No. 847,415. PATENTED MAR. 19, 1907.

E. G. LATTA.

TYPE WRITING MACHINE.

APPLICATION FILED JUNE 14, 1905.

4 SHEETS—SHEET 1.

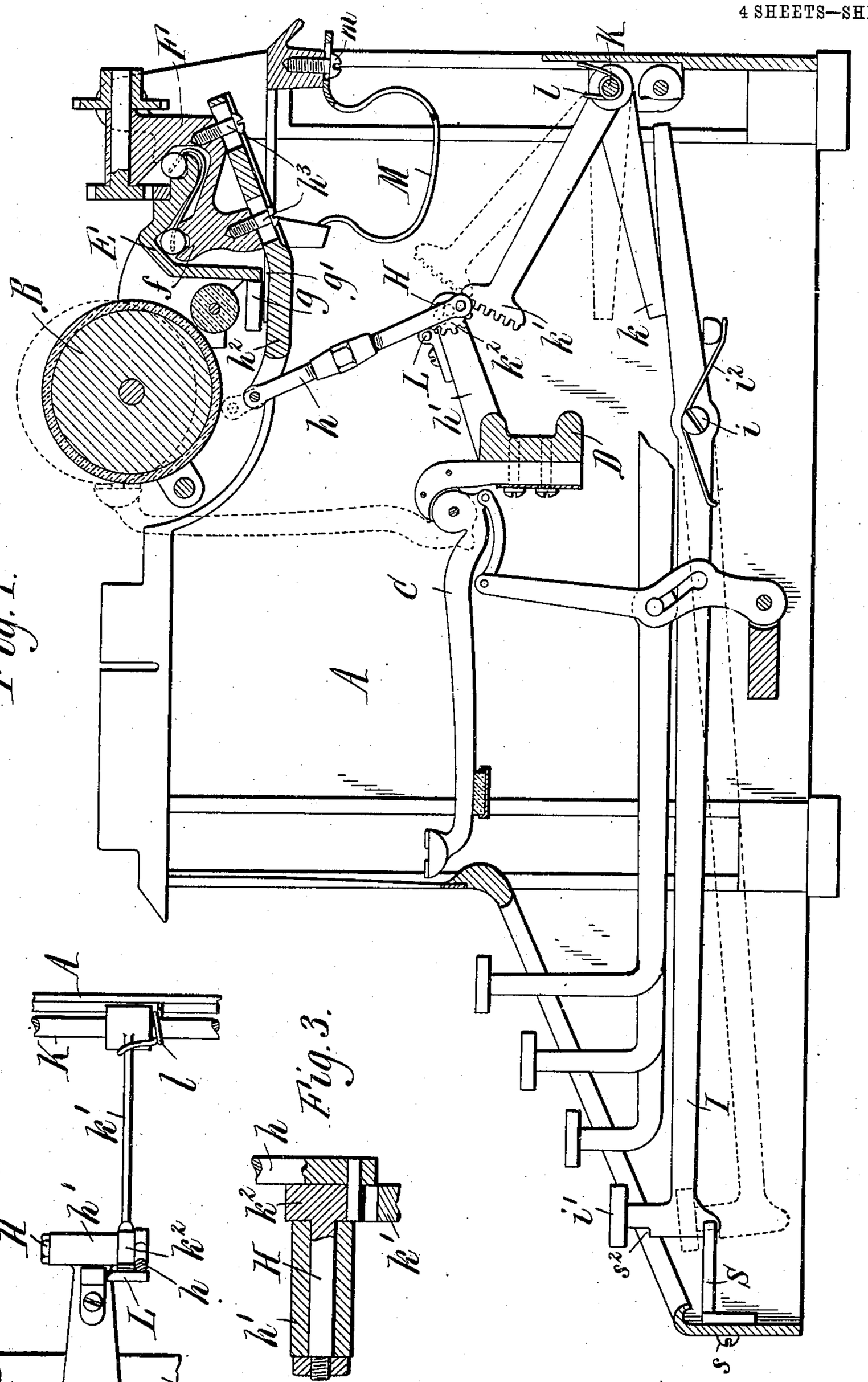

Fig. 1.

Fig. 2.

Fig. 3.

