

J. B. HAMMOND.

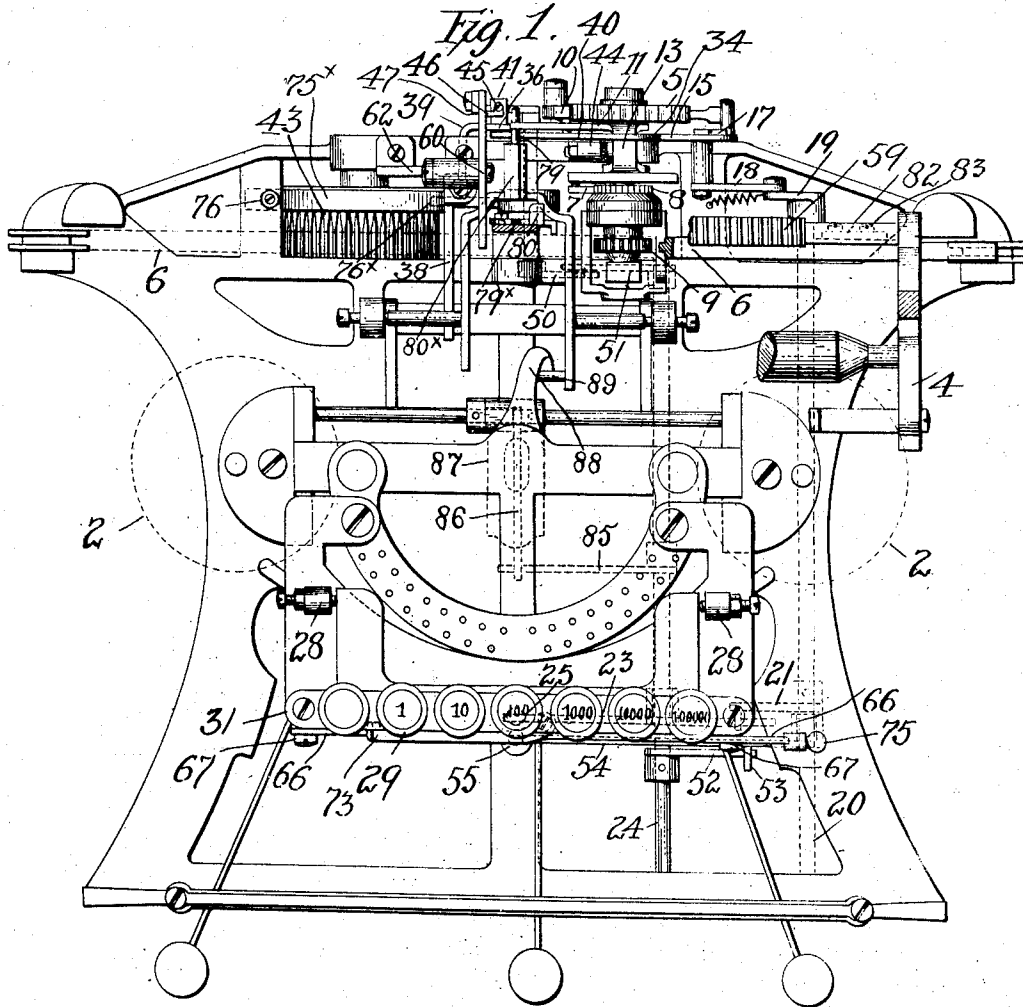
TABULATOR FOR TYPE WRITERS.

APPLICATION FILED DEC. 20, 1906. RENEWED MAR. 3, 1911.

1,041,071.

Patented Oct. 15, 1912.

