

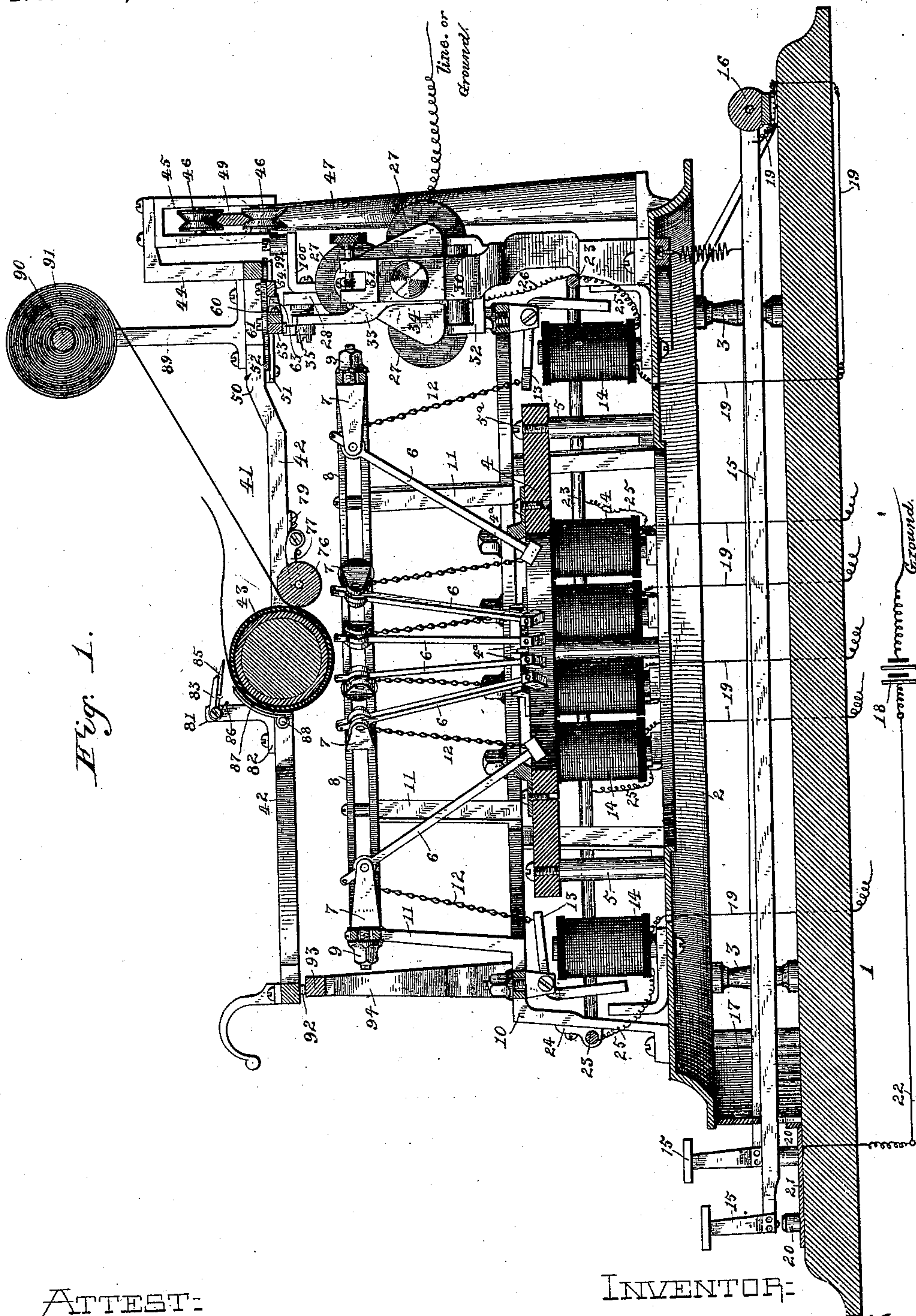
(No Model.)

4 Sheets—Sheet 1.

J. F. McLAUGHLIN.
TYPE WRITING MACHINE.

No. 553,173.

Patented Jan. 14, 1896.