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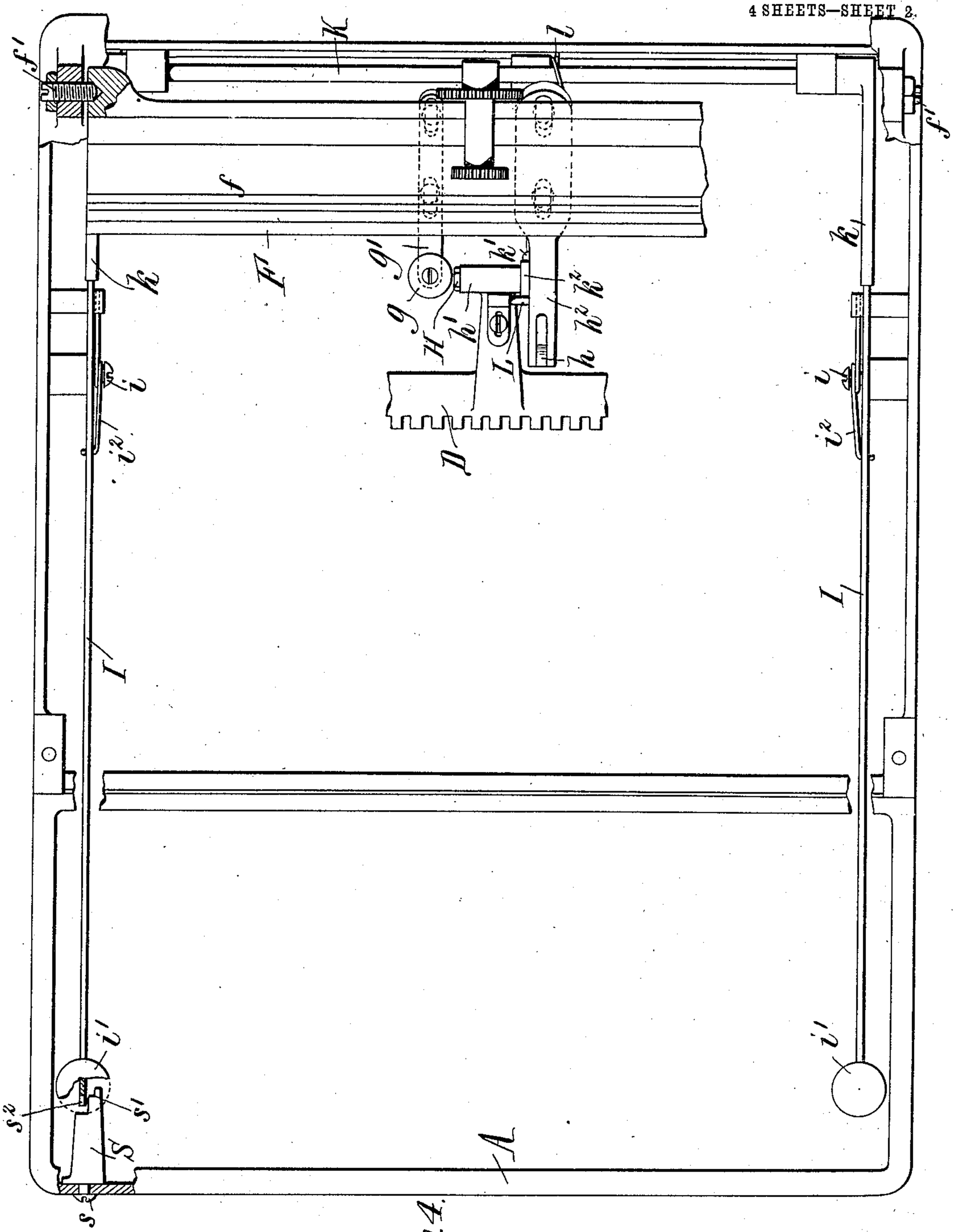

Fig. 4.

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4 SHEETS—SHEET 3.

