F. G. STALLMAN.

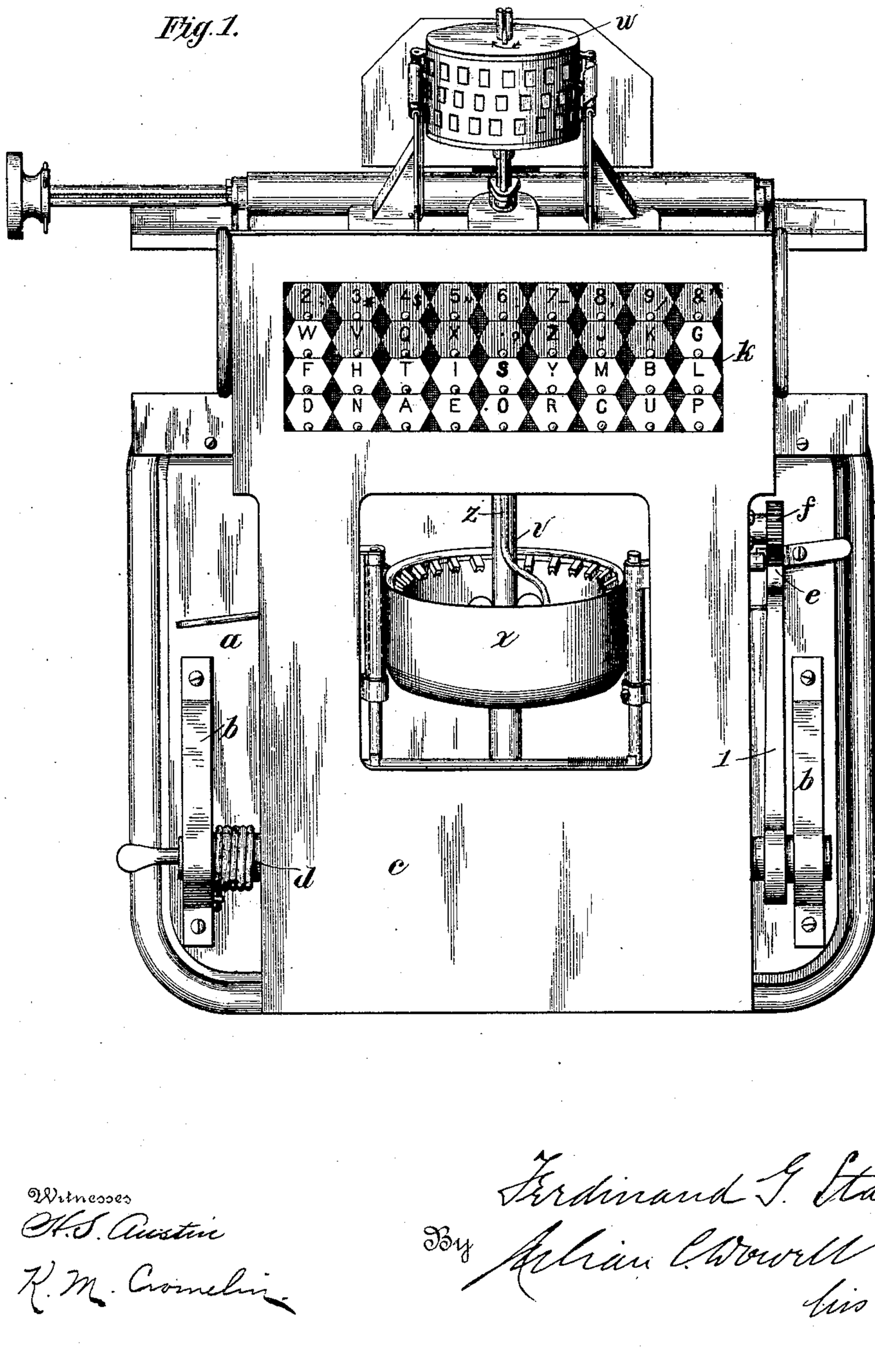
TYPE WRITING MACHINE.

APPLICATION FILED OCT. 22, 1903.

966,714. **Patented Aug. 9, 1910.**

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

Fig. 2.

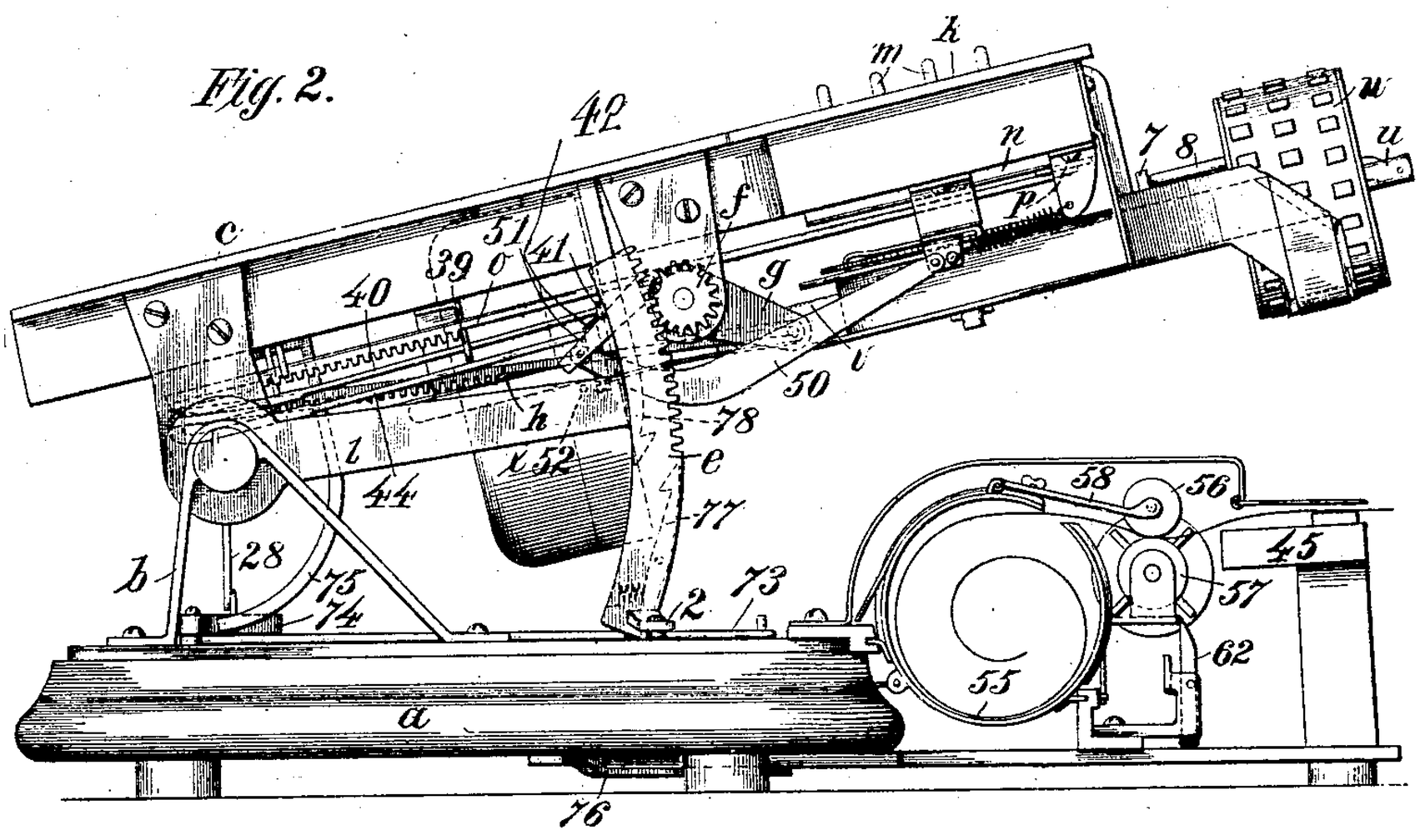

Fig. 3.

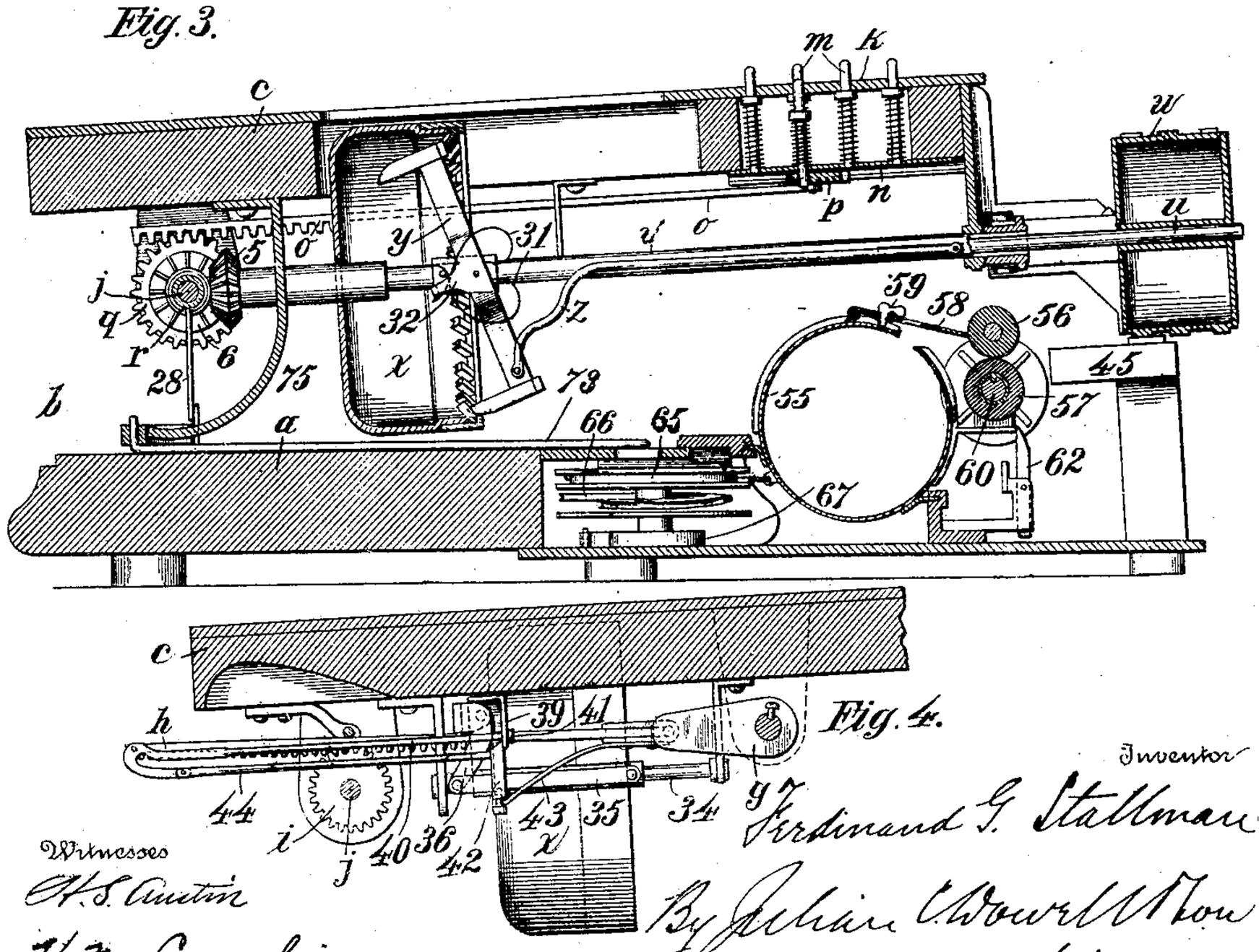

Fig. 4.

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5 SHEETS—SHEET 3.

Fig. 5.

