A. T. BROWN.

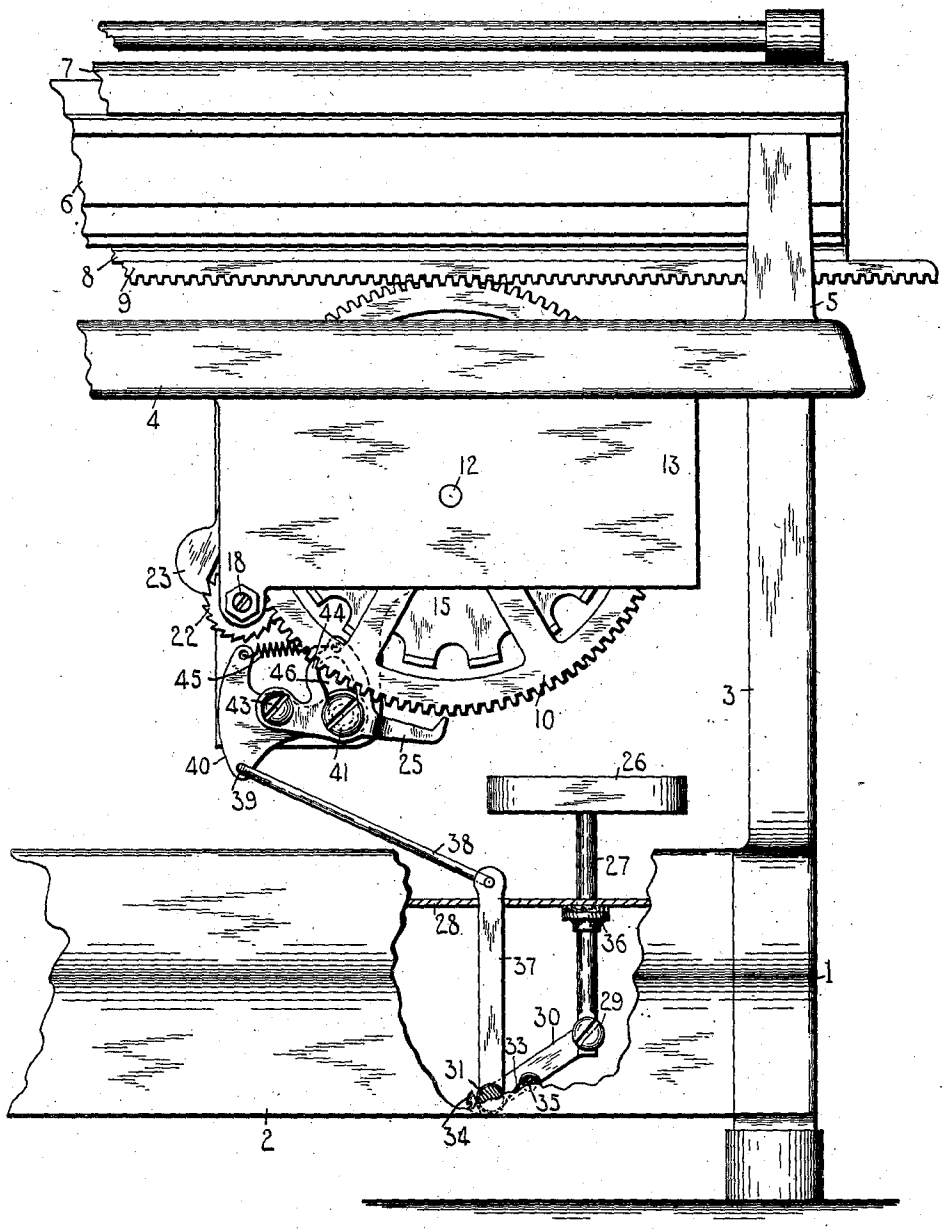
TYPE WRITING MACHINE.

APPLICATION FILED DEC. 29, 1905.

928,627. **Patented July 20, 1909.**

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

M. F. Hanssweber

R. H. Strother

INVENTOR

Alexander T. Brown

BY

Jacob Fehl

ATTORNEY

A. T. BROWN.

TYPE WRITING MACHINE.

APPLICATION FILED DEC. 29, 1905.

928,627. **Patented July 20, 1909.**

2 SHEETS—SHEET 2.

FIG. 2.