4 SHEETS—SHEET 1.



Attest
Edward N. Sartorius

Inventor
James B. Hammond
By Spear, Middleton, Donaldson & Spear
Attorneys

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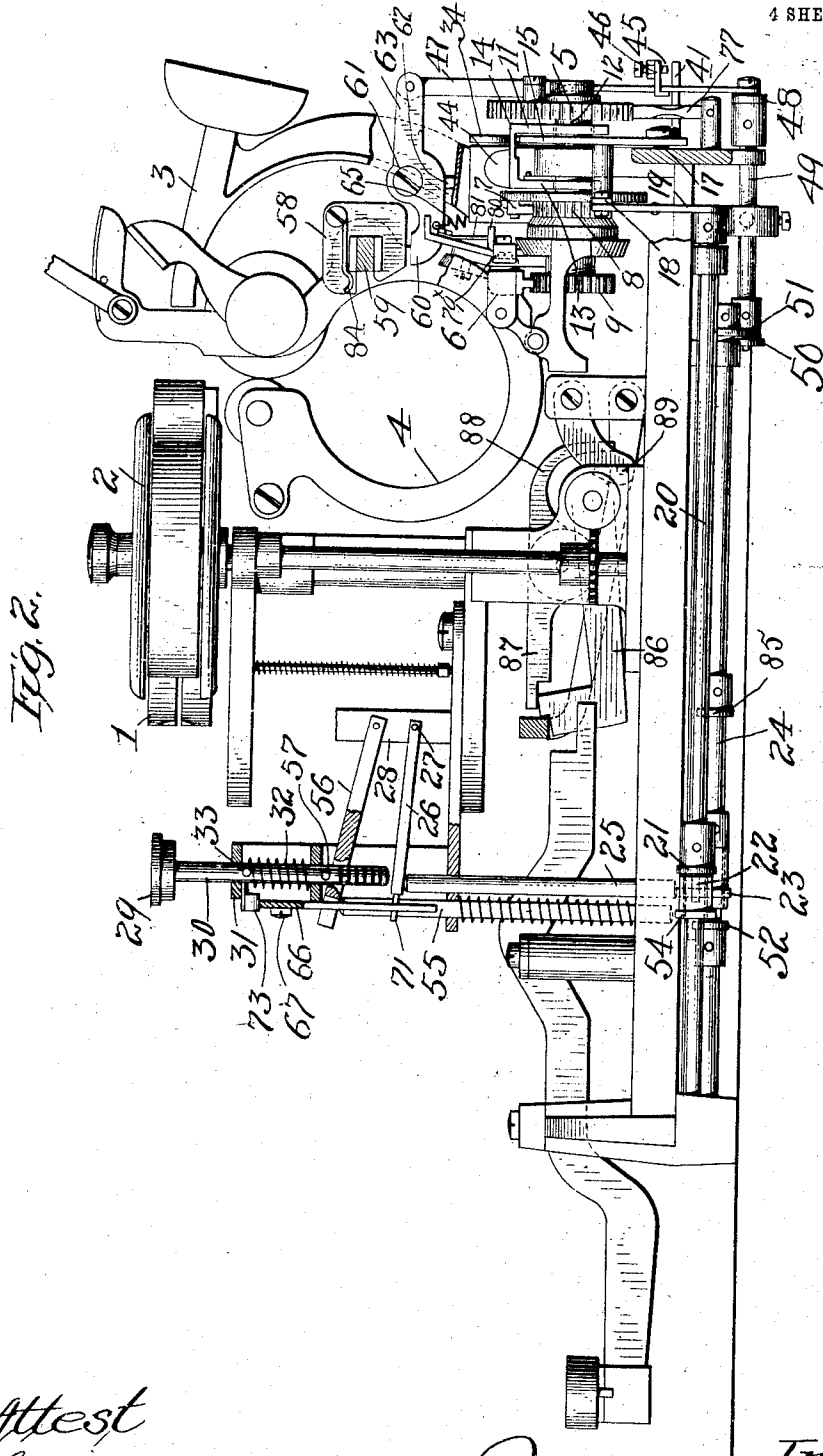


Fig. 2.

Attest
C. M. Mason
Edward N. Sarton

Inventor
James B. Hammond
by Spar, Middleton, Dinsmore & Spar
Attys.

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Fig. 3.