ATTEST:

Percy C. Bowen.
C. B. Waller

INVENTOR:

James F. McLaughlin.
By Harding & Tichenor
his Attorneys.

4 Sheets—Sheet 2.

Patented Jan. 14, 1896.



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James F. McLaughlin;
By Harding & Tichenor
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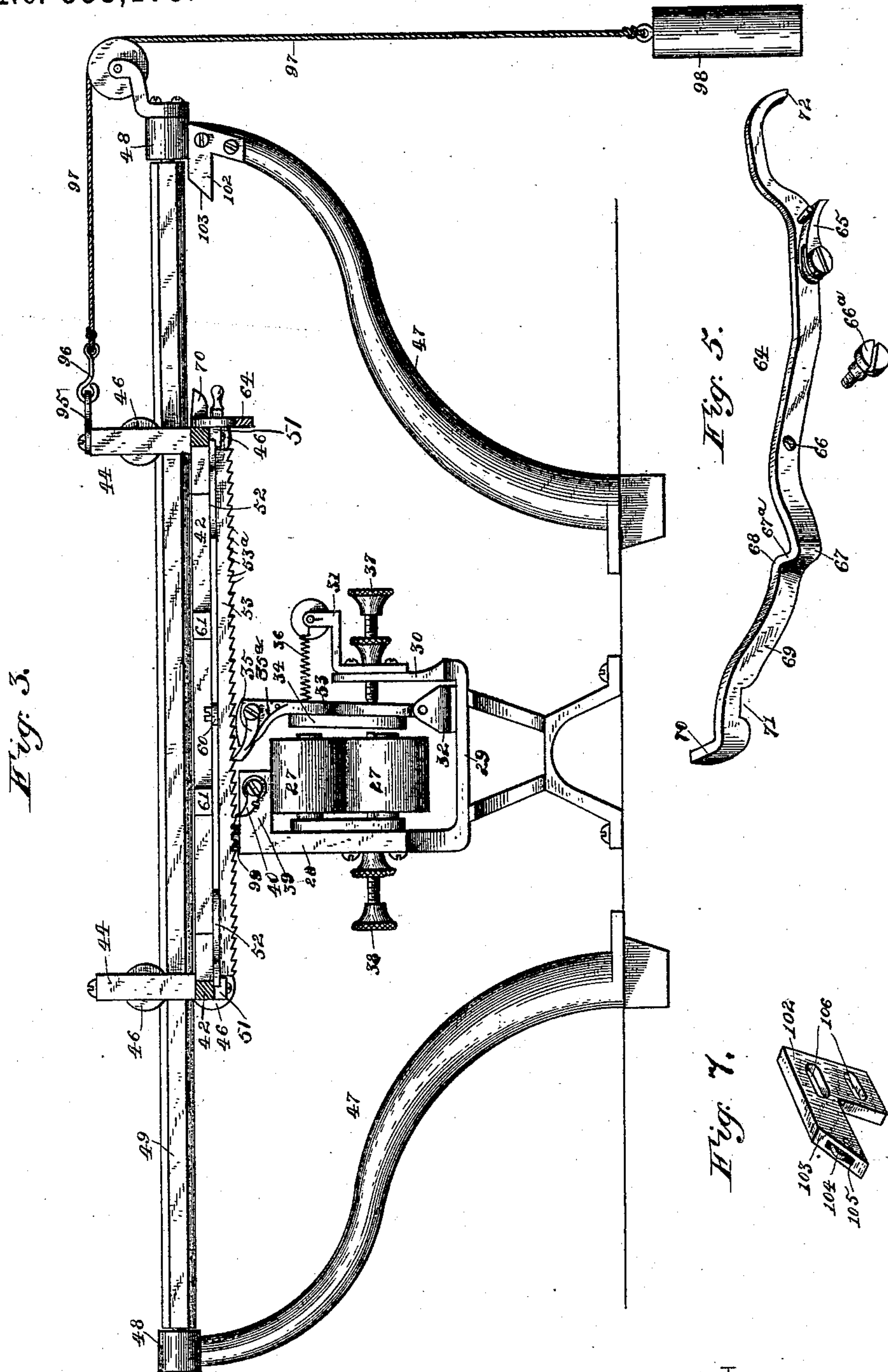
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4 Sheets—Sheet 3.

