

J. A. SMITH.
 BACK SPACING MECHANISM FOR TYPE WRITING MACHINES.
 APPLICATION FILED MAY 21, 1910.

Patented Feb. 11, 1913.
 3 SHEETS—SHEET 1.

1,052,526.

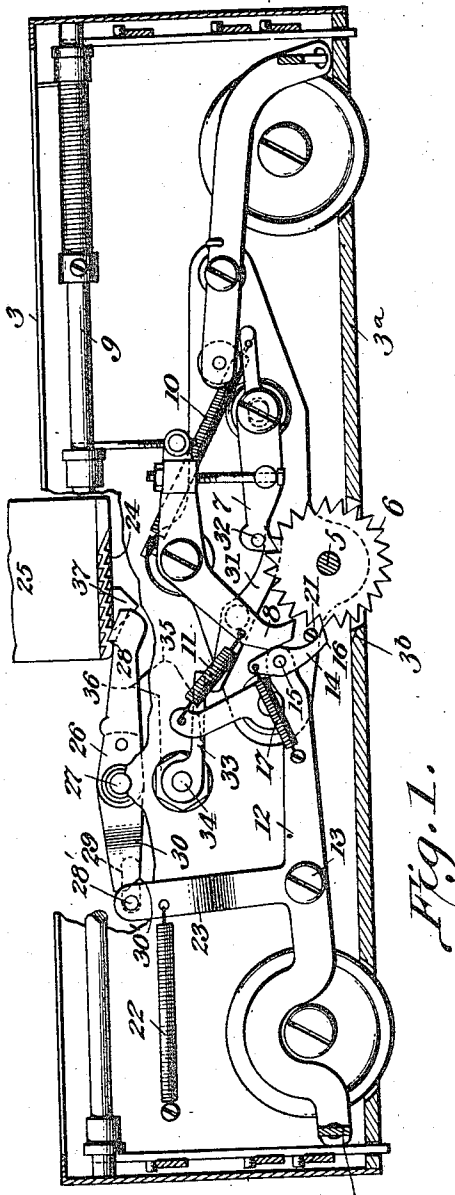


Fig. 1.

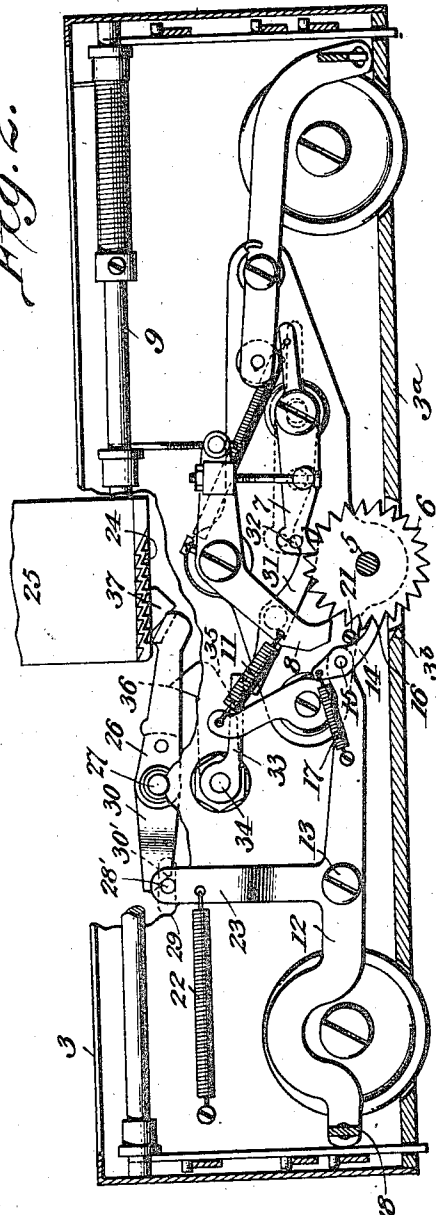


Fig. 2.

