No. 790,292. PATENTED MAY 23, 1905.

W. C. FARNUM.

TYPE WRITING MACHINE.

APPLICATION FILED JUNE 30, 1903.

3 SHEETS—SHEET 1.

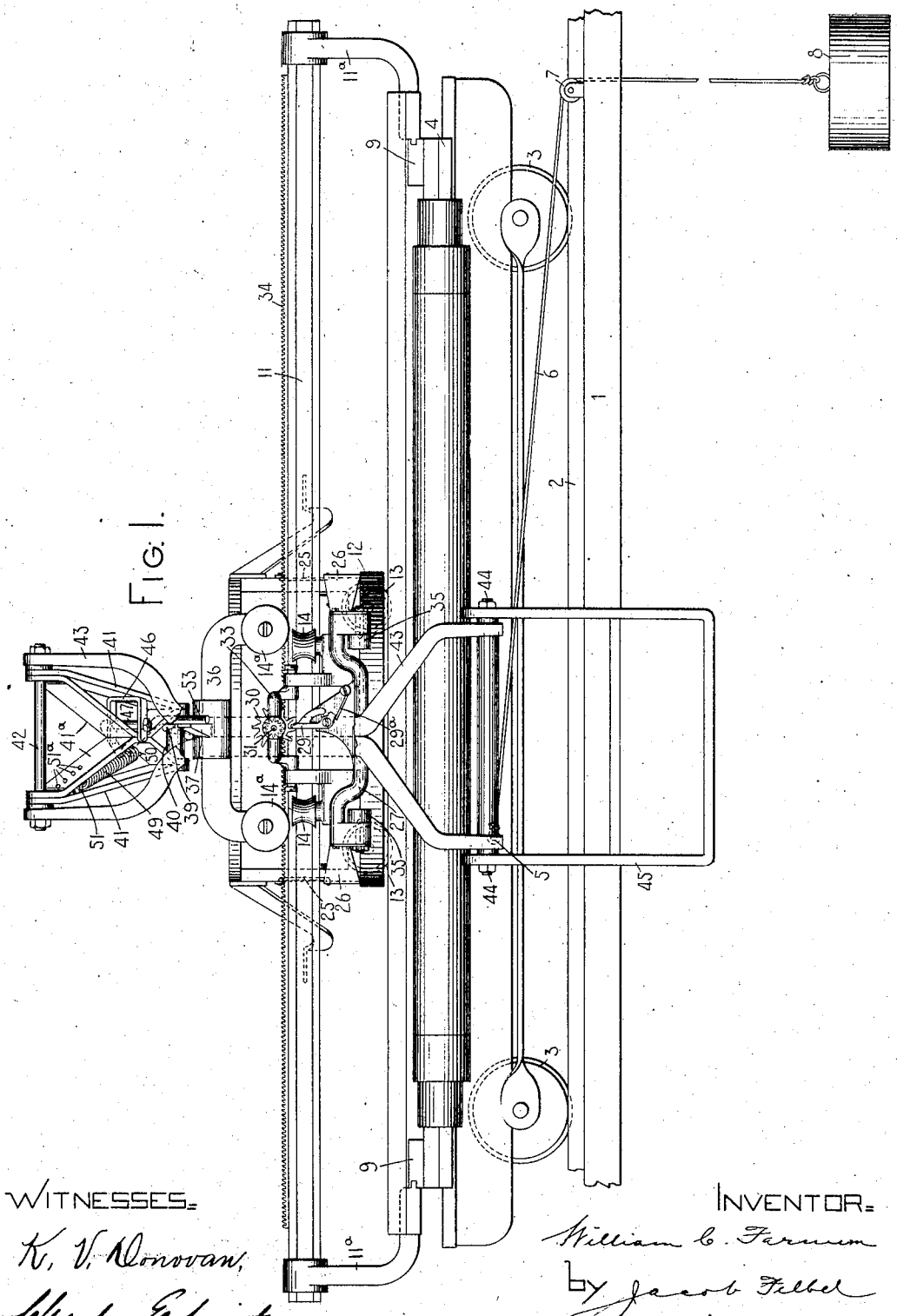

FIG. 1.

