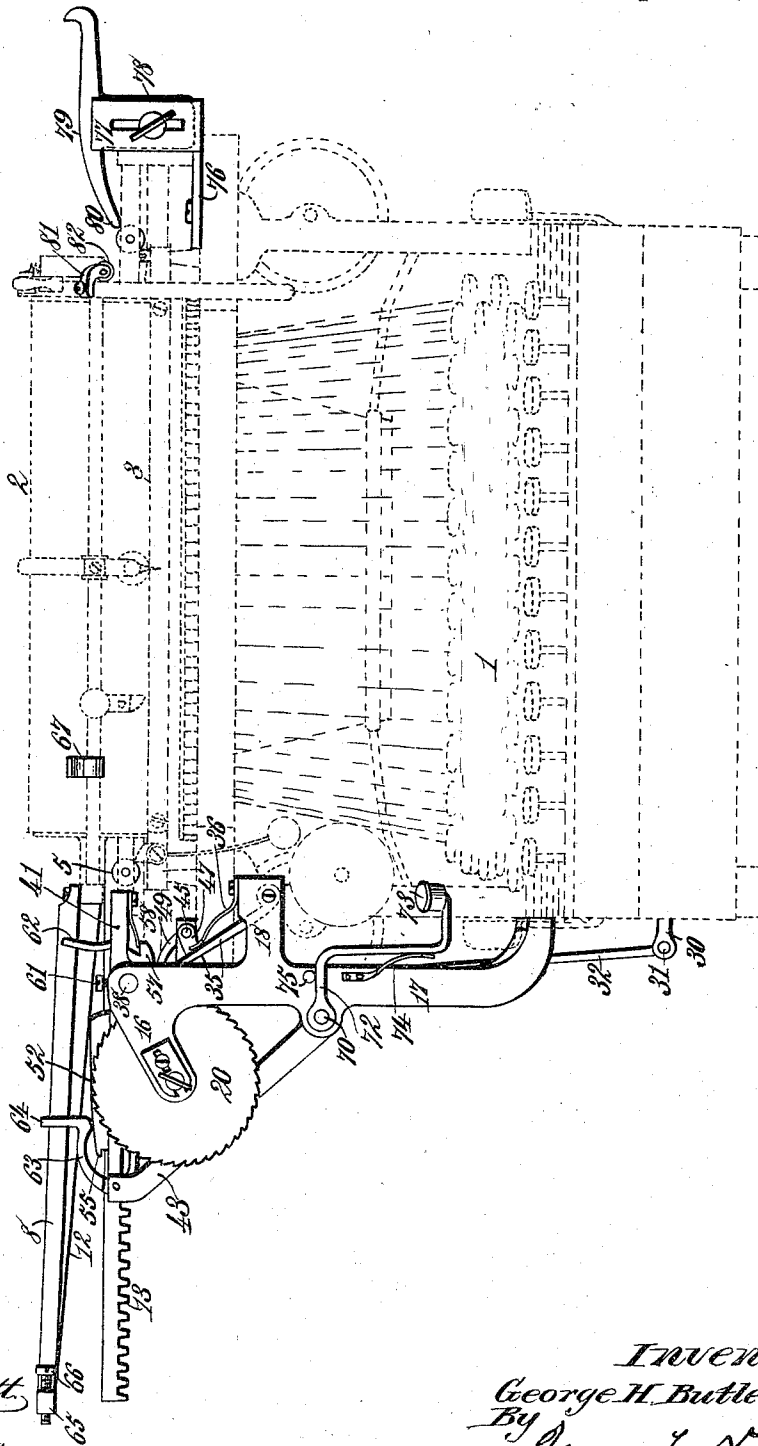


G. H. BUTLER.
TYPE WRITING MACHINE.

No. 537,561.

Patented Apr. 16, 1895.

Fig. 1.



