(No Model.) 3 Sheets—Sheet 1.

F. MYERS.

TYPE WRITING MACHINE.

No. 442,819. Patented Dec. 16. 1890.

FIG. 1

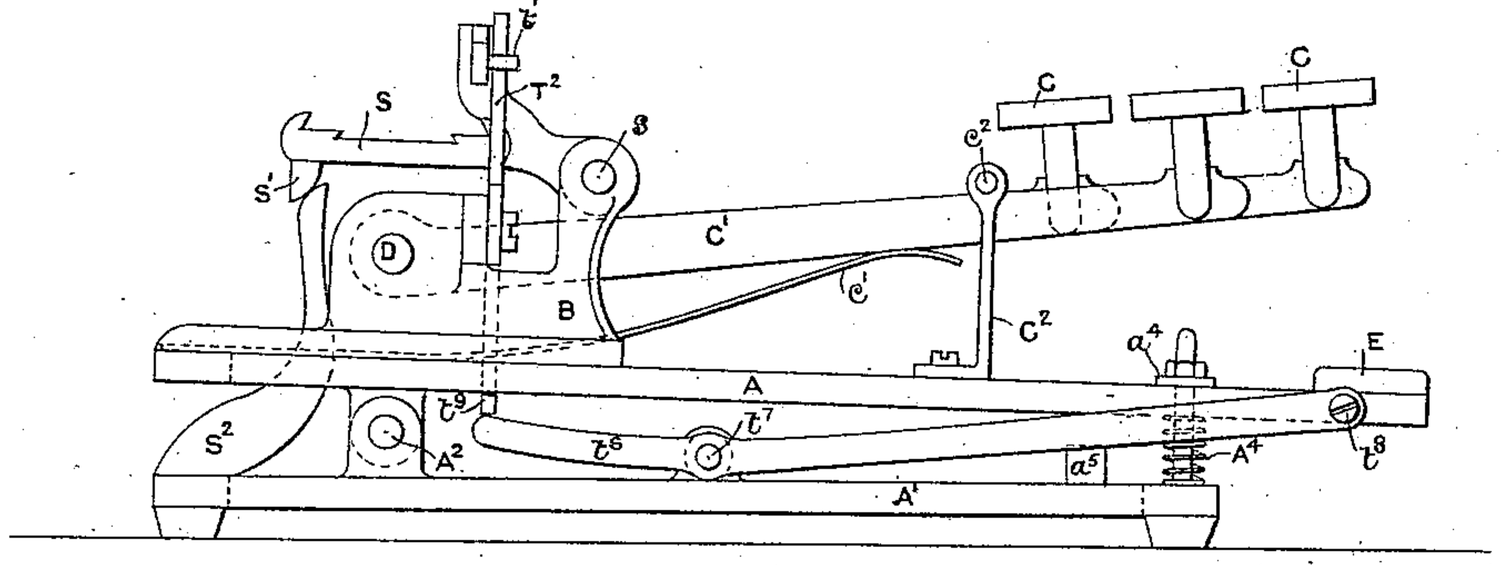


FIG. 6

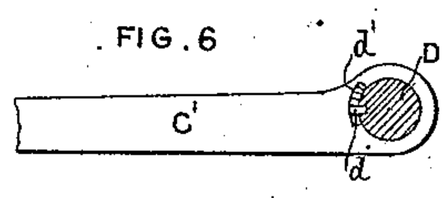


FIG. 5

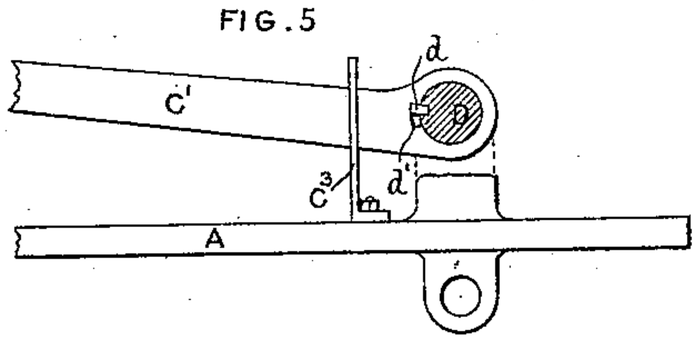
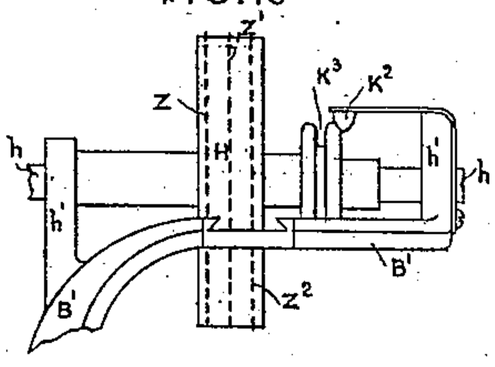