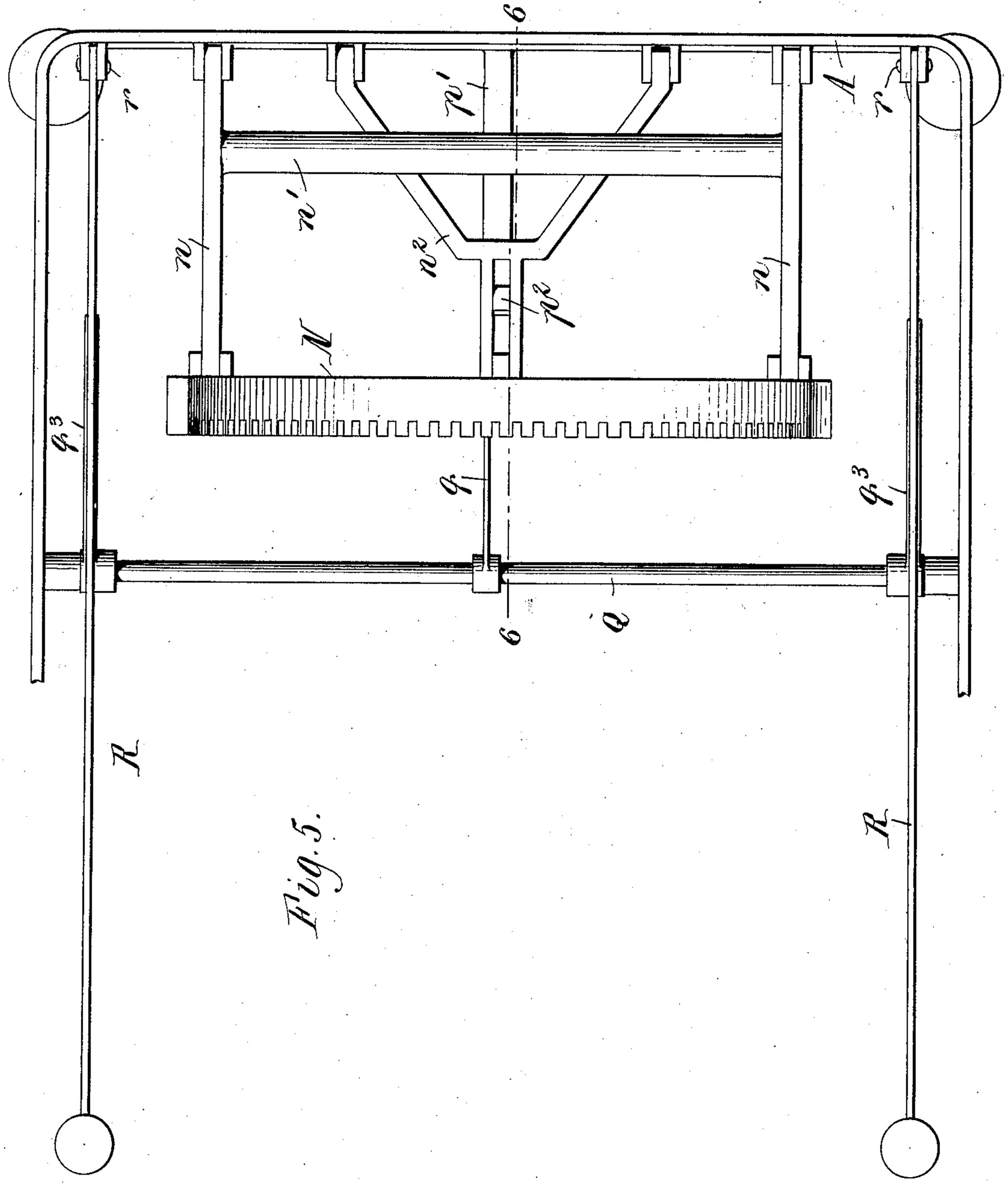

Fig. 5.