WITNESSES

Wm. H. Culverwell.
D. A. Colne

INVENTOR,

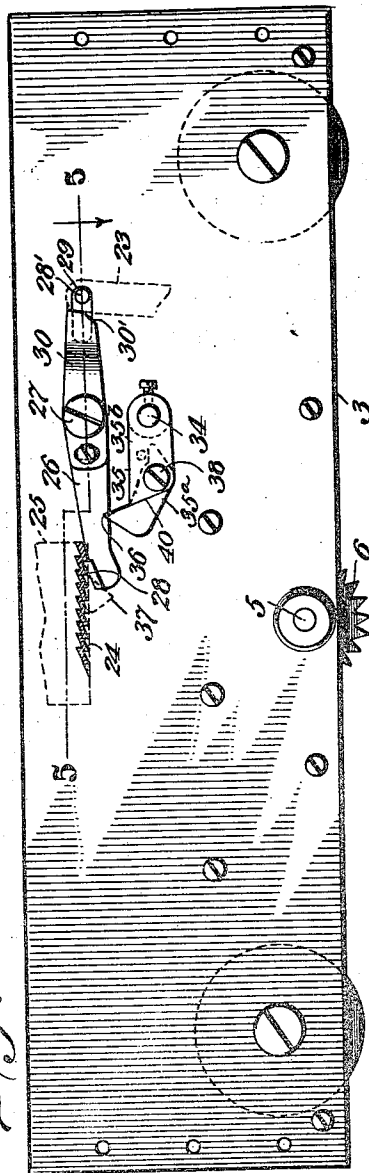
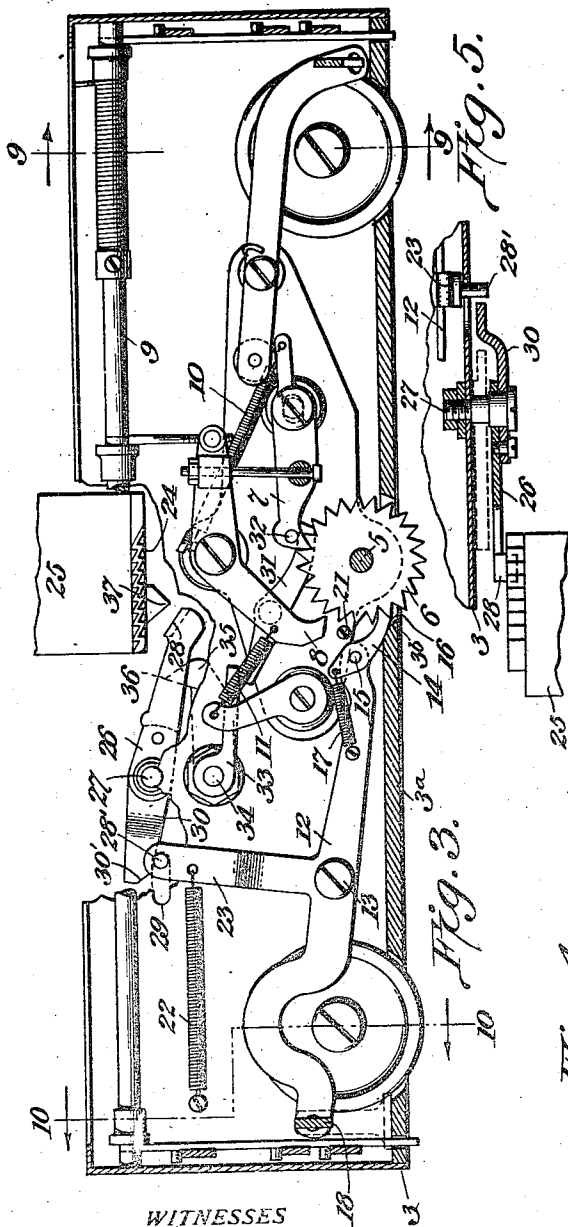
John A. Smith.

by *L. G. Julian* Attorney

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WITNESSES
J. Kaufman
H. A. Colne