FIG. 2

FIG. 10



Witnesses

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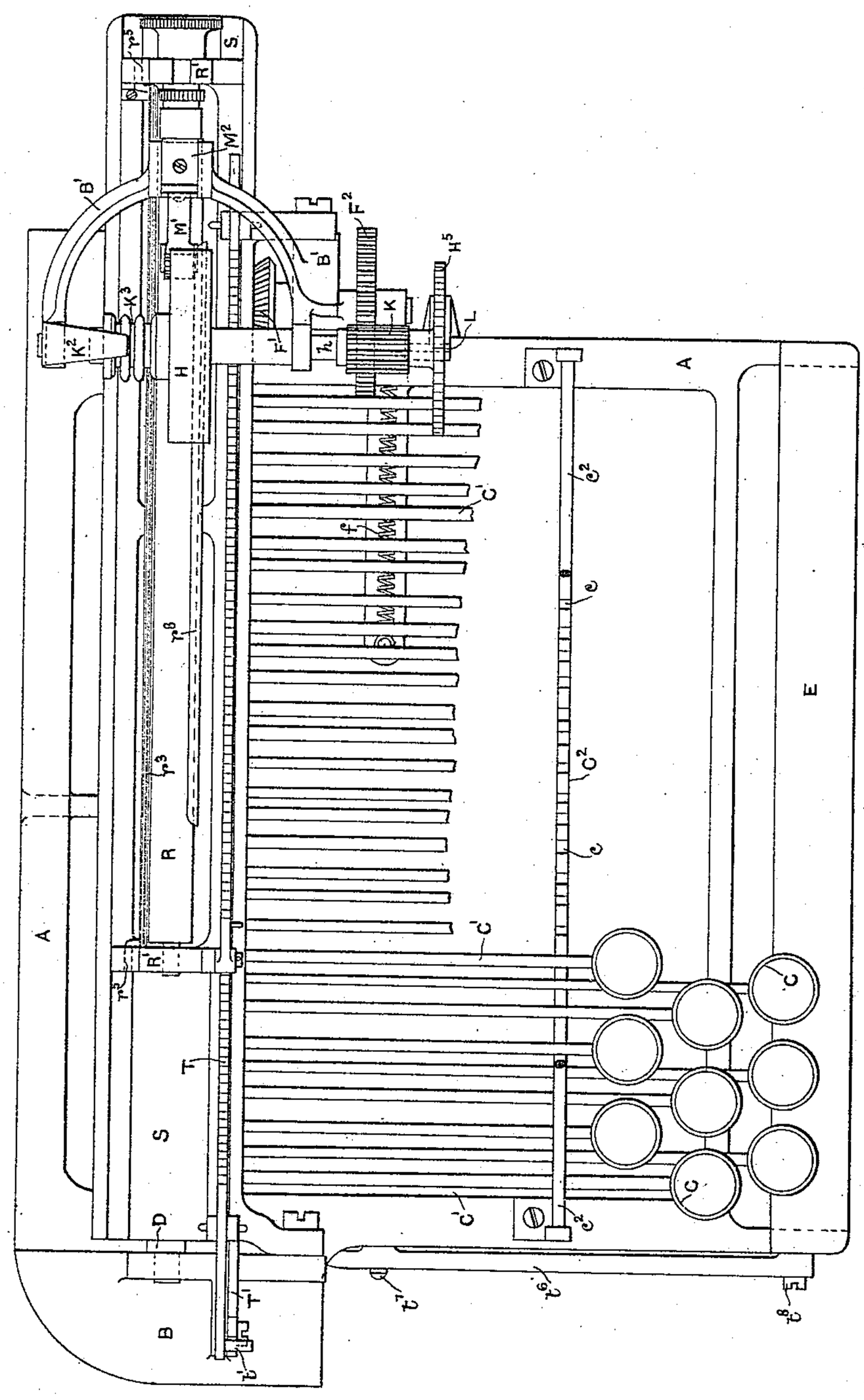
(No Model.) 3 Sheets—Sheet 2.

F. MYERS.

TYPE WRITING MACHINE.

No. 442,819. Patented Dec. 16. 1890.

FIG. 3



Witnesses

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(No Model.) 3 Sheets—Sheet 3.

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TYPE WRITING MACHINE.