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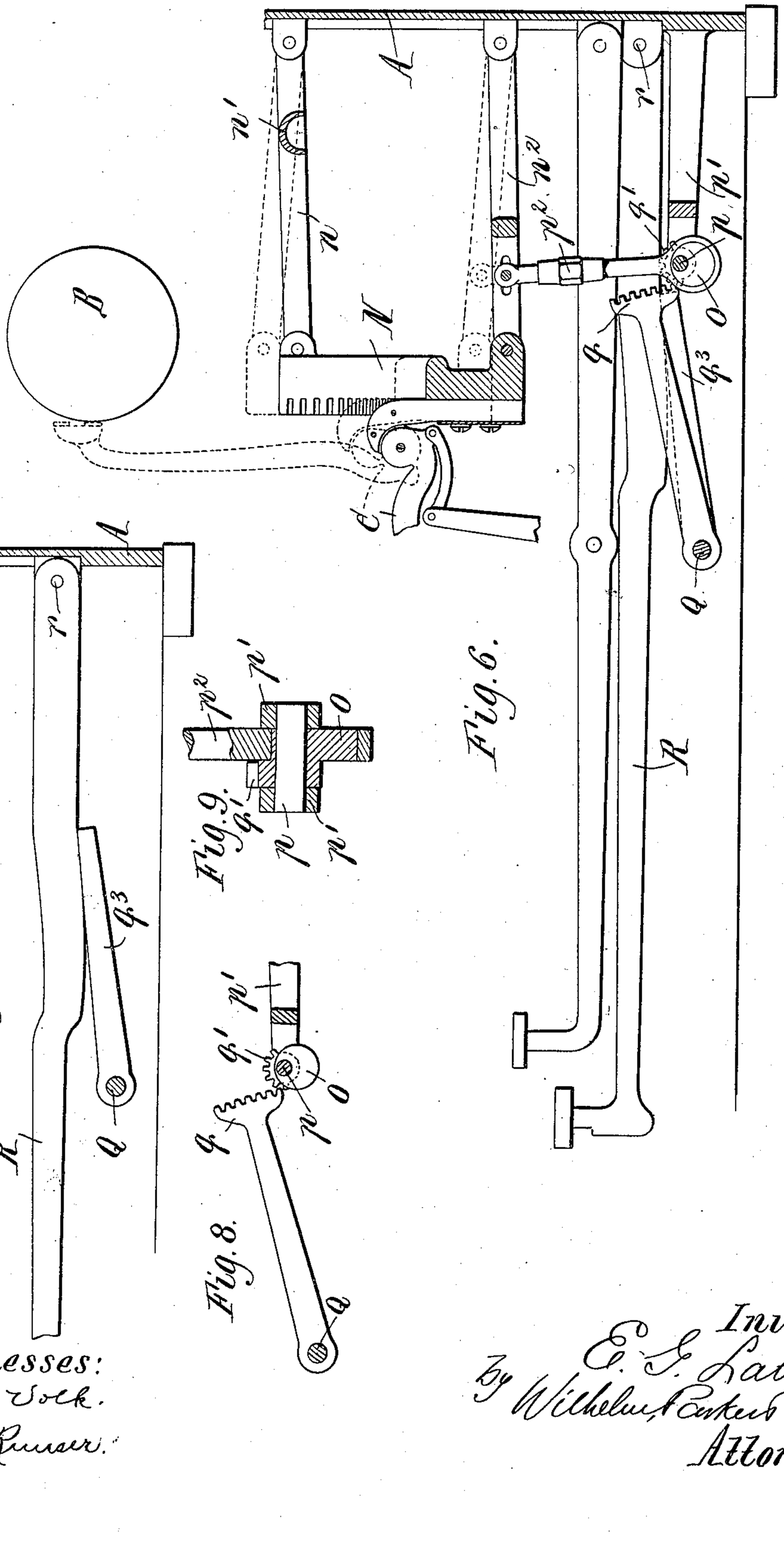
4 SHEETS—SHEET 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

No. 847,415. Specification of Letters Patent. Patented March 19, 1907.

Application filed June 14, 1905. Serial No. 265,217.

To all whom it may concern:

Be it known that I, EMMIT G. LATTA, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification.

This invention relates to type-writing machines in which the type bars or carriers are provided with a plurality of sets of type and in which the platen is normally in printing relation to one set of type, and either the platen or the support for the type-bars is shifted from its normal position to place the platen and the other set of type in printing relation.

The objects of the invention are to provide a simple desirable shifting mechanism for moving the shifting part—that is, the platen or the type-support; which will positively hold the shifting part in its shifted position without exertion on the part of the operator and which will positively prevent the shifting part from rebounding from either its normal or shifted position when quickly shifted; to so construct the shifting mechanism that the leverage is greatest at the commencement of the shifting movement, whereby less exertion is required to overcome the inertia and weight of the shifting part; to cause the shifted part to move first with an accelerating motion and then with a retarding motion as it approaches the limit of its movement to enable a quick shift and prevent the shock of a sudden stop; to provide adjustments whereby the movement of the shifting part can be increased or decreased as required for different sizes or spacing of type; to provide means of simple construction and capable of easy operation for releasably locking the shifting part in its shifted position, and to improve such shifting mechanisms in the respects hereinafter specified, and set forth in the claims.

The shifting mechanism is shown in the drawings and hereinafter described as constructed for a visible-writing machine having type-bars pivoted on a support or segment located below the platen to make the impressions at the front side of the latter and in which the platen or type-support is shifted vertically; but the improvements are not limited to a front-strike machine and can be adapted to other types of machines by making the necessary modifications in the relative arrangement and proportions of the parts of the mechanism.

In the accompanying drawings, consisting of four sheets, Figure 1 is a longitudinal sectional elevation of a type-writing machine provided with a shifting mechanism embodying the invention, only those parts of the machine being shown which are necessary to a proper understanding of the invention. Fig. 2 is a plan view of a portion of the shifting mechanism. Fig. 3 is a detail section, on an enlarged scale, of the oscillating eccentric and associated parts. Fig. 4 is a plan view, partly in section, of the machine, the carriage being omitted and parts broken away to disclose the shifting mechanism. Fig. 5 is a plan view of a modified construction. Fig. 6 is a sectional elevation thereof in line 6 6, Fig. 5. Fig. 7 is an elevation of one of the shift-levers and the rock-lever operated thereby. Fig. 8 is a fragmentary elevation showing the oscillating eccentric and operating-gear used in the modified construction. Fig. 9 is a detail section, on an enlarged scale, of the eccentric and associated parts of the modified construction.