J. F. McLAUGHLIN.
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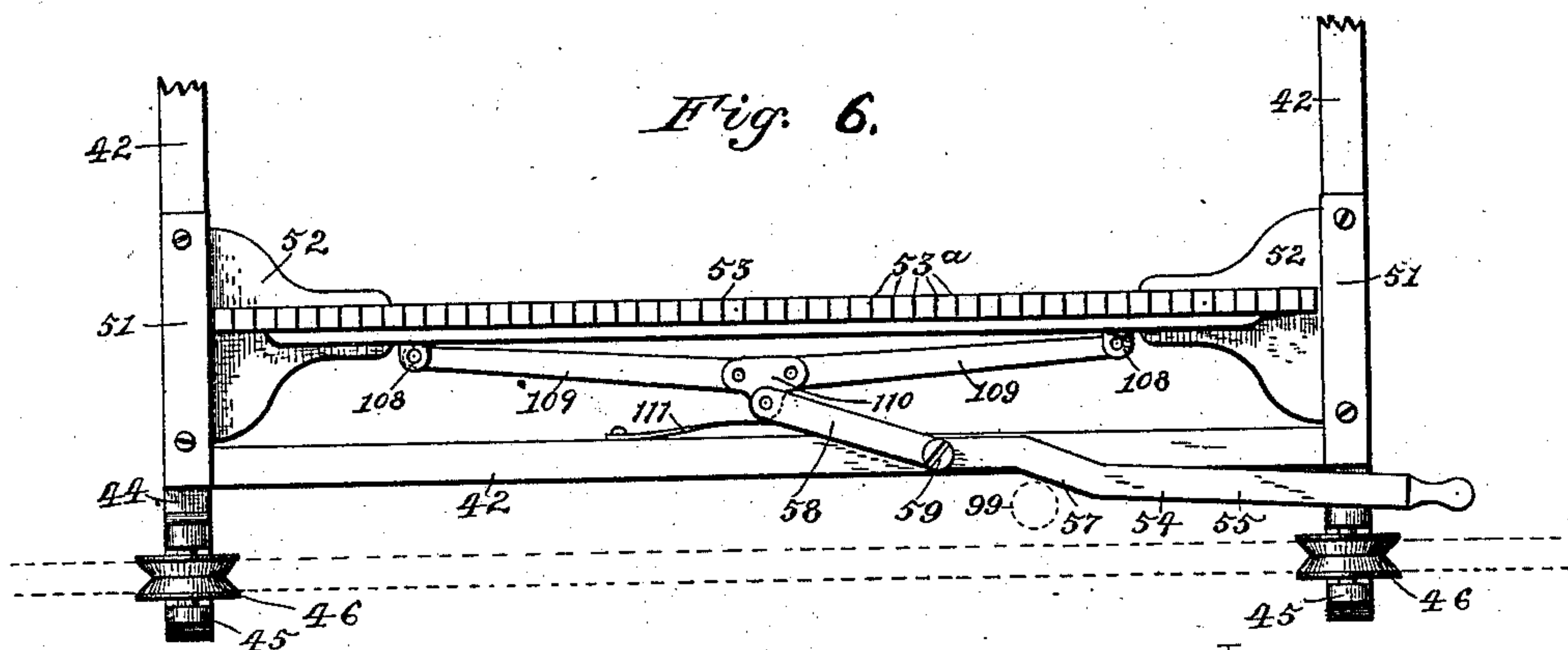
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4 Sheets—Sheet 4

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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,173, dated January 14, 1896.

Application filed July 16, 1887. Serial No. 244,434. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Reverse Movements for Electrical Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to improvements in electrical type-writers, the improvement being directed to the mechanical devices for reversing or returning the traveling carriage to the beginning of the next succeeding line after the desired space has been made between the completed line and the next to be printed, which subject-matter is shown and described in my Patent No. 369,954, dated September 13, 1887. By reference to the said patent it will be seen therefrom that the electrical impulse which actuates the electro-mechanical letter-spacing mechanism is imparted from a local or intermediate source by the movement of each and every type-lever after their respective imprint has been registered upon the traveling paper-roll. However, by this improvement the said letter-spacing mechanism is actuated by the same impulse which energizes the type-lever magnets, as will be fully understood by the explanation given hereinafter. The arrangement and operation of the said type-levers may be found in my separate pending application, Serial No. 232,548, and also in my Patent No. 367,650, dated August 2, 1887.