WITNESSES:

K. V. Donovan,

Wm. E. Smith

INVENTOR:

William C. Farnum

by Jacob Felbel

HIS ATTORNEY

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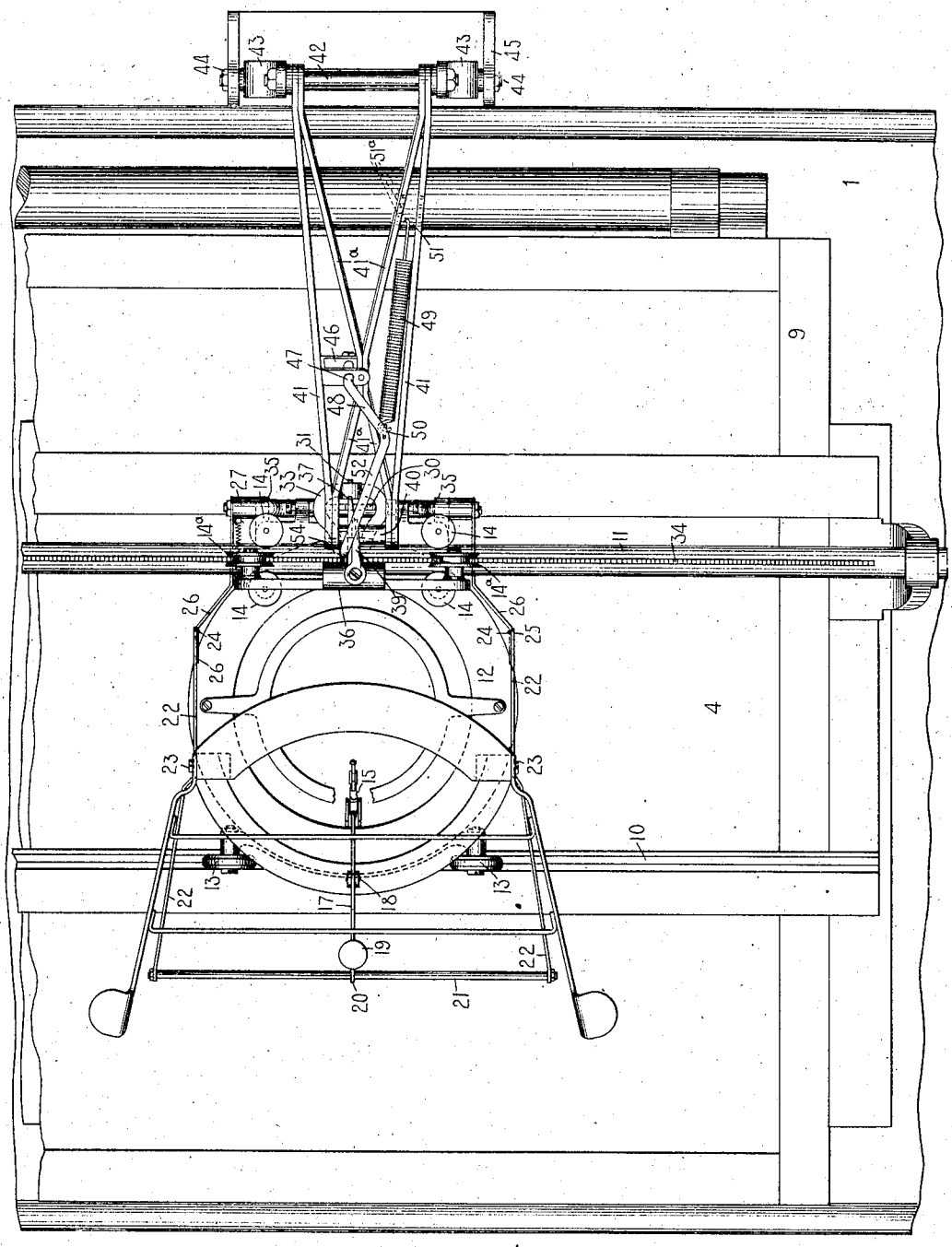

FIG. 2.