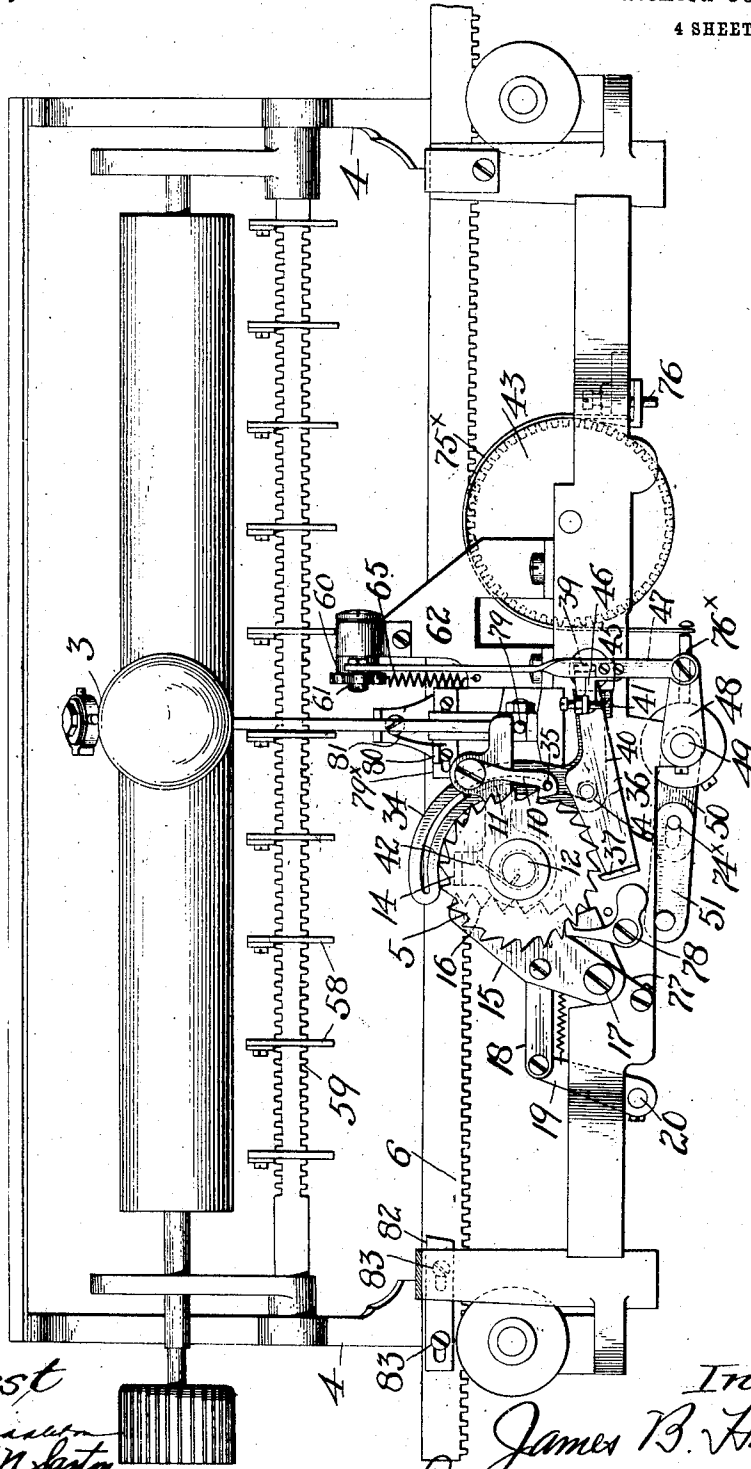


Fig. 4.
58
84

Attest
Ed. M. Mason
Edward M. Mason

Inventor
James B. Hammond
by Spear, Middleton, Denington & Spear
Attys.

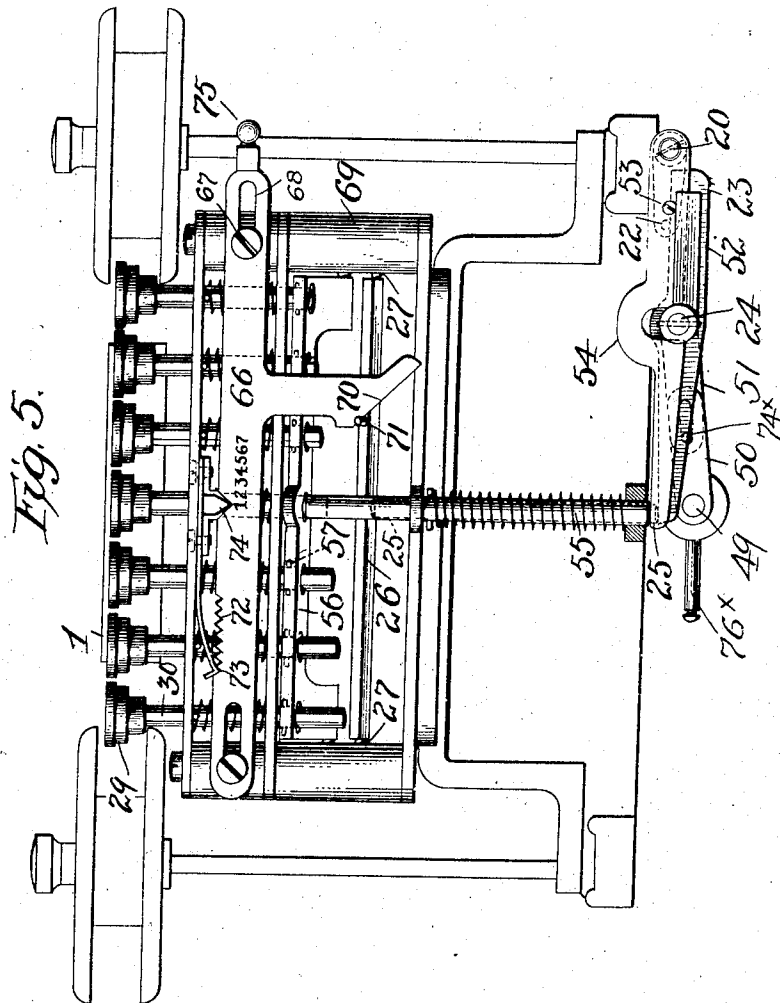
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4 SHEETS—SHEET 4.