My invention consists in a certain novel organization of apparatus comprising details of construction and combinations of parts, all of which will be more fully described hereinafter, and the specific points of novelty in which will be designated in the appended claims.

Referring to the accompanying drawings, which form a component part hereof, Figure 1 is a central longitudinal section through the machine, showing in side elevation the arrangement and construction of parts. Fig. 2 is an inverted plan view of the traveling carriage and its incumbent mechanism. Fig.

3 is a view in elevation of the electro-mechanical letter-spacing motor, the rear framework and rack-bar of the traveling carriage, and certain other co-operating devices herein-after described. Fig. 4 is a view in side elevation of the right-hand side of the traveling carriage, showing clearly the pawl-and-ratchet mechanism on the end of the paper-roll, the pawl-lever actuated by the recoil of the carriage, and the system of devices for rotating the paper-roll one line-space when the said carriage reaches the beginning of the next succeeding line after reversal. Fig. 5 is a detail perspective view of the pawl-lever shown in Fig. 4. Fig. 6 is a detail view of a modification of the rack-bar-shifting mechanism shown in Figs. 1, 2, and 3. Fig. 7 is a detail view of a modified form of the plate which engages the lever of the shifting mechanism when the carriage recoils.

Like numbers of reference indicate like or corresponding parts in all the figures of the drawings.

Referring to the said drawings by numbers, 1 designates a suitable circular base made preferably of insulating material and designed to support the several parts of the apparatus, as shown in Fig. 1.

2 is a supplementary platform supported in an elevated position above the base 1 by means of the standards 3 3, and is centrally perforated, as shown, for a purpose which will appear hereinafter, and 4 is a circular disk supported above the platform 2 by the standards 5 5, and serves as a rest or seat for the free ends of the type-levers, as shown clearly in Fig. 1.

The type-levers 6 6 are fulcrumed in the adjustable supports 7 7, which in turn are located and secured at the required intervals apart in the slotted ring 8 by means of the nuts 9 9, and the ring 8 is suitably supported upon the framework 10 by the inclined standards 11 11, which are formed integral with the said framework. Each type-lever is connected by a suitable chain 12 with the upper end of its corresponding elbow-shaped armature 13, which in turn is pivoted above and in proximity to its respective electromagnet 14. Thus it will be seen that there is an electromagnet and armature for each type-lever circularly and relatively situated upon and in-

insulated from the platform 2, as shown clearly in Fig. 1.

It is not thought necessary to further describe the arrangement of the type-levers, their actuating magnets, and other obvious and non-essential construction, inasmuch as they are all clearly shown and described in two of my patents, Nos. 369,954 and 367,650, and form no component part of this invention.

The circuit-closing key-levers 15, which correspond in number and relative situation to the electromagnets, are suitably pivoted at the rear of the machine in an insulated boxing 16 and extend radially through perforations in the apron 17, forming a keyboard similar in arrangement to that of an ordinary type-writer. As before stated, each of said levers is made of current-conducting metal and is in circuit with its corresponding magnet by means of a wire 19, (see Fig. 1,) and is adapted to engage, when depressed, its contact-point 20, which is secured upon the metallic plate 21, and is in circuit with the battery 18 by means of the wire 22.

From the preceding description it will be understood that each depression of any key-lever will close the circuit from the battery 18 over its path 22 21 20 15 19 to its respective electromagnet 14, thereby energizing same and causing the attraction of its armature and the consequent impact of a type-lever against the traveling paper-roll.