Witnesses.
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E. W. Rea

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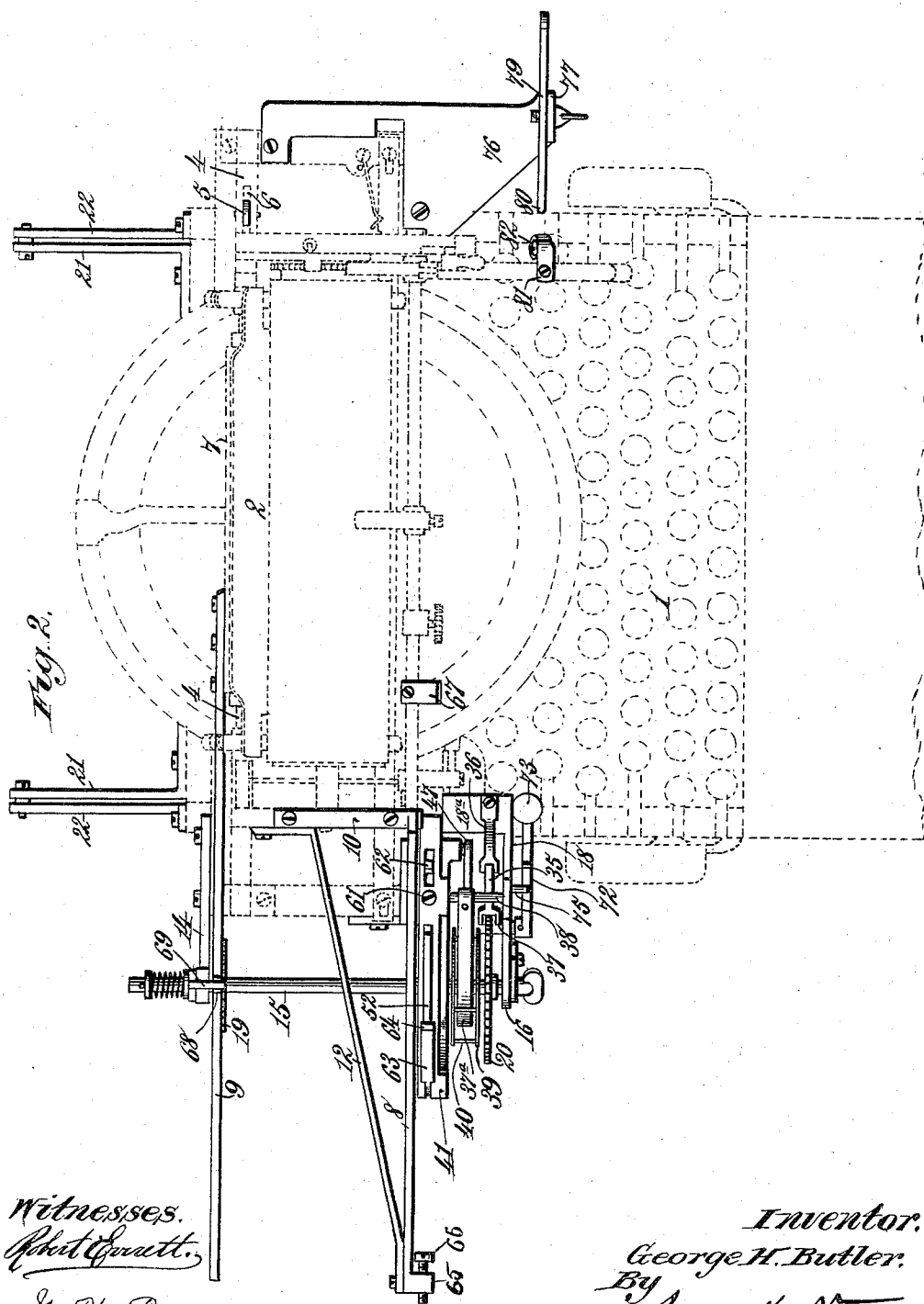
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4 Sheets—Sheet 2.