WITNESSES:

K. V. Donovan

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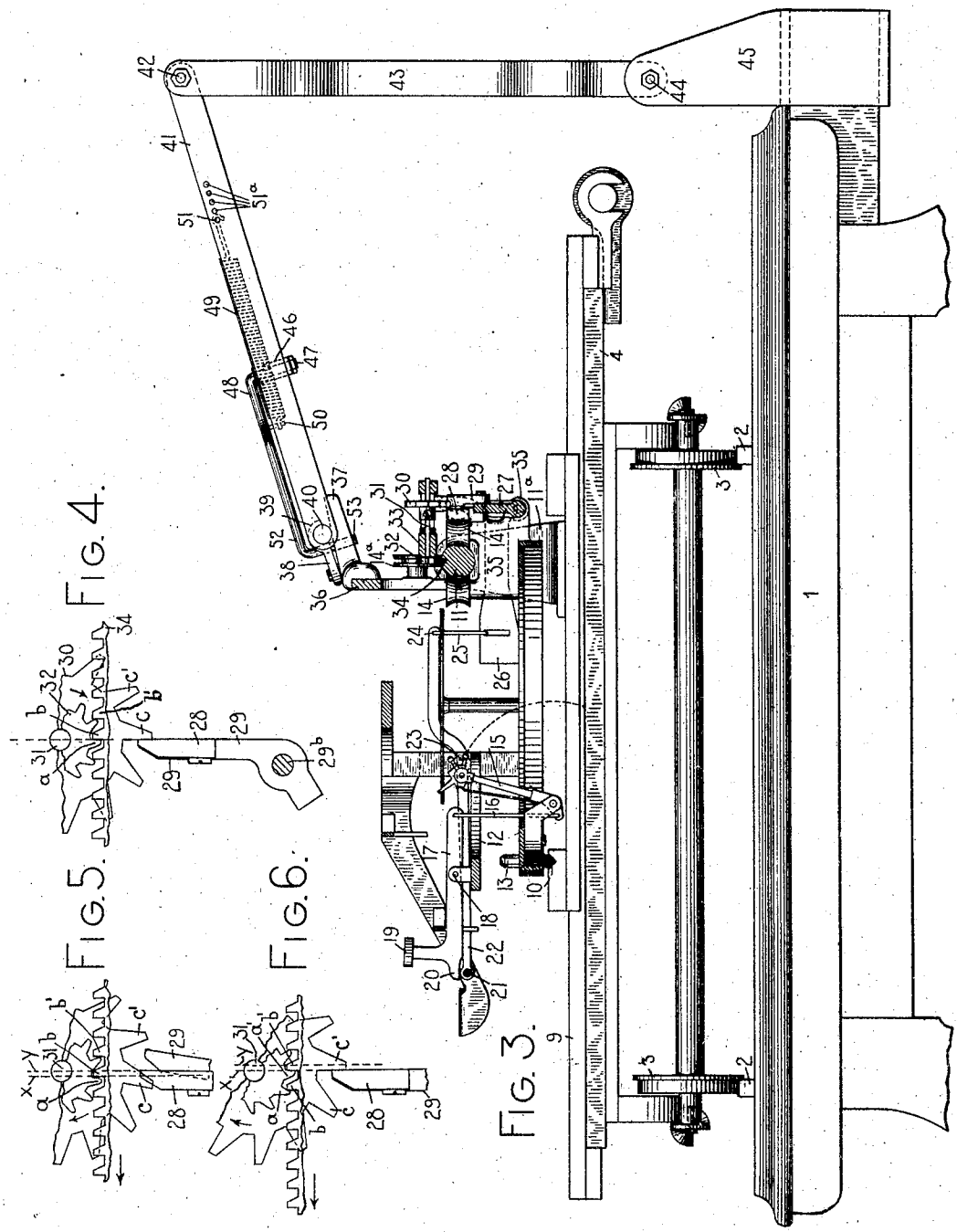

FIG. 3.

FIG. 5.

FIG. 6.

FIG. 4.

WITNESSES:

K. V. Donovan

Charles E. Smith

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UNITED STATES PATENT OFFICE.

WILLIAM C. FARNUM, OF ARLINGTON, VERMONT, ASSIGNOR TO WYCKOFF, SEAMANS & BENEDICT, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 790,292, dated May 23, 1905.

Application filed June 30, 1903. Serial No. 163,684.

To all whom it may concern:

Be it known that I, WILLIAM C. FARNUM, a citizen of the United States, and a resident of Arlington, in the county of Bennington and State of Vermont, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to letter-spacing mechanism for type-writing machines, and more particularly to flat-platen or book machines. It has been customary heretofore to effect the letter-spacing in such machines by either moving the printing instrumentalities with relation to the platen or by moving the platen with relation to the printing instrumentalities. It has been found in practice that the letter-spacing mechanism is not sufficiently rapid and effective under all conditions and under the varying speeds at which the machine is actuated. For instance, when the platen is moved relatively to the printing instrumentalities it is necessary to move the platen, which weighs, say, forty or fifty pounds, together with the book or paper which it carries, at each actuation of a printing or space key in order to effect the letter-spacing, and the spacing operations are not as rapid as the conditions sometimes require.