23 designates a circular current-conducting ring suitably secured by perforated insulated lugs 24 24 to the framework 10 of the machine and extends circumferentially therearound, and 25 indicates a wire connecting one terminal of the helix of each electromagnet with said ring 23; and 26 represents another wire electrically connecting the ring 23 with one terminal of a helix of one of the spacing-magnets 27. The spacing-magnets are preferably three in number and are supported upon a triangular yoke-piece suitably secured upon a framework 28, as shown in Fig. 3, and have the terminals of their helices connected in parallel and then with the line or ground, as shown in Fig. 1. A bracket 32 is mounted upon the horizontal portion 29 of the frame 28, in which is pivoted the lever 33, carrying the triangular armature 34 and the spring-actuated pawl 35. A coiled retracting-spring 36, secured at one end to the lever 33 and at the opposite end to the bracket 31, serves to keep the lever and armature normally away from the magnet-poles, as shown in Fig. 3, and the play of said lever is limited by the adjusting-screws 37 and 38. The upper portion of frame 28 is bent to form the elbow-shaped lug 39, which supports the spring-actuated check-pawl 40.

The carriage 41 consists essentially of the frame 42, the paper-roll 43, and the elbow-shaped projections 44 44. The brackets 45 45 project downwardly from the horizontal portion of said projections 44 44 and carry grooved friction-wheels 46 46.

47 47 are curved supports secured to the supplementary platform 2 and have at their upward extremities the journal-boxes 48 48, in which are pivoted at its ends the guide-bar 49, having in cross-section the form shown in Fig. 1, which, it will be seen, is adapted to fit between the friction-rollers 46 46 and so support the traveling carriage in its proper position, at the same time leaving it free to move lengthwise along said guide-bar 49.

The rear portion of the frame 42 is slightly elevated, as shown at 50, Fig. 4, and to the under side of this elevated portion are secured guide-strips 51 51, having each an angular transverse recess or groove on their inner edges for supporting and guiding the reciprocating plates 52 52, so as to allow the latter to freely engage and slide in the said recesses for a purpose hereinafter explained. The rack-bar 53 is rigidly secured to the under side of each of the said plates 52 52 and is provided with the inclined teeth 53^a, in which normally rest the pawl 35 and check-pawl 40, as shown clearly in Fig. 3. The object of this construction is to permit of the free backward and forward movement of the rack-bar 53 and its attached plates 52 52 for a limited distance in the recesses in the guide-strips 51 51, as will appear hereinafter.

54 designates a lever pivoted at the point 59 and having a cam portion 57 in the form of an obtuse angle, as shown in Fig. 2. As will be seen from an inspection of Fig. 6, the lever 54 is further provided with the straight forward portion 55 and with the inwardly-extending rear extremity 58, which latter portion is connected by means of a pivotal link 60 with the center of the rack-bar 53, whereby the movement of the forward end of the said lever will force the rack-bar into the position shown in dotted lines in Fig. 2.

Extending inwardly from the rear cross-bar of the frame 42 are two transverse plates 61 61 having the pins 62 62 projecting downwardly. (See Fig. 2.) A spring 63 is secured centrally to the rack-bar 53, the ends of which impinge against the pins 62 62, thereby keeping the rack-bar 53 in its normal position, as shown in full lines in Fig. 2.

64 designates the pawl-lever, (shown in Figs. 4 and 5,) which is pivoted to the inner side of the bar of the frame 42 at the point 66 by means of the screw 66^a, from which it extends in a backward and downward direction and is bent nearly to a right angle, as at 67, passing under the frame 42. Here it is again bent, as at 68, and is correspondingly curved in an upwardly-inclined direction, as at 69, and is finally turned at a right angle to form the cam-head 70. To the rear of the head 70 and underneath the lever is a recess 71 to engage and hold the end of the lever 54 when the latter is pressed inwardly out of its normal position. The opposite end of the lever 64 is provided with the spring-actuated pivoted pawl 65 and is curved, as shown, to form the detent 72. A spring 73 is fixed to the un-

der side of the frame 42 and is so arranged as to bear upon the lever 64 at the point 67^a, and thus keep the rear end thereof normally in contact with the end of the lever 54, as shown in Fig. 4.