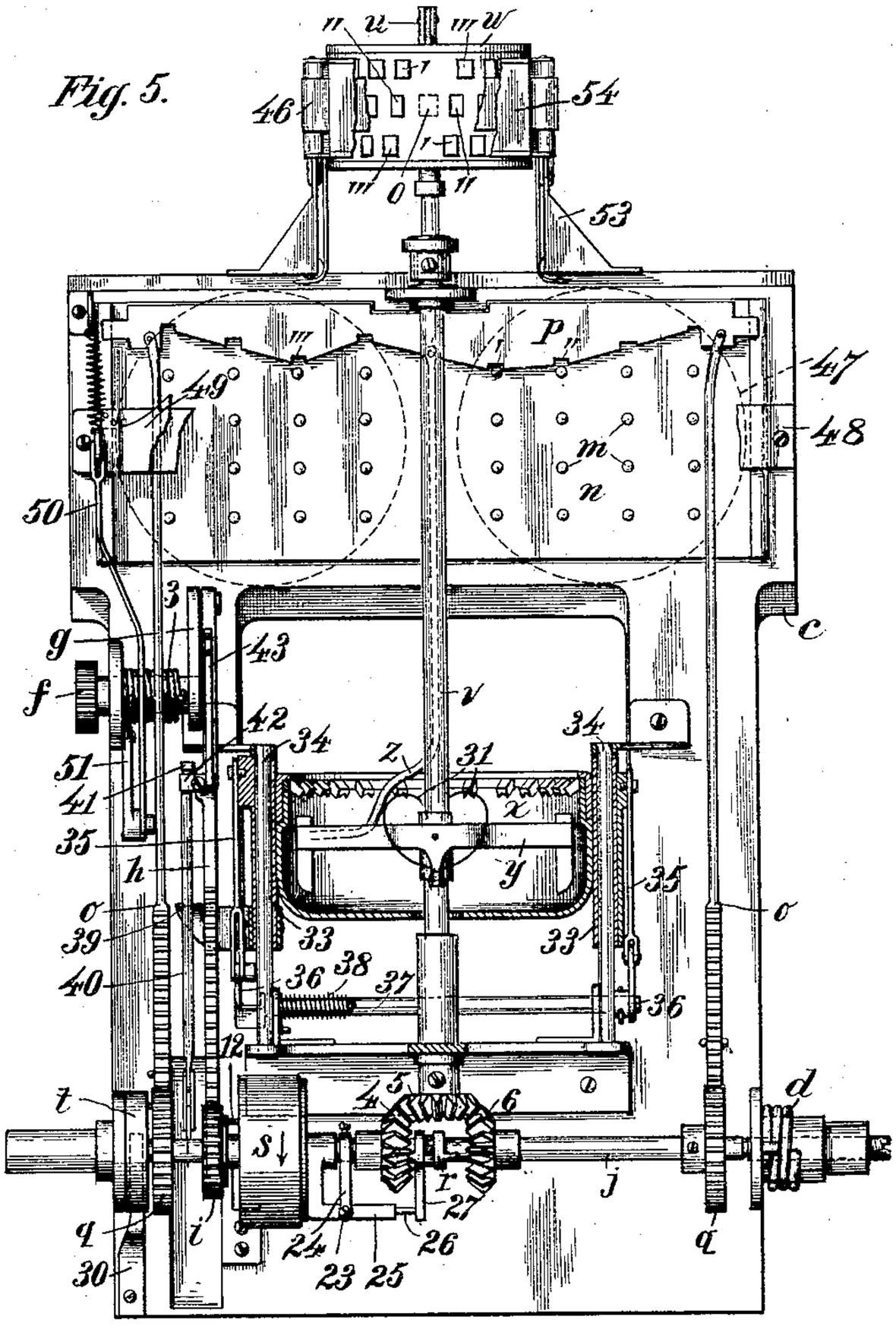
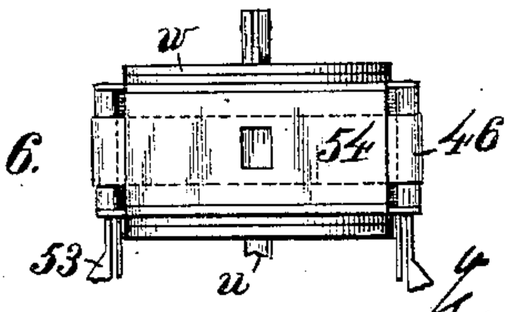


Fig. 6.



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5 SHEETS—SHEET 4.

Fig. 7.

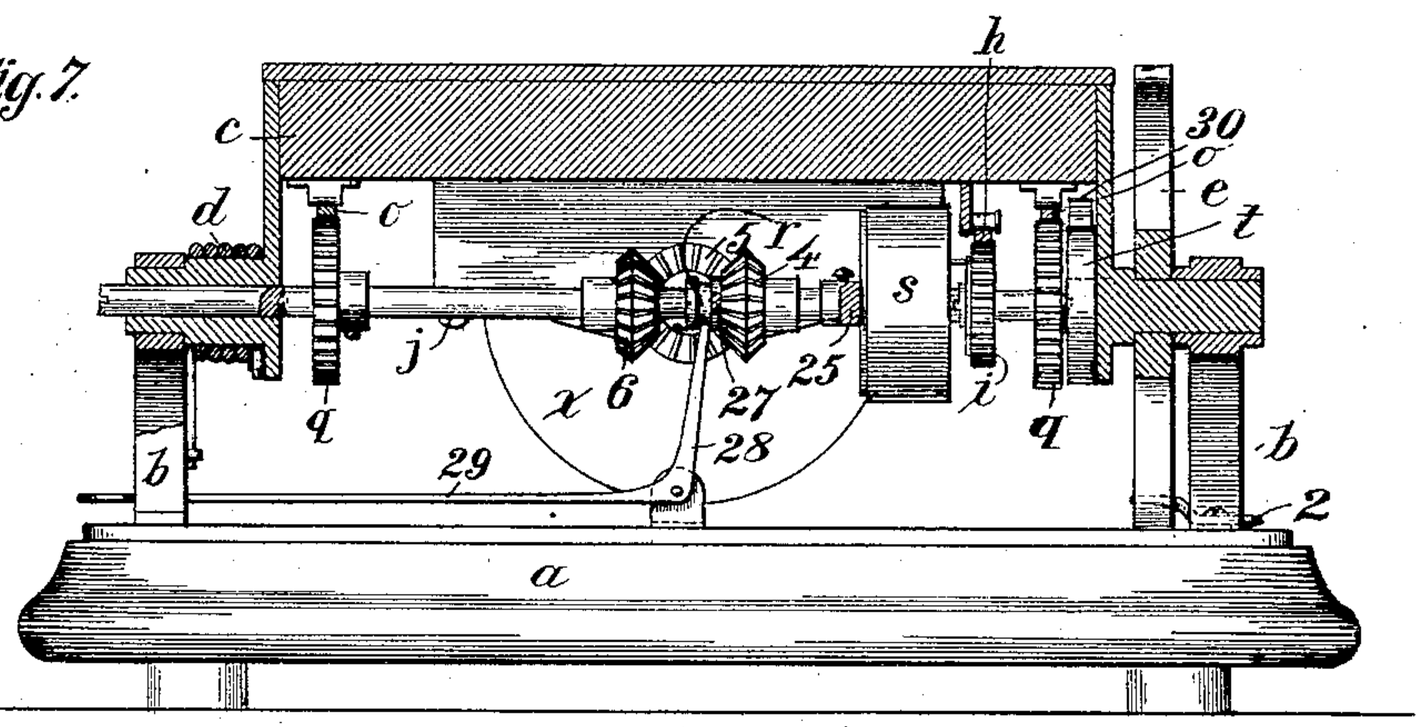


Fig. 8.

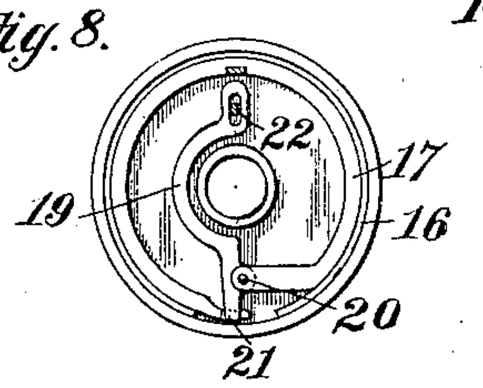


Fig. 9.

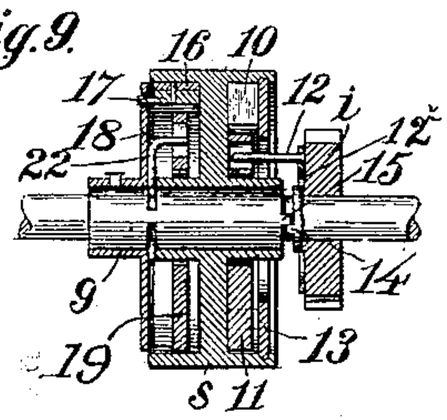


Fig. 10.

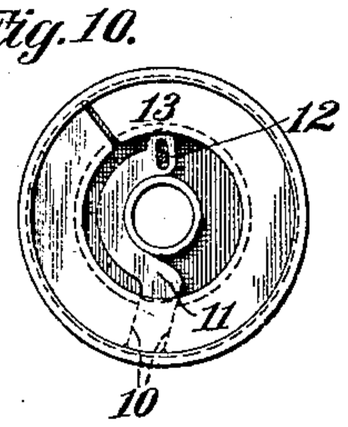


Fig. 11.

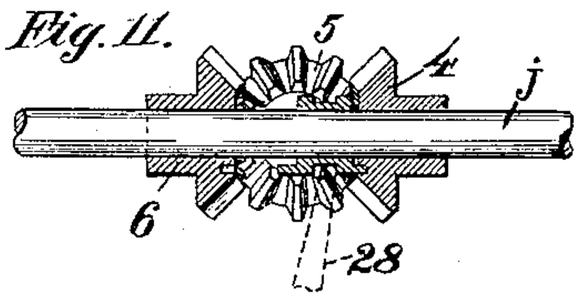
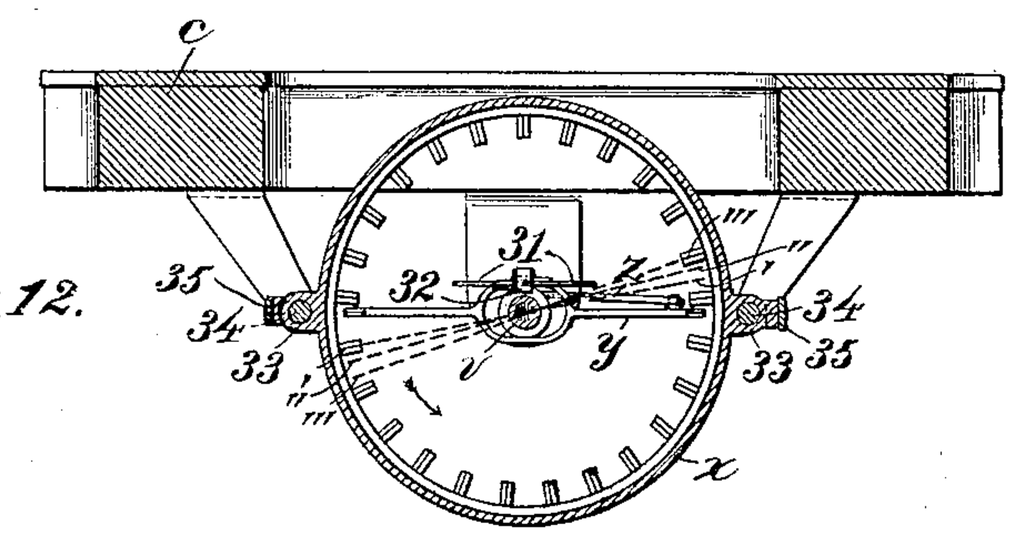


Fig. 12.