Like letters of reference refer to like parts in the several figures.

A represents the main frame, B the platen, and C one of the pivoted type-bars, of a type-writing machine. The platen, as usual, is rotatably journaled on a suitable carriage, which travels transversely of the machine to produce the lines of printing, and in the machine illustrated the type-bars are pivoted on a segment or support D, located below the platen, and swing upwardly and rearwardly to make the impression at the front side of the platen. These parts may be of any known or suitable construction, and the type-bars, carriage, and platen are operated by suitable mechanisms, which it is not necessary to describe. Each type-bar has two type, ordinarily termed the "upper" and "lower" case type, one of which will strike the platen when the parts are in their normal position. The proper printing relation between the other type and the platen is secured by changing the relative position of the platen and type-bar, and this can be done either by shifting the platen or the type-support.

In the construction shown in Figs. 1–4

the type-bar support is stationary, and the platen is shifted vertically, for which purpose the carriage E is entirely supported on a shift-frame F, provided with a suitable track or guide *f*, on which the carriage travels transversely of the machine. The shift-frame is mounted in some suitable manner on the main frame to move up and down. It is preferably pivoted in rear of the carriage to swing vertically on adjustable screw-studs *f'*, projecting inwardly from upright brackets or lugs at the upper rear corners of the main frame into sockets in the rear corners of the shift-frame.

g represents a roller which is journaled on an adjustable bracket *g'*, projecting from the shift-frame, and bears against the front side of the carriage to prevent vertical play of the carriage on its guide-track when the shift-frame is shifted.

The shifting mechanism, or actuating mechanism for the shift-frame, may be constructed in different ways to secure the desired results, the shifting mechanism shown in Figs. 1–4 being constructed as follows: H represents a rotatable or oscillating shaft or element having an eccentric or crank connection with the shift-frame, as by a rod or pitman *h*, so that the shift-frame is raised and lowered by rocking or rotating the eccentric shaft or element H. In the construction illustrated in said Figs. 1–4 the eccentric-shaft is journaled in a bearing-racket *h'*, projecting centrally from the type-bar segment. The connecting-rod *h* is connected at one end to a crank-pin on the shaft and is pivoted at its opposite end to an arm h^2, projecting forwardly from the central part of the shift-frame, the arm being adjustably connected to the shift-frame by screws h^3, passing through elongated slots in the arm. The connecting-rod *h* is also preferably adjustable in length, being made of two parts connected by a turnbuckle.

The shift-frame is raised from the normal position shown in full lines in Fig. 1 by rocking the shaft or element H in one direction through one-half of a revolution and is again lowered to the normal position by a half-revolution of the eccentric shaft or element. By adjusting the arm h^2 out or in on the shift-frame the movement of the frame can be regulated in accordance with the distance between the type of the two sets on the type-bars, and by lengthening or shortening the connecting-rod *h* the shift-frame can be adjusted to insure the exact printing relation between the platen and the type in both the normal and shifted positions. Other adjustments could be used to secure these results.

The eccentric shaft or element can be oscillated, as stated, by suitable key-actuated connections, those shown being as follows: I I represent two key-levers arranged longitudinally at opposite sides of the machine and fulcrumed between their ends on pivots *i*, projecting from the sides of the main frame. The key-levers have finger-keys *i'* at their front ends which are held up in the normal position and returned to such position after depression by suitable springs. Springs i^2, coiled about the lever-pivots, with their ends engaging the levers and lugs on the frame, are shown for this purpose. On the rear arms of the key-levers, which preferably have convexed or rocker-shaped upper edges, bear arms *k*, formed on or rigidly secured to a rock-shaft K, which is journaled in suitable bearings on the rear portion of the main frame and is provided centrally with a toothed segment *k'*, meshing with a gear wheel or segment k^2, formed on or secured to the eccentric shaft or element H. By depressing either of the finger-keys the shaft K and its segment-arm are rocked, thereby oscillating the gear-segment k^2 and the eccentric shaft or element H. L represents a stop for limiting the movement of the connecting-rod *h* to cause the eccentric or crank pin to stop at the end of its throw in either direction in a dead-center position—that is, in a straight line passing through the axis of the eccentric-shaft and the center of the pivot connecting the rod *h* with the arm of the shift-frame. The stop shown is adjustably secured to the bracket *h'* by a screw and can be set to insure the stopping of the eccentric-shaft in the dead-center position. As the eccentric or crank thus starts from and stops in a dead-center position, it positively supports the shift-frame in both its normal and shifted positions and prevents the rebounding of the shift-frame from either position when quickly shifted. The platen is, in effect, locked in both positions, and the printing of a character over or under the line cannot occur. The shift-lever and a type-key may be depressed at the same time and perfect work done, or a character may be printed at the instant the parts return to the normal position, with equal certainty that they will not vibrate and cause the impression to be made above or below the line. This arrangement also affords greater leverage in starting the shift-frame and causes a gradual easy start of the frame, then an accelerating motion, followed by a gradually-retarding motion and a slow easy stop of the frame, so that less exertion is required to overcome the inertia and weight of the parts, and the shock on the machine and operator, due to a sudden stopping of the shift-frame, is avoided. The described rocking connection between the key-levers and arms of the rock-shaft K still further increase the leverage at the commencement of the movement of the shift-frame and the acceleration of its motion and is therefore more desirable than a direct connection between the key-lever and eccentric-shaft, which, however, could be used. While the