The paper-roll 43 is supported in the frame 42 by means of the adjusting-screws 74, and rigidly secured to one end thereof is the ratchet-plate 75. 76 designates a smaller auxiliary roller mounted in the bearing-lugs 77 77, which in turn are pivoted upon the studs 78 78, the said studs being rigidly secured in the small brackets or plates 79 79 riveted to the side bars of the frame 42. 80 designates a spring coiled around each of the said studs 78 and arranged to exert its tension so as to normally press the roll 76 against the larger roll 43.

Near the journal-bearings of the paper-roll 45 and upon each side bar of the framework 42 is affixed an upright 81, having horizontal base 82 formed integral therewith and securely riveted to each of the said side bars. These uprights serve as bearings for each of the spring-actuated knife-supports 83 83, each of which latter is provided with a small laterally-projecting stud or arbor, which in turn enters its respective journal-bearing in the uprights 81 81.

85 designates the longitudinal paper-knife which extends lengthwise and in close proximity to the periphery of the paper-roll 43 and serves as a convenient mode for dividing the paper fed from an endless roll into any number of sheets and of any desired lengths, according to the will of the operator, as will appear from the operation described herein-after.

86 designates a spring coiled and arranged similarly to the spring 80 of the auxiliary roll 76, and serves to keep the knife 85 the requisite distance above the paper-roll, to prevent any impediment to the paper-feeding mechanism.

87 designates a central spring paper-guide adjustably secured upon the central portion of the longitudinal supporting-rod 88, which in turn is rigidly fastened at each extremity in the side bars of the frame 42, (see Figs. 1 and 2,) the function of this spring guide-plate being analogous to its equivalent device on the Remington type-writer.

89 89 are two uprights similar in construction to the knife-supports 81 81, and are secured on the elevated portion of each side bar of the frame 42, and 90 designates a suitable roll journaled at each end in one of the uprights 89, and is designed to carry a roll of paper 91. (See Fig. 1.)

On the forward portion of the framework 42 are journaled two small friction-rollers 92 92, which travel upon the forward guide-bar 93, as the traveling carriage proceeds in a forward or backward direction, and 94 94 are two curved supports similar in construction to the back standards 47 47, supporting

the front guide-bar 93 of the traveling carriage in an elevated position.

95 designates a small horizontal plate rigidly secured to the top of the right-hand elbow-shaped bracket 44 of the traveling carriage, and is provided with a small eye or perforation, as shown in Fig. 3, in which perforation is inserted the link 96, which is attached at its other extremity to the cord 97 carrying the depending weight 98, the object of which latter is to recoil the carriage when assisted by the before-described auxiliary devices.

The operation of my invention is as follows: Assuming the parts to be in their initial position—i. e., at the beginning of a line—if we now depress one of the key-levers 15 to make contact with the point 20 for closing the electric circuit at that point the path of the electric current will be as follows: starting from the battery 18, through the wire 22, plate 21, contact-point 20, key-lever 15, and wire 19 to the electromagnet 14, energizing the same, and passing on, by means of the wire 25, to the conducting-ring 23, and thence through the wire 26 to the spacing-magnets 27, similarly energizing said magnets and passing on to the line to the ground, or back to the battery through any suitable conductor. When the electromagnet 14 is energized the armature 13, being attracted, it thereby actuates the respective type-lever, forcing it against the paper-roll and causing an imprint to be made upon the paper upon the said paper-roll. The magnets 14 being of low resistance and the armature 13 having only the weight of the type-levers to overcome the action of these latter magnets is rendered comparatively easy, and the movement of the type-levers is practically instantaneous, but the spacing-magnets 27, having a greater number of convolutions of wire than the magnets 14, and also having more resistance to overcome in moving the traveling carriage, their action is relatively slower than that of the magnets 14, so that the type-lever has had sufficient time to have performed its function and has returned to its normal position before the spacing movement takes place.

