Jan. 5, 1937. J. F. KOCA 2,066,979

TABULATOR MECHANISM

Filed March 2, 1933 3 Sheets-Sheet 1

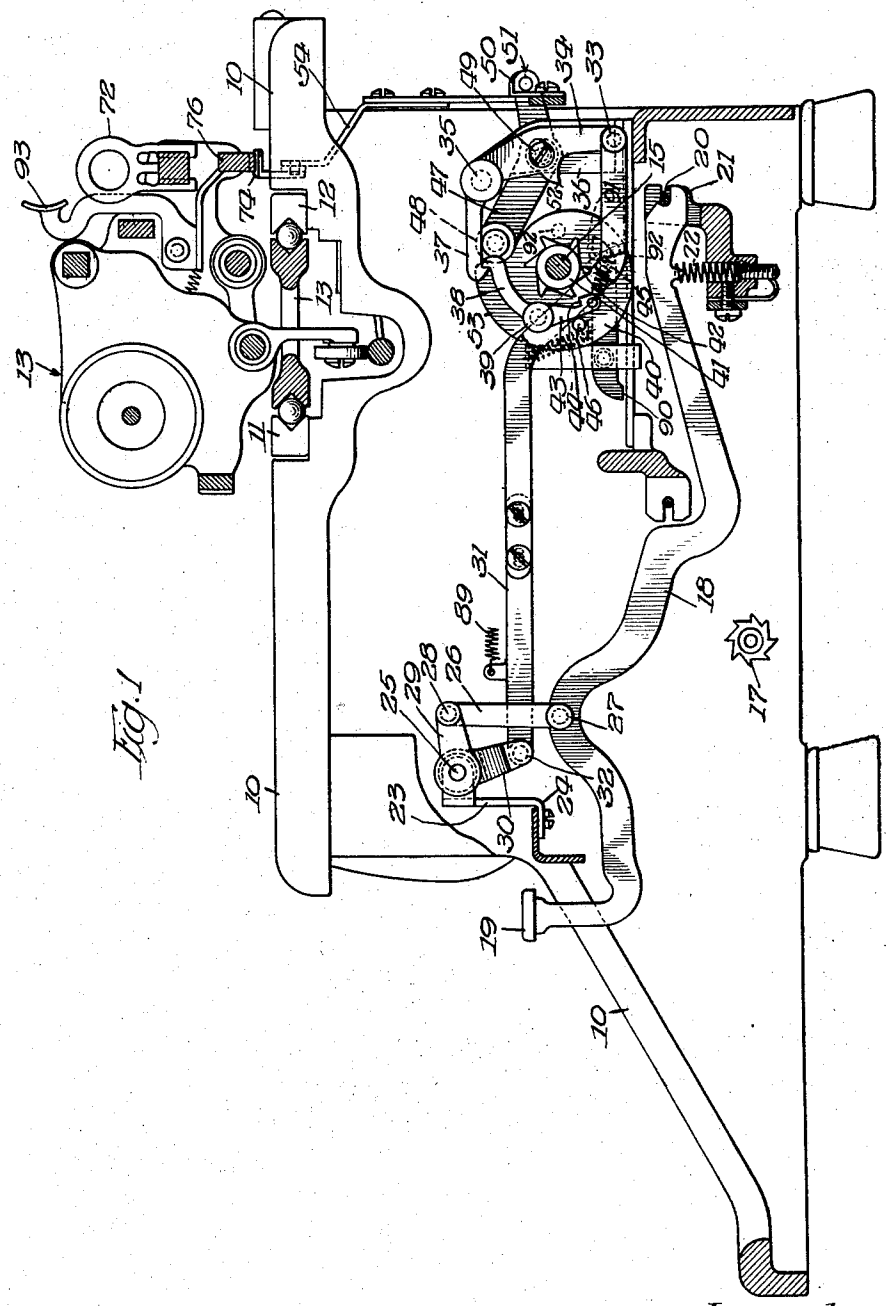