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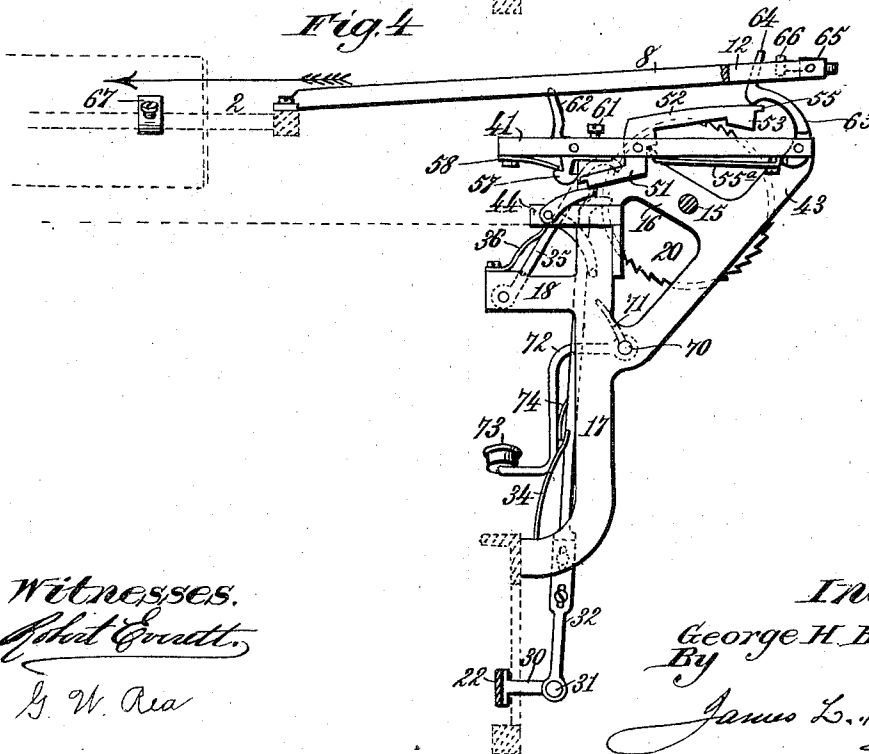
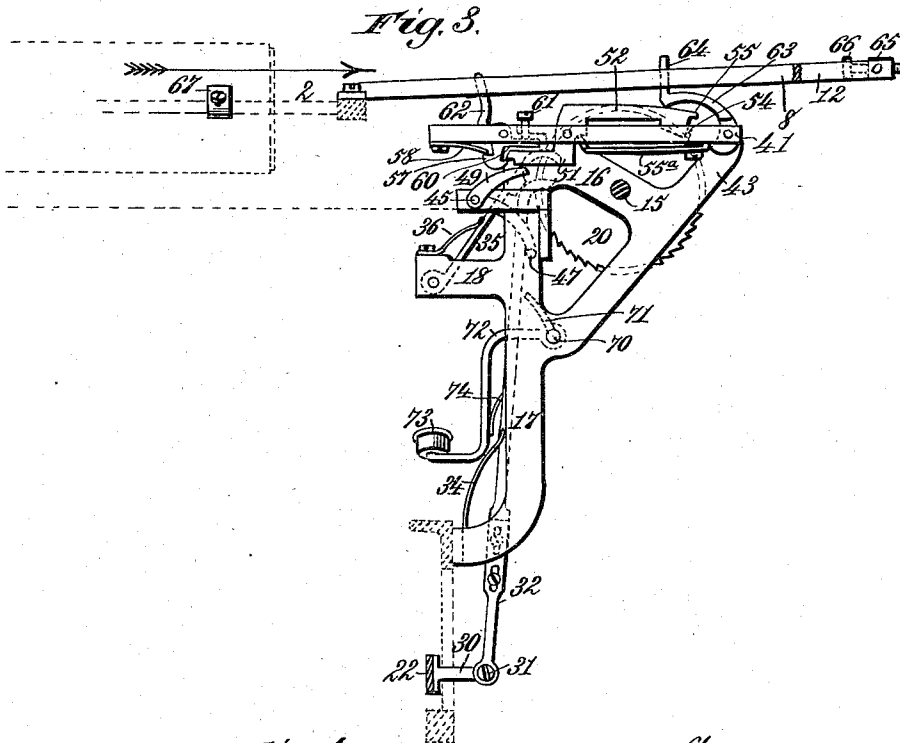
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G. H. BUTLER.
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No. 537,561.

Patented Apr. 16, 1895.