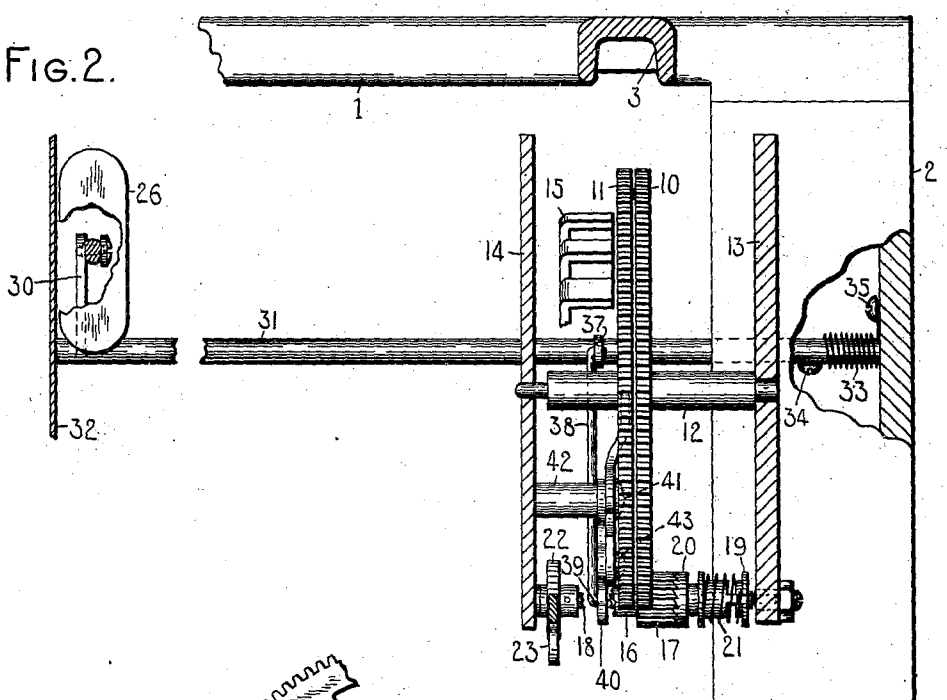
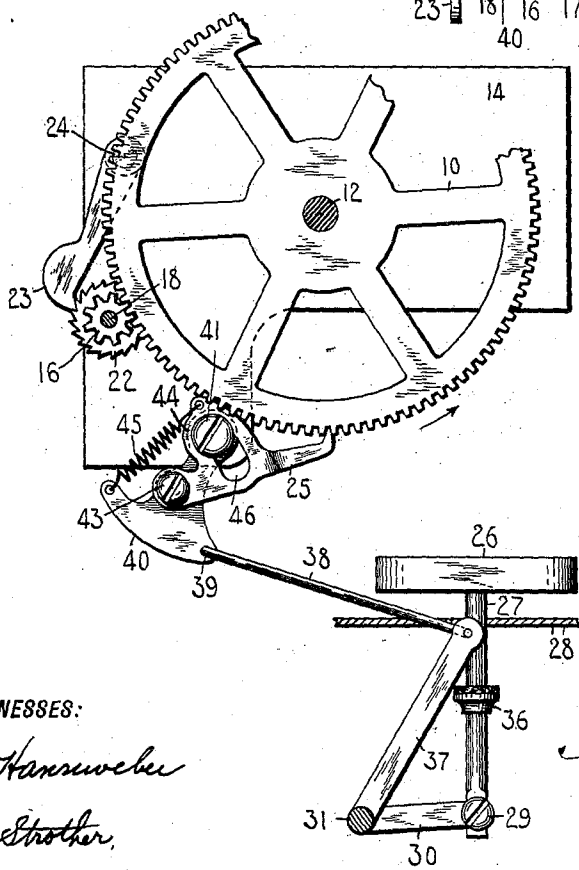


FIG. 3.



WITNESSES:

M. F. Hanrweber

R. H. Strother

INVENTOR

Alexander T. Brown

BY

Jacob Feibel

ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

No. 928,627. Specification of Letters Patent. Patented July 20, 1909.

Application filed December 29, 1905. Serial No. 293,792.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and it has for its principal object to provide an improved device for back stepping the carriage.

My invention consists in certain features of construction and combinations and arrangements of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

My invention is illustrated in the accompanying drawings in which,

Figure 1 is a rear elevation of as much of a type-writing machine as is necessary to illustrate my invention. Fig. 2 is a top view of a portion of the same, the carriage being removed and parts of the framework shown in section. Fig. 3 is a fragmentary view similar to Fig. 1, but showing the parts in the position they occupy when the back spacer key is depressed.

My invention is applicable to typewriting machines generally.