INVENTOR,
John A. Smith.
 by *R. B. Juhn* Attorney

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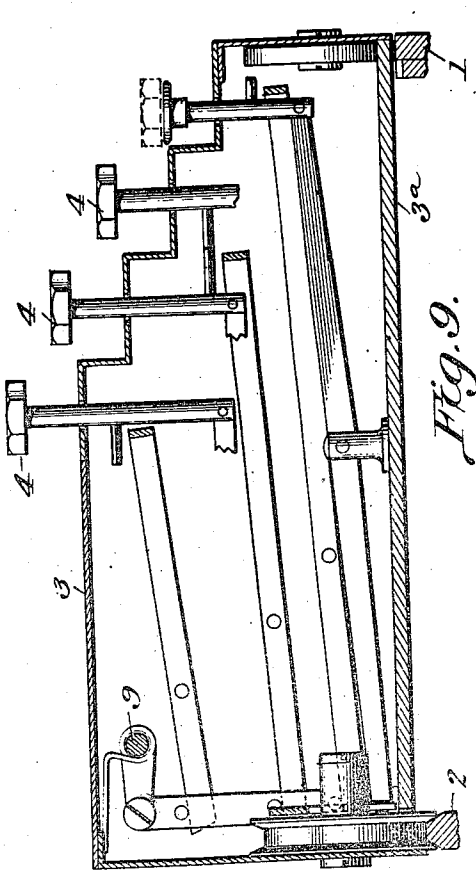


Fig. 9.

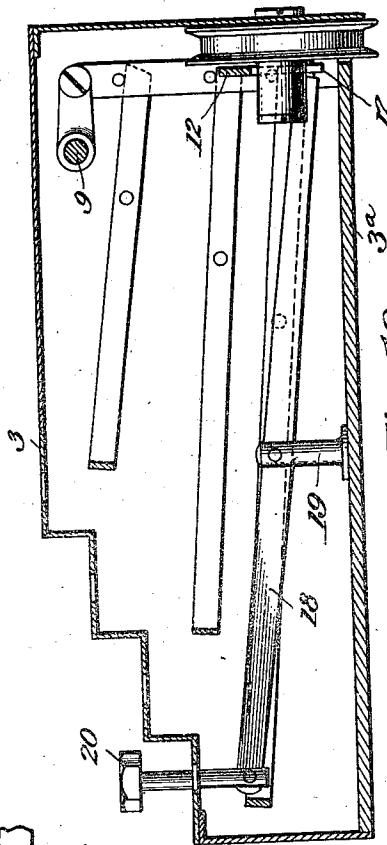


Fig. 10.

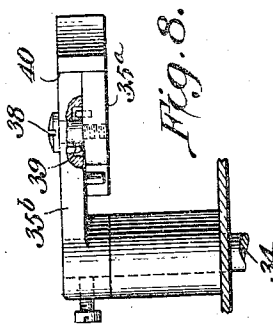


Fig. 8.

WITNESSES

Stauf Kuberswell
L. A. Colne

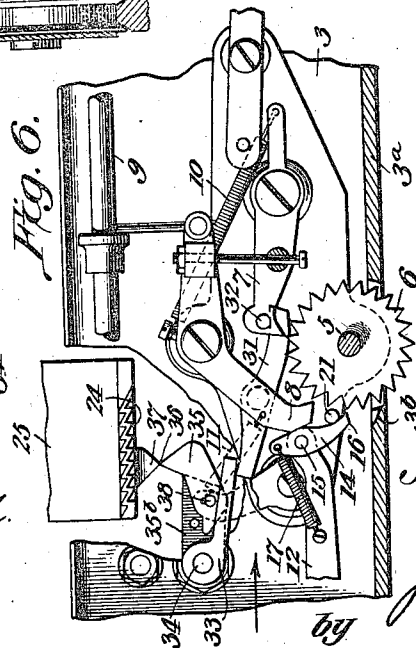


Fig. 6.

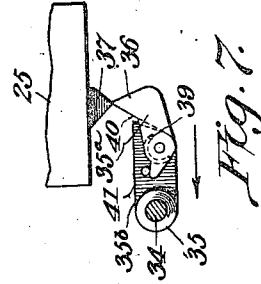


Fig. 7.

INVENTOR,
John A. Smith.

L. J. Gulikn
 ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN A. SMITH, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF HARRISBURG, PENNSYLVANIA, A CORPORATION OF DELAWARE.

