the blade and the other end attached to the magazine will flex the blade and block 126 will rest on the ledge provided by block 130 and also engage plate 128 at the edge of the aperture, so as to provide a latch against return of the blade by its spring 46 and also present a resistance to the tabulating-stop action of the carriage under its conventional spring drum and tape indicated at 132.

Member 103 fixed on rock shaft 44 has a tail with a pin 133 which underlies the rear end of lever 84. The forward end of the lever has an extension 134 which enters between discs 18 arranged in a race in the key-lock bar 17. As is well understood there is a multiplicity of such discs in alignment in the bar with only the space of the thickness of one key lever in the entire line of discs, that is, between the end limits provided by the bar 17. When any key lever is depressed between adjacent discs all available space is taken up and no other key lever can be depressed until the first has been removed. Thus depression of tabulator bar 38 prevents operation of any of the other keys associated with the key-lock device, such, for example, as the type keys, and in the present instance pin 133 is held under the tail of lever 84 by the latching of the tabulator-stop blade 45 in its upper position and none of the other keys on the machine which are associated with the key-lock device can be operated until the carriage banks against blade 45 which overcomes the action of spring 131 carrying block 126 beyond the ledge provided by block 130 and allowing spring 46 to draw the blade downwardly to its original position. This, of course, rocks the shaft 44 in the opposite direction lowering pin 133 and allowing spring 86 to raise the forward end of lever 84 withdrawing the extension 134 from its position between discs 18.

It will be observed that the portion of actuator 97—98 which carries the pivoted pawl 106 may return rearwardly irrespective of the latching of blade 45 in its stop position, this being provided for by the pin-and-slot connection 100 between actuator parts 97 and 98, but until blade 45 is unlatched and restored by its spring, lever 84 is held depressed, there is no effective engagement between lip 95 and lug 96, and subsequent depressions of tabulator bar 38 against return spring 136 are idle movements, the bar being returned to an upper limit-stop 129 shown in Figs. 3, 5 and 6.

When the carriage banks one of its set stops 37 against the tabulator stop blade 45 it unlatches the blade and the downward movement of the same by its spring 46 elevates the forward arm of rocker 117 releasing the arm 125 of bell-crank lever 122 from the tail of escapement dog 34 allowing the dog to be reintroduced to the teeth of escapement wheel 32 by a spring 137. As the forward end of lever 84 rises by reason of the release of pin 133 from the tail of the lever, lip 95 of catch member 88 rides into position over lug 96 of the actuator.

A slight tap and quick release of tabulator bar 38 is therefore effective to set the tabulator counterstop and start and complete the run of the carriage to the desired point. Attempts to operate other agencies of the typewriter after the institution of the tabulating operation and prior to its completion are ineffective. Although the actuator pawl is immediately restored to its original position with relation to the power roller 14 there can be no second engagement of the pawl with the power roller until release and return of blade 45.

Downward movement of the forward end of lever 84 is limited by a shoulder 138 on bar 17 which also limits movement of various other levers such as the key levers of the machine. The downward movement of stop-setting finger 72 is similarly limited by the shoulder 138 by reason of a pendant member 140 having an extension 141 engaging the shoulder means between discs 135.

When it is desired to clear the carriage of all set tabulator stops 37 the "Tab. Clear" key is depressed to operate lever 41 which has a bail 142, an upwardly extending arm 143 of which is connected by an adjustable rod 144 with an arm 145 of a bail 146 rockable on the rod 43. The bail has a rearwardly extending arm 147 which is pivotally connected with blade 51. Depression of the key elevates blade 51 which has at its upper end a cam 148. The carriage is set over to the left of the machine before the "Tab. Clear" key is depressed and the stops are reset in their upper detented position by swinging the rack 28 out of engagement with pinion 30 in conventional fashion and running the carriage across the machine to engage the various set stops with the cam 148.

As many changes might be made in the specific or detailed mechanism above-described without departing from the spirit or scope of the invention it is to be understood that the foregoing is

intended merely as illustrative and is not to be taken in a limiting sense.

What is claimed is:

1. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, a type-key-lock, power means for shifting the tabulator-stop, latch means for holding the stop shifted, a tabulator-key, means controlled by the tabulator-key for rendering the power means and type-key-lock effective, and means moved by the power means and held in position by the latch means to hold the tabulator-key-controlled means in position to maintain the type-key-lock effective.

2. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, a type-key-lock, power means for shifting the tabulator stop, latch means for holding the stop shifted, a tabulator-key, means controlled by the tabulator-key for rendering the power means and type-key-lock effective, and means moved by the power means and held in position by the latch means to hold the tabulator-key-controlled means in position to maintain the type-key-lock effective, said power means including a lost-motion connection enabling the restoration to position of some parts moved in shifting the stop and the retaining under control of the latch means of the means maintaining the type-key-lock effective.

3. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, power means for shifting the tabulator-stop including a rotary drive member and actuator means normally spring-held out of engagement with the drive member and having a lost-motion connection, connections between the actuator means and the tabulator-stop, means for transitorily engaging the actuator means with the drive member, and latch means for holding the tabulator-stop shifted and, through said connections, maintaining a part of the power means in the position assumed in said shifting, other parts of the power means being relatively restorable due to the lost-motion connection.

4. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, latch means for holding the stop in shifted position, a rotary drive member, a two-part actuator device having a lost-motion connection between the parts thereof, said actuator device being pivotally suspended at opposite ends, connections between the actuator device and the tabulator-stop, spring means applied to one of said actuator parts normally holding the actuator device out of engagement with the rotary drive member, and means for transitorily engaging the actuator device with the drive member.

5. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, latch means for holding the stop in shifted position, a rotary drive member, a two-part actuator device having a lost-motion connection between the parts thereof, said actuator device being pivotally suspended at opposite ends, connections between the actuator device and the tabulator-stop, spring means applied to one of said actuator device parts normally holding the actuator device out of engagement with the rotary drive member, and means for transitorily engaging the actuator device with the drive member, said means comprising a lever having provision for engaging a part of said actuator device and a key movable to operate said lever.

6. A power-driven tabulator mechanism for a typewriter comprising in combination a shiftable tabulator-stop, latch means for holding the stop in shifted position, a rotary drive member, a two-part actuator device having a lost-motion connection between the parts thereof, said actuator device being pivotally suspended at opposite ends, connections between the actuator device and the shiftable stop, spring means applied to one of said actuator device parts normally holding the actuator device out of engagement with the rotary drive member, means for transitorily engaging the actuator device with the drive member comprising a lever having provision for engaging a part of said actuator device and a key movable to operate said lever, and means movable with the shiftable stop and held by the latch means to prevent return of said lever, said key being returnable while said lever is held.

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