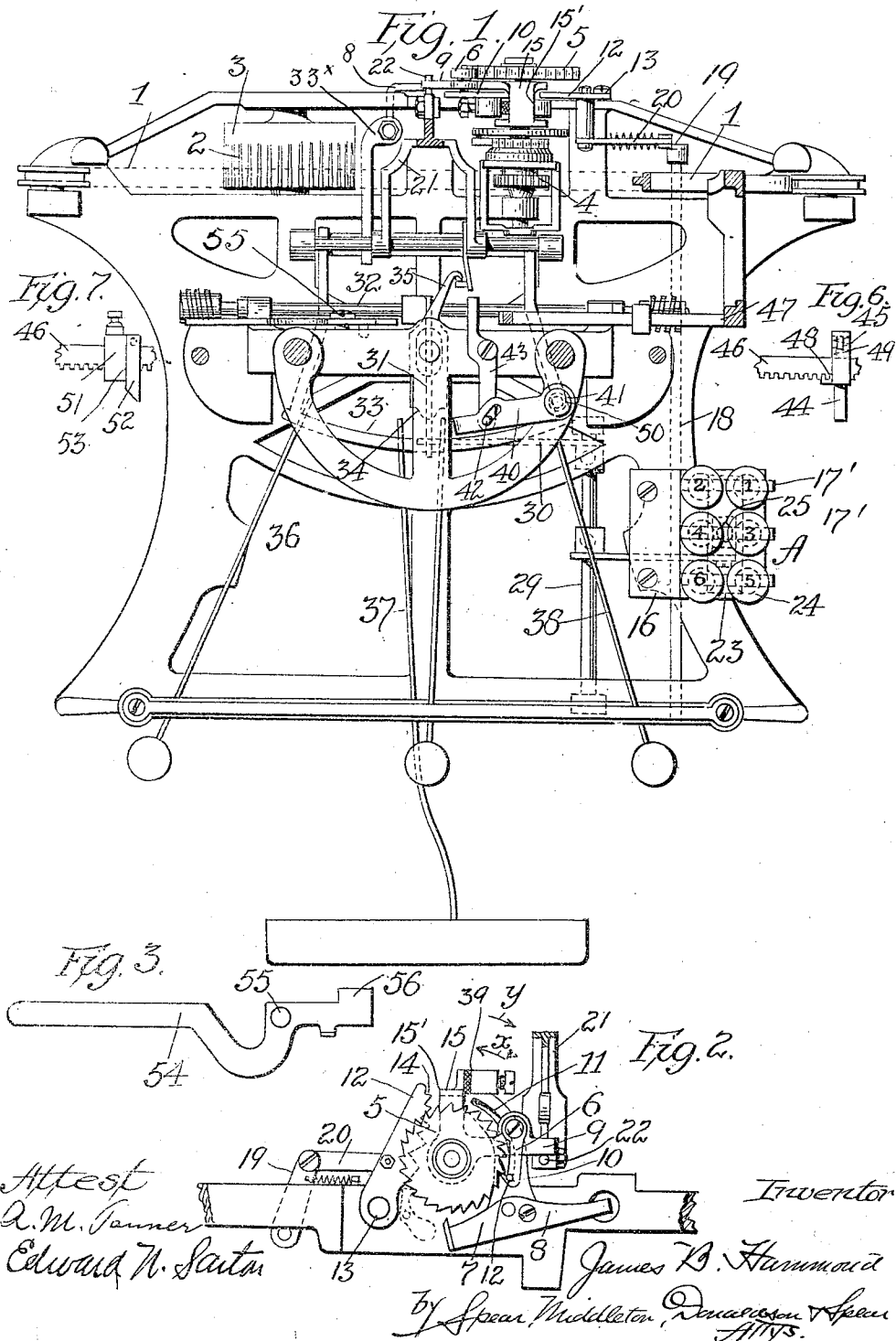


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 TABULATING MECHANISM FOR TYPE WRITERS.
 APPLICATION FILED MAY 31, 1906. RENEWED MAR. 3, 1911.

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Patented Oct. 31, 1911.