Attest
S. Mason
Edward N. Denton

Inventor
James B. Hammond
by Spear, Middleton, Denison & Spear
Attys.

UNITED STATES PATENT OFFICE.

JAMES B. HAMMOND, OF NEW YORK, N. Y., ASSIGNOR TO THE HAMMOND TYPEWRITER CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TABULATOR FOR TYPE-WRITERS.

1,041,071.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed December 20, 1906, Serial No. 348,799. Renewed March 3, 1911. Serial No. 612,102.

To all whom it may concern:

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

My invention relates to tabulators for typewriters and particularly the form of machine well known as the Hammond.

My present invention is an improvement or development upon that disclosed in an application for Letters Patent of the United States filed by me May 31, 1906, #319626.

In carrying out my present invention, I provide means whereby upon the depression of the tabulator key the carriage will be shifted to the proper columnar position and also to the proper position in said column corresponding to the denomination of the number to be printed. I also provide means whereby the machine may be set for variable spacing under the action of the ordinary finger keys.

The invention consists in the features, combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a Hammond typewriter with my improvements attached thereto, some of the parts being omitted for convenience of illustration. Fig. 2 is a side view of the machine with parts omitted and parts in section. Fig. 3 is a rear view with parts of the machine omitted. Fig. 4 is a detail view of one of the column stops. Fig. 5 is a front view of the bank of tabulator keys and the devices associated therewith and connections leading therefrom, this view being taken from the front of the machine of which some parts are omitted.

In these drawings, 1 indicates the anvil upon which the type shuttle works; 2 the ribbon spools; 3 the hammer and 4 the carriage, these parts generally being of the ordinary well known construction. The escapement wheel 5 is also of the well known construction and it is connected in the usual

manner with the carriage rack 6, by means of the pawl and ratchet 7, 8 and the rack pinion 9. The escapement pawl 10 is carried by the hammer returning lever 11, which is pivoted on the shaft 12, of the escapement mechanism, the said lever having a yoke portion 13, the cross bar 14 of which is adapted to co-act with a variable stop 15 similar to that described in the application above referred to, said stop having a series of teeth 16, which when the member 15 is set in different positions will act to arrest the movement of the pawl carrying lever 11, according to the position in which the member 15 is set, and in this way different spacing movement of the ratchet will be effected. This member 15 is pivoted to the frame at 17 and it is connected through a link 18 and an arm 19 with a rock shaft 20, said rock shaft being journaled in the frame of the machine and having an arm 21 fixed thereon, the pin 22 of which overlies a lever 23 which is freely pivoted on a shaft 24 and is operated by a vertically movable rod 25 sliding in bearings in the frame and operated through the action of a universal frame or plate 26 which is pivoted at 27 to standards 28 on the frame. This universal plate or frame is arranged below the bank of tabulator keys 29, the stems 30 of which are of different lengths as shown in Fig. 5, so that the said keys will operate the said universal frame to different degrees and through it and the connections described the variable stop 15 will be set in different positions to arrest the backward or setting movement of the lever 11 at different points for different spacing actions of the escapement wheel and consequently of the carriage according to the denomination of the key operated.