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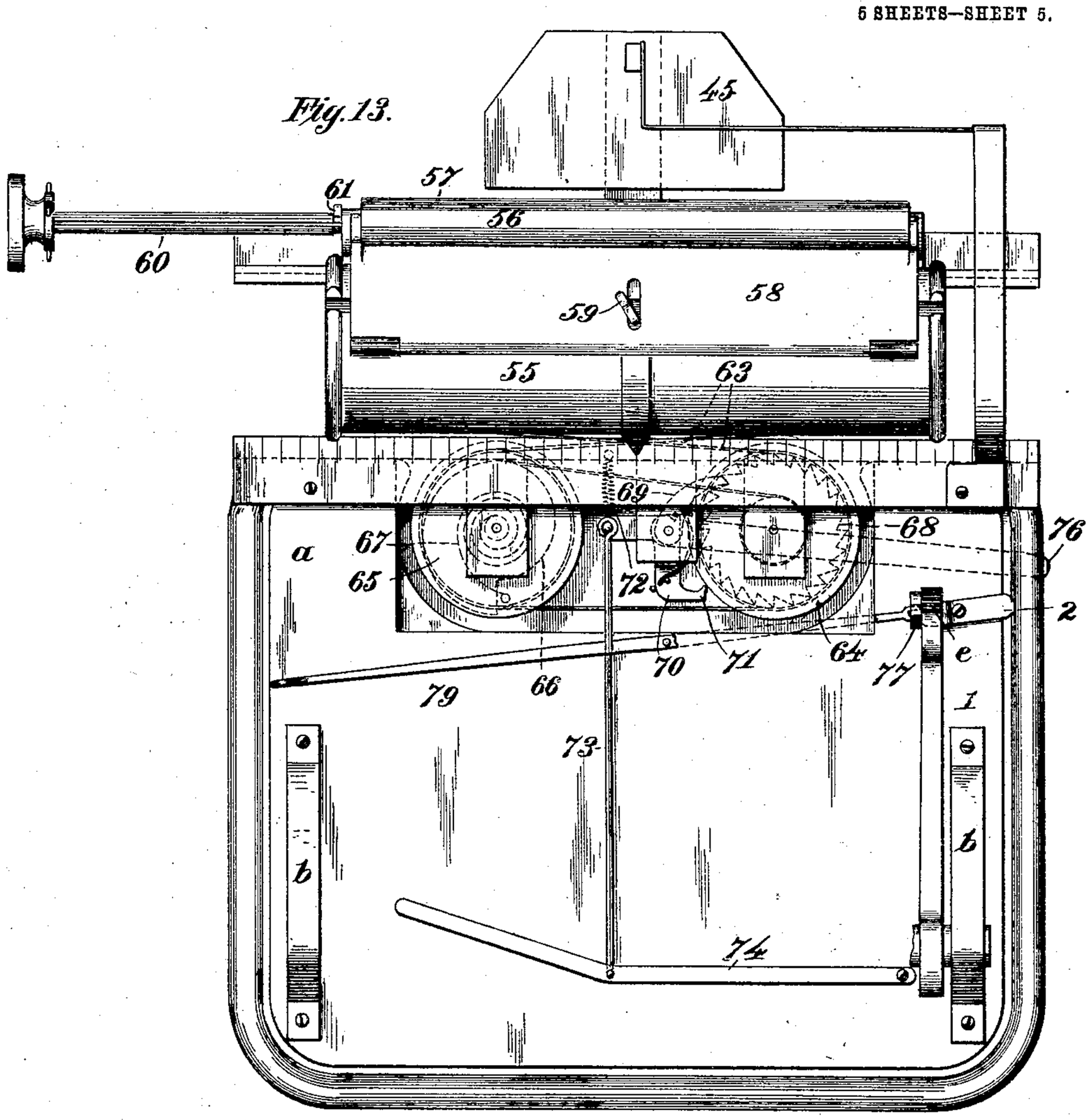
TYPE WRITING MACHINE.

APPLICATION FILED OCT. 22, 1903.

966,714. **Patented Aug. 9, 1910.**

5 SHEETS—SHEET 5.

Fig. 13.



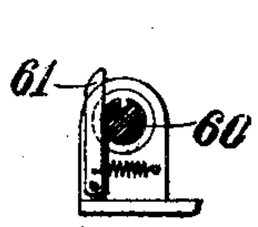


Fig. 14.

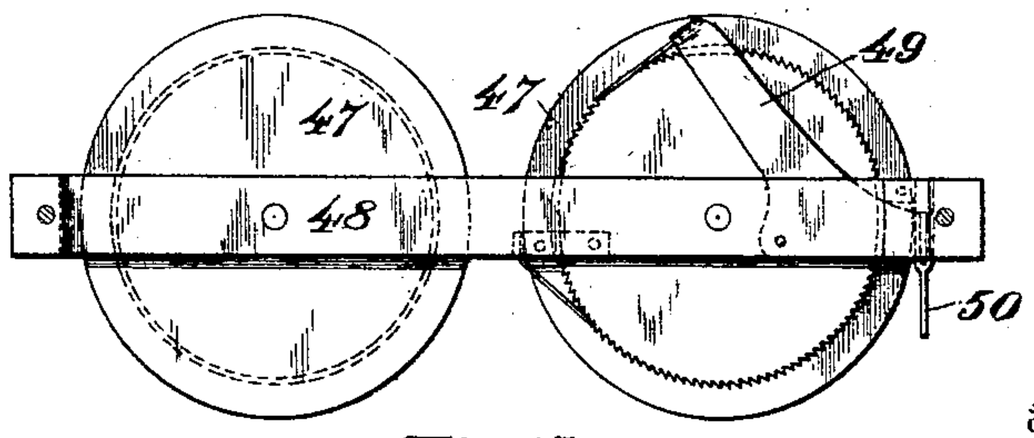


Fig. 15.

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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

966,714. Specification of Letters Patent. **Patented Aug. 9, 1910.**

Application filed October 22, 1903. Serial No. 178,102.

To all whom it may concern:

Be it known that I, FERDINAND G. STALLMAN, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in 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 relates particularly to type-writing machines employing a rotary or pivotal type-wheel or segment with the characters for impression mounted thereon and a depressible key-board or movable member for actuating and controlling the type-wheel or segment to bring the characters corresponding to the keys touched by the fingers into proper position for striking or imprinting on the paper.

The principal objects of the invention are: first, to produce an efficient but exceedingly simple, compact, light and comparatively inexpensive machine of this character, having the functions and utilities of a first class type-writer, though especially adapted to meet the requirements of traveling men and others for office and traveling use; second, to provide an improved simple and efficient type-mechanism and actuating mechanism therefor; third, to furnish a small key-board with the keys or characters closely assembled within range of a single glance of vision and within touch of the fingers of one hand, together with a rest for the palm of the hand, so that the machine may be operated with ease and rapidity entirely by the fingers without raising the wrist; fourth, to provide improved and simplified mechanism for actuating and controlling the type-wheel or segment by the key-board, including means for exerting a resisting force influenced and regulated at the proper periods, so that the tension of the several strokes will be equal and the pressure of every stroke of the key-board will be practically constant throughout; fifth, to provide improved positive automatic means for shifting the type-wheel or segment in an axial direction when necessary for bringing the letters or characters thereon into position for impression, and for locking said type-wheel or segment in its proper position for effecting the printing; sixth, to provide an improved special construction of carriage and roll or paper support for the machine, with the various necessary adjusting devices and means for moving the carriage step by step across the machine, with provision also for adapting the carriage for use with wide sheets of paper, while confining its length within the narrow width of the machine for packing the latter in a traveling-case; and seventh, to improve generally the construction and operation of the machine, and to provide efficient connections and adjuncts for carrying out its various functions.

The invention will hereinafter be fully described with reference to the accompanying drawings, which are to be taken as a part of this specification, and will then be pointed out more particularly in the annexed claims.

In said drawings: Figure 1 is a top plan view of a type-writing machine embodying my invention, with the parts in normal position. Fig. 2 is a side elevation thereof. Fig. 3 is a central longitudinal vertical section of said machine, showing the parts in position for effecting an impression. Fig. 4 is a fragmentary view partly in side elevation and partly in section of the type-wheel shift-actuating mechanism in a position corresponding to Fig. 3. Fig. 5 is a bottom plan view of the movable actuating plate or member and operative mechanism detached from the base or bed-plate of the machine, with certain parts broken away and with other parts in section for the sake of clearer illustration. Fig. 6 is a detail bottom plan view of the type-wheel, shield therefor and a part of the inking ribbon, said shield and inking ribbon being broken away in the preceding figure. Fig. 7 is a transverse vertical section taken on a plane running through the main driving shaft of this machine, with said shaft and various parts in elevation. Fig. 8 is a detail view of one side of a clutch-drum used in the machine illustrated herein. Fig. 9 is a vertical cross section through said clutch-drum. Fig. 10 is a detail view of the opposite side of said clutch-drum. Fig. 11 is a detail transverse section through the reversing gears for changing the direction of rotation of the type-wheel or segment. Fig. 12 is a detail back view of the type-wheel shift-ring and shift-lever actuated thereby. Fig. 13 is a top-plan view of the base or bed-plate of the machine, with the paper sup-

port, carriage and feed mechanism, the type-mechanism and actuating mechanism being removed. Fig. 14 is a detail view of a device for preventing a shift-rod on the carriage from being pushed back in a hollow inclosure therefor after it has been pulled out. Fig. 15 is a detail top-plan view of the ribbon reels.

General structure and operation.—My improved machine in the form adopted for the present illustration includes briefly:—(1) a depressible key-board or a lever or movable member actuated by pressure of the fingers upon the key-board, the latter having suitable stops or keys indicating the letters or characters to be printed; (2) a rotary or pivoted type-wheel or segment, hereinafter referred to as the "type-wheel;" (3) mechanism actuated by the key-board or said lever or movable member for turning the type-wheel to bring the proper type for impression into vertical alinement with the space on the paper which is to receive the impression, hereinafter designated as "type-wheel turning mechanism;" (4) means for stopping the rotation of the type-wheel at such point, while permitting a continued depression or movement of the key-board or actuating member, hereinafter referred to as the "type-wheel stop mechanism;" (5) means for exerting a resistance against the further depression or movement of the key-board, with means for influencing and regulating such resistance, hereinafter termed the "resisting means," the main purpose of which is to compensate for the loss of resistance caused by the check of rotation of the type-wheel, and to produce constant and equal tension for every stroke of the key-board; (6) means for automatically shifting the type-wheel in an axial direction when necessary to bring a type of an inner or outer row into position for printing on the proper space of the paper, and for locking the type-wheel in position, hereinafter referred to as the "automatic shifting and locking device;" (7) means for reversing at will the turn or rotation of the type-wheel, with an arrangement whereby on such reverse movements capitals or "upper case" characters corresponding to the small letters or "lower case" characters of the normal movements may be struck, hereinafter called the "reversing gear;" (8) suitable inking means, in this instance an inking ribbon and means for supporting and automatically feeding it; and (9) the carriage for the paper, with means for automatically moving it step by step across the machine. These several features will be described in the order given, together with the various adjuncts and attachments of the machine. It will be understood however that the invention is not limited to an inclusion of the particular parts above enumerated, since in some machines certain parts may be omitted, combined or supplied by other devices, while the several distinct features of invention are also applicable to other mechanisms. The following description will therefore be taken with reference more especially to the particular machine illustrated.