BACK-SPACING MECHANISM FOR TYPE-WRITING MACHINES.

1,052,526.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed May 21, 1910. Serial No. 562,725.

To all whom it may concern:

Be it known that I, JOHN A. SMITH, a citizen of the United States of America, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Back-Spacing Mechanism for Type-Writing Machines, of which the following is a specification.

10 This invention relates to back spacing mechanism which, while capable of use in other relations, has been especially designed with reference to the equipment of what is known as the Elliott-Fisher writing-adding machine.

15 The object of the invention is to produce an efficient mechanism for back spacing the carriage, as for instance the distance of one letter space.

20 A subordinate object is to combine with the back spacing mechanism proper, certain mechanisms whereby the back spacing of the carriage will not be interfered with by the carriage dogging or decimal spacing mechanisms with which machines of the character herein illustrated are equipped.

25 In the accompanying drawings—Figure 1 is a longitudinal sectional view of a portion of an Elliott-Fisher writing-adding machine equipped in accordance with my invention, the parts being disposed in the positions they normally occupy. Fig. 2 is a similar view showing the parts in the positions they assume at an intermediate point in the depression of the back spacing key. Fig. 3 is still another view of this character with the parts in the positions they assume upon the complete depression of the back spacing key. Fig. 4 is a rear elevation of the carriage of the machine designed more particularly to show the construction and relation of the carriage dogging and decimal spacing devices. Fig. 5 is a detail sectional view of certain of the parts. Fig. 6 is a sectional view of a portion of the carriage showing the normal operation of the decimal spacing mechanism. Fig. 7 is a detail view showing the operation of the co-acting trips of the decimal spacing mechanism during the back spacing movement of

the carriage. Fig. 8 is a detail view of the decimal space trip arm and its associated parts. Fig. 9 is a transverse section through the carriage with certain of the parts broken away and others omitted, and Fig. 10 is a similar view.

Each part is indicated by its appropriate reference character wherever shown.

It is unnecessary for the purpose of the present disclosure to illustrate the entire Elliott-Fisher billing machine to the equipment of which the present invention is directed. Suffice it to say that the machine referred to and partially illustrated in the drawings is what is known as a combined typewriting and adding machine, which includes a stationary flat platen and a machine frame mounted to travel thereover in the direction of line spacing. The platen is not shown, but the front and rear carriage supporting guides 1 and 2 of the main machine frame are indicated in Fig. 9. Upon the guides 1 and 2 of the main machine frame is mounted a carriage 3 which travels transversely of the platen to letter space writing and is under tension from carriage propelling mechanism which constantly tends to draw the carriage to the right. Upon the carriage 3 is mounted the printing mechanism operated by keys 4, said keys and a portion of their connections being indicated in Fig. 9.

Through the center of the carriage is extended a feed spindle 5 geared to racks attached to the guides 2 and 3 in a manner well understood in the art and having fixed thereto an escapement wheel 6. Coacting with the escapement wheel are two escapement dogs 7 and 8 operated from a rock shaft 9 connected through suitable instrumentalities with the keys 4. The dog 7 is normally held in engagement with the wheel 6 by a spring 10 and serves to retain the carriage against the action of the propelling mechanism. Upon the depression of a key the dog 7 is withdrawn from the wheel 6 and the dog 8 is moved into engagement with said wheel against the resistance of a spring 11. This shifting of the dogs takes place upon the depression of the key and

when the latter is released the dog 8 moves out and the dog 7 returns into engagement with the next tooth of the escapement wheel 6, the carriage advancing the distance of one letter space during this return of the dogs to their normal positions. The parts thus far described are common to the Elliott-Fisher machine of commerce.

The back spacing mechanism which I have devised for the purpose of facilitating a limited back spacing movement of the carriage includes a back spacing lever 12 fulcrumed at 13 on the inner side of the back wall of the carriage 3 and carrying at its right hand end a back spacing pawl 14 pivoted at 15 and having its beak 16 urged toward the escapement wheel 6 by a spring 17 connected at one end to the tail piece of the pawl and at its opposite end to the lever 12. Extended along the left hand side or end of the carriage is the back spacing key lever 18 fulcrumed upon a post 19 and having at its front end a back spacing key 20 located at the keyboard of the carriage. The rear end of the lever 18 is connected to the left hand end of the back spacing lever 12.