The aforesaid spacing movement is performed as follows: When the type-lever has left the paper the spacing-magnets 27, being actuated by the same electrical impulse as the magnet 14 but operating at a determinate time thereafter, as before described, the armature 34 is attracted, carrying with it the lever 33 and the pawl 35, and the latter being normally in engagement with the teeth 53^a of the rack-bar 53 through the agency of spring 35^a, it will advance the traveling carriage forward on the bar 49 a distance corresponding to that intervening between two of the teeth 53^a, which distance will be equal to one letter-space. When this movement is completed one of the teeth 53^a will have passed over the pawl 40, and the latter, by reason of the spring at-

tached thereto, will fall behind the said tooth and hold the traveling carriage from backward movement until the circuit is again broken and the armature with its auxiliary mechanism resumes their normal positions, in which latter movement the pawl 35 passes freely over one of the teeth 53^a of the rack-bar 53 in the proper position to repeat the spacing movement when the next key is depressed. When the traveling carriage is nearing the end of a line, the inclined face 57 of the lever 54 comes in contact with the small roller or stop 99 supported upon the bracket 100, secured to the lug 39 of the framework 28. (See Fig. 1.) As the carriage continues to advance the outer end of the said lever is forced inwardly by the action of the roller 99 upon the inclined face 57 thereof, and the opposite end 58, together with the link 60 and the rack-bar 53, are moved rearwardly until the several parts assume the position shown in dotted lines in Fig. 2, at which time the rack-bar 53 is out of alignment or rather engagement with the pawls 35 and 40, and the traveling carriage is free to be recoiled by means of the weight 98, as will be apparent.

Referring to Fig. 4, it will be seen that when in its normal position the end of the lever 64 adjacent to the cam-head 70 will rest upon the end of the lever 54 and the end of the spring-actuated pawl 65 will impinge against the apex of one of the teeth of the ratchet-disk 75, thereby preventing said disk and the attached paper-roll 43 from being accidentally rotated in the direction of the arrow, while the detent 101, pivotally attached to the frame 42 and in engagement on the opposite side in the ratchet-teeth, will prevent any displacement in the other direction. When the traveling carriage reaches the terminus of a line and the lever 54 is consequently forced inwardly, as before described, the recessed portion 71 of the lever 64 will fall by virtue of the spring 73 into engagement with the end of said lever 54, and will hold the same in the position shown in dotted lines in Fig. 2 until the carriage has returned again to its normal initial position. Now when the recessed portion 71 of the lever 64 falls into engagement with lever 54 it will be obvious that the opposite end of said lever 64 will be elevated in a proportionate degree and the pawl 65 will move above the point of a ratchet-tooth in position to engage therewith when the said lever descends. Secured to one of the supports 47, near the upper end thereof, is an angular plate 102, having the upwardly-inclined face 103. (See Fig. 3.) When the traveling carriage in recoiling reaches its normal initial position the cam-head 70 will be brought into contact with the inclined face 103 of the said plate 102, thereby elevating the said cam-head 70 and the end of the lever 64 adjacent thereto, relieving the free end of the lever 54 from the retaining agency of the cam-head 70, and thereby releasing the lever 54 to allow the rack-bar 53 to resume its normal position,

which it will do by virtue of the spring 63, since the lever 54 is, after disengagement of the cam-head 70, free to move from its restricted position. At the same time that the cam-head 70 is elevated, as described, the opposite end of the lever 64 will be depressed and the spring-actuated pawl 65 will be brought into engagement with the ratchet-teeth on the disk 75, thereby rotating the same, and with it the paper-roll, a distance equal to the space between two lines. When the said disk 75 has been rotated the proper distance the detent 72 will engage the ratchet-teeth on said disk and will hold it from further movement, and the detent 101 will prevent rotation in the opposite direction, as will be apparent.

The roll of paper 91 is supported on and above the traveling-carriage, as hereinbefore described, and the paper is fed from said roll as follows: The end of the paper is first passed down between the rollers 76 and 43, and partially around the latter, between it and the spring-guide 87, as shown clearly in Fig. 1. Now it will be obvious that every reversal of the traveling carriage and the consequent tripping of the lever 64 and the operation of the paper-roll step-by-step mechanism will carry the paper out in the direction of the arrow to a distance equal to what is termed a "line-space." Thus the operation is continued until the desired length of sheet has been written, at which time, if desirable, the operator can sever the written matter from the continuous roll by pulling the head of the sheet back against the knife 85 and tearing it off.