The tabulator keys are guided vertically through a frame 31 and are normally pressed upwardly by springs 32, stop pins 33 being provided to limit their upward movement and their normal position. It will be observed that the pawl 10 is thrown into and out of engagement with the teeth of the escapement wheel by means of an arm

34 having a slot receiving a pin 35 from the said pawl. This arm 34 and its function are well known in the Hammond machine, it being associated with the escapement lever 36 which carries the detent or teeth 37 to engage the escapement wheel when the pawl 10 is released therefrom and which escapement lever is operated from the trip frame of the machine through the arm 38 Fig. 1 overlying the forwardly bent end 39 of the said lever. In the present case however, the arm 34 instead of being connected rigidly with the escapement lever 36 is formed independently thereof and is capable of independent movement. Further, its slot is extended so that it will exert control over the position of the pawl 10 for a greater distance around the circumference of the escapement wheel in order that the variable spacing actions may be secured.

In the ordinary operation of the finger keys where the ordinary letter space movement is to be effected the slotted arm 34 must move with the escapement lever 36 so that the pawl 10 will be thrown into and out of engagement with the teeth of the escapement wheel corresponding to the movements of the escapement lever and for this purpose the arm 34 is provided with a substantially right angular extension 40 having a lug or extension 41 reaching under the edge of the escapement lever 36 so that each time the escapement lever is operated the arm 34 will also be operated to withdraw the pawl 10 from the escapement wheel and then the hammer lever 11 carrying the said pawl will, under the action of its spring 42, move the pawl along the periphery of the escapement wheel until it is opposite the next tooth, and then upon the release of the finger key and the return of the escapement lever to normal position, shown in Fig. 3, the pawl will engage the said tooth, and the escapement wheel, under the action of the carriage spring contained in the drum 43, as ordinarily, will rotate through a distance of one letter space until arrested by the cross bar or yoke 13 of the hammer lever which comes against a fixed stop 44 on the frame. In the action just described, due to the ordinary operation of the letter keys it will be understood that the escapement ratchet wheel is under the control first of the pawl 10 and then the detent or tooth 37 of the escapement lever. It will be understood by those familiar with the Hammond machine that when the pawl 10 is released from the ratchet wheel, the hammer is no longer under restraint from the lever 11, and consequently flies forward under the action of its spring, not shown, to make the impression. It will be understood, of course, that the escapement action is made variable by the setting of the variable stop 15, this permitting the hammer lever carry-

ing the pawl 10, to swing to different degrees around the shaft 12 until its cross bar 13 strikes the particular stop or shoulder 16, which is then in line therewith. For bringing the carriage to different columnar positions however, the operation of the escapement is effected without moving the escapement lever 36, for it will be clear that the escapement wheel on the depression of a tabulator key for setting the carriage to a new columnar position must be free to rotate without being detained or controlled by the detent tooth 37, and for this purpose, as above described, the arm 34 is capable of movement independent of the escapement lever and this independent movement is effected through connections leading to the tabulator keys. For this purpose a pin or presser screw 45 is carried by an arm 46 so as to overlie the lug or extension 41 of the lever 34, 40. This arm 46 is connected with a rod 47, which is pivoted to an arm 48 on a rock shaft 49 having its bearings in the frame and connected through arms 50, 51 with the rock shaft 24 before described, which also has its bearings in the frame and which has fixed thereto an arm 52 engaged by a pin 53 on a lever 54 which is pivotally hung on the rock shaft 20 and is operated by a rod 55 sliding vertically in the frame and operated by a universal frame or plate 56 pivoted to the standards 28 before described, and arranged to be operated by the tabulator keys which have pins 57 overlying the said universal frame or plate so that each time the tabulator key is operated the universal plate will be operated and through vertical rod 55 the rock shaft 49 and connections described, the slotted lever 34 will be operated without operating the escapement lever and the pawl 10 will be released from the escapement wheel, and this will be free to rotate without being controlled or stopped by the detent 37. This will permit the carriage to have the necessary movement to bring it to the different columnar positions at which it will be arrested by column stops 58 arranged on a bar 59 fixed to the carriage, the said column stops being in position to engage a frame stop 60 pivoted at 61 to a standard 62 on the frame, the said frame stop 60 being thrown up into line with the columnar stops on the carriage each time a tabulator key is operated, said action being effected through the rod 47, above described, which at its upper end, as shown in Fig. 2, is connected with the tail piece 63 of the stop. Each time therefore that tabulator key is operated the carriage will be set free from its escapement mechanism including the pawl 10 and detent 37 and the carriage will continue its movement until one of the column stops 58 on the carriage strikes the frame stop 60.