The object of my present invention is to overcome the difficulties heretofore encountered and to provide a simple, rapid, and efficient letter-spacing mechanism which will adapt itself to the various conditions and to the differences in speed of operation of the machine.

To the above and other ends, which will hereinafter appear, my invention consists of the features of construction, arrangements of parts, and combinations of devices to be hereinafter described, and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a rear elevation with parts broken away of one form of type-writing machine embodying my invention. Fig. 2 is a fragmentary plan view of the same. Fig. 3 is an end elevation of the machine with parts in section. Fig. 4 is an enlarged fragmentary detail diagrammatic view of portions of the escapement mechanism, the view illustrating the parts in front elevation and in normal positions. Fig. 5 is a like view of the same, showing one phase of the feed movements of the parts. Fig. 6 is a like view of the same, showing the completion of the feed movements under one phase or condition of operation of a letter-spacing mechanism.

I have shown my invention applied to an Elliot & Hatch machine, though it should be understood that the invention may be applied to other characters of machines and that from the broad aspect of the invention it may be employed in other than flat-platen machines.

The supporting-table 1 is provided with tracks 2, upon which the traverse rollers or wheels 3 are supported. These rollers are carried by brackets or supports, which are connected to a flat platen 4. This platen is connected at 5 (see Fig. 1) to a band 6, that passes over a guide-roller 7 and through an opening in the table 1. The lower end of the band 6 carries a weight 8, which tends to move the platen from right to left on the tracks 2. The platen 4 is provided with tracks 9, that extend fore and aft of the machine and support a frame comprising a carriage-track 10 and a guide-rod 11, supported at its ends in upwardly-extending bracket-arms 11^a. It will be understood that the tracks 9 are intended to afford a movement of the carriage from front to rear of the machine in order to effect a line-spacing by the usual or any preferred line-spacing mechanism. (Not shown.) The carriage 12 is provided at the front portion thereof with traction-rollers 13, which coöperate with the track 10 to support the forward portion of the carriage, whereas the rear of the carriage is supported on and guided by a guide or traverse rod 11 through the rollers 14 and 14^a, which embrace the rod on opposite sides and enable the carriage to be turned back thereon. The carriage 12 supports a series of type-bars 15, which are connected by links 16 to key-levers 17, fulcrumed at 18 to the

carriage, each key-lever being provided with the usual finger-key 19 and with a projection 20, adapted to bear upon a universal bar 21. The side arms 22, supporting the universal bar, are fulcrumed at 23 to fixed portions of the carriage and are connected at their rear ends, as indicated at 24, to links 25, which in turn are connected to arms 26, that project forwardly from a dog-rocker 27, that carries a fixed dog 28 and a loose dog 29. These dogs coöperate with an escapement-wheel 30, which is operatively connected to a shaft 31, that carries a feed-pinion 32 at its forward end and is supported in a bearing 33, which is pivotally connected to carriage 12 in order to afford a release of the platen when desired. The feed-pinion meshes with the feed-rack 34, that extends longitudinally of and is carried by the traverse-rod 11. The bearing 35 for the dog-rocker and different portions of the escapement devices are carried by the carriage 12, so that the movement of the carriage effects a bodily movement of the escapement devices with it. A bracket 36 projects from the carriage and carries a rearwardly-projecting arm or stop 37, to which a horizontally-pivoted hook or engaging piece 38 is connected. The nose 39 of this engaging piece extends over and partly surrounds a rod 40, that extends between and connects the side arms 41 of a bracket-frame, which is secured against movement in the direction of the travel of the platen, though it is pivoted at 42 to an upright frame 43, the lower end of the frame 43 being pivoted at 44 to a bracket 45, which is secured to the table 1 of the machine. By this construction the carriage is allowed only a limited movement in the direction of the travel of the platen and is free to be swung back on the traverse-rod 11.