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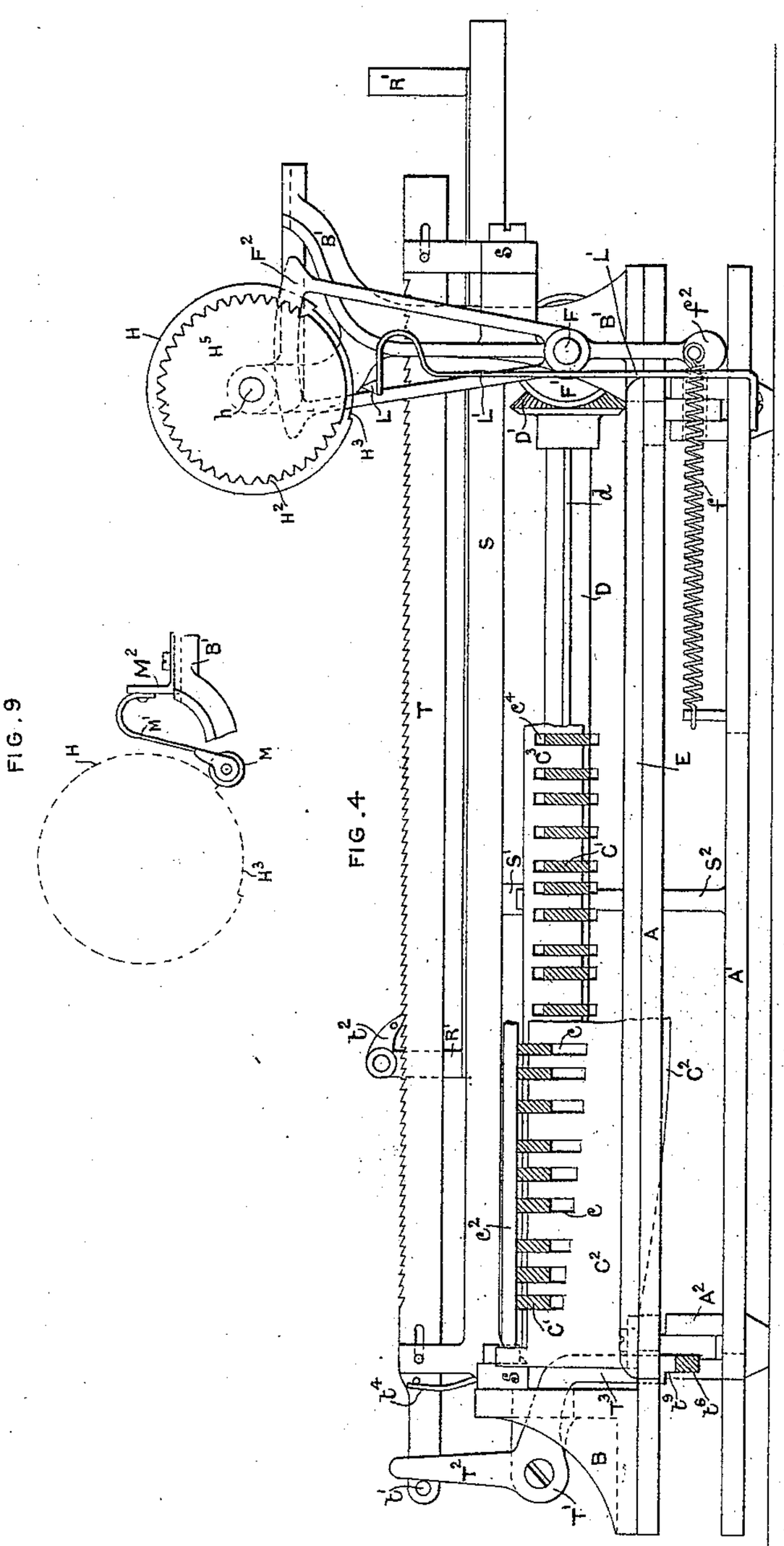