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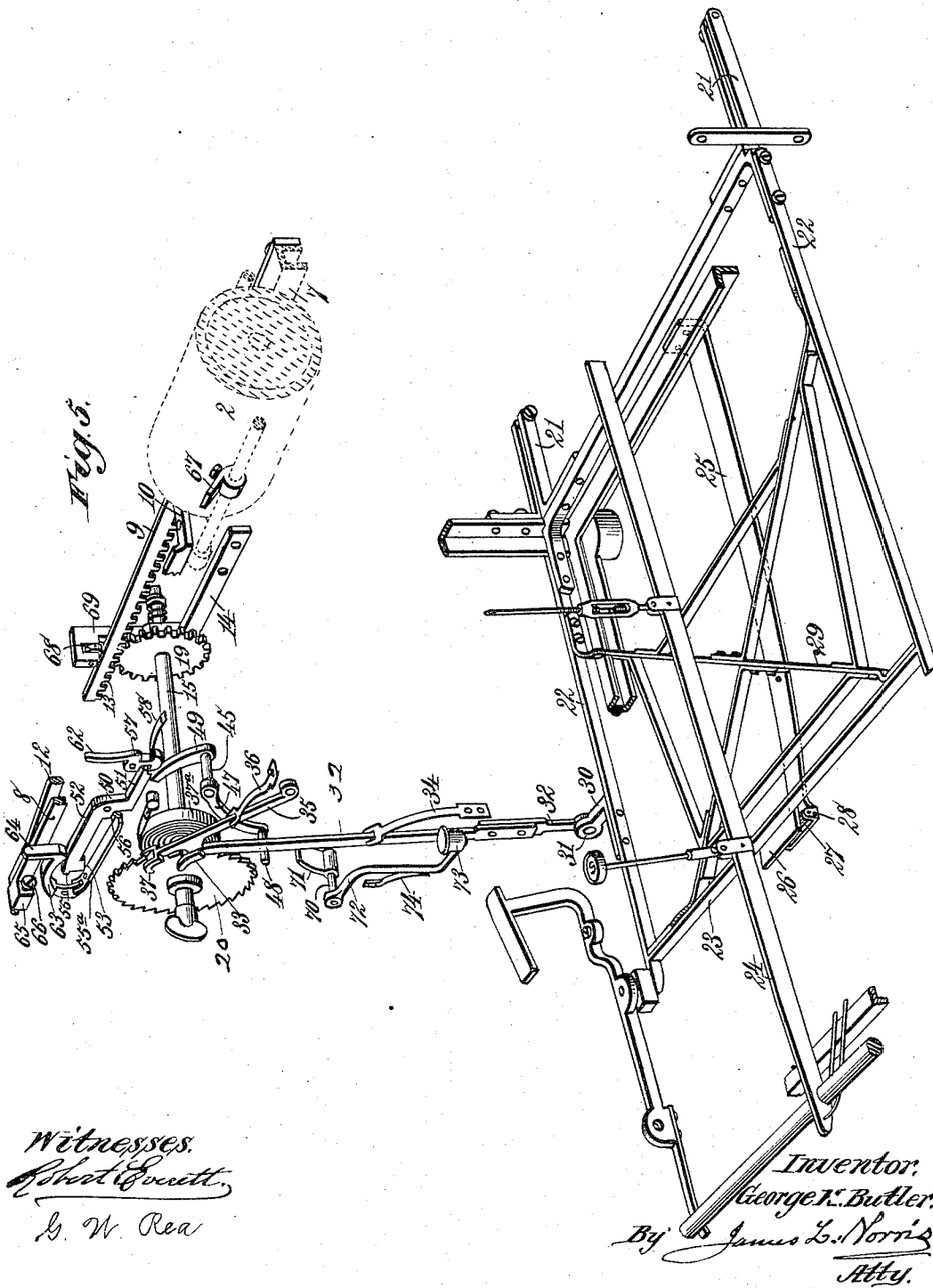
(No Model.)

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G. H. BUTLER.
TYPE WRITING MACHINE.

No. 537,561.

Patented Apr. 16, 1895.



Witnesses:
Robert G. Smith
G. W. Rea

Inventor:
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UNITED STATES PATENT OFFICE.

GEORGE H. BUTLER, OF CORSICANA, TEXAS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 537,561, dated April 16, 1895.

Application filed April 6, 1894. Serial No. 506,564. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BUTLER, a citizen of the United States, residing at Corsicana, in the county of Navarro and State of Texas, have invented new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to type-writing mechanism of that class in which the paper carriage has an intermittent, rectilinear movement, for the letter-space, while the paper-cylinder mounted on said carriage receives a rotary feed, after the completion of each line, to form the line-space.

The Caligraph, Remington, and other well known machines, are illustrations of the class referred to.

It is the purpose of my invention to provide novel means for imparting the letter-space movement to the paper-carriage, and to dispense with the spacing-rack usually employed, the object of this substitution being to enable the spacing mechanism provided by my invention to co-operate with, and form part of, a novel arrangement of parts by which the paper-carriage shall, at the termination of each line, be automatically released and returned to the proper point for the commencement of the succeeding line, and to effect the automatic release of the paper-carriage by means of devices which are operated by the last letter-space movement of said carriage, which is made immediately after the last type-impression in each line, or by the stroke of the space-key made at the same point, in contradistinction to effecting such release by the operation of a special, or additional key-lever, and to combine therewith means whereby the automatic return of the paper-carriage, shall be preceded by the automatic release of the spacing-devices, which are thrown out of action to permit the return-movement, and shall be followed by an automatic re-engagement of said devices, whereby the letter-space feed shall be again brought into action.