The parts thus far described are similar to those employed in the Elliot & Hatch machine, except as to the specific form of connection between the carriage and the frame comprising the side arms 41, by which a movement of the carriage in the direction of the travel of the platen is afforded, and further detailed description of the construction is unnecessary. Projecting inwardly from one of the side arms 41 is a U-shaped bracket 46, which is adapted to provide bearings for a rock-shaft 47, that is bent laterally and prolonged at 48 to form a crank-arm to which one end of a contractile spring 49 is connected at 50, the other end of this spring being connected to a pin 51, adapted to be seated in any of the openings 51^a in one of the arms 41 and in one of the braces 41^a. The crank-arm 48 is extended at 52 and is bent downwardly at 53, so as to extend into the path of the arm or stop 37, and which is likewise adapted to bear against the frame comprising the members 41 and 41^a at the point 54, for purposes as will hereinafter more clearly appear. It will be understood that the length of the bar 40 is such as to afford an independent movement of the carriage with relation to the frame 41 41^a for a distance or for a distance which corresponds to, say, eight letter-spaces or between the points where the braces 41^a connect with the bar 40. It will likewise be seen that the tension of the spring 49 tends to move the carriage toward the right, the spring exerting its pressure through the depending finger 53 on the left-hand side of the projection 37. The tension of the spring 49 is, however, overcome by the power applied by the weight 8 to the platen, and when the parts are at rest or in their normal positions the power of the weight 8 will through the feed-rack 34 move the carriage against the tension of the spring 49 until the finger 53 is arrested against the abutment 54, with which it coöperates.

The construction and arrangement of the parts of the letter-spacing mechanism is such that the letter-spacing movements will be effected in different manners as the conditions are varied. In some instances a depression of a finger-key 19 will cause a printing movement of the type-bar and through the actuation of the universal bar 21 will produce a rearwardly-swinging movement of the dog-rocker 27, so as to move the loose dog 29 out of engagement with the escapement-wheel and swing the fixed dog 28 into the path of the same tooth thereof, thus enabling the loose dog to receive its advance movement by the spring 29^a. When the finger-key is released, the fixed dog will pass out of engagement with the escapement-wheel and the next advancing tooth thereof will engage the loose dog and the power applied to the platen will through the feed-rack 34 and pinion 32 cause the escapement-wheel to be rotated the distance between two teeth, thus restoring the loose dog to its normal position against the tension of its spring 29^a, and a letter-spacing movement of the platen will be effected, while the printing instrumentalities remain fixed against spacing movement.

Under other conditions the depression of a finger-key will bring about the same movements of the feed-dogs; but the tension of the spring 49 will become effective on the release of the finger-key to produce a slight movement of the carriage toward the right when the platen is being moved toward the left, so that a partial letter-space movement is effected by the movement of the carriage to the right and a partial letter-space movement is effected by the movement of the platen to the left, the relative movements between the platen and carriage in opposite directions making a complete letter-space movement.

The conditions mentioned above relate to the speed of operation of the machine, the amount of tension or power applied to the platen to move it, and the weight of the platen with the book or paper which it carries.

Thus, for instance, if the speed or operation of the machine is slow and the weight of the platen and the paper or book which it carries are decreased to the minimum it may be that the power applied to the platen will be effective to produce a sufficiently rapid movement thereof so that the platen alone will be moved to produce the letter-spacing and the carriage may at all times be maintained to the left with the depending finger 53 against its cooperating abutment 54. This is due to the fact that the speed of the platen is such that a full letter-space movement is acquired before the spring 49 has an opportunity to effect a movement of the carriage toward the right. If, on the other hand, the movement of the platen is a sluggish one and does not keep up with the speed of operation of the machine, then an opportunity will be afforded at each upstroke of a finger-key for the spring 49 to move the carriage a slight distance to the right with relation to the platen, and a part of the letter-space movement will be effected by a movement of the platen toward the left. In each instance the machine automatically regulates itself to the various conditions mentioned and accommodates itself to all speeds of operation and all conditions, such as a sluggish or to a comparatively rapid movement of the platen, and an efficient letter-spacing mechanism is provided, which accommodates itself automatically to all operations and to different conditions that may exist.