2 SHEETS—SHEET 1.



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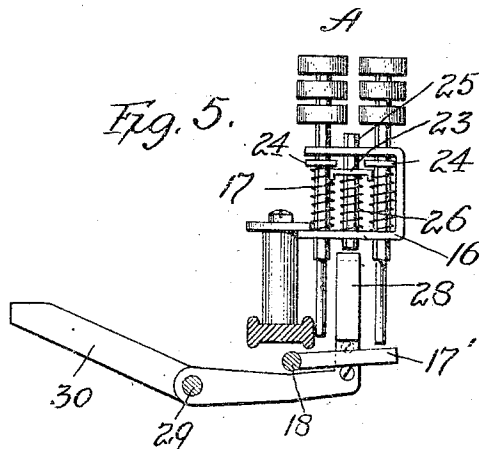
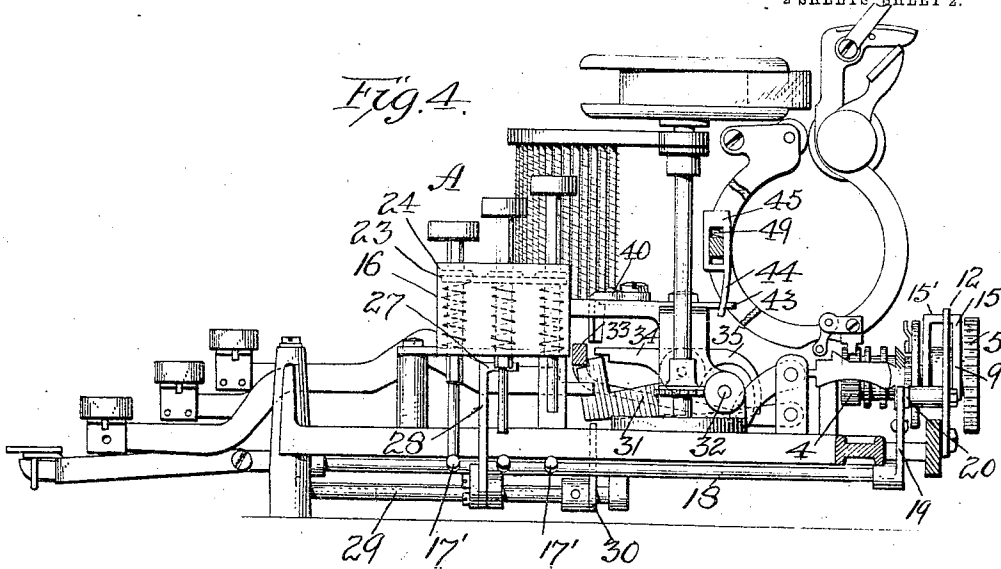
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UNITED STATES PATENT OFFICE.

JAMES B. HAMMOND, OF NEW YORK, N. Y.

TABULATING MECHANISM FOR TYPE-WRITERS.

1,007,098.

Specification of Letters Patent.

Patented Oct. 31, 1911.

Application filed May 31, 1906, Serial No. 319,626. Renewed March 3, 1911. Serial No. 612,101.

To all whom it may concern:

Be it known that I, JAMES B. HAMMOND, citizen of the United States, residing at New York, N. Y., have invented certain new and useful Improvements in Tabulating Mechanism for Type-Writers, of which the following is a specification:

My invention is an improvement in tabulating mechanism, particularly adapted for use in connection with the Hammond typewriter. It is characterized by the fact that a tabulator stop lever is set in different positions according to the tabulating key which is operated, said stop lever having a series of shoulders or stops arranged to arrest the backward throw of the hammer lever after different degrees of movement according to the denomination of the tabulating key which is struck, the degree of said backward movement, of course, determining the number of tooth spaces the escapement wheel must move forward before the hammer lever returns to normal position and consequently the number of letter spaces which the carriage will feed forward. It will be understood that the carriage is brought to the desired columnar position and then by striking the key of the proper denomination the carriage is set in precise position for printing the number of the desired denomination.

In the drawings, Figure 1 is a plan view of the machine with parts omitted. Fig. 2 is a rear view of the escapement mechanism. Fig. 3 is a detail view of a marginal stop. Fig. 4 is a side view with parts omitted. Fig. 5 is a front view of the bank of tabulator keys. Figs. 6 and 7 are detail views respectively of line lock and marginal stops.