FIG. 9

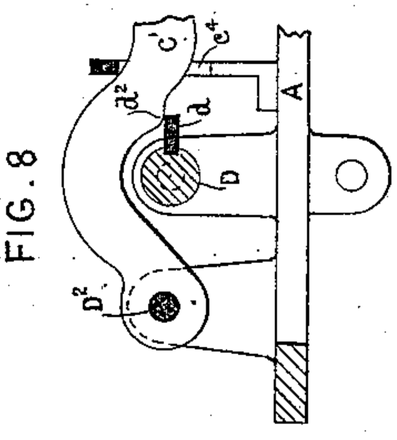

FIG. 8

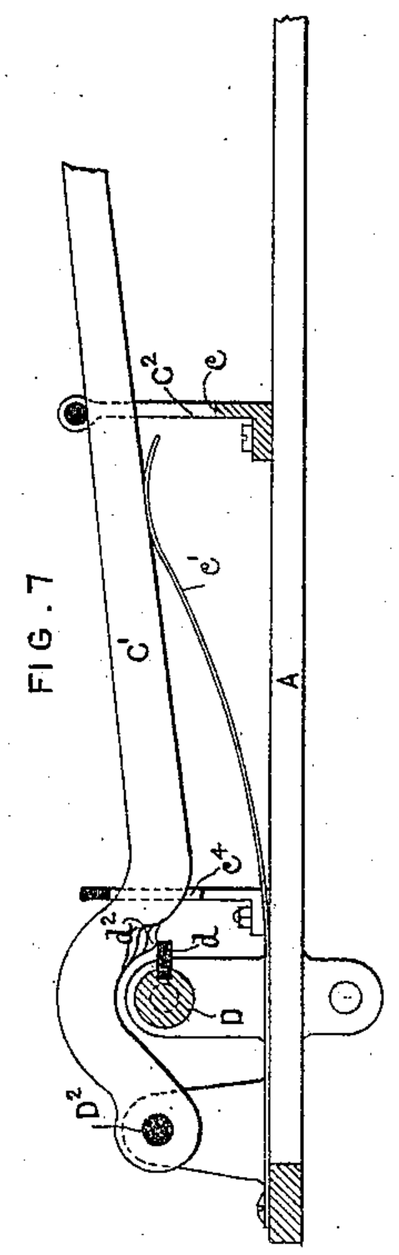

FIG. 7

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UNITED STATES PATENT OFFICE.

FREDERICK MYERS, OF LIVERPOOL, ENGLAND.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 442,819, dated December 16, 1890.

Application filed May 14, 1889. Serial No. 310,696. (No model.) Patented in England July 18, 1888, No. 10,410; in France January 17, 1889, No. 195,430, and in Belgium January 18, 1889, No. 84,675.

To all whom it may concern:

Be it known that I, FREDERICK MYERS, a citizen of the United States of America, residing at Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain new and useful Improvements in Type-Writing Machines, (for which I have received Letters Patent in England, No. 10,410, dated July 18, 1888; in France, No. 195,430, dated January 17, 1889, and in Belgium, No. 84,675, dated January 18, 1889,) of which the following is a specification.

This invention relates to that kind of type-writing machine in which the type are arranged above the paper carriage or platen upon the peripheries of one or more vertical disks, the said disk, or each disk, (if there be more than one,) being rotated into a given position for each type thereon, the relative amounts of such rotation depending upon the relative distances to which the type-key levers are depressed. Certain portions of the mechanism are, however, applicable to type-writing machines other than the above, and certain portions also are fully described and claimed in my former patent specification, Serial No. 304,816.

The invention relates more especially to the position and manner of mounting the type-wheel, to the mechanism for operating and adjusting said wheel, to the spacing mechanism, to means for raising the platen against the type, and to various other details, the object being to construct a strong and comparatively cheap machine, and one which shall at the same time be easily and quickly worked by means of the ordinary keys placed in front of the machine.

The invention may be understood by reference to the accompanying drawings, in which—

Figure 1 is an end elevation of the machine. Fig. 2 is an elevation of the reverse end of the machine to that shown in Fig. 1. Fig. 3 is a plan of the machine with parts broken away. Fig. 4 is a front elevation of the machine with parts removed and other parts broken away. Figs. 5 to 8 are views showing various details and modifications of the key-levers and their connections. Fig. 9 is a detail view of the inking mechanism. Fig. 10 shows a modified device for holding the type-wheel in any of its longitudinal positions.

In the drawings and specification only so much of the machine is shown and described as is necessary for the proper understanding of the invention.

On one end of the main frame A of the machine is mounted an upright frame B, and on the other an overhanging standard B′. The main frame carrying the aforesaid frame and standard and almost the whole of the mechanism is pivoted, as at A^2, in an approximately horizontal position to the lower fixed machine-bed A′, being held in its normal position by a spring or springs A^4 and an adjustable stop a^4, which is preferably fitted with a buffer-block. A similar buffer or buffers a^5 may also be provided for the frame to strike against at the termination of its downward movement.

The main frame is preferably pivoted to the bed A′, directly below the key-lever shaft D and platen R, as shown in Figs. 1 and 2, or even slightly in advance of these parts. By this arrangement the weight of the frame and mechanism is almost equally distributed on each side of the pivots A^2, so that a comparatively light spring may be employed at A^4, and little power is required to compress the spring when the frame is depressed.