The main frame of the machine shown in the drawings comprises two side plates 1, connected together by a back plate 2. Said side plates have posts 3 which support a top plate 4 from which rise posts 5 that support a stationary carriage rail 6. The rail 6 is grooved in its upper and lower edges to form raceways in which run anti-friction balls or rollers that coöperate with rails 7 and 8 of a carriage, which supports the usual roller platen. These parts have not been shown in detail as they may be of any suitable construction as far as the present invention is concerned. The carriage has secured thereto a feed rack 9, said feed rack in the present instance being secured to the lower carriage rail 8. The rack 9 meshes with two gear wheels 10 and 11, both loosely mounted on a shaft 12 which is supported by frame plates 13 and 14 which in turn are supported by the top plate 4. The rack 9 is of sufficient width to mesh with both of the gear wheels 10 and 11. The carriage is driven in letter spaced feed direction by the gear wheel 11 which is connected in any suitable manner with a driving spring coiled within a barrel or drum 15 which is mounted on the shaft 12. Any suitable means may be provided for regulating the tension on the driving spring. The step-by-step feed of the carriage is controlled through the gear wheel 10 which meshes with the pinion 16 which is controlled by an escapement mechanism (not shown). The pinion 16 forms part of, or is rigidly connected with, a collar 17 that is mounted with freedom to turn but not to move longitudinally on a shaft 18 that is journaled in the frame plates 13 and 14. Said shaft 18 has rigidly mounted thereon a collar 19 and a second collar 20 is loosely mounted on the shaft and is connected by a tooth and slot connection with the fixed collar 19 in such fashion that the collar 20 is free to slide longitudinally of the shaft 18 but is constrained to turn with said shaft. The collars 17 and 20 have ratchet teeth formed on their proximate faces and the collar 20 is normally pressed into engagement with the collar 17 by a spring 21. The construction is such that when the carriage is moved toward the left the shaft 18 is normally constrained to turn with the pinion 16, but the carriage may be moved toward the right without turning the shaft 18, the ratchet teeth on the collars 17 and 20 slipping past one another. In order to hold the shaft 18 against backward rotation a ratchet wheel 22 is fixed on said shaft near its forward end and said ratchet wheel is engaged by a retaining pawl 23 that is pivoted to the frame plate 14 at 24 and is held by gravity in engagement with the ratchet wheel 22. Any suitable escapement wheel may be mounted on or geared to the shaft 18 and said wheel may be controlled by any suitable feed dogs.

It will be understood that the machine is equipped with the usual printing keys and space key and that said feed dogs are operated by any of said keys to permit the carriage to be fed step-by-step toward the left.

My back spacer comprises a back spacing pawl 25 that is adapted to engage a toothed member that moves in unison with the carriage. In the present instance, said pawl operates on the gear wheel 11 and is adapted to turn said wheel backward a distance suitable to move the carriage toward the right one letter space distance at a time. Said pawl is operated by a back spacer key 26 that is mounted on the top of a stem 27 which passes loosely through a suitable open-

ing in a keyboard plate 28 that is mounted on the side plates 1. At its lower end the key stem 27 is pivoted on a headed screw 29 that passes through said key stem and is threaded into an arm 30 projecting from a rock shaft 31 which is journaled at its forward end in a frame plate 32 and at its rear end in the back plate 2. The shaft 31 is provided with a returning spring 33 coiled about said shaft near the rear end thereof and connected at one end to a screw 34 threaded into the shaft and at the other end to a screw 35 threaded into the back plate 2. The motion of the parts under the impulse of the spring 33 is limited by a collar 36 secured to the key stem 27 and engaging the under side of the keyboard plate 28. The shaft 31 carries an upwardly extending arm 37 to the upper end of which is pivoted one end of a link 38, the other end of which is pivoted at 39 to a lever 40, which is pivoted on a shouldered and headed screw 41 (Fig. 1) that is threaded into the end of a post 42 (Fig. 2) which is secured to the frame plate 14. The pawl 25 is pivoted to the lever 40 on a shouldered and headed screw 43. Said pawl is formed with an arm 44 to the upper end of which is secured one end of a spring 45, the other end of which is secured to an arm of the lever 40. The tension of the spring 45 tends to move the free end of the pawl 25 toward the gear wheel 11. The arm 44 is formed with a curved slot, the curvature of said slot being concentric with the pivot screw 43. The screw 41 on which the lever 40 is pivoted passes loosely through said slot and said screw limits the motion of the pawl 25 in both directions by the end of the slot coming into engagement with the screw.