Fig. 1

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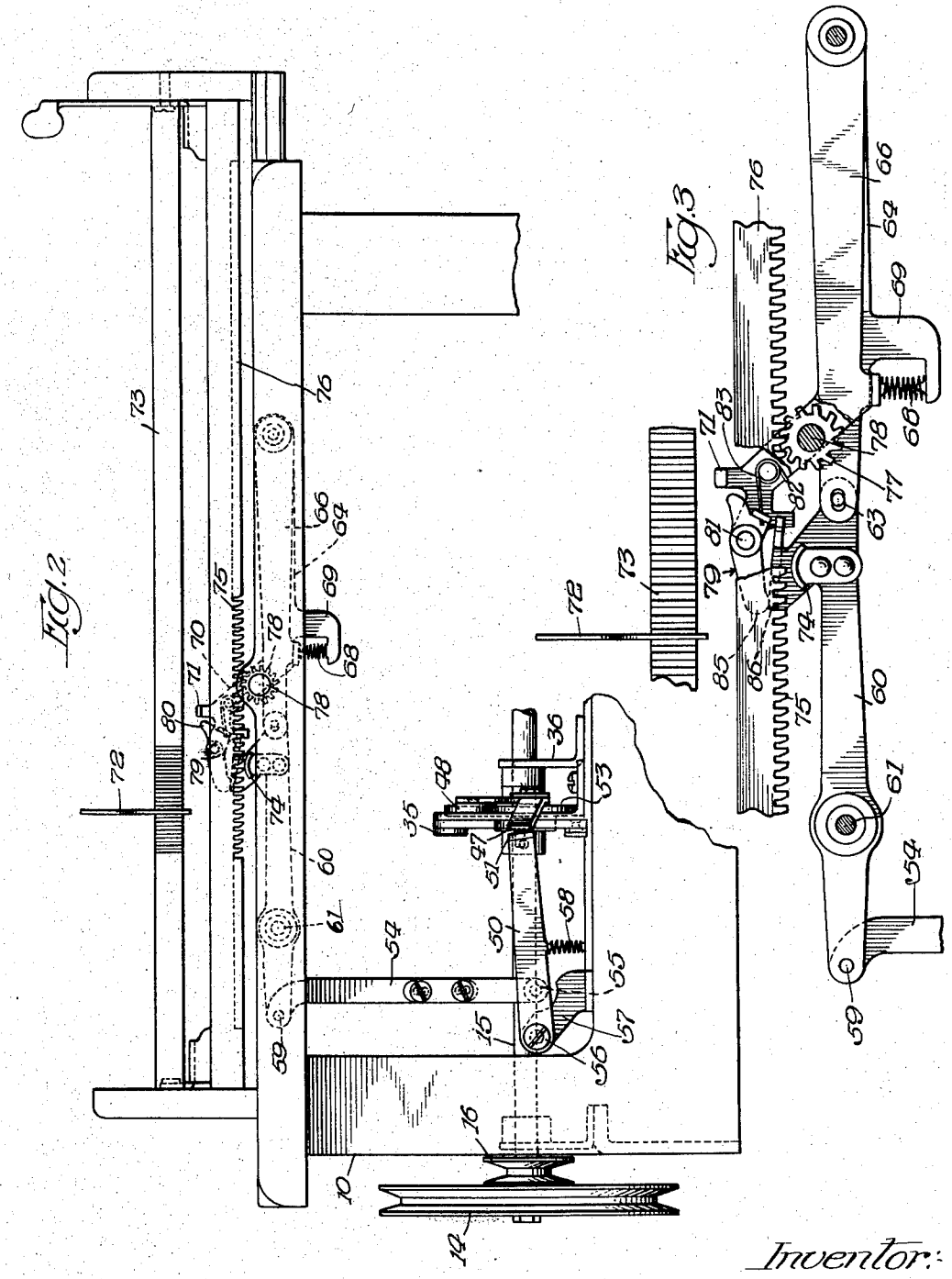


FIG. 2.

FIG. 3.