In Fig. 6 is shown a modification of the rack-bar-shifting mechanism illustrated in Fig. 2. From the foregoing description and explanation, taken in connection with the illustrations, it will be seen that if both halves of the spring 63, which have their free extremities bearing respectively against the pins 62, are not exactly equal in tension, the lever 54, when operated by the fixed roller 99, will not withdraw the rack-bar 53 squarely from its bearings. However, by the arrangement shown in Fig. 7, this difficulty is effectually overcome, inasmuch as the rack-bar 53 is provided with two rearwardly-projecting lugs 108 108, each located at equal distances from the plates 52 52, and are each pivotally connected to the plate 110. This plate is also provided with a central rearwardly-projecting lug, as shown, to which is pivoted the inclined rear portion 58 of the shifting-lever 54. Thus it will be seen that if the free end of the lever 54 is forced inwardly toward the rack-bar 53 the effect or pull upon the said rack-bar 53 will be equally distributed to the points 108 108; and, furthermore, should the free end of the lever 54 now be released the retracting agency of the spring 111, which is affixed to the bar 42, will be exerted centrally between the points 108 108, and therefore equally upon the link-rods 109 109.

In Fig. 7 is shown a modified form of the

angular plate 102, having a small friction-roller 104 journaled in a recess 105 in its inclined face 103, and further provided with slots 106 for the purpose of adjustment upon its supporting-screws.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a carriage for a type-writer, the combination with a reciprocating rack-bar; and a step by step device, substantially as described, for actuating said rack-bar; of a cam lever for shifting said rack-bar; and a stop for intercepting and guiding said cam lever, whereby the said rack-bar is thrown out of engagement with said step by step device by the action of the shifting lever when actuated at a certain point in the line of its travel.

2. In a carriage for a type-writer, the combination with a rack-bar attached to a traveling carriage and arranged to have a reciprocatory movement in its bearings; of a cam lever pivotally connected to said rack-bar; a fixed stop in the path of said lever, arranged to divert the free end of the latter from its normal position by engagement; a retracting spring for restoring said rack-bar and lever to their normal position when they are free to return thereto; and means substantially as described for actuating the traveling carriage.

3. The combination with the toothed rack-bar arranged to have a lateral reciprocating movement in its bearings, of a fulcrumed lever attached pivotally at one extremity by a link connection to the said rack-bar, a guiding roller located at a fixed point in the line of travel of the said lever and arranged to divert the free end thereof by engagement therewith, a spring for retracting the rack-bar to its normal position when free to return thereto; and means substantially as described for advancing the toothed rack-bar in a step by step manner, as specified.

4. In a carriage for a type-writer, the combination with the laterally reciprocating toothed rack-bar, of the fulcrumed shifting lever pivotally connected at one end to the

said rack-bar, a guiding roller located at a fixed point in the line of travel of the shifting lever, and arranged to divert the same from its normal position at such fixed point, the spring actuated pivoted lever, 64, provided with a cam-head adapted to engage and hold the free end of the shifting lever when the latter is diverted, a retracting-spring for the rack-bar, and means substantially as described for advancing the traveling carriage, substantially as specified.

5. The combination with a reciprocating rack-bar and the fulcrumed shifting lever arranged as described, of the guiding roller located at a fixed point in the line of travel of the shifting lever and arranged to divert the said lever at such fixed point, the spring actuated detent-lever, 64, having a cam-head for engaging and holding the free end of the shifting lever at the time of its diversion, a retracting-spring for restoring the shifting lever to its normal position when it is released from the cam-head of the lever 64, a guide-plate at the beginning of the line for tripping the lever 64; and means substantially as described for advancing and reversing the traveling carriage, as specified.

6. In a carriage for a type-writer, the combination with the fulcrumed shifting lever, 54, attached to a reciprocating rack-bar, and having a free extremity periodically in engagement with a cam-head of a pawl-lever; and means substantially as described for periodically shifting said lever, 54; of a pawl-lever, 64, having a cam-head; a fixed tripping plate for actuating said pawl lever; a step by step paper feeding mechanism operated by said pawl-lever; and means substantially as described for actuating said rack-bar forward and backward.

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

J. F. McLAUGHLIN.

Witnesses:

JULIUS SOLGER,
F. R. HARDING.