As above set forth, another action also re-

sults from the operation of a tabulator key consisting in the setting of the variable stop 15 and the arresting thereby of the lever 11 with the pawl 10 in position to engage a new tooth of the ratchet escapement wheel for the variable spacing action, and it will be observed from the relative arrangement of the tabulator keys with respect to the universal frame or plate 26 that the stop 15 will be set in different positions according to which tabulator key is operated, and as the tabulator keys correspond to the different denominations the setting of the stop 15 by the operation of any one of the keys will cause the pawl 10 to be set opposite the proper tooth in the escapement wheel to secure the proper escapement action corresponding to the denomination of the number to be printed, so that we have, upon the operation of any tabulator key, a two-fold action consisting of the release of the carriage from the escapement and arresting the same at the proper column and the setting of the escapement mechanism to get the proper spacing movement to locate the number to be printed at the proper position in said column according to its denomination, and when the parts have been so set by depressing a tabulator key and the said key is released the frame stop 60 is withdrawn from the column stop on the carriage and the pawl 10 immediately engages the ratchet escapement wheel and moves forward therewith under the action of the carriage spring until the cross bar 14 of the hammer lever strikes the frame stop 44 Fig. 1, whereupon the carriage is arrested in proper position in the column for printing the number of a denomination corresponding to the particular tabulator key which has been depressed.

The lever 34, 40 is under tension of a spring 64 tending constantly to move the said lever in a direction so as to throw the pawl 10 into engagement with the escapement wheel.

The frame stop 60 is under tension of the spring 65 tending constantly to withdraw the said stop out of line with the column stops of the carriage. The vertical rod 55 is also under tension of a spring tending to keep it up in normal position.

I provide an arrangement whereby the machine may be set for different spacing actions of the carriage when the ordinary letter keys are operated, and the means for doing this are associated with the connections above described forming part of the tabulator mechanism. For this purpose I provide a slide 66 supported by screws 67 passing through slots 68 into the frame post 69, the said slide having a cam incline 70 carried thereby engaging a pin 71 on the universal frame plate 26 before described. The slide is provided with a series of teeth 72 engaged by a detent 73 and it is pro-

vided with a scale marked from 1 to 7 contacting with a pointer 74 on the frame. It will now be observed that by grasping the finger piece or handle 75 of the slide it may be moved in either one direction or the other and set at any of the points marked on the scale where it will be held by the detent 73 engaging one of the teeth 72. In this movement the cam 70 will act against the pin 71 with the result that the frame 26 will either move up or down and through the connections described the variable stop will be set in the desired position and there maintained for securing the desired spacing action of the escapement mechanism when the ordinary letter keys are operated.

The connection between the arms 50, 51 consists as shown in Fig. 3, of a pin and slot at 74*.

When the carriage is released from its escapement mechanism and is free to run under the action of its spring to get into different columnar positions, it is desirable that its speed be controlled in order to avoid shock, and for this purpose I provide a brake band 75* connected with the frame at 76 and extending over a portion of the spring drum 43 of the carriage, the said band being connected with an arm 76* on the rock shaft 49 so that each time the carriage is released to run free for the different columns the brake band will be set against the spring drum and a resistance to the movement therefore will be applied. I also provide means for preventing overthrow of the escapement wheel when it is running at its maximum speed as the result of setting the carriage at different columnar positions, this means consisting simply of a spring 77 fixed to the frame and bearing upon the ordinary escapement stop pawl 78. The ordinary function of this pawl is to prevent the escapement wheel from turning when the carriage is returned to begin a new line, but in my present arrangement this stop pawl performs the additional function of preventing the overthrow of the escapement wheel and centering the same in relation to the pawl 10 and detent 37 at the moment that the carriage is arrested by the column stops. The spring 77 forces the tooth of the pawl to the bottom of the tooth and thus accurately centers the ratchet wheel, which at this moment is free and is likely to become displaced.