In the normal positions of the parts shown in Fig. 1 the free end or tooth of the pawl 25 and the centers of the screws 41 and 43 are approximately in alinement and the lower end of the slot 46 is in engagement with the screw 41 and the free end of the pawl is thereby held away from the gear wheel 11. When the key 26 is depressed the shaft 31 is rocked and the lever 40 is drawn to the position shown in Fig. 3, rocking about its pivot 41. During the first part of the rocking movement of the lever 40, the pawl 25 simply rocks in unison with the lever about the screw 41 as a center so that the free end of the pawl moves directly toward the gear wheel 11 and enters the notch between two of the teeth of said wheel. When the pawl engages the gear wheel the motion of the former about the pivot 41 as a center is arrested and in a further motion of the lever 40 said pawl is forced to turn about its pivot 43 against the tension of the spring 45. This motion continues until the upper end of the slot 46 engages the screw 41 and positively prevents any further rocking of the pawl about its pivot 43. When the parts reach this position any further motion thereof would of necessity consist of a rotation of the pawl 25 and the lever 40 in unison about the pivot 41. As any such rotation is prevented by the engagement of the pawl with the gear wheel the parts are arrested by the pressure of said pawl upward against the gear wheel. It will be perceived that the result of this action is to press the pawl forcibly into engagement with said wheel, thus positively preventing any overthrow of the wheel and consequently of the carriage. When the gear wheel 11 is thus turned toward the right the collar 20 being held against rotation by its connection with the shaft 18, which in turn is held against backward rotation by the retaining pawl 23, said collar 20 is cammed toward the rear of the machine by the ratchet teeth on the collar 17 until the latter collar has turned through a distance of at least one ratchet tooth and of less than two ratchet teeth, so that the collar 17, the gear 10 and the carriage have been moved one letter space position backward with relation to the shaft 18 and to the escapement wheels controlled by said shaft. The gear wheels 10 and 11 being held against rotation in letter space direction, when the back spacing key 26 is released and allowed to return to normal position under the impulse of the spring 33, the pawl 25 slips out of the notch between the teeth of the wheel 11 and is returned to its normal position. It will be obvious that the back spacer key may be operated as many times as desired and that the carriage will be moved toward the right a letter space distance at each actuation of said key.

When on a depression of the space key the pawl 25 first engages the wheel 11, the point or tooth of said pawl and the pivot screws 41 and 43 are nearly in alinement and approximately on a line that is tangent to the wheel 11 at the point of engagement of the pawl, so that said pawl is nearly on the dead center of the lever 40, and consequently said lever 40 has a very high leverage on the wheel. As the parts approach their final position shown in Fig. 3, this leverage is greatly diminished. It results from this construction that the back spacing movement of the carriage starts off slowly and increases in velocity, which gives an easy touch to the key 26.

Various changes in the details of construction and arrangement may be made without departing from my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, a spring

connected at one end with said pawl and at its other end with said lever, means acting directly on said lever for actuating said lever and pawl, and means independent of said toothed member for limiting the motion of said pawl about its pivot in one direction to cause said lever to press said pawl forcibly into engagement with said toothed member in order to prevent overthrow of said toothed member and said carriage.

2. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, a spring connected at one end with said pawl and at its other end with said lever, means acting directly on said lever for actuating said lever and pawl, means for limiting the motion of said pawl about its pivot in one direction to hold said pawl normally out of engagement with said toothed member, and means independent of said toothed member for limiting the motion of said pawl about its pivot in the other direction to cause said lever to press said pawl forcibly into engagement with said toothed member in order to prevent overthrow of said toothed member and said carriage.

3. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, means for actuating said lever, and a pivot for said lever, said pawl having two abutments adapted to engage said pivot and serving to limit the motion of said pawl relatively to said lever in both directions.

4. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, means for actuating said lever, and a pivot for said lever, said pawl having a slot through which said pivot passes, the ends of the slot engaging said pivot serving to limit the motion of the pawl relatively to said lever in both directions.

5. In a typewriting machine, the combination of a carriage, a toothed wheel geared to said carriage, a lever pivoted near said toothed wheel, a back spacer pawl pivoted to said lever and adapted to engage said toothed wheel, the pivot points of said lever and said pawl being approximately on a line tangent to said toothed wheel at the point of engagement of said pawl, means for limiting the motion of said pawl with relation to said lever, and means for actuating said lever.

6. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, and means for actuating said lever, the point of said pawl and the pivot points of said lever and pawl being approximately in a straight line when the parts are in normal position and arranged to move out of a straight line during the operation, whereby said actuating means has a high leverage on said toothed member in the first part of the stroke and whereby said leverage decreases during the stroke.

7. In a typewriting machine, the combination of a carriage, a toothed member that moves with said carriage, a back spacer pawl adapted to engage said toothed member, a lever to which said pawl is pivoted, two abutments on said pawl adapted to engage the pivot of said lever to limit the motion of said pawl relatively to said lever in both directions, a back spacer key in the keyboard of the machine, a rock shaft extending to the back of the machine and operated by said key, and a connection between said rock shaft and said lever.

8. In a typewriting machine, the combination of a carriage, a feed rack on said carriage, a toothed wheel meshing with said feed rack, a pinion that is geared to said feed rack, a shaft, a ratchet connection between said pinion and shaft whereby said shaft is turned by said pinion in one direction, a detent for preventing rotation of said shaft in the other direction, a back spacer pawl adapted to engage said toothed wheel, a lever to which said pawl is pivoted, two abutments for limiting the rotation of said pawl about its pivot, and a back spacer key for actuating said pawl.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 23d day of December A. D. 1905.

ALEXANDER T. BROWN.

Witnesses:
C. E. TOMLINSON,
GEO. M. BLOWERS.