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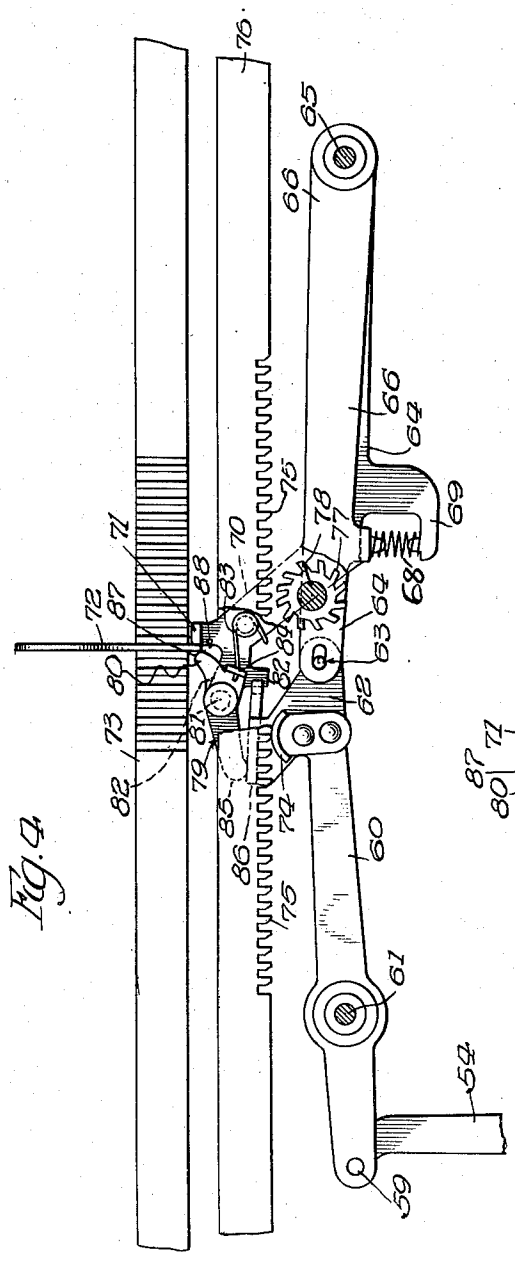


Fig. 4

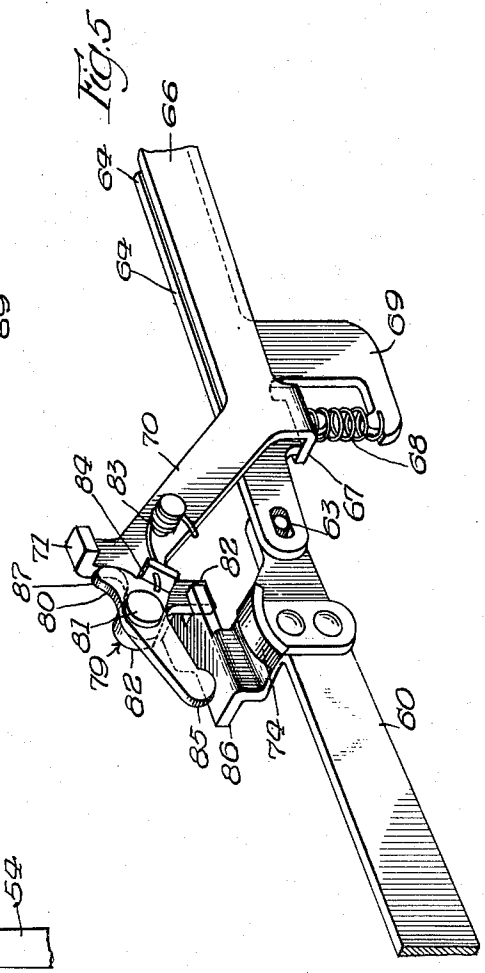


Fig. 5

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Patented Jan. 5, 1937

2,066,979

UNITED STATES PATENT OFFICE

2,066,979

TABULATOR MECHANISM

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Application March 2, 1933, Serial No. 659,334

3 Claims. (Cl. 197—176)

This invention relates to typewriters and particularly to tabulator mechanism. More specifically the invention relates to tabulator mechanism for electrically operated typewriters.

The primary object of the present invention is to provide new and improved tabulator mechanism for electrically positioning the tabulator to electrically shift the platen to tabulated position by the depression of a single key lever.

Another object of the invention is to provide electrically controlled and operated tabulator mechanism for moving or shifting the platen to tabulated position upon the depression of a single tabulator key, as well as electrically controlled mechanism cooperating with the tabulator key.

A further object is to provide simple, efficient, and positive electrically operating mechanism for moving the carriage to tabulated position.

A still further object is to provide a new and novel arrangement of parts including a continuously rotating shaft cooperating with certain correlated parts and controlled by shift key mechanism to control the movement of the carriage to and from tabulated position and to lock the carriage and prevent rebound thereof at the end of the tabulating position.