The invention consists, to these ends, in the novel features of construction, and in the parts and combinations of parts hereinafter fully described and then particularly pointed out and defined in the claims.

To enable others skilled in the art to fully understand and to make, construct and use

my said invention, I will now proceed to describe the same in detail, reference being had, for such purpose, to the accompanying drawings, in which—

Figure 1 is a front elevation of a type-writing mechanism with which my invention is combined. Fig. 2 is a plan-view of the parts shown in Fig. 1, the known elements of the mechanism being shown in dotted lines and the parts constituting my invention being shown in full lines in both figures. Fig. 3 is a sectional elevation of the left hand end of the machine, the point of view being in rear and the section being taken vertically in rear of the paper cylinder, the direction of movement of the latter being shown by the arrow. Fig. 4 is a similar view of the same parts, showing the cylinder in process of returning and illustrating the position of the several parts after the automatic release of the paper carriage. Fig. 5 is a perspective view showing the relative arrangement of the parts, the frame work of the machine being entirely omitted, as well as the type-operating devices, with the exception of a single key and key lever.

The reference-numeral 1, in said drawings, indicates the key-board of a Caligraph type-writing machine, though my invention is equally applicable to the Remington machine, as well as to any other in which the paper-carriage and cylinder have rectilinear and rotary movement, respectively.

The numeral 2 indicates the paper-carriage, which is, in itself, of the usual construction, and movable upon the cylinder-shift-rail 3, and the carriage-way, or hinged-rod 4. The front bar of the carriage is supported upon the cylinder-shift rail 3 by a roll, in the usual manner and to diminish the friction as far as possible I prefer to journal small rolls 5 in vertical slots 6, formed at suitable intervals in the hinge-rod 4, the space separating said rolls being such that at least two of said rolls are always in engagement with the eye-bar 7, which connects the rear bar of the carriage with the hinge-rod 4.

The line-space lever and pawl, the pointer, bell-ringer, cylinder, and other essential parts, do not materially differ, in themselves, from the corresponding parts used in Caligraph machines, nor are the other parts present

changed save that the bell is placed somewhat lower than usual, to make way for other parts.

As the organization of my invention involves the omission of the spacing rack heretofore used for giving intermittent letter-space movement to the carriage, and the substitution therefor of other mechanism which will accomplish the same result, and also form part of the automatic releasing and returning mechanism, a clear understanding of the invention will be aided by following, as nearly as possible, the order of operation of the several parts. As the construction and operation of the machine are well known, aside from the parts constituting my invention, no further description will be given of the type-writing mechanism, proper, except so far as their connection with novel parts may require it.

Upon the paper-carriage, and in substantially the same longitudinal lines with the front and rear bars thereof, are mounted bars 8 and 9, the former having an angular piece 10, which is laid upon and bolted, or screwed, to the end-bar of the carriage. The end of this bar, which projects toward the left, is stiffened by a brace 12, which is inclined at an angle to the bar and secured at its end to the end of the carriage. The other bar 9, which is lapped upon and bolted to the eye-bar on the rear of the carriage, is provided upon its lower edge with a rack of teeth 13, having a length somewhat in excess of the maximum line-length, or greatest travel of the carriage.

Upon the rear of the machine-frame, at its top, is a laterally projecting bracket 14, which forms the rear support for a shaft 15, its forward portion being supported in brackets 16, mounted on, or forming part of, two parallel uprights 17, which rise at the left side of the machine and are suitably braced to the main frame by parallel arms 18. Upon said shaft 15 is fixed a spur-gear 19, which meshes with the rack of teeth 13 on the bar 9, and by its revolution imparts movement to the paper-carriage in either direction. Upon the same shaft 15, between the two parallel brackets 16, is mounted a ratchet 20, having its teeth cut at intervals suited to the space-feed of the carriage. The intermittent fractional revolution of this ratchet, by which the spacing is effected, is produced in the following manner:

Mounted upon the rear of the main frame of the machine, at each side, are rearwardly projecting brackets 21, upon the ends of which are fulcrumed levers 22, which extend in substantial parallelism with the sides, to a point in front of the bank of keys, or between the keys and the fulcrum of the key-levers, where said levers 22 are rigidly united to the ends of the universal bar 23, which is sustained in proper relations to the series of key-levers 24 by means of a spring plate 25, of suitable strength rigidly secured by one end to the rear of the machine frame. The free end of this spring has bearing upon a plate 26, rigid upon the univer-

sal bar, or forming part of the latter, and to diminish friction a roll 27 is journaled in suitable lugs 28, upon the end of the spring, in such manner that it shall have a rolling contact with the lower face of the plate 26. In order to give such rigidity, or solidity, to all parts of the frame composed of the levers 22 and universal bar 23, it is provided with a system of braces 29, having some resemblance in arrangement to the trussing of a span and arranged between the levers 22 and rigidly secured to them and to the universal bar.

Upon the lever 22 lying at the left hand of the operator, is mounted, or formed, a bracket arm 30, which projects laterally through an opening in the frame of the machine and is provided upon its outer end with a pivot-bearing 31, which may consist of a screw tapped into the end of the bracket. Upon said bearing is pivotally mounted a bar 32, which extends to a point in the horizontal plane of the shaft 15, or thereabout, its extremity being provided with a pawl 33, which is adapted to engage the teeth of the ratchet 20, with which it is normally engaged by the pressure of a spring 34, mounted upon the side-frame of the machine.

The rearward projection of the brackets 21, the position of the pivotal bearing 31 and of the universal bar, are all so arranged, relatively to each other, that each stroke of a key, or spacing bar, will depress the side-levers 22 far enough to insure the engagement of the pawl 33 with a tooth next below that which it previously engaged, while the rise of the key-lever and universal bar will advance the ratchet 20 a distance substantially equal to the interval of separation between its teeth. This advance of the ratchet imparts movement to the shaft 15, and through the spur-gear 19 and rack 13 intermittent movement is thereby given to the paper-carriage. This movement takes place as the key-lever, or spacing bar, rises, after it is released by the operator, and even though it should be slightly in excess, so that the ratchet is advanced a little more than the exact interval between its teeth, the carriage will instantly assume its correct position, in a manner presently to be explained. When the parts are accurately constructed, however, and simple means provided for such compensating adjustments as may be required by wear, an exact spacing will be obtained without difficulty. Backlash, or retrograde movement of the ratchet 20 is prevented by a holding-pawl 35, pivotally mounted upon a bracket 18^a, which also forms a support for one of the parallel arms 18. The holding pawl is held in engagement by a spring 36, and its nose is provided with lateral fingers 37, which lie on each side of the ratchet and maintain it in proper relations to the teeth with which it engages. The nose of the pawl 33 has a similar provision, for the same purpose. The pawl last named lies below the holding-pawl 35 and in such position, rela-

tively to the latter, that when the bar 32 is drawn back to disengage its pawl from the ratchet, such movement will also draw the holding pawl out of engagement and leave the ratchet free to revolve.

Upon the shaft 15, between the parallel brackets 16, is a strong spiral spring 37^a, coiled upon the shaft and having one end secured to it. The other end of said spring is fastened to a rigid bar 38, mounted in the upper ends of the uprights 17. The spring is inclosed between two disks 39, loose upon the shaft and connected together by short tie-bolts 40, leaving room for the free action of the spring but supporting the coil against lateral displacement. The spring is coiled upon the shaft and placed under the required tension by the revolution produced by the action of the pawl 33 on the ratchet 20.

Beneath, and nearly in the vertical plane of the bar 8, projecting from the end of the paper-carriage, is a horizontal bar 41, supported at one end by an inclined brace 43, connected to one of the uprights 17. On a projection 44, on the rear upright 17 is a bearing for a rock-shaft 45. Upon said rock-shaft is rigidly mounted an arm 47, provided, upon its extremity, with a finger 48, which normally lies immediately in front of, or against, the outer edge of the bar 32. On the end of the rock-shaft 45, lying beneath the bar 41, is an arm 49, which is curved, or inclined, upward and toward the left of the machine, its end lying a little below the lower face of the bar 41. In a vertical slot in the latter is pivoted a short, flat bar 50, which forms the connecting-piece between two arms 51 and 52, the former lying beneath the bar 41, and extending toward the paper-carriage until it passes over the end of the arm 49, which lies normally close to, or in contact with, its lower edge. The arm 52 lies upon the upper side of the bar 41 and extends toward the left hand, its end being provided with a guide-lug 53, which lies in a recess 54, in the bar 41, and a toe 55 which extends beyond said recess and overhangs the solid face of the bar, thereby serving as a stop, or detent, to the arm, when pushed downward.