The keys C are preferably arranged in three parallel rows at the front of the machine. The same keys which are used for printing the large characters are also used for printing the small characters and the figures, in the manner hereinafter described. Each key is attached to the front end of a key-lever C′, all the key-levers being carried by the horizontal key-lever shaft D, which passes through their rear ends and is supported in bearings, preferably on the main frame A, and upright frame B, aforesaid. The key-levers may be connected to the key-lever shaft by a long key or feather *d*, which passes through a suitable slot *d′* in the eye of each lever, so that the shaft is rotated for a certain distance whenever a key-lever is depressed, (see Fig. 5;) or the eye of each key-lever may be provided with a feather, and a long slot may

be formed in the lever-shaft. Each of the key-levers is guided preferably at or near its outer end by guiding-slot *c*, Figs. 3 and 4, against the lower end of which it strikes when depressed to a certain distance. The slots are preferably formed in a vertical rib C^2, extending across the main frame below the levers. No two slots in the rib have the same depth, so that each key depresses its lever to a different point and rotates the shaft through a different angle from that of any other key. Each key-lever, after being depressed, is returned to its normal position by a spring *c'*. This spring is preferably secured to the rear of the frame A and rests against the under side of the lever. By this arrangement the levers cannot depress the main frame before striking the bottom of the slots *c*, as they otherwise might do if the springs were mounted upon the front part of the frame. The upward movement of the levers is controlled by a check-rod c^2 or by other suitable check arrangement.

The levers C' may be retained in their position longitudinally upon the shaft D by loose collars upon the shaft; but it is preferable to retain them in position by passing them through slots c^4 in a vertical rib C^3, Figs. 4 and 5, which is mounted upon the frame A and placed as near as practicable to the shaft. After a lever is released the shaft D is returned to its normal position by a spring *f*, hereinafter described.

To avoid depressing all the levers each time a key is moved, the slots *d'* in the lever-eyes are extended downward—that is, away from the working-edge of the feather *d* on the key-lever shaft, as shown in Fig. 5, or upward from the feather *d* if the latter be on the rear side of the shaft. The upper or working edge of the feather is held normally in an arrangement such as shown in Fig. 5 by the spring *f* aforesaid, or its equivalent, against the corresponding edges of all the slots, so that the least downward movement of a key-lever will actuate the shaft. The greatest movement of which a key-lever is capable will not, however, cause the shaft to rotate so far as to bring the lower or rear edge of the feather in contact with the corresponding sides of the slots of the other levers and the latter will consequently remain stationary.

Instead of mounting the key-levers C' upon their shafts D, as described above, so that their varying travel imparts a varying movement to the type-wheel, they may be mounted upon or connected with their shaft, as shown in Figs. 6 and 7, by either of which arrangements the varying movements of the type-wheel may be effected with a constant key-lever travel. In the arrangement shown in Fig. 6 the working-edges of the slots *d'* in the lever-eyes instead of bearing normally against the working-edge of the feather *d*, as in Fig. 5, are located at a certain distance above—that is, away from—the working-edge of the feather in the shaft, (or below the working-edge, if the feather be on the rear side of the shaft,) so that during a certain definite portion of each lever's movement the shaft remains stationary. No two slots have their working-edges at the same distance from the corresponding edges of the feather, and therefore the shaft D (and consequently the type-wheel) will be rotated by the constant travel of each lever into a different and definite position. This constant travel is effected by placing the lower ends of all the guiding-slots *c* at the same distance below the levers. The working-edge of the feather *d* may be held normally by the spring *f* against the corresponding edge of the narrowest slot *d'*, so that the least downward movement of the corresponding lever will actuate the shaft; or the shaft may be held in its normal position by other equivalent means.

In the modified arrangement shown in Fig. 7, which also gives a constant lever-travel, the key-levers C' are connected with their shaft in such a manner as to greatly reduce the friction between the levers and shaft when the latter is rotated by any given lever. The levers are loosely pivoted upon a rod D^2, carried in suitable brackets on the main frame A and lying parallel to and in the rear of the lever-shaft D. The feather *d* in said shaft is extended outward for a short distance and the levers are arched over the shaft and are each provided with a projection or shoulder d^2, which is located at a given distance above the feather, the amount of such distance depending on the amount of movement required on the shaft. By this arrangement the friction is reduced to that of the shaft-bearings of the feather *d* and lever projection d^2, and of one lever-eye. The working-edge of the feather *d* may bear normally, as before, against the lowest projection d^2.

Fig. 8 shows how the arrangement set forth in Fig. 7 may be so modified as to give a variable lever movement. All the projections d^2 bear normally against the feather *d*, and the slots *c* are of various depths, as described with reference to Figs. 3, 4, and 5.