The frame and actuating mechanism.—In the drawings, *a* designates the base or bed-plate of the machine, and *b b* denote standards rising therefrom to which are fulcrumed a pivotal plate or lever *c*, hereinafter for convenience termed the actuating plate or member, the latter in the present instance having trunnions journaled in bearings in said standards. By means of a suitable spring, as indicated at *d*, the free or back end of the actuating plate is normally held upward. This actuating plate or lever, in the present machine, carries all the operating mechanism, with the exception of the carriage and its feeding-device; but such arrangement, while preferable and greatly advantageous, is not essential. The letter *k* denotes the key-board, shown located at the back or free end of the actuating plate, so that pressure upon the key-board will produce a suitable swing or downward movement of the actuating plate. The letter *j* refers to a transverse shaft, which may be mounted in any suitable bearings, though as shown its ends are journaled in and coaxially with the trunnions of the actuating plate or lever, said shaft being thus in constant relation with the other mechanism carried by said actuating plate. The letter *e* denotes a fixed segmental rack, and *f* a pinion carried by the actuating plate and in mesh with said rack. The segment *e* is represented having a forwardly extending arm 1, the end of which is loosely mounted on one of the trunnions of the actuating plate, and the lower end of the segment has a notch engaged by a catch 2 to hold the segment stationary. By disengaging the catch from said segment, the latter may be swung upward with the free end of the actuating plate, or may be carried with the actuating plate when detached from its base, still in mesh with the pinion *f* and thus always in proper relation. The shaft or spindle of the pinion *f* has a crank-arm *g*, connected to a toothed pitman or rack-bar *h* which engages a pinion *i* loosely mounted on the shaft *j* but adapted to be operatively connected therewith in the manner hereinafter explained. It is the turning of the pinion *f* by engagement with the segmental rack *e*, as the actuating plate or key-board lever is depressed by the operator, which actuates the operating mechanism of the machine. A suitable spring as indicated at 3 may be employed to aid the pinion and crank-arm in regaining their normal position after each movement.

The type-wheel is indicated by the letter *w* and its shaft by the letter *v*, the type-wheel shaft being at right-angles to the shaft *j* and geared thereto by reversing bevel gears 4, 5, 6, one of the gears 4 or 6 operatively connecting shafts *j* and *v*.

The key-board.—The key-board *k* (Fig. 1) at the free end of the actuating plate or key-board lever, is represented simply as a small lettered surface or sheet, having its letters and characters closely assembled so that the whole key-board may be comprehended in a single glance of the eye, and all the keys may lie within range of the fingers of the right hand of the operator, whose palm may rest on the front part or fulcrumed end of the actuating plate or lever, while his left hand may be free to shift the carriage or to perform such other adjustments as may be necessary. By providing such a rest for the palm with the keys or characters within reach of the fingers, the machine may be worked with ease and rapidity with one hand since no raising of the wrist nor movements of the hand from key to key are required. The pressure of the operator's palm and wrist upon the front end of the actuating plate or key-board lever, as the fingers are raised after striking the keys, also aids in quickly releasing and lifting the key-board after each depression. The letters and characters of the key-board are shown marked in little blocks or spaces. For the purpose of reducing the dimensions of the key-board to a minimum while yet insuring distinctness of every letter and character, the said blocks or spaces may be hexagonal in form and arranged in transverse rows with coincident apexes and in vertical columns with contiguous edges, while the intervening spaces between them may be blackened or darkened to distinguish each key or character. Any desirable arrangement of the letters and characters may be adopted, but for a machine of the present nature such an arrangement as illustrated is very advantageous. It will be observed that the letters and characters which are seldom employed are arranged in the shaded spaces of the two back or upper rows, while the letters which are frequently used are disposed together in the two front or lower rows. By means of an attachment hereinafter described the shaded characters may be cut out from operation, and the light characters may be operated by shorter strokes, thus increasing the speed. The keys may consist of little spring-held pins or studs *m*, vertically arranged in a suitable recess or recesses beneath the key-board, having their upper ends or tips projecting slightly through and above openings therefor in the key-board, preferably at the fronts or lower sides of the lettered spaces, and having their lower ends depending into apertures therefor in a plate *n* secured to the under side of the actuating plate or key-board lever *c*. By depressing any desired pin or key of the key-board, its lower end will be caused to protrude beneath said plate *n* and form a stop to arrest the movement of a sliding stop-plate *p*, hereinafter referred to in the description of the type-wheel stop mechanism. The arrest of this stop-plate checks rotation of the type-wheel with the type corresponding to the key depressed in vertical alinement with the space on the paper to receive the impression, as hereinafter explained.

The type-wheel and its shafts.—In the illustrated machine, the type-wheel shaft *v* (Figs. 1, 2, 3, 5 and 6) is journaled in suitable bearings or hangers on the under side of the actuating plate or key-board-lever, whereby the type-wheel acts as a hammer for imprinting the letters or characters on the paper, which may lie upon or against a suitable paper support, carriage or roller, or, as in the present case, the part of the paper which receives the impression may rest on a paper-support such as indicated at 45 in Figs. 2, 3 and 13. This arrangement, while exceedingly advantageous and desirable for simplicity, compactness and efficiency, is not however essential, since obviously the invention is applicable to a machine employing a type-wheel with a fixed axis and a separate hammer, actuated by the actuating plate or key-board lever; for if the type-wheel shaft were mounted in fixed bearings, it would still be properly geared with shaft *j* and actuated in the same manner by the mechanism *f*, *g*, *h*, *i*, *j*, while the actuating plate could carry a swinging hammer. The point or space on the paper-support where the impression is made on the paper is preferably slightly raised, as represented, for the purpose of receiving better the imprint from the cylindrical surface of the type-wheel and preventing blurring. This point or space may be termed the "printing space." The type-wheel may of course be a segment, since the type or character to be imprinted is brought into place by a semi-rotation of said wheel or segment; a wheel is employed by preference for compactness. In the present machine, a different rotation of the type-wheel is necessary for each letter or character; a certain rotation in one direction for small letters or "lower case" characters, and a corresponding rotation in the reverse direction for capitals or "upper case" characters, this latter being accomplished by the reversing gear hereinafter described. Hence the type-carrying surface of the type-wheel is divided into halves or segments, one of which has the small letters or "lower case" type and the other the capitals or "upper case" type. The type on the wheel are shown ar-

ranged in three circular or circumferential rows, and it will be observed that the letters of the several rows do not appear in longitudinal alinement, or in columns parallel with the axis, but they are shown disposed across the breadth of the type-wheel in oblique or inclined columns, that is a letter of each row is offset laterally with respect to the corresponding letter of either of the other rows; which is for the reason above stated that a different rotation of the type-wheel takes place for each type for impression.

The type-wheel is represented so disposed that when the actuating-plate or key-board-lever is depressed the middle row of type will lie in horizontal alinement with the line of writing on the paper, or immediately over the printing point, while the inner and outer rows will lie respectively in front and in rear or below and above such line of writing or printing space; so that if a type of the middle row is to be printed no shifting of the type-wheel is necessary, while if a type of either the front or back row is to be struck an axial shift is essential either backward or forward accordingly. Thus the same amount of shift takes place for either the front or rear row, which permits a simpler construction of operating mechanism than if either the inner or outer row lay normally in alinement with the line of writing and a single and double shift were necessary for striking the letters of the other two rows.

The type-wheel of the illustrated machine is normally held in position by the opposite equal actions of a spring or springs 31 hereinafter referred to. See Figs. 3 and 5. To permit rotation or turning and axial shift of the type-wheel, its shaft *v* or the back end thereof is made hollow, and the type-wheel is mounted on a shaft or spindle *u* slidably inserted in the end of said shaft *v*, which latter shaft is also suitably connected to the type-wheel so as to turn the latter therewith, as by means of an arm 7 rigid on shaft *v* having a rod or pin 8 extending loosely through a hole in the face of the type-wheel; as shown in Figs. 1, 2 and 5, a latch is pivoted in a slot in the end of the type-wheel spindle, to hold the type-wheel in place and permit its detachment when the latch is swung back into the slot.

The type-wheel turning mechanism.—As hereinbefore explained, the mechanism is actuated, on depression or movement of the actuating-plate or key-board-lever *c*, by turning of pinion *f* in engagement with segmental rack *e*, which rocks the crank-arm *g* and thereby reciprocates or moves forward the pitman or rack-bar *h*, the teeth of which mesh with pinion *i* on the driving shaft *j*. Said shaft *j* is connected to the type-wheel shaft *v* by said reversing bevel gears 4, 5, 6; either one of the beveled pinions 4 or 6 being adapted to be brought into action, by means of a reversing device *r*, according as to whether the small letters or capitals are to be printed (Figs. 3, 5, 7 and 11).

The letter *s* designates a clutch-drum or device loosely mounted on shaft *j*, or rather on a sleeve or part 9 on said shaft and which is itself capable of a slight limited oscillation or independent turn thereon. See Figs. 5, 7, 8, 9 and 10. This clutch-drum with its accessories performs four functions, viz: First, it clutches or operatively engages pinion *i* with shaft *j* to turn the type-wheel to the correct position corresponding to the key depressed; second, it releases or partly releases said shaft after each turning, when the type-wheel stop mechanism comes into play; third, it exerts a resistance against the continued movement or depression of the actuating plate or key-board lever, to compensate for the loss of resistance caused by check of rotation of the type-wheel and prevent a resistless drop or clap of the type-wheel upon the paper-support; and fourth, it permits a limited independent reverse turn of pinion *i*, after which the drum and shaft *j* continue the remaining reverse turn with said pinion to return the type-wheel to its normal position.

While different constructions of the clutch-drum may be adopted, the specific construction illustrated is as follows. The drum is divided by a radial web or partition into two parts or opposite circular recessed faces. In the side or face confronting the pinion *i* is located an automatic ratchet or clutch device adapted to lock the pinion with the drum on direct rotation of the pinion and to release the pinion from the drum on reverse rotation. For this purpose a divided ring or rather two confronting segments 10 are disposed in this side of the drum, and between the extremities of said ring or segments is fitted a part or end of a lever 11. By means of a pin 12 projecting from pinion *i* and engaging a notch or recess in lever 11, said lever is caused to rotate with said pinion. Said pin 12 is shown carried by a curved spring 12× on said pinion to serve as a cushioning means. Said lever is shown curved around and close to the hub of the drum at one side thereof, whereby on direct rotation of pinion *i* the initial turning of the lever will immediately twist its part between the extremities of the ring or segments 10 and thus spread the latter and produce a clutch, while on reverse rotation of said pinion the lever in turning will bear against the hub of the drum and simply carry around the ring or segments 10 with it. A ring or annular plate 13 is shown sprung into an internal peripheral groove therefor in this side of the drum, to hold the parts in place. Thus on

direct rotation of pinion *i* the drum turns therewith, clutching also part of the time with the shaft *j* as afterward explained to rotate the type-wheel; while on reverse rotation of said pinion the drum remains stationary until a lug 14 on the pinion abuts a lug 15 on the sleeve 9, whereupon the shaft together with the clutch-drum will make the remaining reverse turn with the pinion, the purpose of which is to return the type-wheel to its normal position after each direct turn to bring the proper type for impression into place.