The carriage rack is indicated partly in full lines and partly in dotted lines at 1-1. It meshes with the gear 2 of the spring drum 3 and with the gear 4 on the shaft of the escapement wheel 5. This escapement wheel is of the usual form and arrangement known in this style of machine and is controlled in the usual manner by a detent 6 engaging therewith and also the detent 7. The latter detent is on a lever 8 connected with the keys in the well known manner and the detent or pawl 6 is carried by a lever 9 freely pivoted upon the shaft of the escapement wheel. Heretofore this hammer lever 9 has been controlled in such a manner as to allow the detent or pawl 6 to have a limited amount of movement cir-

cumferentially of the escapement ratchet so as to produce the uniform minimum letter spacing. By my present tabulator arrangement I design to control the movement of this hammer lever so that the escapement movement of the ratchet wheel 5 may be equal to a distance of one or a larger number of letter spaces according to the denomination of the operated tabulator key. The detent or pawl 6 is controlled as to its position in relation to the ratchet wheel by a slotted arm 10 connected with the trip or detent lever 8, and having a slot 11 receiving a pin 12 from the pawl 6. The slot is curved concentrically to the axis of the escapement ratchet. In order to vary the retracting movement of the hammer lever 9 with the pawl 6, in order to provide for the variable spacing movement necessary in tabulating, I employ a swinging arm 12 pivoted to the frame at 13 and having a series of stop shoulders 14 adapted severally to arrest the backward movement of the hammer lever 9, which lever as shown in Fig. 2 is provided with an upward extension 15, the rear edge of which at 15' is adapted to strike the shoulder of the arm 12, which may at that time be in the path of movement of the said edge 15'. This swinging arm is set in its different positions for securing the variable spacing movement for tabulating by means of connections leading to tabulating keys arranged in a bank at A, the keys of said bank being numbered 1, 2, 3, 4, 5 and 6 and representing respectively the denominations hundred-thousandths, ten-thousandths, thousandths, hundredths, tenths and units. These keys are arranged in a bracket 16 and they are pressed upward by springs 17. Their stems overlie arms 17' projecting from a rock-shaft 18 which is connected by an arm 19 and a link 20 with the swinging stop-arm 12 above mentioned. The stems of the keys are arranged at different heights in relation to the arms 17' so that different degrees of lost motion will result from the depression of the keys and thus the swinging arm 12 will be set in a different position, when, for instance, the key No. 1 is pressed from the position assumed by it when the key 6 is pressed, and this will cause different stop shoulders on the arm 12 to be brought into action to arrest the hammer lever 9 after it has performed different degrees of movement.

It will be understood that the hammer for making the impression is of substantially the same form as is well known in the Hammond construction, the arm carrying said hammer being indicated at 21 and this hammer is connected with the hammer lever 9, said connection being a loose one and consisting simply of the pin 22 on the hammer arm extending beneath the hammer lever 9.

The tabulating keys not only serve to set the stop arm 12 in position to arrest the retracting movement of the hammer lever, but I have also utilized these tabulating keys to operate the trip frame and the escapement mechanism so that when a tabulating key is operated not only will the variable stop 12 be set in position but the escapement mechanism will also be operated and the carriage will therefore move the predetermined number of letter spaces according to the denomination of the tabulator key which is depressed. For this purpose a universal bar or plate 23 extends between the stems of the tabulating keys, the said stems carrying collars 24 overlying this universal bar or plate so that when either one of the tabulating keys is depressed the universal bar will also be depressed. It is carried by a stem 25 and is pressed normally upwardly by a spring 26.

The stem of the universal plate or bar overlies the upper bent end 27 of an arm 28 which is connected to a rock-shaft 29 journaled in the frame, the said shaft carrying an arm 30 extending beneath a lever or arm 31 pivotally supported on the worm shaft 32, the latter element being a well known part of the machine. This arm or lever 31 extends beneath the universal trip frame 33 and also beneath the tail piece 34 of the hammer detent or hook 35. The trip arm 33 is of the usual form and arrangement well known in this type of machine, and the same is true of the hammer arresting hook 35. The trip frame 33 extends over the rear ends of the key levers, only a few of which are illustrated in the drawing, for instance at 36, 37 and 38. These key levers are fulcrumed, as in the ordinary Hammond typewriter, at a point intermediate their length for instance at the point *x*. When either of the key levers is operated the trip frame is raised at its front end thus depressing its rear arm 33* which bearing down on the forwardly bent end of the lever 8 operates through the slotted arm 10 on said lever 8 to release the hammer lever 9 and hammer from the escapement ratchet 5. The same action takes place when the said trip frame is operated through the connections just described, leading from the universal bar of the bank of tabulator keys. In the latter case however, the hammer lever 9 is allowed to retract a greater or lesser distance circumferentially of the ratchet wheel 5, according to which of the tabulator keys is

operated and this determines the number of letter spaces which the ratchet wheel 5, and consequently the carriage will be allowed to move on the release of the key. In tabulating the carriage is brought to the predetermined columnar position and then the appropriate tabulator key is depressed to set the carriage in the proper position in relation to said column for printing the number of the denomination required or to print the letter or word in the desired position in relation to said columnar position.