Numerous other objects and advantages will be apparent throughout the progress of the following specification.

The accompanying drawings illustrate a selected embodiment of the invention and the views therein are as follows:

Fig. 1 is a detail transverse sectional view through a typewriter and embodying the invention.

Fig. 2 is a detail rear elevation, certain parts being broken away for the sake of clearness.

Fig. 3 is a detail sectional view of the tabulator stop mechanism and embodying the invention, the parts being shown in normal operating or initial position.

Fig. 4 is a detail sectional view similar to Fig. 3 showing the parts in operating position and engaging a tabulator stop.

Fig. 5 is a detail perspective view of some of the tabulator operating mechanism showing the same in inoperative initial position.

The typewriter to which the present invention refers has a frame 10 which supports the front and rear carriage rails 11 and 12 respectively, Fig. 1, which support the carriage 13. The particular typewriter herein shown is a "Woodstock" typewriter, and in general, the parts including the frame, type bars, platen and others are standard with Woodstock machines, and various parts of the typewriter will not be described except in connection with such parts as may be required for the electrical operation of the tabulator mechanism. A motor, not shown, drives a pulley 14 which is fixed to a transverse shaft 15. The shaft 15 also carries a pulley 16 about which a belt passes to drive a type bar actuating shaft 17. A tabulator key lever 18 having a key 19 is pivotally connected at 20 to a rear transverse support 21, a spring 22 being arranged in the position shown in Fig. 1 to normally hold the key lever 18 in its normal initial upward position.

A bracket 23 is fixed to part of the frame 10 as indicated at 24 and supports a revolubly mounted shaft 25. A link 26 is pivotally connected to the key lever 18 as indicated at 27 and makes pivotal connection at 28 with an arm 29 which is fixed to the shaft 25. A second arm 30 is fixed to the shaft 25 and is pivotally connected to an adjustable link 31 as indicated at 32. The link 31 is pivotally connected at 33 to a latch 34. The latch 34 is pivoted at 35 to a bracket 36 and carries a pawl 37 which is adapted for locking relationship with a second pawl 38. The pawl 38 is pivoted at 39 to a cam 40 which is revolubly mounted on the transverse shaft 15. A ratchet 41 having teeth 42 is arranged in juxtaposition relative to the cam 40 and rotates with the shaft 15. The tail-piece 43 of the pawl 38 is provided with a latching end 44 which is adapted to have locking engagement with a tooth 42 on the ratchet 41 when the pawl 37 becomes disengaged from the pawl 38. A spring 45 is connected to the tail-piece 43 and urges the pawl 38 in a predetermined position normally into locking engagement with the pawl 37. A pin 46 is fixed to the cam 40 and limits the movement of the pawl 38. When the key 19 is depressed, the key lever 18 will move downwardly and through the link 26 and arm 29 will rock the shaft 25 and swing the arm 30 to the left, Fig. 1, pulling the link 31 to the left. When the link 31 moves to the left, the latch 34 will be swung on its pivot 35 and disengage the pawl 37 from the pawl 38. Upon disengagement of these two pawls, the spring 45 will pull the latching end 44 of the pawl 38 into engagement with a tooth 42 on the ratchet 41, thereby locking the cam to the shaft 15 and causing the cam to rotate with the shaft. A lever 47 carrying a cam follower or roller 48 is pivoted at 49 to the bracket 36 and operates the lever 50 which has a hole and pin connection 51 with the outer end of the lever 47.

During rotation of the cam, the pawl 38 will engage the projection 52 on the latch 34, the pro-