In its opposite side or recessed face, the drum has a friction device, preferably a friction-ring or spring; in this instance two interfitting springs 16 and 17, medially connected together so as to constitute in effect a longitudinally split spring and connected at their juncture to a disk 18 fast on the sleeve 9; said disk also forming a closure for this side of the drum. The drum *s* is loose on the sleeve 9, but adapted to be clutched therewith by the friction-spring. The sleeve 9 is rotatable with the shaft, but is capable of a slight independent turn or oscillation thereon, limited by means of a pin 22 fast on the shaft and extending through a short slot or opening in the sleeve. The expansion of the friction-spring or springs and consequent friction within the drum serves to lock the drum with the shaft *j*, or rather with its sleeve, on direct rotation of pinion *i*, so that the shaft will turn and through its connections rotate the type-wheel. In this side of the drum is also located a lever 19, fulcrumed or pivotally connected to one end of the inner friction-spring 17, as at 20, having its point or short arm engaging the other end of said friction-ring as at 21, and having its other arm engaged by or connected to the pin 22 fast on shaft *j*, said pin extending through an opening or slot in the sleeve 9, as above stated. When rotation of the shaft *j* is checked by the type-wheel stop mechanism, the lever 19 will be moved by the then fixed pin 22 so as to bring the ends of the inner friction-ring toward each other, thus slightly contracting said friction-ring and partly releasing the drum from said shaft, so as to permit a continued independent turning of the drum. This is effected by the slight independent turn of the sleeve 9, on which is the disk 18 to which the friction-spring is connected. However, to compensate for the release and loss of resistance caused by stoppage of rotation of the shaft *j* and type-wheel, the friction-spring, or in this case the outer friction-spring 16, which first rotates with the drum, now comes into play as a substitute and produces a friction or resistance against the inner periphery of the drum. Thus will be seen the advantage of employing two medially connected springs, one of which is continually in contact with the drum while the other is at times contracted and at times expanded. The amount of release or contraction of friction-ring 17 is determined by the extent of independent turn of sleeve 9 on shaft *j*, and hence it may be controlled or adjusted by an adjusting screw 23 projecting from an arm 24 fast on shaft *j* and forming a stop or abutment for an arm 25 fast on sleeve 9 or rigid with disk 18. Either or both of the friction-springs 16 and 17 may be located on the outside instead of the inside of the drum, though the arrangement shown is preferred for compactness and housing the parts.

To summarize, it will be seen that on direct rotation of pinion *i* it immediately clutches or operatively engages the drum, which is also friction-clutched or operatively engaged with the shaft *j*. When rotation of shaft *j* is checked by the type-wheel stop mechanism, the drum is automatically released or partly released from shaft *j* and continues its movement to perform further functions against frictional resistance. On reverse rotation of pinion *i*, the drum remains stationary for a time, until the lug 14 on said pinion strikes the lug 15 on the sleeve 9, whereupon the shaft *j* with the drum are reversed to return the type-wheel to its normal position. The functions of clutching and releasing the drum and shaft might be accomplished by a single friction-spring, adapted to be released so slightly as to exert a continued frictional resistance; but the present means is preferable.

In order to furnish drag or resistance against the reverse turn of the shaft *j*, which causes the return of the type-wheel to its normal position, a clutch device *t* (Figs. 5 and 7) is mounted on one of the trunnions of the actuating plate, adapted to rest loosely thereon during direct rotation of shaft *j* but to clutch therewith during reverse rotation, and having a flat spring 30 or other friction device acting against its surface. The clutch device *t* is shown mounted between one of the standards *b* and a gear *q*, having a pin engaging them. It may be of any suitable character, but for a simple compact construction a style similar to that between pinion *i* and drum *s* is preferably adopted, acting of course in a reverse direction; and this being already understood will need no further explanation.

The type-wheel stop mechanism.—Rotation of the type-wheel in proper position is checked by arrest of the stop-plate *p* by the particular key or pin *m* which is depressed. See Figs. 3 and 5. This stop-plate *p* is guided between suitable grooves or ways at opposite sides of the plate *n* or on the under side of the actuating plate or key-board-lever, and is connected to rods or rack-bars *o* having teeth engaging gears or pinions *q* fast on the shaft *j*. Hence arrest of move-

ment of the stop-plate also stops rotation of shaft *j* and type-wheel shaft *v*. Said rods or rack-bars *o* are preferably pivotally joined to said stop-plate for the purpose of adjustment. It will be seen that the pinion *i* and clutch-drum *s* constitute driving mechanism, while the stop-plate *p*, rack-bars *o* and gears *q* constitute stop mechanism. It will also be noted that the stop-plate is held normally in position, and is operatively connected to the actuating mechanism, as well as with the type-wheel, by the friction-spring in the clutch-drum *s*.

The stop-plate has an oblique or diagonal front edge, which by reason of its relation to the different rows of keys or pins *m* insures its arrest in a different position for each key depressed, and the mechanism connecting said stop-plate with the type-wheel will bring a type corresponding to the key depressed above or in vertical alinement with the space on the paper which is to receive the impression, or the printing space. The action thus depends simply on the relation provided between the type on the type-wheel and the characters on the key-board and the check-points on the stop-plate, that is the different points where the plate is met by the depending ends of the depressed keys or pins *m*, at which points the plate is preferably notched for better engagement with said pins. For example, the relation existing in the present machine is as follows:—The front edge of the stop-plate is shown formed to provide three inclines or oblique edges, all preferably of the same angle and of such extents as to divide the key-board above the plate into three sections or groups of keys, corresponding to the three rows of type on the type-wheel. In this instance, the middle group of keys (looking at Fig. 1) includes letters or characters corresponding to the front or inner row of type on the type-wheel; the left-hand group contains the characters corresponding to the middle row of type, and the right-hand group includes those corresponding to the back or outer row of type. If the keys were depressed in the order of the successive different turns or movements of the type-wheel, the stop-plate would first be arrested by a key of the middle group, next by a key of the left-hand group, then by a key of the right-hand group, as indicated by the check-points marked ′, ″, and ‴ in Fig. 5, and so on repeatedly throughout the whole series of keys; and accordingly the rotations of the type-wheel would be limited so as to bring into position first a type of the front row, next a type of the middle row, then a type of the rear row, and so on repeatedly throughout the range of movement. In other words, the relation of the rows of apertures in the plate *n* to the check-points or notches in the stop-plate *p* is such that as the stop-plate moves along under said plate *n* first a check-point on the middle incline, next a check-point on the left-hand incline, then a check-point on the right-hand incline, cross successive apertures; and the type on the type-wheel are so disposed with relation to said apertured plate and stop-plate as to bring by its corresponding successive rotations a letter first of the front row, next of the middle row, then of the rear row into position, and so on repeatedly, while the keys on the key-board are designated accordingly. It will be understood that this particular relation is described purely for explanation and clear comprehension of the illustrated machine, and that other arrangements may as well be adopted; for examples, the middle group of keys may correspond to the middle row of type, and the side groups to the inner and outer rows; or a stop-plate having a single edge may be employed; again, instead of such a systematic order, any desired arrangement of type on the type-wheel might be adopted and the key-board simply indexed to correspond to the movements necessary for the different type.

The resisting means.—The resisting means has already been explained in describing the clutch-drum *s*. See Figs. 5, 7, 8, 9 and 10. As before stated, when the rotation of the type-wheel is checked by the stop-mechanism (stop-plate *p*, rack-bars *o*, and gears *q*), the further rotation of pinion *i* carries around the drum *s* against resistance of the friction-spring or springs therein. The purpose of this resistance is to compensate for the release or partial release between drum *s* and shaft *j* and the loss of load or resistance caused by arrest of rotation of shafts *j*, *v* and type-wheel *w*, and to insure equal tension and a uniform or constant pressure of every stroke of the key-board. The extent of release of the inner friction-ring 17 may also be limited by the adjusting screw 23 forming a stop or abutment for the arm 25 which is rigid with disk 18 on the sleeve 9. This adjusting screw thus controls the extent of oscillation of said disk on shaft *j*, with a consequent effect on the contraction of the friction-spring and the extent of its release.

The automatic shifting and locking device.—If a key is depressed corresponding to a type on the middle row of the type-wheel, no shift or axial movement of the type-wheel is necessary, for after the type-wheel stops turning the continued depression of the key-board will bring the type down on the printing space. But if the key depressed corresponds to a type on the front or back row of the type-wheel, a backward or forward shift of the type-wheel is accordingly necessary. For this purpose the type-wheel spindle *u*, slidably fitted in the

hollow type-wheel shaft v, is connected to the shift-rod z which in this instance is shown joined to a pin projecting from said spindle u through a longitudinal slot in said shaft v. See Figs. 1, 2, 3, 5 and 12. The said shift-rod is connected to and actuated by a double-arm lever y, one or the other of the opposite ends of which is adapted to be engaged by a tooth or projection of a reciprocatory toothed ring x, according to whether the type-wheel is to be shifted backward or forward. If no shift is necessary, the ring x engages neither end of the lever, but moves so as to let the opposite ends of the lever pass between teeth. In either event, whether one end of the lever or the other is engaged by a tooth, or whether the ends of the lever pass between teeth, the type-wheel thereby becomes locked in the position to which it has been turned by the engagement or contact of said ring with said lever; the two functions of shifting and locking being thus simultaneously performed by one and the same device. The ring x is shown formed or provided with a forward hood or cover, which houses the lever y and protects the same from any accidental obstruction. In the illustrated machine, the annular series of teeth normally stand behind the lever, and on forward movement of the ring one of said teeth engages one or the other end of the lever for shifting, though I am not limited to this arrangement. The opposite ends of the lever are preferably provided with pointed wedges or picks, and the teeth of the ring x are correspondingly notched or V-shaped for engagement with said picks or wedge-shaped ends of the lever. The lever y is centrally fulcrumed on the type-wheel shaft v, so that it turns or rotates with the type-wheel. Its opposite arms are acted on with equal tension by a spring or springs 31, thus normally holding the lever at right-angles to shaft v. In this instance a heart-shaped spring or springs 31 are shown, connected to the shaft v or fulcrum of the lever and having its members acting oppositely against an arm 32 projecting centrally from said lever. Said spring or springs also hold said type-wheel shaft and type-wheel in normal position, and exert equal resistance against shift in either direction.

The ring x may be mounted for reciprocation on suitable guides or ways. As shown, it has sleeves 33 slidable on stationary guide-rods or bars 34, and said sleeves are connected by connecting-rods 35 with rock-arms 36 on a rock-shaft 37, which is actuated by a suitable spring as 38 to hold the ring in its normal rearward position. In the present machine, forward movement of the toothed ring x to shift the type-wheel takes place after the rotation of the type-wheel stops, and backward movement to reshift the type-wheel occurs before the reverse rotation of the type-wheel; though modifications or the reverse of such arrangement may be adopted in some mechanisms. This reciprocation is performed during the independent rotations of pinion i, that is the rotations independent of shaft j, by suitable connections with the pitman or rack-bar h. The said connections of the illustrated machine are as follows. Projecting from one of the sleeves 33 is an arm having an apertured ear or lug 39. See Figs. 2, 4, and 5. Passing through said apertured lug is a rod or link 40, pivotally connected at its forward end or portion to the pitman or rack-bar h and having a rearward collar or projection 41. On direct or forward movement of the pitman or rack-bar h, the type-wheel is first rotated through the actions of pinion i, clutch-drum s, shafts j and v, as already explained, until stopped by the stop-plate p. Then on continued direct movement of said pitman, the collar 41 on rod 40 engages lug 39 and thus moves forward or shifts the ring x. Backward movement or return of the ring x to normal position, on raising the fingers from the key-board, may be accomplished by the spring 38; but positive means is preferably employed for this purpose. As illustrated, a lug or arm 42 is carried by a rod or link 44 connected to the rod or link 40 or a U-shaped return bend at the forward end thereof, and said lug is pressed against by a spring 43 on pitman h. On forward movement of pitman h, the lug 42 passes under and in front of the lug 39, being held in engagement therewith by the spring 43, as shown in Fig. 4. Hence on reverse or backward movement of said pitman, the lug 42 positively acts against said lug 39 and thus re-shifts the ring x, after which the movement of the pitman h carries said lug 42 under and behind the lug 39 again.

The number and arrangement of teeth on the ring x is determined of course by the type on the type-wheel. For the purpose of a clear comprehension of this feature of invention, the relation existing in the present machine will now be explained.