Normally, see Fig. 1, the pawl 14 is held away from the wheel 6 by a pin 21 fixed to the back wall of the carriage 3. Upon the depression of the back spacing key 20 the lever 18 is oscillated, thereby oscillating the back spacing lever 12, and causing the pawl 14 to descend with the left hand end of the back spacing lever. That face of the pawl 14 which is opposed to the pin 21 is so formed that as said pawl descends its beak is allowed to approach the wheel 6, engaging the same after more or less preliminary movement of the lever 12. Continued depression of the key will cause the pawl 14 which is now engaged with the wheel 6 to rotate the latter and thus cause the back spacing of the carriage, overthrow being prevented by the bottom wall 3^a of the carriage 3 formed with a recess 3^b for the reception of the lower end of the pawl as the latter reaches its limit of movement, see Fig. 3.

From what has been said it will be seen that the back spacing pawl 14 coacts at the opposite limits of its movement with fixed parts or members, to-wit the pin 21 and the bottom wall 3^a of the carriage, such coaction serving to hold the pawl normally out of engagement with the wheel and in engagement with the wheel at the limit of the back spacing stroke to lock the escapement wheel 6 against overthrow. The back spacing mechanism is retracted and normally retained in the position shown in Fig. 1 by a retracting spring 22 secured at one end to the back wall of the carriage casing and at its opposite end to an arm 23 extended

laterally from the lever 12 opposite the fulcrum of the latter.

The mechanism thus far described constitutes the back spacing mechanism proper, but in machines of the specific character shown in the drawings provision is made for dogging the carriage against retraction during a portion of its advance movement, as for instance while the printing point of the machine is opposite a column. It is desirable, therefore, to provide means whereby the operation of the back spacing mechanism will automatically render the carriage dogging mechanism inoperative and thus oppose no resistance to the back spacing operation.

In the drawings I have shown so much of the carriage dogging mechanism or retraction lock as is necessary to fully disclose the coaction between this mechanism and the back spacing mechanism. In Fig. 1 for instance is shown a toothed plate or ratchet 24 which is ordinarily formed at the under side of a register or computing device 25 a fragment of which is shown in the drawings and which it may be mentioned incidentally is mounted on the main machine frame and is therefore relatively fixed with respect to the moving carriage which supports operating connections, not shown, whereby the computing device is operated to add as the numeral keys of the typewriter are operated to print numbers on the work sheet. Coacting with the ratchet 24 is what is in effect a dogging lever 26 fulcrumed at 27 on the back wall of the carriage. At the right hand end of the lever 26, looking from the front of the machine, is a cam plate 28 which coacts with the teeth of the ratchet 24 in a manner to permit the forward movement of the carriage, but to prevent or dog the retractile movement thereof as long as the printing mechanism occupies a position opposite an adding field or column. The normal position of the dogging lever or member 26 is shown in Fig. 1.

To effect the automatic release of the dogging mechanism when the back spacing mechanism is operated, the upper end of the arm 23 of the back spacing lever 12 is provided with a pin 28' projecting through a slot 29 in the back wall of the casing and coöperatively related to the tail piece 30 or adjacent end of the lever 26, the latter being preferably provided with a bevel or cam 30' along which the pin 28' rides to swing the dogging lever 26 from its normal engaged position, shown in Fig. 1, to its ineffective or disengaged position, shown in Fig. 3. It will now be seen that when the back spacing key is depressed the back spacing pawl 14 will be urged toward the wheel 6, during which movement the pin 28' by coaction with the lever 26 will render the carriage

dogging mechanism ineffective so that said dogging mechanism will oppose no obstruction to the back spacing of the carriage when the pawl 14 finally engages the wheel, as shown in Fig. 2, and back spaces the latter.