It will be seen from the above that when a tabulator key is operated the stop arm 12 is set in position to limit the retracting movement of the hammer lever and at the same time through the connections to the trip frame 33 the lever 8 is moved, causing the slotted arm 10 to throw the pawl 6 from the escapement wheel and the hammer then flying forward moves the hammer lever in the direction of the arrow *x* so that the detent 6 will get into position to reengage the escapement or ratchet 5 to be carried forward thereby in the direction of the arrow *y* until the arm 15 of said hammer lever strikes the fixed stop 39 in the ordinary manner. The forward movement of the ratchet wheel 5 in the direction of the arrow *y* determines the number of letter spaces which the carriage moves at each escapement action and of course the farther the pawl 6 is allowed to retract circumferentially in relation to the escapement wheel in the direction of the arrow *x* before reengaging with the said wheel the greater number of letter spaces the carriage will move when the pawl 6 together with the hammer lever moves in the arrow direction *y*, and as above stated the amount of the retracting movement of the hammer lever depends upon the position of the stop arm 12.

When the pawl 6 is thrown out of engagement with the escapement wheel in order to allow the hammer to go forward and the hammer lever to be set for a new escapement action, the detent 7 is thrown into engagement so that upon the return of the detent lever 8 to its normal position with the detent 7 out of engagement with the escapement wheel the pawl 6 will be thrown into engagement and the tension on the escapement wheel from the carriage spring will cause the escapement wheel to turn in the direction of the arrow *y* until the hammer lever strikes the fixed stop 39, it being understood that the pawl 6 on the forward movement of the ratchet or escapement wheel in the direction *y* has been in engagement with the said escapement wheel. The movement of the escapement wheel in the direction *y* will depend upon the distance the hammer lever 9 moved in the direction *x* after the pawl 6 had been disengaged therefrom. The connection between the hammer

and the hammer lever is a loose one so that the hammer lever will be impelled by momentum in the arrow direction α when the pawl 6 is released and thus it is only necessary to provide means for arresting the movement of the detent or hammer lever 9 in the arrow direction α at different positions in order to secure the variable spacing action for tabulator work. For instance if the hammer lever moves in the direction α a distance equal to one tooth of the spacing wheel the ordinary spacing will be performed, but if the said lever is moved distances equal to 2, 3 or more escapement spaces the letter spacing movement of the carriage will correspond thereto but it will be seen from the above that the amount of movement in the direction α of the lever 9 will depend upon which stop shoulder of the arm 12 is in line with the arm 15 of the hammer lever.

The curved formation of the slot 11 plays an important part in the variable action of the spacing mechanism as it permits the pawl 6 to assume different circumferential positions in relation to the escapement wheel while maintaining the end of the pawl 6 close to the periphery of the said wheel so that its disengaging and engaging action is substantially similar for all different positions that the detent may assume circumferentially of the said escapement wheel. When a tabulator key is operated the arm 31 operates the hammer hook 34 so as to arrest the hammer from striking a blow. This hook is also operated when the space key is operated, but this is a feature long known in the Hammond machine.

I have provided a line lock consisting of a lever 40 pivoted to the frame at 41 and having a pin and slot connection 42 with an arm 43, the end of which lies within the path of the finger 44 on a stop 45, mounted adjustably on a rack bar 46 secured to the carriage head at 47. The stop 45 has a finger 48 adapted to engage the teeth of the bar 46 and it is provided with a spring 49 resting on the bar 46 which normally holds the stop up with the finger 48 engaging the said teeth. To adjust the stop along the bar 46 pressure is applied to depress it thus disengaging the tooth 48 from the teeth of the bar 46, then the stop may be shifted along the bar and released so that its spring will force the tooth 48 upwardly to engage the proper tooth of the bar. The finger 44, as the carriage moves toward the left, will strike against the lever 43 and through the pin and slot connection the end of the lever 40 will be moved over the trip frame 33 to prevent the operation of the same with the keys, thus locking the machine against operation according to the point at which the line lock stop 45 is located on the bar 46. A spring at 50 returns the lever 40 and the