The key-board illustrated in Fig. 1 comprises say thirty-six keys, divided as aforesaid into three groups of twelve keys each; and corresponding therewith, each half of the type-wheel has thirty-six type, arranged in three rows of twelve each. As before stated, a different rotation of the type-wheel takes place for each type, and hence the type are shown disposed across the width of the type-wheel in oblique columns or lines diagonal to the axis. Looking at the bottom view in Fig. 5, which shows the mechanism in normal position, it will be observed that a blank space or false type is indicated by dotted lines in the middle row directly under the axis of rotation; while adjacent oblique

blank spaces in the same line or column therewith are left in the front and back rows. This dotted space, designated by the symbol *o*, is the starting point from which all rotations begin. Commencing from such zero point, the type-wheel makes thirty-six different turns in either direction in order to bring the successive type thereon into place corresponding to the normal position of the zero point. For convenience, these movements may be termed units of rotation though they need not necessarily be equal. Considering only the small letter division of the type-wheel (the right-hand side in Fig. 5), it will be seen that the first turn will bring into position the first type, marked ′, which in this instance happens to be on the front row; the second turn will bring into position the second type ″ on the middle row, and the third turn the third type ‴ on the rear row; the fourth turn the fourth type on the front row again; and so on throughout the range of rotation of the type-wheel. When the type-wheel is operatively turned in the reverse direction from said zero point, to bring capitals or "upper case" type into place, practically the same order obtains, though in the present case the first type of the opposite or left-hand division to come into place is on the back row. It will be seen that one unit of rotation is necessary from one type to an adjacent type of an adjacent row, but three units of movement are necessary from any type to an adjacent type of the same row. Now the lever *y* moves around and stops with the type-wheel, and so likewise makes thirty-six different turns or rotations in either direction to stop in different shift positions. The teeth or projections of the reciprocatory shift-ring *x* are therefore so numbered and disposed that of said thirty-six turns of the lever twelve will bring it into position for engagement at one end or pick, to shift the type-wheel backward; twelve turns will bring it into such position that its opposite ends or picks will pass between teeth; and twelve turns will bring it into position for engagement at its opposite end or pick to shift the type-wheel forward. If the keys of the key-board are depressed in the order of the successive type or consecutive movements of the type-wheel, the lever is thus first engaged at one end, then passes between teeth, then is engaged at its opposite end, and so on, so that in this sense the opposite ends of the lever may be said to be alternately actuated.

In Fig. 12, the lever is represented in normal position, and the first three consecutive positions to which it turns, in the direction indicated by the arrows, are indicated by dotted lines, and designated by the symbols ′, ″ and ‴. It will be understood that this relation is purely explanatory, and may be varied to suit the requirements, or to correspond with the number and arrangement of type and characters on the key-board.

The reversing gear.—As before stated, for each rotation of the type-wheel in one direction to bring a small letter or "lower case" type in position, a like rotation in the opposite direction will bring the corresponding capital or "upper case" type into position. Hence the corresponding small letters and capitals are disposed at like distances or units of rotation from the zero point. In this instance, the type on the front row of one division of the type-wheel correspond to the type on the back row of the other division, as indicated by the index symbols, though this arrangement is not essential. Hence, in the present machine, where a shift of the type-wheel in one direction is necessary for a small letter, a shift in the opposite direction is necessary for a capital. This is taken care of by the ring *x*, by virtue of the number and arrangement of the teeth already explained; for when rotation of lever *y* in one direction is stopped so that on movement of the ring a tooth will engage one end thereof, a like rotation in the opposite direction is stopped so that a tooth will engage the opposite end. In connection with this arrangement of the type and their relation to the toothed shift ring *x*, it is only necessary to provide suitable means for changing the direction of rotation of the type-shaft *v*. While any suitable reversing gear may be employed, that illustrated herein is as follows: Opposite bevel gears 4 and 6 which mesh with bevel gear 5 are loose on shaft *j*. Between said gears is the reversing device or clutch *r*, which is shown as a sleeve or collar having opposite teats or lugs adapted to engage recesses in said gears; said collar being also loose on shaft *j* but having a slidable connection with sleeve 9, as by pin 26 projecting from arm 27 on the collar and entered loosely into hollow arm 25, whereby said collar will turn with sleeve 9, which it will be remembered has only a slight oscillation on shaft *j*. To shift the collar *r*, so as to engage either one or the other of gears 4 and 6, a bell-crank lever is shown pivoted to a suitable support on the base *a*, having a forked arm 28 engaging a groove in the collar, and having its other arm 29 adapted for manipulation by the left-hand of the operator.

The inking ribbon and feeding mechanism.—In the present machine, an inking ribbon 46 is represented wound on reels or pulleys 47 suitably mounted on the under side of the actuating-plate or key-board lever, or on a cross-piece 48 secured thereto. See Figs. 5 and 15. The winding reel is shown having a ratchet engaged by a pawl carried by a spring-held lever or arm 49 connected by a link 50 to an arm or lever 51 pivoted to said actuating-plate. On each depression of

the actuating-plate, a pin or projection 52 on segment *e* stops or engages said lever 51 and thereby pulls link 50 and lever 49 to turn the reel one step or ratchet tooth. A stationary dog or spring-pawl may act against said ratchet to prevent unwinding, and a similar dog or pawl may act against a ratchet on the other reel for the same purpose. A duplicate reversing feed may be used at the opposite side. As a means of guiding the ribbon, it is shown passing from one reel and under the type-wheel to the other reel by means of a yoke 53 carried by the actuating-plate and having suitable guides or rollers for the ribbon. Under the printing portion of the ribbon may be arranged a suitable shield 54 having an opening to permit impression of the desired type on the printing space, but adapted to prevent smearing by the other portion of the ribbon, shown in Fig. 6. The construction and arrangement here described is especially adapted for the present machine, by virtue of its simplicity and compactness; but other arrangements as well as other inking means may be employed.

The carriage and operating mechanism.—While it will be understood that any appropriate carriage and paper support may be employed for holding the sheet of paper and conveying it step by step across the machine, a carriage especially applicable to the present machine and to the fulfillment of the purpose primarily stated is herein illustrated and described. See Figs. 1, 2, 3 and 13. Neither the carriage nor its feed-mechanism *per se* are specifically claimed herein, since these form the subject-matters of separate applications filed as divisions of the present application. The carriage and feed-mechanism are illustrated and described, and the feed-mechanism with its accessories separately claimed in my copending application Serial No. 182308, filed November 23, 1903. The carriage is also illustrated described and claimed in my copending application Serial No. 189725, filed January 19, 1904.

This carriage is mounted for reciprocation or transverse travel between suitable guides, and it consists of a hollow cylinder or tube 55, which however may be of elliptical or other desired form, having a longitudinal slit or opening so that the sheet of paper may be inserted and rolled therein. However narrow the machine may be, the said cylinder or carriage-roll need be no longer, and yet wide sheets of paper may be placed therein and printed practically all the way across, for the carriage may travel over half its length beyond each side of the base. The sheet of paper may be fed into the slitted roll or cylinder by coacting rollers 56 and 57, preferably having rubber or other gripping surfaces, mounted on and movable with said roll or carriage. The upper roller is shown carried by a plate 58 pivoted to the upper part of roll or cylinder 55, and by means of a latch 59 screwed or pivoted to the cylinder and projecting through a slot in said plate and engaging the latter said plate may be held more or less closely against the cylinder, thus furnishing means for adjustment of the pressure between the rollers. One roller, here the lower one, is hollow and has fitted therein an operating rod 60, which may be keyed or splined therein, or which may have its inner end split and expanded to clutch therein, and which at its outer end is provided with a knob or handle. When the machine is not in operation, or when it is closed up for packing or storing, the rod 60 may be pushed all the way into the roller, so as to reduce the dimensions; but when in use the rod may be pulled out for manipulating the rollers, to insert the paper into the cylinder, to feed the paper from one line of writing to another, and to shift the carriage. Suitable means may be provided to prevent the rod from being pushed back into the carriage, such as a spring-actuated dog or pawl 61 which may engage an annular groove in the rod when it is pulled out, as shown in Fig. 14. After each step-by-step travel of the carriage, the operator shifts or pushes it back to the other side of the machine by means of the rod 60 and also turns said rod to space the paper or to bring a new line for writing into place. Suitable means may also be furnished for regulating the feed of the paper, or the spaces between the line of writing. For instance, the rod 60 or its knob or handle may be formed with equi-distant pins. When the operator shifts the carriage to the right, the pin-wheel straddles a stationary spring-pressed dog or pawl, 62, and the operator then turns the operating-rod to cause one of the pins to ride against said dog, until this action is limited by abutment of the dog against a stop therefor. On operation of the key-board, the carriage begins to move to the left again, thus carrying the pin-wheel away from the dog and allowing it to snap back to normal position in alinement with the space between the next two pins, ready for the next spacing.

As a means for feeding the carriage step-by-step across the machine, the opposite ends of the carriage are shown connected to the opposite ends of a continuous tight cord or flexible connection 63, which crosses itself and passes around drums or pulleys 64 and 65 mounted in a suitable recess in the base *a;* said cord being fastened to pulley 64 at a suitable point on its circumference and passed one or more times entirely around said pulley to provide sufficient length thereof to permit reciprocation of the carriage. Coaxial with the axle of the pulley 65, is an involute cam 66, the greatest radius of which is connected to a cord or flexible connection

passing around the cam and to the hub of the other drum 64 to which it is also connected; and by means of a spring 67 coiled around and joined to the hub of said cam and also connected to the base, said drum 64 is positively impelled to rotate in a direction to move the carriage to the left. On pushing the carriage to the right, the spring 67 winds up and will then exert its energy in feeding the carriage to the left again. The purpose of the involute cam 66 is to compensate for the gradual increase or decrease of tension of the spring 67, as the latter is wound up or unwinds, by providing a correspondingly lengthening or diminishing lever-arm for pulling on the cord; thus rendering the feed of the carriage substantially uniform across the machine. In the present case, the step-by-step movement to the left is accomplished by a suitable escapement, specifically represented as follows. The drum 64 has a ratchet or escapement-wheel 68 normally engaged by a spring-held dog or holding-detent 69 pivoted independently but coaxially with a bell-crank lever 70. Said dog or holding-detent is shown held in engagement with the teeth of said escapement-wheel by a leaf-spring acting against said detent and one arm of the bell-crank-lever; also with a pin held against a notch or fork in the hub of the bell-crank-lever so as to furnish an engagement between the detent and the bell-crank-lever when the latter is rocked. One arm of the bell-crank-lever carries a dog or detent 71 held normally out of engagement with the escapement-wheel by a spring 72 pulling against the other arm, which is connected by a link 73 with a space-bar or lever 74 at the front of the machine. Said space-bar may be moved by the operator's finger to space from word to word, and it is automatically engaged and moved for spacing from letter to letter by an arm or member 75 depending from the actuating plate or key-board lever; being in each instance returned by the spring 72. Said arm 75 engages said space-bar just prior to the impression, or at the end of downward movement of the actuating-plate. When the link is pulled forward by the space-bar, the detent 69 is tripped from engagement with the escapement-wheel, by means of the aforesaid engagement therewith by the bell-crank-lever 70, while the pawl 71 is carried into engagement with the escapement-wheel in time to prevent its movement more than one ratchet tooth, which corresponds to a space on the paper. When the link moves back, the detent 69 springs into engagement with the escapement-wheel at the next tooth, while the dog 71 is carried out of engagement. If it is desired to move the carriage a considerable distance to the left instead of step-by-step, this may be accomplished by a lever 76 having a pin or projection adapted to move pawl 69 and disengage it from the ratchet.