The type-wheel and the adjusting, locking, and driving mechanism therefor may be arranged as follows: The key-lever shaft D carries a bevel-wheel or quadrant D', which gears with a similar wheel or quadrant F' on a transverse shaft F, carried in bearings on the upright standard B' aforesaid. The front end of the shaft F carries a toothed quadrant-arm F^2, which projects vertically upward for some distance. The said arm is connected with the spring *f*, or its equivalent, which returns it to its normal position whenever it is released, the said spring being preferably secured to a weighted downward extension f^2 of the quadrant-arm, as shown. The said weighted extension serves as a counter-balance for the quadrant-arm F^2 as the latter is oscillated.

The type are carried on the periphery of a

type-wheel H, which is mounted upon a horizontal shaft *h* above the platen R in such a manner as to be capable of oscillating in a vertical plane passing approximately through the axis of the said platen. The type are arranged in one or more (preferably three) parallel circles Z Z′ Z^2 around or partly around the periphery of the type-wheel, a blank space or gap H^3 being left at one point in the circles of type or in the type-wheel itself, for a purpose hereinafter set forth. Instead of arranging two or more groups of type upon one wheel, I may arrange them on separate wheels of equal diameters mounted side by side upon the same shaft. One group or circle of type—as, for instance, Z—contains the capitals and the stops or signs most frequently used therewith. A second group, as Z^2, embraces the small letters, with their usual stops, &c., while the third group Z′, which is preferably the central one, includes the numerals and those stops, signs, or characters which are seldom used. By thus arranging the type in two or more parallel rows the diameter and weight of the type-wheel may be greatly reduced.

The type-wheel shaft *h* is mounted in suitable bearings *h′* upon the machine, preferably upon the standard D′, so as to move with the main frame, but independently of the platen R. The shaft *h* is capable of a considerable amount of movement longitudinally, so that any of the groups of type upon the type-wheel may, as desired, be brought into position above the platen by simply pushing back or pulling forward the shaft. The shaft and wheel are held in the desired longitudinal position by means of a spring-pawl K^2, or its equivalent, which is adapted to engage any one of a series of parallel circumferential grooves K^3, carried by the shaft and corresponding in number and distance apart to the groups of type on the type-wheel. The grooves can be formed on a boss on the type-wheel or shaft, as shown, or upon the shaft itself, and the spring-pawl is so constructed as to yield when a slight force is applied longitudinally to the shaft, while at the same time it is stiff enough to hold the type-wheel securely in position without in the least interfering with its rotation; or the grooves K^3 may be replaced by a simple collar having a central groove, the pawl in this case resting either within the groove or against one end of the collar. This arrangement may be seen in Fig. 10.

The type-wheel shaft carries near its front end a toothed wheel K, into which gears the vertical quadrant-arm F^2 aforesaid, so that the type-wheel is rotated more or less at each movement of the quadrant-arm—that is, of the key-lever shaft D, worked by the key-levers. It will be obvious that other mechanism might be employed for connecting the main shaft with the type-wheel.

The front end of the type-wheel shaft carries a locking wheel or disk H^5, having on its periphery a series of teeth or notches H^2, or their equivalent, corresponding in number to and in the same relative angular position as the type on the type-wheel. A locking pin or pawl L is arranged to engage with one of these notches each time the main frame is depressed to print a character, so that the type-wheel is always held firmly in position during the moment of printing.

The locking-pawl L is preferably supported by a spring-finger L′ attached to the fixed bed A′. After the pawl has engaged one of the notches H^2 and during any further depression of the main frame the spring-finger is compressed and prevents any injury to the locking wheel or pawl. The locking-wheel H^5 also serves as a handle for adjusting the longitudinal position of the type-wheel.

One side of the hinged bed S, carrying the platen-frame R′, is hinged or pivoted to the upright frame B and standard B′, or in other convenient manner, and the other side (preferably the rear one) is supported (by means of a projection S′ on the hinged bed) upon an abutment S^2, carried by the fixed machine-bed A′, as shown in Figs. 1 and 2. The bearing-face of the abutment S^2 or projection S′ (or both) is curved or sloped, as shown, in such a manner that the rear side of the bed S (and therefore the printing-platen R) is raised slightly, as the pivots *s* of the hinged bed are drawn slightly forward and downward by the depression of the main frame A in the act of printing. The bed S might be pivoted at its rear side upon the main frame and its front side be supported upon an elevating device S′ S^2, as above described. The depression of the pivoted main frame A also causes the platen-frame R′ to be moved longitudinally the necessary distance for spacing the letters. This may be effected as follows: A toothed rack T is supported in brackets attached to the hinged bed S, and has at or near one end a horizontally-projecting pin *t′*, Figs. 3 and 4. The sliding platen-frame R′ has pivoted to it a pawl t^2, which engages the teeth of the toothed rack in one direction only. The rack-pin *t′* is engaged by the upwardly-projecting arm T^2, Fig. 4, of an angle-lever T′, which is pivoted to the frame B. The other arm T^3 of the lever is first cranked horizontally and then projects vertically downward and rests upon the rear end of the lever t^6, Figs. 1 and 3, which is pivoted to the fixed bed A′ at t^7 and to the front of the oscillating main frame A at t^8. As the main frame is depressed, the rear end of the lever t^6 rises and lifts the arm T^3 of the angle-lever. By reason of the shape of the angle-lever T′ the lower end of the arm T^3, when raised, moves sidewise toward the right, while the upper end of the arm T^2 moves toward the left and draws along the rack T. By the time the rack has been moved the proper distance, the lower end of the arm T^3 has moved off the rear end of the lever t^6, and any further upward movement of the latter (due to the depression of the frame A