In the particular machine disclosed there is another mechanism which must be modified to prevent interference with the back spacing operation. This is what is known as the automatic spacing mechanism for automatically spacing or skipping the machine over a decimal, comma or other space. The automatic spacing mechanism includes what is known as a retarding lever 31, one end of which coacts with a pin 32 projecting from the normally engaged dog 7. The opposite end of the lever 31 underlies an arm 33 extending from a rock shaft 34 having a bearing in the back wall of the carriage casing and provided on its rear end with what is known as a trip arm 35 at the extremity of which is a pointed trip 36 designed to coact with a pointed trip 37 which is relatively fixed and is ordinarily carried by the register or computing device 25. The operation of this automatic spacing mechanism, which is well known in the art, is substantially as follows: When the last digit to the left of the desired space is printed upon the depression of the key, the pawls 7 and 8 of the escapement are shifted, as heretofore explained, without material advance movement of the carriage. Upon release of the key the dogs are re-shifted, the dog 8 being withdrawn from the wheel 6 and the normally engaged dog 7 moving back toward its engaged position. Normally this re-shifting of the dogs is accompanied by a single letter space movement of the carriage, but we are supposing that this movement will bring the printing point of the carriage opposite the space desired, the location of this space being determined of course by the adjustment of the normally fixed trip 37. Instead, therefore, of arresting the carriage after a single letter space movement, the movement of the dog 7 toward its engaging position is retarded by the lever 31, this retardation being due to the fact that the normal letter space movement of the carriage brings the trip 36 of the trip arm 35 into engagement with the fixed trip 37, thus causing a momentary depression of the trip arm and the arm 33, which latter in turn coacts with the retarding lever 31 to cause the latter to retard the return movement of the dog 7. This retardation or exaggeration of the normal operation of the escapement is only momentary, however, and the consequence is that the dog 7 engages and arrests the wheel 6 after the carriage has advanced the distance of two letter spaces instead of one, as normally.

As thus far described the automatic spacing mechanism is not new, but an understanding of its operation is necessary to a comprehension of its relation to the back spacing mechanism. It will be seen that if the printing point of the carriage is opposite the letter space immediately beyond or to the right of the space over which the carriage has been skipped, the operation of the back spacing mechanism will back space the carriage one step, thus presenting the printing point opposite the decimal or other space on the work sheet. This backward movement of the carriage will also present the trips 36 and 37 in engagement, with the result that the dog 7 will be held out of the wheel 6 and the carriage will be permitted to again move forward as soon as the back spacing key is released. In other words, if, with the carriage located immediately to the right of the space which has been skipped, an attempt is made to back space the carriage, the latter will move back one space, but the automatic spacing mechanism will interfere with the holding of the carriage in its new position by the dog 7 and consequently the carriage will only remain in its back spaced position as long as the back space key is held depressed. It is impossible, therefore, to back space across and beyond the space previously skipped. To avoid this interference with the back spacing operation by the automatic spacing means it is simply necessary to modify the spacing mechanism so that the latter will coact with the dog 7 on the forward movement only of the carriage. This end is attained by forming the trip arm 35 in two parts 35^a and 35^b, as shown in Figs. 4, 6, 7 and 8, pivotally connected, as by a screw pintle 38 and yieldingly retained in a predetermined relative position by a spring 39. The trip 26 is formed on the member 35^a which is also provided with a shoulder 40 abutting against the end of the member 35^b.

The relation of the parts is such that when the carriage is advancing in a forward direction, as shown in Fig. 6, the engagement of the trips 36 and 37 will effect no relative movement of the members 35^a and 35^b, but will cause said members to move in unison from the rock shaft 34 as an axis thus effecting automatic spacing in the manner heretofore explained. Upon the return movement of the carriage, however, the engagement of the trips 36 and 37, as shown in Fig. 7, will cause the member 35^a to swing about the screw 38 as an axis without depressing the member 35^b. In other words, during the retraction of the carriage the member 35^a of the trip arm will yield when the trips 36 and 37 coact and no operation of the automatic spacing mechanism will result. Consequently, if now it is attempted

to back space the carriage from a position immediately to the right of the space previously skipped, the dog 7 will engage and hold the ratchet wheel upon the release of the back spacing key, because while the trips will coast during this back spacing movement, there will be no consequent retardation of the reengaging movement of the dog 7.