jection 52 being moved to shifted position upon swinging movement of the latch due to the movement of the link 31 when the key lever is depressed. Thus, when the roller 48 reaches the rise 53 of the cam 40, the lever 47 will pull down on the lever 50 and lower the adjustable link 54 which is pivoted to the lever 50 as indicated at 55. The lever 50 is pivoted at 56 to a bracket 57 fixed to the frame 10. A spring 58 is arranged underneath the lever 50 and normally urges this lever in an upward position. The adjustable link 54 is pivoted at 59 to an actuating lever 60 which is pivotally mounted to a part of the frame 10 as indicated at 61. The inner end 62 of the actuating lever 60 has a pin and slot connection 63 with a second actuating lever 64 which is pivoted at 65 to the frame 10. A tabulator stop lever 66 is also pivoted to the frame at 65 and has a bent-over flange 67 which is engaged by a compression spring 68. The compression spring also engages a tail-piece 69 on the second actuating lever 64. The tabulator stop lever 66 has an extending arm 70 which carries a bent-over ear 71 which forms an abutment for a tabulator stop 72 on the tabulator bar 73. Thus, when the key 19 is depressed to move the link 31 and cause rotation of the cam 40, the arm 49 will operate the link 54 and raise the actuator lever 60. The actuator lever 60 has a shoe 74 fixed thereto which is then brought into engagement with the underside 75 of the pivotally mounted escapement rack 76. When the escapement rack 76 is raised by the shoe 74, the escapement rack will be raised out of engagement with a pinion 77 which is revolubly mounted on a stud 78 fixed to a part of the frame 10. The pinion 77 is associated with the usual conventional escapement wheel, not shown, but which has operative engagement with the escapement rack in the usual conventional manner. Therefore, the carriage 13 is free to move to the left, under tension of the usual drum spring device commonly used in typewriters, until the ear 71 comes into engagement with a tabulator stop 72 as shown in Fig. 4. The impact of the ear 71 with the tabulator stop 72 would naturally cause considerable rebound. Therefore, rebound mechanism 79 is provided to engage the tabulator stop 72 at the moment of impact to prevent rebound of the carriage.

The rebound mechanism 79 comprises a pawl 80 pivoted at 81 to a support 82 formed integral with the arm 70. A spring 83 engages an ear 84 on the pawl 80 and normally tends to swing the pawl 80 in an upward direction on its pivot 81. The pawl 80 has a tail-piece 85 which rests on a bracket 86 formed integral with the actuator lever 60. Therefore, the spring 83 continuously holds the tail-piece 85 against the top of the bracket 86 and prevents free swinging movement of the pawl in the other direction. Therefore, when the carriage moves to the left, which will be toward the right in Fig. 4, the upper edge 87 of the pawl 80 will be depressed by the lower end of the tabulator stop 72 until the tabulator stop is engaged by the ear 71 at which time the tabulator stop will have cleared the pawl 81 and the spring will immediately return the pawl 81 into contacting relationship with the end of the tabulator stop 72 and prevent rebound of the carriage, the tabulator stop being, therefore, received in the space 88, Fig. 4, between the ear 71 and the pawl 80. The carriage is, therefore, returned to the position set by the tabulator stop 72.

As soon as the tabulator key lever 18 is released, the spring 22 and an additional spring 88, fastened to the link 31, will return the tabulator key lever 18 to its normal upward position. The return of the tabulator key lever 18 will return the adjustable link 31 to its normal position, the link 31 moving to the right during the return to normal position. As the link 31 returns to normal position, the latch 34 will be swung on its pivot and cause the projection 52 to become disengaged from the pawl 38 at which time the spring 45 will again pull the latching end 44 of the pawl 38 into engagement with a tooth 42 on the ratchet 41. The cam will then again rotate with the shaft 15 until the pawl 38 becomes engaged with the pawl 37 as shown in Fig. 1. Immediately upon engagement of these two pawls, the latching end 44 of the pawl 38 will be released from the ratchet and the cam will cease rotating. The parts will have then returned to normal initial rest position, and the pinion 78 will again be in meshing relationship with the escapement rack 76. A detent 90 is provided with a recess 91 into which pins 92 engage to assist in maintaining the cam in either operating or rest position.

Operation

When the key 19 is depressed, the tabulator key lever 18 will move downwardly and through the link 26 and the arm 29, shaft 25 and arm 30 will move the link 31 to the left, Fig. 1, causing the latch 34 to swing on its pivot 35 and disengage the pawl 37 from the pawl 38 and move the projection 52 into the path of the pawl 38. Disengagement of the pawl 37 from the pawl 38 will cause the cam 40 to rotate with the shaft 15 and operate the lever 47. The lever 47 will operate the link 54 and raise the shoe 74 to lifting position relative to the escapement rack 76 to disengage the teeth 75 on the escapement rack from the pinion 78. As soon as the pinion 78 is disengaged from the teeth 75, the conventional carriage operating mechanism will move the carriage to the right, Fig. 4, until the ear 71 comes into engagement with a tabulator stop 72. Immediately upon engagement of the ear 71 with the tabulator stop 72, the pawl 80 will return to upward position and engage the opposite side of the tabulator stop 72 to arrest the carriage and prevent rebound, the ear 71 being raised sufficiently to permit engagement with the stop 72 by the actuating levers 60 and 66. As soon as the depression of the key 19 has ceased, the parts will return to normal initial position at which time the actuating levers 60 and 66 will drop and release the tabulator stop 72 from the ear 71 and the pawl 80, the parts being so constructed, positioned and timed that the teeth on the escapement rack 76 will be engaged with the teeth on the pinion 78 before the tabulator stop 72 is completely released from the ear 71 and the pawl 80.