during the moment of printing) takes place along the vertical part t^9 of the arm T^3 without causing it to be moved sidewise. When the main frame is released, the rack T and lever T′ are returned to their normal position by the spring t^4.

In spacing a word the main frame is depressed by means of a finger-bar E, provided at its front edge for that purpose. A gap H^3 is left as aforementioned in the groups of type on the type-wheel H, in order that the platen, when raised in spacing a word, may not come in contact with the wheel.

The sheet of paper Q is held in position on one side of the platen by a wire or rod r^3, Figs. 2 and 3. The wire r^3 is cranked at each end, and is pivoted to the platen-frame at r^5, as shown, a stop r^9 being provided at one or both ends for it to rest against. The wire clip is pivoted somewhat stiffly in its bearings, and the stop or stops r^9 are in such a position that the clip, when resting against them, lies near enough to the platen to cause the paper Q to lie close against its upper side, but not so near as to press the paper against the side of the platen and prevent it from moving freely along when the platen is turned round in spacing a line. In conjunction with the clip r^3 the top of the paper-guide r^8 is so placed as to hug the platen and hold the paper tightly against the same on the side remote from the clip. To fix a sheet of paper in the machine, the edge of the sheet is first slipped under the platen, being guided by the guide r^8. The platen is then turned so as to draw the paper past the guide and the clip is thrown back. The edge of the paper is now turned over the platen and held in position thereon by replacing the clip.

The type may be inked previous to each impression, as follows: The ink is placed upon a roller M, Figs. 3 and 9, of absorptive material. This roller bears against the type and is carried in bearings, preferably upon the spring-arm M′. The latter is attached to a bracket M^2, which is adjustably mounted in guides upon the frame or standard B′, as shown in Figs. 2, 3, and 8. The type required to print is drawn across the ink-roller each time the type-wheel is rotated previously to and after printing.

A warning-bell, such as is usually found in type-writing machines, may be placed in any convenient position, so as to ring when a line is almost complete.

The mode of action of the foregoing parts of the machine is as follows: The type-wheel H is first adjusted so that its spring pin or pawl K^2 rests in that groove on the type-wheel shaft corresponding to the group of type with which it is desired to print. A key is depressed and causes a partial rotation of the type-wheel by means of the key-lever C′, belonging to the said key, and the mechanism connecting the said lever with the type-wheel shaft. The key-lever strikes the bottom of its guiding-slot *c* as soon as the type-wheel has been rotated sufficiently to bring the corresponding type into position for printing. By continuing the pressure on the key the pivoted main frame A is depressed. This causes the locking-disk H^5 to be brought down upon the locking pin or pawl L aforesaid. The pawl, entering the notch H^2 immediately above it, exactly adjusts and locks the type-wheel in position before printing. During the first part of the downward movement of the main frame A the rack T is operated by means of the lever t^6 and the angle spacing-lever T′, and the platen R is consequently drawn along into the proper position for printing. During the depression of the main frame the platen R is raised toward the type-wheel H by the sliding contact of the projection S′ and abutment S^2, and by the time the main frame has descended to the buffer a^5 the platen has pressed the paper against the type-wheel and produced an impression. The key being released, the key-lever, type-wheel, and main frame are returned to their normal position by their respective springs, the spacing-lever releases the rack-pin t', and the rack is returned to its original position by its spring t^4. The machine is now ready for another or the same key to be depressed to produce the next impression.

In describing the foregoing parts of the machine it has been assumed that the matter was printed from left to right. The machine could, however, be arranged to print from right to left; also, the style of the printed characters may be varied by having a series of similar type-wheels, each bearing characters of a particular style, any one of which wheels may be readily changed for any other, disconnecting the wheel from its shaft, and withdrawing the latter from its bearings.

I do not herein lay any broad claim to the following constructions, as substantially similar constructions are fully described and claimed in my pending application, Serial No. 304,816.