It will be observed that the hammer has a pin 79 which is engaged by the end of the hammer lever 11, the said hammer lever being adapted to have movement in excess of that of the hammer. The hammer not being connected with the hammer lever it is possible for it to have one more forward movement even after the carriage has reached its extreme left hand position provided a key is struck, and should the car-

riage be now thrown back to the right to begin a new line the hammer might catch on and tear the paper. In order therefore to lock the hammer when the carriage reaches the end of its stroke I provide a slide 79 on the frame having a locking lug 80 carried thereby, the said slide being under tension of a spring 81 which holds the lug to one side of the stem of the hammer until the carriage reaches the limit of its stroke when the projection or plate 82 fixed adjustably to the rack bar of the carriage by screws 83 contacts with the end of the stop slide 79 and the said stop 80 will be moved in front of the stem 80* of the hammer and thus prevent the same from moving forward even though it be released by the operation of the key. When the carriage is returned for a new line the spring 81 moves the stop slide to withdraw the stop 80 from in front of the hammer stem.

The column stops consist of fork shaped pieces adapted to engage the teeth of the bar 59, a spring 84 being arranged to hold the stop in position.

When the carriage is being set in different columnar positions the hammer is prevented from printing by the ordinary hammer hook or detent 88, the tail piece 87 of which is raised by the arm or lever 86 so that the hook will engage the pin 89 of the hammer frame. The lever 86 is operated by an arm 85 on the shaft 24, these parts being substantially the same as those described in an application filed by me for Letters Patent of the United States, #319672, May 31/03.

I claim as my invention:—

1. In combination in a typewriter, a carriage, escapement mechanism, a variable spacing stop for the escapement mechanism to set the parts according to the denomination of the number to be printed, tabulator keys connected to said stop releasing means operated by said keys and means for arresting the carriage at different columnar positions also controlled from said tabulator keys, substantially as described.

2. In combination in a typewriter, a carriage, a hammer escapement mechanism, including an escapement wheel, a hammer lever, a pawl carried thereby, a variable spacing stop to control said pawl for variable spacing actions, means for releasing the pawl from the escapement wheel, tabulator keys connected with said means, connections from the tabulator keys to the said variable stop to set the same, and means controlled from the tabulator keys for arresting the carriage in different columnar positions, substantially as described.

3. In combination in a typewriter, escapement mechanism, a carriage, a pivoted stop for variable spacing to engage a part of the escapement mechanism, tabulator keys having connections to the said stop, releasing

means operated by said keys and means for arresting the carriage at different columnar positions with connections thereto from the tabulator keys, substantially as described.

4. In combination in a typewriter, a carriage, an escapement wheel, an escapement lever, having a detent tooth to engage the escapement wheel, a pawl engaging the escapement wheel and controlled by the escapement lever, connections to the escapement lever from the ordinary letter keys, means for releasing the escapement pawl from the escapement wheel independently of the escapement lever, tabulator keys with connections for operating said means, a variable stop for the escapement pawl to determine the denomination of the number connections thereto from the tabulator keys, means for arresting the carriage at different columnar positions and connections thereto from the tabulator keys, substantially as described.

5. In combination in a typewriter of the Hammond type, a carriage, escapement means comprising an escapement wheel and pawl, denomination stop means coacting with the escapement means, means for arresting the carriage in different columnar positions, tabulator keys and connections therefrom to the denomination stop and the columnar stop means, substantially as described.

6. In combination, in a typewriter, a carriage, an escapement wheel, a hammer, a hammer lever, a pawl carried thereby, a denomination stop to limit, variably, the retracting movement of the said hammer lever with the pawl, an escapement lever for releasing the pawl, connections thereto from the finger keys, means for releasing the pawl independently of the escapement lever, tabulator keys, connections therefrom to the said means and to the denomination stop, means for arresting the carriage in different columnar positions and connections thereto from the tabulator keys, substantially as described.

7. In combination in a typewriter, a carriage, denomination stop means, columnar stop means, tabulator keys for setting said denomination and columnar stop means, an escapement wheel, a pawl, an escapement lever, a second lever having a slotted arm for throwing the pawl into and out of engagement with the escapement wheel, said second lever being operated by the escapement lever when the ordinary letter keys are operated and connections for operating the said second lever independently of the escapement lever, said connections leading from the tabulator keys, substantially as described.