In Figs. 4, 5, and 6 I have illustrated diagrammatically the changes in relation of the parts during a complete letter-spacing movement, when the carriage and platen move in opposite directions to effect the letter-spacing. From an examination of Fig. 4, which represents the normal positions of the parts, it will be seen that the tooth a of the feed-pinion engages the tooth b of the feed-rack 34. At this time the loose dog 29 engages the tooth c of the escapement-wheel 30 and prevents it from turning. A depression of a finger-key or the space-key (not shown) effects a movement of the dogs toward the rear of the machine, releases the loose dog 29, and brings the fixed dog 28 into engagement with this same tooth c of the escapement-wheel without allowing it to advance, and the loose dog 29 will be moved to the advanced position (shown in Fig. 5) ready on the forward movement of the dog-rocker to engage the next advance tooth c' of the escapement-wheel. When pressure on the finger-key is released and the upward movement thereof takes place, the dog-rocker will swing forward, thereby disengaging the fixed dog from the tooth c of the escapement-wheel, and at the instant of disengagement (illustrated in Fig. 5) the power of the weight 8 applied to the platen and feed-rack 34 is released from its restraining influence on the spring 49 and said spring exerts its pressure on the carriage to move it to the right, thereby shifting the entire escapement mechanism with it to the right and relatively to the feed-rack. I have indicated this bodily movement of the carriage relatively to the feed and platen for a fraction of a letter-space by the lines x and y in Fig. 5. Thus suppose the line x to represent a fixed line which is coincident with the center of the shaft 31 of the escapement-wheel and pinion when the parts are in the normal positions, as indicated in Fig. 4. Then during the upstroke of the key the carriage will be shifted to the right by its spring 49, so that the center of the shaft 31 will move from the position indicated by the line x in Fig. 5 to the line y. It will be understood that at the same time the feed-rack 34 is being moved to the left with the platen by the power of the weight 8. The movements of the carriage to the right and of the platen to the left cannot exceed a letter-space distance at each operation of a finger-key or space-key, by reason of the meshing engagement between the pinion 32 and rack 34 and the limited extent of the rotation of the escapement-wheel from one tooth to another. It will of course be understood that when the escapement-wheel is released, as shown in Fig. 5, there is a turning of the wheel as well as a bodily movement thereof from the line x to the line y, so that the next tooth a' on the pinion is in the position formerly occupied by the tooth a, and it engages the next succeeding tooth b' on the feed-rack 34, and a letter-space movement is thus effected during the elevation of the key or during the time the tooth c' of the escapement-wheel is moving from the position shown in Fig. 5 back to the normal position and can move no farther around its pivotal center 29^b in this direction and no further relative movement between the escapement-wheel 30, pinion 32, and rack 34 (and the platen to which it is connected) can take place. The full power of the weight 8 will then be applied through the rack 34, escapement devices, arm 37, and finger 53 to overcome the tension of the spring 49 to move the carriage and platen together until the arm 53 contacts with its abutment 54 and further movement of the parts will be arrested and the center of the shaft 31 will have have been moved from the line y back to the line x, where it originally stood. As above pointed out, in this movement of the escapement devices and carriage back to the normal position, and which is indicated by a movement of the center of the shaft 31 from the line y back to the line x, there is no change in the relation between the platen and carriage, the parts moving together, so that this return movement of the carriage against the tension of the spring 49 does not affect the letter-spacing.

While I have referred above to a one-half letter-space movement of the carriage in one

direction and a one-half letter-space movement of the platen in an opposite direction, it should be understood that this is taken merely as an example and that the extents of movement of the parts in opposite directions will vary under different conditions and that in some cases the platen alone will receive a letter-spacing movement and the carriage will remain fixed with the finger 53 against the abutment 54 and that in still other cases the carriage may receive one or more letter-spacing movements to the right and with relation to the platen, which is moving slowly toward the left, before the finger 53 has an opportunity to strike the abutment 54. This, however, in no manner affects the letter-spacing, since only the movement of the carriage to the right and not the left changes the relation between the platen and carriage. Should the carriage be moved several letter-space distances to the right by reason of the very slow movement of the heavy platen to the left, the carriage and platen will move together to the left at the first pause. It will thus be seen that if for any reason the movement of the platen is so slow as to be almost arrested a rapid letter-spacing can still be effected, since the carriage in that event would receive almost the entire letter-spacing movements, and the weight 8 is almost constantly applied to the carriage during the operation of the machine and tends almost constantly to restore it to the left against the tension of the spring 49 and the weight becomes effective for this purpose at the slightest cessation of work upon the machine.

In practice I have found that by making the bar 40 sufficiently long and the distance between the arms 41 and braces 41^a such that the carriage can receive eight letter movements relative thereto in the direction of the travel of the platen ample travel of the carriage is afforded, and, indeed, it is seldom that there is any necessity for the carriage moving more than two or three letter-space distances.

Various changes may be made without departing from the spirit of my invention.

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

1. In a type-writing machine, the combination of a platen, printing instrumentalities, and means for affording letter-spacing movements of either the platen or the printing instrumentalities.