shift-frame is, in effect, locked or held in its two positions, the locking and releasing are effected by the simple depression of the key-lever, and no device requiring independent operation is necessary. The arm h^2 on the shift-frame is made heavy enough to be perfectly rigid, and the shift-frame cannot spring or yield when the eccentric is in either dead-center or locking position. The central location of the arm and its actuating connections enables power to be applied to the shift-frame to the best advantage and prevents the twisting of the frame or an unequal movement of its opposite ends. The key-levers can be made light enough to spring or yield slightly when suddenly depressed, and thus prevent shock to the fingers of the operator; but the described relation of the eccentric-shaft and its connection with the shift-frame positively prevents the latter from taking part in any flexure of the key-levers. The shifting parts cannot be moved from their normal position without first depressing the shift-lever. The machine can therefore be turned upside down without movement of the shifting mechanism, and this is a convenience in handling and avoids the necessity for special fastening when boxing the machine for shipment.

A suitable spring l, acting on the rock-shaft K, assists in restoring the parts to their normal position or starts them from the shifted position, and a spring M, secured to the main frame and bearing against a pendent lug on the shift-frame, partly supports the weight of the shift-frame and assists in shifting the same, thus materially relieving the shifting mechanism of this weight and lessening the work of shifting the shift-frame and carriage. This spring M is preferably adjustably connected to the main frame by a screw m, so that it can be adjusted to regulate its tension.

In the construction shown in Figs. 5 to 9 the platen and carriage has only the usual movement transversely of the machine, and the type-bar support or segment is shifted to place one or the other set of type in printing relation. The segment N can be supported to move toward and from the platen in any suitable manner. As shown, it is pivoted at its ends to the forward ends of links n, which are connected by a cross-bar n' and are pivoted to lugs on the rear portion of the main frame, and its central portion is pivoted to the front end of a link n^2, having a forked rear end pivoted to lugs on the rear of the main frame. The segment is raised and lowered by an eccentric O, which is mounted on a shaft p, supported in a fixed bracket p' on the frame, and is connected by a rod or pitman p^2 to the supporting-link n^2 of the segment. The connecting-rod is adjustable in length and is adjustably connected to the segment-link to regulate the movement of the segment and insure the correct normal and shifted positions of the same, and the eccentric is adapted to oscillate between dead-center positions, as in the construction before described and for similar reasons. The segment could be rocked by the same arrangement of key-levers and connections shown in Figs. 1 to 4; but slightly-different actuating means are shown, in which a rock-shaft Q, journaled in the central portion of the machine, is provided with a toothed segment q, meshing with gear-teeth q', formed on the eccentric, and has fixed arms q^3, which bear on rocker-shaped portions of key-levers R, which extend longitudinally of the machine at its sides and are fulcrumed at their rear ends on suitable pivots r. The action of this construction is similar to that of the other construction described. Key-levers and connections of the character just described for shifting the type-bar segment could be employed in the other construction for shifting the shift-frame.

While the key-levers and rocker connections for oscillating the eccentric shaft or element are preferred for the reasons stated, it is obvious that an eccentric or an equivalent device or devices for shifting the shift-frame or type-support could be operated by various different actuating means and effect the desired results to a greater or less extent.

A device is provided in the machine shown in Figs. 1 and 2 for releasably locking the shifting part in shifted position to relieve the operator from holding the shifting lever depressed. This device consists of a bracket S, adjustably secured to the front of the main frame by a screw s and having a shoulder s', adapted to engage with a projection s^2 on the adjacent shift-lever. The shift-lever vibrates adjacent to the bracket without engagement therewith in its shifting movements. When it is desired to lock the shifted part in shifted position, the shift-lever is depressed and is then pressed laterally toward the bracket to engage its projection s^2 under the shoulder of the bracket, which will then hold the lever until it is pressed laterally in the opposite direction to disengage the interlocking parts. This device is very simple and effective, the shift-lever can be engaged therewith and disengaged therefrom with great ease, and it obviates the necessity for a key or device requiring independent operation.