10 For a more complete disclosure of the machine to which my invention is shown applied reference is made to Patents Nos. 829,971 to Laganke and Smith, and 922,559 to H. D. Bolton.

15 It is thought that from the foregoing, the construction and operation of the mechanism constituting my invention will be clearly understood, but I reserve the right to use said invention in other than the specified relation and to effect such variation of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. The combination with a carriage, of
25 controlling mechanism therefor including an escapement wheel and cooperating dogs, of back spacing mechanism including a back spacing lever and a pawl carried thereby and coasting with the escapement wheel, a
30 spring tending to urge the pawl into engagement with the wheel, a fixed part normally holding the pawl out of engagement with said wheel, and another fixed part coasting with the pawl to prevent overthrow.

35 2. The combination with a carriage, of an escapement movable therewith and controlling the movement of said carriage, said escapement including an escapement wheel and coasting dogs, and back spacing mechanism also movable with the carriage and
40 including a back spacing lever, a pawl carried thereby in cooperative relation with the escapement wheel, a spring tending to urge the pawl into engagement with the
45 wheel, fixed parts coasting with the pawl to hold the pawl normally out of engagement with the wheel and to positively hold the dog in engagement with the wheel at the end of the back spacing stroke, a back
50 spacing key, and a suitable connection between the back spacing key and the back spacing lever.

3. The combination with a carriage and means for dogging the carriage against
55 backward movement, of back spacing mechanism operative to back space the carriage and cooperatively related to the carriage dogging means to control the latter.

4. The combination with a carriage, escapement mechanism controlling the movement thereof in one direction, means for
60 dogging the carriage against premature movement in the opposite direction, and

back spacing mechanism coasting with an element of the escapement and also coasting
65 with the carriage dogging means to render said dogging means ineffective.

5. The combination with a carriage, escapement mechanism controlling the movement thereof in one direction, means for
70 dogging the carriage, key-operated back spacing mechanism for the carriage, and means whereby the operation of the back spacing key will render the carriage dogging means ineffective during the back spacing
75 movement of the carriage.

6. The combination with a carriage, of an escapement mechanism controlling the movement thereof in one direction, back spacing mechanism including a back spacing lever,
80 a pawl carried thereby and coasting with an element of the escapement, and a back spacing key for operating the lever, carriage dogging mechanism including a ratchet and a dogging lever, and means movable
85 with the back spacing lever and coasting with the dogging lever to move the same out of cooperative relation with the ratchet.

7. The combination with a carriage, of an
90 escapement mechanism controlling the movement thereof in one direction, back spacing mechanism for the carriage, and automatic spacing mechanism operative during the movement of the carriage in one direction
95 but ineffective during the back spacing movement of the carriage.

8. The combination with a carriage, escapement mechanism controlling the step-by-step advance thereof, back spacing mechanism
100 for the carriage, automatic spacing mechanism including coasting parts brought into engagement by the forward movement of the carriage to exaggerate the normal spacing thereof, one of said parts being
105 arranged to yield ineffectively when said parts engage during the back spacing movement of the carriage.

9. The combination with a carriage and an escapement mechanism controlling the
110 normal step-by-step advance thereof, of back spacing mechanism for the said carriage, carriage dogging mechanism, means for rendering said carriage dogging mechanism ineffective upon the operation of the back
115 spacing mechanism, and automatic spacing mechanism including coasting parts operative upon the forward movement of the carriage to exaggerate the normal spacing thereof and ineffective when brought into
120 engagement during the back spacing movement of the carriage.

10. The combination with a carriage, of controlling mechanism therefor including
an escapement wheel and cooperating dogs,
125 a back-spacing pawl adapted to engage the

escapement wheel, a back-spacing lever
carrying said pawl, a spring urging the pawl
toward the escapement wheel, and two fixed
parts coacting with opposite faces of the dog
5 at the opposite limits of its movement to
hold the dog normally out of engagement
with the wheel and to hold said dog firmly
in engagement with the wheel at the end of

the back-spacing stroke to prevent over-
throw of the wheel.

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

JOHN A. SMITH.

Witnesses:

M. L. BOWMAN,

W. M. BREITINGER.

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