2. In a type-writing machine, the combination of a platen, printing instrumentalities, and means adapted to afford letter-spacing movements of either the platen or printing instrumentalities, or of both the platen and printing instrumentalities.

3. In a type-writing machine, the combination of a platen, printing instrumentalities, means for affording a feed movement of the platen from right to left, and means for automatically affording a limited movement of the printing instrumentalities from left to right and with relation to the platen.

4. In a type-writing machine, the combination of a platen, printing instrumentalities, means for affording a feed movement of the platen from right to left, and means for automatically affording a limited movement of the printing instrumentalities from left to right with relation to the platen and for automatically moving the printing instrumentalities with the platen for a limited distance from right to left.

5. In a type-writing machine, the combination of a power-driven platen, printing instrumentalities, means for affording letter-spacing movements of the platen, and spring-pressed means for moving the printing instrumentalities for a limited distance in a direction opposite to the direction of feed of the carriage.

6. In a type-writing machine, the combination of a power-driven platen, printing instrumentalities, means for affording letter-spacing movements of the platen, and spring-pressed means for moving the printing instrumentalities for a limited distance in a direction opposite to the direction of feed of the carriage, which spring-pressed means are normally overcome by the power applied to drive the platen.

7. In a type-writing machine, the combination of a power-driven platen, printing instrumentalities that are adapted to move a limited distance in the direction of the travel of the platen, a spring that tends to move the printing instrumentalities in a direction opposite to the feed movement of the platen, and escapement mechanism between said platen and printing instrumentalities.

8. In a type-writing machine, the combination of a power-driven flat platen, printing instrumentalities, a carriage for said printing instrumentalities, said carriage being adapted to move a limited distance in the direction of the travel of the platen, a spring that tends to move said carriage in a direction opposite to the feed movement of the platen and which when the parts are at rest is overcome by the power applied to the platen, and escapement mechanism between said platen and carriage.

9. In a type-writing machine, the combination of a platen, printing instrumentalities, and letter-spacing mechanism which first affords a relative movement of the printing instrumentalities and platen in opposite directions and then affords a movement of the platen and printing instrumentalities together.

10. In a type-writing machine, the combination of a power-driven flat platen, a carriage, printing instrumentalities that are carried by said carriage, a stop connected to said carriage and affording a movement of the carriage in the direction of the travel of the platen for a limited distance, a spring which tends to move said carriage in a direction opposite to the feed movement of the platen and which is

overcome by the power applied to the platen when the parts are at rest, and escapement devices between the platen and the carriage.

11. In a type-writing machine, the combination of a flat power-driven platen, printing instrumentalities, a carriage for said printing instrumentalities and which has a limited extent of movement in the direction of the travel of the platen, a feed-rack carried by the platen, and coöperating feeding devices carried by carriage.

12. In a type-writing machine, the combination of a flat power-driven platen, printing instrumentalities, a carriage for said printing instrumentalities and which has a limited extent of movement in the direction of the travel of the platen, spring-pressed means which tend to move the carriage in a direction opposite the feed movement of the platen and which is normally overcome by the power applied to move the platen, a feed-rack carried by the platen, and coöperating feeding devices carried by carriage, whereby the letter-spacing may be effected solely by the movement of the platen or by the movements of the platen and carriage in opposite directions.

13. In a type-writing machine, the combination of a power-actuated platen, printing instrumentalities, power-actuated means which tends to move the printing instrumentalities in a direction opposite the feed movement of the platen, and escapement devices between the platen and printing instrumentalities and which are adapted to afford a relative letter-spacing movement between the platen and printing instrumentalities.

14. In a type-writing machine, the combination of a power-driven flat platen, printing instrumentalities, a carriage therefor, means for affording a limited movement of the carriage in the direction of the travel of the platen, spring-pressed means which tend to move the carriage in a direction opposite the feed movement of the platen, the power of said spring-pressed means being less than the power applied to propel the platen, a feed-rack carried by the platen, a feed-pinion meshing with said feed-rack, an escapement-wheel operatively connected to the pinion, and feed-dogs coöperating with said escapement-wheel, the feed-dogs, escapement-wheel and feed-pinion being carried by said carriage.

Signed at Arlington, in the county of Bennington and State of Vermont, this 27th day of June, A. D. 1903.

WILLIAM C. FARNUM.

Witnesses:
O. E. ADAMS,
JAS. A. CULLINAN.