An important advantage of the eccentric shifting mechanism described consists in the fact that there is no lost motion between the shift-key and shift frame or segment which is operated thereby. The movement of the key is smooth from start to finish and free from the aggravating irregularity of touch present in other shift mechanisms that lock the shifted part by the action of the shift key or lever. Another desirable feature is that

the shift-lever and eccentric not only positively and automatically hold the shifted part against vibration in either direction from either of two different positions, but automatically release the same from such holding in either position by the natural movement of the shift-key, the locking and unlocking being both effected without lost motion and without parts in addition to those required to effect the desired motion. The eccentric is described as normally resting on one dead-center and shifting to another dead-center. This is the preferred construction; but in case of wear on the stop or its imperfect adjustment, so that the eccentric moves a few degrees more or less than one hundred and eighty degrees, there would be no material difference in its action, and as some operators may prefer to quicken the return movement of the shifted part by adjusting the stop to prevent the movement of the eccentric a full one hundred and eighty degrees I do not confine myself to stopping the parts exactly on dead-centers.

I claim as my invention—

1. In a type-writing machine, the combination of a platen and a type-support, one of which is adapted to be shifted to change the relation of the type and the printing-point, an actuating device for said shifting part, and an eccentric connected between said operating device and said shifting part and which is turned by said actuating device from one rest position to another to shift said shifting part, said eccentric automatically acting in its rest positions to positively hold said shifting part against vibration in either direction from either of the two positions to which it is moved by the eccentric, substantially as set forth.

2. In a type-writing machine, the combination of a platen and a type-support one of which is adapted to be shifted to change the relation of the type and the printing-point, an oscillatory eccentric, a connection between said eccentric and said shifting part arranged to prevent movement of the shifting part independently of the eccentric, and means for oscillating said eccentric from one to the other of its dead-center positions whereby the shifting part is shifted and positively held from vibration in both positions, substantially as set forth.

3. In a type-writing machine, the combination of a platen and a type-support one of which is adapted to be shifted to change the relation of the type and the printing-point, an oscillatory eccentric, a link connected to said eccentric and to said shifting part, and means for oscillating said eccentric from one to the other of its dead-center positions whereby the shifting part is shifted and positively held from vibration in both positions, substantially as set forth.

4. In a type-writing machine, the combination of a platen and a type-support one of which is adapted to be shifted to change the relation of the type and the printing-point, an oscillatory eccentric arranged in the machine centrally between the sides thereof, a connection between said eccentric and the middle portion of said shifting part arranged to prevent movement of the shifting part independently of the eccentric, and means for oscillating said eccentric from one to the other of its dead-center positions whereby the shifting part is shifted and positively held from vibration in both positions, substantially as set forth.

5. In a front-strike type-writing machine, the combination of a platen and a type-support one of which is adapted to be shifted vertically to change the relation of the type and the printing-point, an oscillatory eccentric, a link connected to said eccentric and to said shifting part, and means for oscillating said eccentric from one to the other of its dead-center positions whereby the shifting part is shifted by said eccentric and stationarily supported by the eccentric in either of two positions, substantially as set forth.

6. In a type-writing machine, the combination with a platen and a type-support, one of which is adapted to be shifted to change the relation of the type and the printing-point, of a shift-lever, a second lever having a rocking connection with said shift-lever, and an eccentric connection for transmitting motion from said second lever to the shifting part and for holding the shifting part from rebounding when shifted, substantially as set forth.

7. In a type-writing machine, the combination with a platen and a type-support, one of which is adapted to be shifted to change the relation of the type and the printing-point, of two shift-levers, a rock-shaft, two auxiliary levers secured to said rock-shaft and having rocking engagement with said shift-levers, and connections between said rock-shaft and shifting part which remain substantially centrally with respect to said rock-shaft and shifting part, substantially as set forth.

8. In a type-writing machine, the combination with a platen and a type-support, one of which is adapted to be shifted to change the relation of the type and the printing-point, of two shift-levers, a rock-shaft, two auxiliary levers secured to said rock-shaft and having rocking engagement with said shift-levers, and means connected to the central portions of said rock-shaft and shifting part for operating the latter, susbtantially as set forth.

9. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing characters, and a platen, one of which is adapted to be shifted to change the relation of said

support and platen, of a shift-key, an eccentric actuated by said shift-key, and a device positively connected to said eccentric and to the shifting part, said eccentric being arranged to rest substantially on a dead-center when in its normal position and hold the shifting part against change of position until the shift-key is moved, substantially as set forth.

10. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing characters, and a platen, one of which is adapted to be shifted to change the relation of said support and platen, of a shift-key, an eccentric actuated by said shift-key, and a device positively connected to said eccentric and to the shifting part, said eccentric being arranged to rest substantially on a dead-center when in its shifted position and hold the shifting part in shifted position until the shift-key is moved toward its normal position, substantially as set forth.

11. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing characters, and a platen, one of which is adapted to be shifted to change the relation of said support and platen, of a shift-key, an eccentric actuated by said shift-key, and a connection pivoted to said eccentric and to the shifting part, said eccentric being arranged to oscillate between two substantially dead-center positions and to change the position of the shifting part when moving from one dead-center position to the other, substantially as set forth.

12. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing characters, and a platen, one of which is adapted to be shifted to change the relation of said support and platen, of a shift-lever, and a connection between said lever and the shifting part constructed to move the shifting part with a slow starting motion increasing during the first part of its movement and decreasing during the last part of its movement, substantially as set forth.

13. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing characters, and a platen, one of which is adapted to be shifted to change the relation of said support and platen, of an eccentric or equivalent device, means for turning said eccentric through an arc of substantially one hundred and eighty degrees, a rod connecting said eccentric and said shifting part, and a stop against which the connecting-rod strikes to limit the movement of said eccentric and shifting part, substantially as set forth.

14. In a type-writing machine, the combination of a platen and a type-support, one of which is adapted to be shifted to change the relation of the type and the printing-point, an oscillatory eccentric, a link connected to said eccentric and to said shifting part, a gear-segment having a toothed engagement with said eccentric, and means for operating said gear-segment to turn said eccentric one-half revolution from one to the other of its dead-center positions, substantially as set forth.

15. In a front-strike type-writing machine, the combination of a platen and a type-support, one of which is adapted to be shifted up and down to change the relation of the type and the printing-point, an oscillatory eccentric arranged below said shifting part, a link connected to said eccentric and to said shifting part, a gear-segment having a toothed engagement with said eccentric, and means for operating said gear-segment to turn said eccentric one-half revolution from one to the other of its dead-center positions, substantially as set forth.

16. In a front-strike type-writing machine, the combination with a segment supporting a series of type-bars each having a plurality of printing characters, and a platen, of a shift-lever, a platen-shift frame mounted to oscillate vertically and having a rigid central arm projecting forwardly under the platen, and connections whereby the shift-lever acts on the front portion of said arm to shift the platen, substantially as set forth.

17. In a front-strike type-writing machine, the combination with a series of type-bars each having a plurality of printing characters, and a platen, of a platen-shift frame pivoted to move up and down, a counterbalancing-spring for said frame, an eccentric or equivalent for actuating said shift-frame, a shift-key for operating said eccentric, and a second spring acting to restore the eccentric to normal position, substantially as set forth.

18. In a front-strike type-writing machine, the combination with a main frame, the type-bars each having a plurality of printing characters, and a platen-carriage, of a carriage-shift frame which is pivotally connected to the main frame at each side of its center to swing up and down and supports said carriage, a shift-lever, and connections by which the lever acts on the center of the shift-frame to shift the platen, substantially as set forth.

19. In a type-writing machine, the combination with a main frame, a series of type-bars, a platen, and a carriage for the platen, of a shift-frame supporting the carriage and arranged transversely on the main frame and connected thereto by pivots at each side of the center of the main frame and at the rear of the shift-frame, and a vibrating support connecting the front central part of the shift-frame to the main frame, substantially as set forth.

20. In a type-writing machine, the combination with a support for a series of type-bars each having a plurality of printing char-

acters, and a platen, one of which is movable to change the relative position of said support and platen, of a horizontal shift-lever pivoted between its ends, a horizontal auxiliary lever arranged over the shift-lever and having a rocking bearing thereon, and an eccentric connection between said auxiliary lever and shifting part whereby the relation of the type-bar support and platen is changed, substantially as set forth.

21. In a type-writing machine, the combination of a part adapted to be shifted to change the relation of the printing-point and the type, a shift-key, and an actuating device for said shifting part which is moved by said shift-key and is constructed to shift said shifting part with a slow-starting and slow-stopping motion and to automatically hold the same against vibration in either direction from either of two different positions, substantially as set forth.

Witness my hand this 8th day of June, 1905.

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Witnesses:
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OSCAR C. KAYLE.