arm 43 to normal position when the carriage is shifted to the right. I also provide a marginal stop 51 adjustably mounted on the bar 46 of the carriage as indicated in Fig. 7, the said stop carrying a pivoted portion 52 adapted to yield in one direction and to be rigid in the other direction, resting for this purpose against the edge or shoulder 53. The marginal stop coöperates with a finger lever 54 pivoted at 55 to the frame and having a stop portion 56 to coöperate with the stop 52. These parts operate in substantially a well known manner, it being obvious that if it is desired to print beyond the margin determined upon the finger lever 54 is swung on its pivot to withdraw the stop 56 out of line with the stop 52 so as to allow the carriage to have further movement toward the right and then on the left hand movement during the printing the stop 52 will swing and pass over the stop 56.

From the above it will be seen that the invention consists in a stepped or like stop which is set in different positions according to the denomination of the tabulator key which is struck, said stop controlling the action of the escapement to different numbers of letter spaces through which the carriage moves and said tabulating means as for instance the keys controlling the escapement to give the carriage its spacing action.

I claim as my invention:—

1. In combination in a Hammond type-writer, a hammer, an escapement ratchet wheel and pawl, a hammer lever carrying said pawl, an escapement lever to engage the ratchet wheel, stop means for limiting the retracting movement of the hammer lever to different degrees, letter keys, tabulator keys independent of the letter keys with connections to the stop means, and connections between the said tabulator keys and the escapement pawl of the hammer lever whereby the escapement is released and the stop is set as the result of the operation of a tabulator key, substantially as described.

2. In combination with a hammer an escapement ratchet wheel, a pawl, a hammer lever carrying the said pawl, an escapement lever, keys with connections to the escapement lever, an arm pivoted to swing in a vertical plane adjacent the ratchet wheel and having a series of stop shoulders on its edge adapted to limit the retracting movement of the pawl carrying hammer lever at different points, and means controlling the position of the said swinging stop-arm, substantially as described.

3. In combination in a Hammond type-writer, an escapement wheel, a hammer, a hammer lever, a pawl carried by the hammer lever to engage the escapement wheel, an escapement lever having a detent to engage the escapement wheel, means whereby

the operation of the escapement lever will withdraw the pawl from the escapement wheel, keys with connections to the escapement lever for operating the same, an adjustable stepped stop for the hammer lever and tabulator keys with connections for setting said stop and for releasing the said pawl to allow the hammer lever to move until arrested by said stop, substantially as described.

4. In combination the trip frame, the hammer hook, the escapement mechanism, tabulator keys, an adjustable stop for varying the action of the escapement mechanism for variable spacing, connections between the tabulator keys and the said stop and connection between the said tabulator keys and the trip frame and hammer hook of a Hammond typewriter, substantially as described.

5. In combination, the escapement mechanism, an adjustable stop for varying the action thereof consisting of a pivoted arm, a rock shaft extending from front to rear of the machine, the arm and link connecting the rock shaft with the pivoted stop, tabulator keys arranged to give different degrees of movement to the said rock shaft and connections between the tabulator keys and the escapement mechanism for releasing the latter, substantially as described.

6. In combination the escapement mechanism comprising an escapement wheel, a hammer, a hammer lever carrying a pawl to engage the escapement wheel, an oscillating arm having a plurality of stop should-

ers on its edge to engage the hammer lever, a rock shaft, tabulator keys for giving different degrees of movement to the rock shaft and to the swinging arm, a trip frame with connections to the escapement mechanism, a rock shaft with means thereon for controlling the trip frame, and means for operating the said rock shaft from the tabulator keys, substantially as described.

7. In combination with the carriage, an escapement wheel, an escapement pawl, a hammer, a hammer lever carrying the pawl and a denomination stop to variably limit the movement of the said lever, a series of tabulator keys with connections for setting said denomination stop in different positions according to the denomination of the tabulator key operated, and connections between the tabulator keys and the escapement, substantially as described.

8. In a typewriter, the combination of means for setting a tabulator stop-lever in different positions according to the tabulating key which is operative, said stop-lever having a series of shoulders furnished to arrest the backward throw of the hammer-lever after different degrees of movement according to the denomination of the tabulating key which is struck.

In testimony whereof, I affix my signature in presence of two witnesses.

JAMES B. HAMMOND.

Witnesses:

JOHN M. BANCROFT,
WALTER DONALDSON.