Upon the lower face of the bar 41 is mounted a strong bar-spring 55^a, the free end of which presses upward against a shoulder 56, upon the short connecting plate 50, thereby causing the arm 51 to exert a downward pressure upon the arm 49 of sufficient force to rock the shaft 45 and disengage both the pawls 33 and 35 from the ratchet 20. In a vertical recess in the bar 41, a little to the right of the end of the arm 51, is pivoted a latch 57, which hangs below the bar and is pressed by a light spring 58 toward the end of the arm 51, which is provided with a shoulder, adapted to engage the latch whenever the arm 51 is lifted high enough to allow the latch to snap under said shoulder. A finger 60, rigid on the latch, projects just beneath the bar 41, through

which latter is tapped a screw, its lower end serving as an adjustable stop for the latch. From the latter a trigger-arm 62, rises above the bar 41, for a purpose presently to be explained.

At the extreme left hand of the horizontal bar 41 is pivoted a bar 63, which is curved slightly upward, in the longitudinal line of the bar, until its free end overhangs the end of the arm 52. From this free end rises a vertical finger 64, which lies in the line of movement of an offset lug 65 formed, or mounted, on the end of the arm 8, which projects from the end of the paper-carriage. This offset-lug projects toward the front and is provided with a set-screw 66, tapped through it in a direction parallel with the bar 8. Upon the front rail of the paper-carriage is mounted, by means of a set-screw, an adjustable tripping-finger 67, which projects from the rail in such a direction that its line of movement intersects the trigger-finger 62, upon the latch 57.

The operation of the parts thus far described is as follows: As the key levers and spacing-levers are operated, the universal bar is depressed by each, individual operation, thereby causing the levers 22 to move downward, and communicating a similar movement to the bar 32 and its pawl 33. The rise of each key-lever, or space-lever, is accompanied by a like movement of the said pawl, by which the ratchet 20 is advanced, the spur-gear 19 receives a fractional revolution and the paper-carriage is fed a single space by the engagement of the spur-gear with the rack 13, the teeth of which are held in engagement with the gear by a friction-roll 68, riding on the arm 9 and journaled in an overhanging bracket 69, which is supported on the bracket 14. At each advance of the ratchet 20 the spring 37 is coiled in a corresponding degree on the shaft 15 and its tension increased. At the moment when the last type-impression is made at the end of a line of full length, the tripping finger 67 lies close to the trigger 62, and the ensuing space-movement of the paper-carriage operates the said trigger, and trips the latch 57. The arm 51, released thereby, is pressed by the spring against the arm 49, the shaft 45 is rocked, the pawls 33 and 35 are both drawn out of mesh with the ratchet 20, and the spring 37 instantly returns the carriage to a position in which the succeeding line may begin at the proper point. As this point is reached, the set-screw 66, in the off-set lug 65, strikes the vertical finger 64 on the free end of the arm 63, forcing the latter downward and carrying with it the arm 52, thereby raising the arm 51 which is engaged by the latch 57 and held in readiness for a repetition of the operation. The pawls 33 and 35, being thus released, are returned by their springs to normal engagement with the ratchet. It should be noted that, by this method of re-setting the latch, the elastic re-

sistance of the spring 57 is utilized to relieve the shock upon the paper-carriage and prevent the tendency to recoil which might be produced by impact with an unyielding body, or with a spring which was subject to react after sudden compression.

To enable the carriage to be returned automatically at any point in the line before reaching its end, I arrange an independent rock-shaft 70 in suitable bearings in the uprights 17 and mount thereon a wiper-plate 71, which lies against the outer edge of the bar 32. An arm 72 on said shaft projects toward the side of the machine and has a hanging key 73, lying in convenient proximity to the key-board, a spring 74 supporting it and holding the arm 72 against a stop 75, on one of the uprights 17.

Upon the right hand side of the machine frame is mounted a bracket 76 having a vertical arm 77, to which is adjustably connected a plate 78, having a cross-head 79 on its upper end, the edge of the same being curved, or inclined, in such manner as to bring one extremity 80 beneath the line of movement of the line space lever, while the highest part of the curved edge is at a suitable distance above said line. Upon the line-space lever is mounted a clamp 81, having a friction-roll 82, located at such a point that it will engage the edge of the cross-head 79, as the carriage returns, and raise the lever, thereby turning the cylinder far enough to give the required space. The vertical adjustment of the plate 78 enables this spacing to vary in width, as desired.