The usual hand controlled lever 93 is operatively connected to the usual escapement rack 76 for the purpose of moving the carriage in the usual conventional manner.

The invention provides tabulator mechanism which is operated by a rotating auxiliary shaft and controlled by the depression of a single tabulator key. The parts are compactly positioned and arranged and are so timed as to perform the function at the proper time and sequence. The tabulator mechanism moves or shifts the platen

to tabulated position upon the depression of a single tabulator key.

Changes may be made in the form, construction, and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

The invention is hereby claimed as follows:

1. In a typewriter having a carriage, a power operated tabulator release system for the carriage comprising a key, a tabulator lever operated thereby, a bell crank, a bar connecting an intermediate point of the tabulator lever to one end of the bell crank, a longitudinally adjustable motivating bar connected at one of its ends to the other end of the bell crank, a second bell crank connected at one end to the motivating bar and having a projection located along its length between the point of pivot and the point of connection to the motivating bar, said second bell crank having a catch-like termination at its other end, a centrally pivoted pawl having a catch at one end adapted to engage the catch on the second bell crank, a driven shaft, a cam freely mounted on said driven shaft, said cam having substantially 90 degrees of its surface conforming to a circle, the center of which coincides with the center of the driven shaft upon which the cam is mounted, a ratchet wheel rigidly mounted on the driven shaft so as to rotate therewith, said pawl being fixed to the cam and being spring-urged, a roller carrying means adapted to ride on the surface of said cam, and unitary means operated by said roller carrying means, said unitary means being adapted to disengage the carriage from the usual escapement mechanism and, at the same time, interpose a stop into the path of movement of said carriage so as to limit its movement.

2. In a typewriter having a carriage, a power operated tabulator release system for the carriage comprising a tabulator key, a longitudinally shiftable motivating bar, means for adjusting the length of the bar, means connecting one end of the bar to said tabulator key whereby depression of said key serves to move the bar longitudinally, a pawl member connected to the other end of said bar, said pawl member having a pair of pawl projections, a power driven ratchet wheel, a cam freely mounted coaxially with said ratchet wheel, a second pawl member carried by the cam having a first portion adapted to engage the ratchet wheel whereby to cause the cam to move with the ratchet wheel and a second portion adapted during movement of the cam to engage and be controlled by the projections on said first mentioned pawl, a lever having a roller at one end thereof adapted to ride upon the surface of said cam, and tabulator mechanism for the carriage operated by said lever.

3. A typewriter comprising a tabulator key, a power operated ratchet wheel, a cam, a pawl connected to the cam, means operated by said tabulator key upon depression thereof for causing the pawl to engage the ratchet whereby to impart movement to the cam, said means comprising a bell crank pawl member having a pawl projection on one arm thereof adapted to engage with said first mentioned pawl, and an adjustable linkage connecting the tabulator key and said bell crank pawl member, means also rendered operative upon depression of said key to cause disengagement of said first mentioned pawl from said ratchet after a partial revolution of the cam and to stop said cam, said means comprising a pawl projection on the second arm of said bell crank pawl member, tabulator mechanism comprising a spring-urged carriage, a series of abutments adapted to be adjustably positioned on the carriage, an engageable rack and escapement wheel, and a stop member adapted to selectively engage said abutments, means operated by the cam upon said partial revolution thereof to disengage the rack and escapement wheel and to position said stop for engagement by said abutments, said bell crank pawl member being operable by the tabulator key upon release thereof to complete the revolution of said cam, and means operated by the cam upon said completed revolution to reengage the rack and escapement wheel and return the stop to normal position.

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