8. In combination in a typewriter, a carriage, denomination stop means, columnar stop means, tabulator keys for setting said 1

denomination and columnar stop means, an escapement wheel, a pawl, an escapement lever, a second lever having a slotted arm for throwing the pawl into and out of engagement with the escapement wheel, said second lever being operated by the escapement lever when the ordinary letter keys are operated and connections for operating the said second lever independently of the escapement lever, said connections leading from the tabulator keys, said second lever when operated by the escapement lever being moved independently of said connections leading from the tabulator keys, substantially as described.

9. In combination in a typewriter, a carriage, escapement mechanism, denomination stop means, columnar stop means, means for releasing the escapement mechanism, a series of tabulator keys, a universal frame or plate operated by the said keys, connections leading therefrom to the denomination stop, a second universal frame or plate operated by the said tabulator keys, and connections from said second universal frame to the columnar stop means and to the releasing means of the escapement, substantially as described.

10. In combination in a typewriter, a carriage, escapement mechanism, denomination stop means, columnar stop means, means for releasing the escapement mechanism, a series of tabulator keys, a universal frame or plate operated by the said keys, connections leading therefrom to the denomination stop, a second universal frame or plate operated by the said tabulator keys, and connections from said second universal frame to the columnar stop means and to the releasing means of the escapement, said connections including vertically extending rods 25, 55 and rock shafts, substantially as described.

11. In combination, in a typewriter, a carriage, escapement mechanism, a denomination stop for the escapement to secure variable spacing according to the denomination of the number to be printed, tabulator keys, connections between said keys and said stop means and means for setting said connections to adjust the stop for different spacing movements under the action of the ordinary finger keys, substantially as described.

12. In combination, in a typewriter, a carriage, escapement mechanism, a denomination stop for the escapement, tabulator keys, a universal frame to be operated thereby, connections between said frame and the denomination stop, ordinary finger keys, having connections to the escapement and means for adjusting the said universal frame in different positions to set the stop for variable spacing under the action of the ordinary letter keys, substantially as described.

13. In combination in a typewriter, a carriage, escapement mechanism, a denomina-

tion stop for the escapement, tabulator keys, a universal frame to be operated thereby, connections between said frame and the denomination stop, ordinary finger keys having connections to the escapement and means for adjusting the said universal frame in different positions to set the stop for variable spacing under the action of the ordinary letter keys, said means consisting of the slide having a cam for depressing the universal frame, substantially as described.

14. In combination in a typewriter, a carriage, an escapement wheel, an escapement pawl, a denomination stop, a columnar stop, tabulator keys, connections therefrom to the denomination stop, a lever for controlling the escapement pawl, connections from the tabulator keys to the column stop including a rod or bar 47, said bar being adapted to operate the controlling lever of the escapement pawl and an escapement lever arranged to operate the said controlling lever and key connections for operating the escapement lever, substantially as described.

15. In combination, the carriage, an escapement wheel, an escapement pawl, an escapement lever, connections between said lever and the ordinary finger keys, a controlling lever for the escapement pawl arranged to be operated by the escapement lever and having also independent movement, a columnar stop, tabulator keys, connections between the said tabulator keys and the columnar stop, the said controlling lever having a lug or projection borne upon by the escapement lever and by a part of the said connections to the columnar stop, substantially as described.

16. In combination in a typewriter, a carriage, escapement mechanism, the finger keys, a row of tabulator keys arranged in front of the printing mechanism above the finger key and across the machine substantially at the center thereof, a denomination stop coacting with the escapement mechanism, a pair of universal frames extending below the tabulator keys, connections from said frames to the denomination stop and the columnar stop respectively, a slide extending across in front of the tabulator keys and connections from said slide to the denomination stop to set the same for variable spacing, substantially as described.

17. In combination with the escapement wheel and its pawl, an escapement lever, a lever for releasing the pawl from its ratchet, connections for operating the said escapement lever from the keys, connections for operating the pawl releasing lever from its ratchet independently of the escapement lever, and means whereby the escapement lever, when operated, will operate the pawl releasing lever, substantially as described.

18. In combination with the escapement wheel and its pawl, an escapement lever, a

lever for releasing the pawl from its ratchet, connections for operating the said escapement lever from the keys, connections for operating the pawl releasing lever from its ratchet independently of the escapement lever, and means whereby the escapement lever, when operated, will operate the pawl releasing lever, said pawl releasing lever

being pivoted axially to the pivot of the escapement lever, substantially as described. 10

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

J. B. HAMMOND.

Witnesses:

JOHN M. BANCROFT,
F. ECKLINE

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