I prefer to make the bar 32 in two parts, so united that an adjustment of length may be readily effected in order to enable a compensation to be made for any wear of the parts. A different construction may, however, be adopted for the same purpose, as there are other ways in which the same result may be accomplished.

It is evident, also, that the invention may be applied to type-writing machines now in use, as well as to those hereafter constructed. In either case changes in arrangement and proportions of parts may be made without any departure from the essential features of my invention.

What I claim is—

1. In a type-writing machine, the combination with the paper-carriage of a gear meshing with a rack on said carriage, a ratchet on the shaft of the gear, a spring coiled under tension by the revolution of the shaft, means operated by the universal bar for advancing the ratchet, a push-pawl and holding-pawl engaging the ratchet, a rock-shaft carrying an arm engaging said pawls, a spring-pressed arm having one end arranged to act on an arm on said rock-shaft to disengage the pawls, a spring-pressed latch adapted to engage and hold said spring-pressed arm, the latch being provided with a trigger-finger lying in the path of a tripping-finger on the carriage, and

means for automatically returning the spring-pressed arm to engagement with the latch at the end of the return movement of the carriage, substantially as described.

2. The combination with the paper-carriage of a type-writer of a shaft, a spur-gear and ratchet mounted thereon, a rack on the carriage engaged by the gear, a holding-pawl and push-pawl engaging the ratchet, a lever connected to the universal bar and to the push-pawl, a spring operating on the shaft of the ratchet and gear to return the carriage to place, a rock-shaft carrying an arm engaging said pawls, a spring-pressed arm having one end arranged to act on an arm on said rock-shaft to disengage the pawls, a spring-pressed latch adapted to hold the spring-pressed arm out of action, said latch having a trigger-finger lying in the path of a tripping-finger on the carriage, and a pivoted bar having a finger lying in the path of an offset-lug moving with the carriage, to restore the spring-pressed arm to engagement with the latch and release the pawls and permit them to return to the ratchet, substantially as described.

3. The combination with the paper-carriage of a shaft a spur-gear and ratchet thereon, a rack on the carriage meshing with said gear, a holding-pawl and push-pawl engaging the ratchet, a spring coiled under tension by the revolution of the shaft, means for operating the push-pawl from the key-board, a spring-pressed arm adapted to release both pawls from the ratchet, a spring-operated latch holding said spring-pressed arm out of action, said latch having a trigger-finger lying in the path of a tripping-finger moving with the carriage, and a pivoted curved bar having a vertical finger lying in the path of an offset-lug moving with the carriage and adapted to restore the spring-pressed arm to engagement with its latch and permit the pawls to return to their engagement with the ratchet, substantially as described.

4. The combination with the paper-carriage of a gear and ratchet, a returning-spring coiled on the same shaft, a push-pawl operated by the universal bar, a spring-pressed arm to disengage said push-pawl from the ratchet, a spring-operated latch to engage and hold said spring-pressed arm out of action, a pivoted bar having its free end resting upon an arm forming part of the spring-pressed arm, the latter having a guide lug to enter a recess in its supporting bar, an adjustable tripping-finger moving with the carriage to trip the latch and release the spring-pressed arm at the completion of a line, and an offset-lug also moving with the carriage to strike a finger on the pivoted bar at the end of the return movement and reset the spring-pressed arm and permit the pawl to re-engage the ratchet, substantially as described.

5. The combination with the paper-carriage of a type-writing machine, of a shaft, a spur-gear and ratchet mounted on said shaft, a

rack on the carriage meshing with the gear,
a spring-pressed push-pawl engaging the
ratchet, a lever connected to the push-pawl
and universal bar, a spring-actuated arm to
5 disengage the pawl, a spring-pressed latch
holding said arm out of action, an adjustable
tripping-finger on the paper-carriage to en-
gage a trigger-finger on said latch and release
the spring-actuated arm, a curved bar pivoted
10 on the machine frame and having its free
end resting on an arm forming part of the

spring-pressed arm and provided with a ver-
tical finger lying in the path of an offset-lug
mounted on the end of an arm projecting from
the carriage, substantially as described. 15

In testimony whereof I have hereunto set
my hand and affixed my seal in presence of
two subscribing witnesses.

GEO. H. BUTLER. [L. S.]

Witnesses:

JAMES L. NORRIS,
G. W. REA.