The combination, with a type-wheel and a type key-lever shaft, of a toothed wheel on said shaft, a wheel gearing with the same and rigidly mounted upon an oscillatory shaft, a toothed quadrant on said oscillatory shaft, and a toothed driving-wheel gearing with said quadrant and movable synchronously with the type-wheel.

The combination of a type-wheel having type arranged around its periphery, a locking-wheel movable synchronously with the type-wheel and having a concentric series of notches on its periphery corresponding in number and relative angular position with the type, a depressible main frame carrying both type-wheel and locking-wheel, and a locking-pawl mounted in proximity to the locking-wheel and adapted to be introduced into the adjacent notch on said wheel at each depression of the main frame.

I claim as my invention—

1. In a type-writer, the combination of a

type-wheel capable of an oscillatory and a longitudinal movement upon an approximately horizontal axis, a series of key-levers connected with said type-wheel and adapted to impart varying amounts of oscillation to the same, a depressible main frame carrying said wheel, together with the said levers and connecting mechanism and pivoted upon an axis lying below the wheel and approximately at right angles to the axis of the same, and a platen-carrying bed below the wheel, hinged at one side to the main frame on an axis approximately parallel to the pivot-axis thereof and supported at the opposite side upon an elevating device not carried by the frame, substantially as described.

2. In a type-writer, a pivoted depressible main frame A, a type-wheel H, mounted thereon, and a platen-bed S, located below the type-wheel and hinged at or near one side to the main frame, as described, in combination with a stationary abutment S^2, supporting the opposite side of the platen-bed and having a sloping termination adapted to bear against the opposing sloping face of a piece S′ on the bed, whereby the depression of the main frame causes the platen-bed to be raised toward the type-wheel a distance sufficient to print, substantially as set forth.

3. In a type-writer, the combination, with a rocking shaft D, connected by suitable mechanism with an oscillatory type-wheel, of a series of parallel depressible key-levers arranged transversely to said shaft, each lever having the same amount of travel and each constructed to operate the said shaft during a definite and different portion of such travel, whereby a variable type-wheel movement is obtained with a constant movement of the key-levers, substantially as set forth.

4. In a type-writer, a type-wheel H, a shaft D, connected therewith, and a series of key-levers C′, each having the same travel and each capable of imparting a different amount of rotary movement to the said shaft, in combination with a check-rod c^2, placed above the upper edges of the said levers, springs c', adapted to hold the levers normally in contact with said check-rod, and an upright rib C^2, provided with lever-guiding slots c, having all their lower closed ends located at the same distance from the opposing lower edges of the levers, substantially as set forth.

5. In a type-writer, the combination, with a rocking shaft D, connected with an oscillatory type-wheel, of a series of key-levers C′, lying transversely to said shaft and mounted upon a separate axis in the rear of the same, a projecting feather d upon the shaft, and a projection upon each lever adapted to engage the said feather, whereby the shaft may be operated by the depression of a lever with a minimum amount of friction, substantially as described.

6. In a type-writer, the combination, with a rocking shaft D, held normally in a given angular position, of a series of key-levers C′, having a constant travel and mounted transversely above the shaft upon an axis in the rear of the same, a projecting feather d upon the shaft, and a projection d^2 upon each lever adapted to engage said feather and having its lower face located normally at a distance from the upper face of the feather different from that of any of the other projections, substantially as set forth.

7. In a type-writer, the combination, with a depressible main frame A and a reciprocatory spacing-rack T, connected, as described, with the sliding platen-frame, of a pin t', projecting laterally from said rack, an angled spacing-lever T′, pivoted on the main frame and having one of its arms bearing against the side of said rack-pin, and a rocking lever t^6, pivoted upon a stationary part of the machine and having one end engaging the other arm of said angled lever and the opposite end connected to the front portion of the main frame, whereby the said rack and platen are drawn along the necessary distance to space a character or word each time the main frame is depressed, substantially as described.

8. In a type-writer, a reciprocating spacing-rack T, having a rack-pin t', a depressible main frame A, and a rocking lever t^6, operated, as described, at each depression of the said frame, in combination with an angled spacing-lever T′, pivoted to the main frame and having its upwardly-extended arm T^2 bearing against the side of the said rack-pin and its lateral downwardly-cranked arm T^3 bearing with its lower extremity upon the rear end of the said rocking lever, and provided at such extremity with a vertical part t^9, substantially as and for the purposes set forth.

9. In a type-writer, the combination of a type-wheel H, an absorptive inking-roller M, bearing against the type, a flexible arm M′, carrying said roller, and a bracket M^2, serving as a support for said arm and adjustable in guides to and from the type-wheel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

F. MYERS.

Witnesses:
WM. P. THOMPSON,
H. P. SHOOBRIDGE.