Operation.—In operation, the palm of the operator's right hand may rest on the support at the front of the actuating-plate or key-board lever *c*, so that the whole key-board will lie within convenient reach of the fingers; while the left hand may be free to move the space-bar 74 for spacing between words, to shift the carriage at the end of each line of writing, and to turn the rod 60 for feeding the sheet of paper from line to line. To print a letter or character, the operator simply depresses the key-board by pressing down on the proper key or pin, which causes the lower end of said key to depend beneath the under side of the key-board or through the apertured plate *n*. As the actuating-plate or key-board lever swings downward, the pinion *f* is operatively turned by engagement with segmental rack *e*, and thus swings or rocks the crank-arm *g* which moves pitman or rack-bar *h* forward and thereby operatively or directly rotates pinion *i*. On such direct rotation said pinion *i* clutches with or engages the drum *s*, which clutches or engages with shaft *j* or rather the sleeve 9 thereon, and thus drives or turns shaft *j* and the type-wheel shaft *v* geared therewith, whereby the type-wheel *w* together with the shifting lever *y* is also turned or rotated. As said shaft *j* turns, the gears *q* thereon meshing with rack-bars *o* draw the stop-plate *p* forward, until it is arrested by the depressed key or pin *m*. Arrest of the stop-plate immediately stops rotation of shaft *j*, and consequently checks rotation of the type-wheel and shifting lever *y*. Said type-wheel stops with the desired character in vertical alinement with the printing space, and said shifting lever stops in position for proper action by the toothed ring *x*, by means of the connections and relations of parts already explained. When the depressed key arrests the stop-plate and thus checks further movement of the shaft *j* and type-wheel and shift-lever, the continued direct rotation of pinion *i* turns the drum *s*, which partly releases from the sleeve 9 by virtue of the slight oscillation or turn of the drum with the sleeve on said shaft. After such oscillation and release, the friction-spring in the drum is held stationary with sleeve 9 and consequently exerts resistance against further movement, to compensate for the release and loss of resistance caused by stoppage of rotation of the parts *j*, *v*, *w*, *y*, etc. The continued forward movement of rack-bar *h* brings the knob or projection 41 on link or rod 40 into engagement with lug 39 projecting from the shift-ring *x*, and thereby moves the shift-ring into action with the shift-lever *y*. If the key depressed corre-

sponds to a type on the middle row of the type-wheel, the shift-ring *x* will move so that the opposite ends or picks of lever *y* pass between oppositely disposed teeth, with corresponding sides of said ends against the teeth, which merely produces a lock. If a type of the front row is to be printed, one end of the lever will be engaged so as to shift the type-wheel backward, by the shift-rod *z*, while if a type of the back row is to be struck the opposite end of said lever will be engaged so as to shift the type-wheel forward. Engagement of either end of the lever also locks the type-wheel in position. As the crank-arm *g* approaches the end of its direct or operative throw, the lug 42 on spring 43 passes in front of the aforesaid lug 39, and engages therewith, so as to reshift the ring *x* on reverse movement of the pitman *h*. Now, the type-wheel having been turned, stopped, shifted and locked, the crank-arm *g* has about reached a dead center with respect to the pitman *h*, and hence a slight further movement of pinion *f* will not effect the positions of the parts. This condition exists at the end of downward movement of the actuating-plate or key-board lever, when the type-wheel strikes the paper and makes the impression. Prior to the impression, the space-bar is engaged by the arm depending from the actuating-plate to move the carriage one step. The inking ribbon is also fed one step during the movement of the actuating-plate, as before explained.

After depressing the key-board to the limit allowed and thus performing the operations above described and printing the desired character on the paper, the operator lifts his finger from the key-board and allows it to rise, by action of the spring *d*, which is also aided by the play of the palm and wrist on the rest at the front of the actuating-plate. On upward movement of said actuating-plate or key-board lever, the crank-arm *g* makes a reverse turn or throw, drawing back pitman or rack-bar *h*, during the early part of which movement the lug 42 pushes back lug 39 and positively reshifts the ring *x*, thus unlocking and reshifting the type-wheel. As the reverse throw of crank-arm *g* continues, the lug 42 is of course moved under and back of said lug 39 by the movement of the pitman imparted by said crank-arm. The return movement of the rack-bar *h* rotates the pinion *i* reversely, and during such reverse turn said pinion is disengaged from drum *s*. The drum *s*, sleeve 9 and shaft *j* thus remain stationary, pending the unlocking and reshifting of the type-wheel; but after a suitable period the pinion *i* engages sleeve 9, by lugs 14 and 15, and thus reverses the drum *s*, shaft *j*, and gears *q*, thereby moving back rack-bars *o* and stop-plate *p* and returning all parts to normal position ready for the next operation. While the operator uses his right hand for operating the key-board, he uses his left hand for moving the lever of the reversing gear for making capitals, punctuation marks, or other "upper case" characters, for moving also the lever, shifting the carriage and spacing the paper.

It will be observed that for the forward letters of the key-board a considerable movement takes place before the stop-plate is arrested. I have taken advantage of this fact in providing an improved arrangement of the key-board and type-wheel, in connection with a convenient attachment, whereby the machine may be operated through a reduced range of movement for the letters most frequently in use, thus increasing the speed. As hereinbefore explained, the letters of regular occurrence in type-writing are disposed in the two front or lower rows of the key-board, while the letters and characters of infrequent use are disposed in the back or upper rows; the latter being preferably shaded, as in Fig. 1. The end letters of the third row from the front are shown light, since these may also be employed in the arrangement now to be described. A latch 77 is shown on the segment *e* adapted to engage a latch 78 depending from the actuating-plate or key-board-lever when the latter is depressed about half its distance. Said latch 77 is represented in Fig. 2 out of engagement with latch 78, but may be spring-held in engagement therewith and provided with a lever 79 for moving it out of engagement when desired. When the lever 79 and latch 78 are left free, a certain depression of the actuating-plate or key-board lever will engage the latches, about half the movement having thus already been taken up; and thereafter the actuating-plate or key-board lever cannot rise farther than permitted by the latches. The remaining slight range of movement does for the front characters on the key-board, while the shaded keys are thus cut out from operation.

Having thus fully described my invention, with the reservation however that the same may be organized in different machines and its distinct features embodied in different mechanisms and relations for accomplishing the objects stated, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A type-writing machine having, in combination a movable or depressible actuating member, a type-wheel or segment, mechanism actuated and controlled by said member for turning and stopping said type-wheel in printing position, means for effecting the impression by continued movement of said member, and means for exerting a resisting

force in the actuating mechanism itself after the type-wheel is checked in such position.

2. A type-writing machine having, in combination, a movable or depressible actuating member, a type-wheel or segment, mechanism actuated and controlled by said member for turning and stopping said type-wheel in printing position, there being no resisting mechanism brought into action during such movement, means for effecting the impression by continued movement of said member, and means for exerting a resistance against further movement of said member after the type-wheel is checked to compensate for the cessation of force exerted by said actuating mechanism in turning the type-wheel to printing position.

3. A type-writing machine having, in combination, a swinging actuating member, a swinging or striking type-wheel or segment carried thereby and driving mechanism operated and controlled by said member to turn, stop and shift said type-wheel to bring the desired type into position for striking.

4. In a type-writing machine, a movable or depressible actuating member, a rotatory and shiftable type-wheel or segment, and a driving mechanism therefor actuated and controlled by said member to turn and stop said type-wheel in proper position and then to shift said type-wheel to bring the desired type into printing position, with means for exerting a resistance in said mechanism after stopping rotation of said type-wheel said resisting means compensating for the cessation of force, exerted by said mechanism in turning the type-wheel to printing position, there being but one compensating mechanism brought into action during one entire operation of the type-wheel.

5. In a type-writing machine, a movable or depressible actuating member, a rotary and shiftable type-wheel or segment, and mechanism carried by said member operated and controlled thereby to turn, stop and shift said type-wheel to bring the proper type for impression into position.

6. In a type-writing machine, a movable or depressible actuating member, a rotatory and shiftable type-wheel or segment, an actuating mechanism therefor operated and controlled by said member to turn and stop said type-wheel in proper position, a type wheel shift and lock mechanism actuated and controlled by said driving mechanism to move and stop in proper position with the type-wheel and then to act on the type-wheel after such stopping.

7. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment, an actuating mechanism therefor operated by movement of said member, means for turning said type-wheel by said mechanism to bring the proper type for impression into position, said means being controlled by the key depressed to stop turning of said type-wheel in proper position, and said actuating mechanism containing means for exerting a compensating resistance against its further action to compensate for the cessation of force exerted by said actuating mechanism in turning the type-wheel.

8. In a type-writing machine, a movable or depressible actuating member, a rotary type-wheel or segment carried thereby, a platen having a printing space, shift mechanism, actuating mechanism operated and controlled by said member to turn and stop the type wheel in proper position and also to actuate the shift mechanism to bring the type-wheel into proper relation to the printing space.

9. In a type-writing machine, a movable or depressible actuating member, a type-wheel or segment, an actuating mechanism therefor actuated and controlled by said member to turn and stop the type-wheel in proper position, and mechanism for effecting a shift between the type-wheel and printing space whereby the proper type and the printing space are brought into relative position to make the impression, with means for exerting a resistance against further movement of said member after turn of the type-wheel is checked, there being but a single compensating mechanism brought into action during one operation of the type-wheel.

10. In a type-writing machine, a movable or depressible actuating member, a type-wheel or segment, an actuating mechanism therefor operated by said member, means for operatively connecting said mechanism with said type-wheel to turn the latter on movement of said member, means for stopping turning of said type-wheel in proper position, and means for partly releasing said mechanism and type-wheel and exerting a resistance against further movement.

11. In a type-writing machine, a movable or depressible actuating member, a type-wheel or segment, an actuating mechanism therefor operated by said member, means for operatively connecting said mechanism with said type-wheel to turn the latter on movement of said member, means for stopping turning of said type-wheel in proper position, and means for partly releasing said mechanism and type-wheel and exerting a resistance against further movement, with means for automatically effecting a shift of the type for impression with respect to the printing space during such continued movement.

12. In a type-writing machine, a type-mechanism, an actuating mechanism therefor, means for operatively connecting said mechanisms so as to bring the proper type

for impression into place, and means for partly releasing such connection to exert a compensating resistance against further action.

13. In a type-writing machine, a movable or depressible actuating member, a rotary driving element operated thereby, a type-wheel or segment carried by said movable member, and means for frictionally connecting said element on direct movement with said type-wheel to turn the latter to proper position, with means for stopping rotation of said type-wheel.

14. In a type-writing machine, a movable or depressible actuating member, a driving element operated thereby, a type-wheel or segment, means for operatively connecting said element on direct movement with said type-wheel to turn the latter to proper position, means for stopping rotation of said type-wheel, and means for partially releasing said element in such manner as to exert a compensating resistance against cointinued movement.

15. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment, and a driving or turning shaft therefor having its rotation limited by the key depressed, a driving element operated by movement of said member, and means for operatively connecting said element and shaft until rotation of the latter is checked by the key depressed and for then partly releasing said element from the shaft so as to exert a compensating resistance against further movement of the actuating member.

16. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, rotation of the latter being limited by the key depressed, a pitman or reciprocating part actuated by movement of said member, a rotary driving element actuated by said pitman, and means for operatively connecting said element and shaft until rotation of the latter is checked and thereupon releasing such connection.

17. In a type-writing machine, a movable actuating member, a rotatory and shiftable type-wheel or segment, a pitman or reciprocatory device actuated by said member, and connections for turning and shifting said type-wheel by said pitman on direct movement thereof, with a shift device for changing the relation of the type and printing space actuated by said pitman.

18. In a type-writing machine, a movable actuating member, a type-wheel or segment and driving shaft therefor, a pitman or reciprocatory part actuated by said member, means for operatively connecting said pitman with said driving shaft to turn the type-wheel, and means for stopping said type-wheel in proper position and releasing connection between said pitman and shaft.

19. In a type-writing machine, a movable actuating member, a rotatory and shiftable type-wheel or segment, a reciprocatory device actuated by said member, and connections for turning and shifting said type-wheel by said reciprocatory device on direct movement thereof.

20. In a type-writing machine, a movable actuating member, a type-wheel, a reciprocatory device actuated by said member, a type-wheel turning mechanism operated by said device to turn the type-wheel to proper position, and a shift mechanism actuated thereby to shift the type-wheel.

21. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a slidable stop-plate connected to said shaft and having its movement limited by the key depressed, a pitman or reciprocatory device actuated by said member, connections between said pitman and shaft for turning the latter until checked by the stop-plate, and a shifting device actuated by said pitman.

22. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a slidable stop-plate connected to said shaft and having its movement limited by the key depressed, a rotary driving element actuated by said member, and means for operatively connecting said element with the shaft for turning the latter until checked by the stop-plate and then for partly releasing to exert a compensating resistance against further movement.

23. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a movable stop-plate connected to said shaft having its movement limited by the key depressed, a rotary driving element and an operating pitman therefor actuated by said member, means for operatively connecting said element and shaft to turn the type-wheel until checked by said stop-plate and then for releasing such connection, and a shift mechanism actuated by said pitman.

24. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a movable stop-plate connected to said shaft having its movement limited by the key depressed, a rotary driving element and an operating pitman therefor actuated by said member, means for operatively connecting said element and shaft to turn the type-wheel until checked by said stop-plate and then for partly releasing such connection so as to provide a compensating

resistance, and a type-wheel shift-mechanism actuated by said pitman.

25. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a movable stop-plate connected to said shaft having its movement limited by the key depressed, a driving pinion loosely mounted on said shaft and a toothed pitman or rack-bar engaging the same actuated by said member, a clutch device adapted to connect said pinion on direct rotation with said shaft until the latter is checked by said stop-plate and then partly to release the same so as to exert a compensating resistance, and a shift-mechanism actuated by said pitman.

26. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a movable stop-plate having toothed connecting-rods or racks in mesh with gears on said shaft and having its movement limited by the key depressed, a driving pinion loosely mounted on said shaft, an operating pitman or rack therefor actuated by said member, means for operatively connecting said pinion and shaft on direct movement to turn the type-wheel until checked by said stop-plate, and a type-wheel shift mechanism actuated by said pitman.

27. In a type-writing machine, a movable or depressible actuating member, a type-wheel or segment, an actuating mechanism therefor operated by said member, means for operatively connecting said mechanism with said type-wheel to turn the latter, means for stopping the turn of said type-wheel in proper position, means for partly releasing said mechanism and type-wheel and exerting a resistance against further movement, means for effecting a shift between the type and printing space, means for reversing said actuating mechanism independently of said type-wheel during reversal of the shift, and means for then returning said type-wheel to normal position.

28. In a type-writing machine, a type-mechanism, an actuating mechanism therefor, means for operatively connecting said mechanisms so as to bring the proper type for impression into place, and means for partly releasing such connection to exert a compensating resistance against further action, with means for reversing said actuating mechanism independently of said type-mechanism.

29. In a type-writing machine, a movable or depressible actuating member, a rotatory driving element actuated thereby, a type-wheel or segment, means for frictionally connecting said element on direct rotation with said type-wheel to turn the latter to proper position, means for stopping rotation of said type-wheel, and means for partly reversing said element independently and then reversing the type-wheel thereby to return it to normal position.

30. In a type-writing machine, the combination with a type-wheel or segment of a driving element and means for operatively connecting said element on direct movement with said type-wheel to turn the latter to proper position and then partly releasing such connection so as to exert a compensating resistance against further movement of said element.

31. In a typewriting machine, the combination with a type-wheel or segment of a driving element and means for operatively connecting said element on direct movement with said type-wheel to turn the latter to proper position and then partly releasing such connection so as to exert a compensating resistance against further movement of said element, with means for permitting a limited independent reverse movement of said element and then for connecting it with said type-wheel to return the latter to normal position.

32. In a type-writing machine, the combination with a type-wheel or segment, of a rotatory driving element, means for frictionally-connecting said element on direct movement with said type-wheel to turn the latter to proper position, means for locking the type-wheel in position, and means for effecting impression, the said rotatory element exerting a frictional resistance to the impression-making action.

33. In a type-writing machine, the combination with a type-wheel or segment of a rotatory driving element and means for frictionally connecting said element on direct movement with said type-wheel to turn the latter to proper position and then partly releasing such connection so as to exert a compensating resistance against further movement of said element.

34. In a type-writing machine, the combination with a type-wheel or segment of a rotatory driving element and means for frictionally connecting said element on direct movement with said type-wheel to turn the latter to proper position and then partly releasing such connection so as to exert a compensating resistance against further movement of said element, with means for permitting a limited independent reverse movement of said element and then for connecting it with said type-wheel to return the latter to normal position.

35. In a type-writing machine, a rotatory driving element, a type-wheel or segment, and a clutch device having means for connection with said type-wheel, and means for engaging said element on direct rotation with said device and for disengaging it on reverse rotation.

36. In a type-writing machine, a rotatory driving element, a type-wheel or segment, and a clutch device having means for connection with said type-wheel, and means for engaging said element on direct rotation with said device and for disengaging it on reverse rotation, with means for reversing the type-wheel by said element after a certain independent reverse turn thereof.

37. In a type-writing machine, a rotatory driving element, a type-wheel or segment, a clutch-drum, means for engaging said element on direct rotation with said drum, and means for operatively connecting said drum with said type-wheel to turn the latter to proper position and then releasing the same.

38. In a type-writing machine, a rotatory driving element, a type-wheel or segment, a clutch-drum, means for engaging said element on direct rotation with said drum and disengaging it on reverse rotation, means for frictionally connecting said drum and type-wheel to turn the latter, and means for stopping said type-wheel in proper position.

39. In a type-writing machine, a rotatory driving element, a type-wheel or segment capable of a limited turn to bring the proper type for impression into position, and a clutch device having means to connect said element on direct rotation operatively with the type-wheel and to release the same at limit of turn of said type-wheel and having means for exerting a resistance against further movement of said element.

40. In a type-writing machine, a rotatory driving element, a type-wheel or segment, and a clutch-drum having means for operative connection with said type-wheel, and a clutch adapted to engage said element with said drum consisting of a divided friction-ring in the drum and a lever engaged by said element and having a part fitted between the ends of said ring adapted on turning of said element to force apart said ends or spread said ring.

41. In a type-writing machine, a rotatory element, type-actuating mechanism, and a clutch-drum having means for connection with said mechanism and means for connection with said element, consisting of a divided friction-ring in the drum and a lever connected to said element and having a part fitted between the ends of said ring adapted on turning of one of said parts to force apart said ends or spread said ring.

42. In a type-writing machine, a rotatory driving element, a type-wheel or segment capable of a limited turn to bring the type for impression to position, and a clutch-drum connected to said element and having a friction ring connected to said type-wheel and engaging said drum so as to turn the type-wheel on direct rotation of said element.

43. In a type-writing machine, a rotatory driving element, a type-wheel or segment capable of a limited turn to bring the type for impression to position, and a clutch-drum connected to said element and having a friction-spring connected to said type-wheel so as to connect said element therewith, and means for only partly releasing said spring when rotation of the shaft is stopped, which allows a remaining connection for further movement.

44. In a type-writing machine, a rotatory driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a clutch-drum connected to said element, a part on said shaft capable of a limited turn or oscillation thereon, a friction-ring connected to said part and engaging said drum, and means carried by said shaft for releasing said friction-ring when rotation of said shaft is checked.

45. In a type-writing machine, a rotatory driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a clutch-drum connected to said element, a part on said shaft capable of a limited turn or oscillation thereon, a friction-ring connected to said part and engaging said drum, and a lever connected to said shaft and engaging said friction-ring adapted to release the latter when rotation of the shaft is stopped.

46. In a type-writing machine, a rotatory driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a sleeve on said shaft capable of a slight limited turn or oscillation thereon, a clutch-drum loosely mounted on said sleeve engaged by said element, a disk on said sleeve beside the drum, a friction-ring or spring connected to said disk and engaging said drum, and a lever connected to said shaft and engaging said friction-ring adapted to release the same when rotation of said shaft is checked.

47. In a type-writing machine, a rotatory driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a sleeve on said shaft capable of a slight limited independent turn or oscillation, a clutch-drum loosely mounted on said sleeve, a friction-ring connected to said sleeve and normally engaging the drum, means on said shaft for releasing said friction-ring when rotation of the shaft is checked, and means for reversing said shaft to return the type-wheel to normal position consisting of an engagement of said element after a certain rotation with said sleeve.

48. In a type-writing machine, a rotatory driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a clutch-drum engaged by said element having two fric-

tion-springs connected to said shaft and engaging the drum to lock the element and shaft, with means for releasing one spring on stoppage of said shaft and permitting the other to exert a frictional resistance.

49. In a type-writing machine, the combination with a type-wheel or segment, of a rotary driving element, intermediate driving connections, and a friction spring operatively uniting such connections and thereby connecting said element and type-wheel.

50. In a type-writing machine, the combination with a type-wheel or segment, of a rotatory driving element, and a spring connected to one of them and adapted on rotation of said element to connect them by frictional engagement with the other or a part accessory thereto.

51. In a type-writing machine, the combination with a type-wheel or segment capable of a limited turn to bring the proper type for impression into position, of a rotatory driving element, and a spring connected to one of them and adapted on rotation of said element to establish by friction a connection with the other, said spring exerting a resistance against further movement after check of rotation of the type-wheel.

52. In a type-writing machine, the combination with a rotatory and shiftable type-wheel or segment, of actuating means therefor, including a rack *h* and pinion *i*, means for operatively connecting said pinion on direct movement with said type-wheel to turn the latter to proper position, and means actuated by said rack for shifting said type-wheel.

53. In a type-writing machine, the combination with a rotatory and shiftable type-wheel or segment, of an actuating instrumentality therefor, means for operatively connecting said instrumentality on direct movement with said type-wheel to turn the latter to proper position, a shifting device thereafter engaged and operated by said instrumentality, means for reversing said instrumentality independently of said type-wheel to reverse the shift and thereafter connecting said instrumentality and type-wheel to return the latter to normal position.

54. In a type-writing machine, the combination with a type-wheel or segment capable of a limited turn to bring the proper type for impression into position, of a rotatory driving element, driving connections between said element and type-wheel including an intermediate spring and means for partly releasing said spring from such connections on check of rotation of the type-wheel.

55. In a type-writing machine, the combination with a type-wheel or segment, of an actuating instrumentality therefor, driving connections between them including a spring operatively uniting such connections adapted on direct movement of said instrumentality to cause rotation of said type-wheel to desired position and then to partly release and exert resistance, and means for effecting a shift movement actuated by said instrumentality after the type-wheel turns to proper position.

56. In a type-writing machine, the combination of a type-wheel or segment and actuating mechanism for turning it, of means for checking the turn of said type-wheel in proper position, and a friction device operatively connecting said actuating mechanism with means to bring the latter into action.

57. In a type-writing machine, the combination with a type-wheel or segment and actuating mechanism therefor, of means for stopping the turn of said type-wheel in proper position, driving mechanism between said actuating mechanism and type-wheel including a friction device establishing operative connection, thereby also bringing said stopping means into play, and means for releasing such frictional connection after turn of the type-wheel is stopped.

58. In a type-writing machine, the combination with a type-wheel or segment and actuating mechanism for turning it, of means for checking the turn of said type-wheel in proper position, and connections between said actuating mechanism and checking means including a spring operatively uniting such connections with said means to bring the checking means into action.

59. In a type-writing machine, the combination with a type-wheel or segment, and actuating mechanism therefor, of means for stopping the turn of said type-wheel in proper position, connection including a spring operatively connecting said actuating mechanism and type-wheel to turn the latter, thereby also bringing said stopping means into play, and means for partly releasing such spring after turn of the type-wheel is stopped to exert a compensating resistance.

60. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and actuating mechanism therefor operated by movement of said member, a movable stop-plate connected to said type-wheel and having its movement limited by the key depressed, and connections including a spring between said mechanism and stop-plate to move the latter when the type-wheel is turned.

61. In a type-writing machine, a type-mechanism, an actuating mechanism and stop-mechanism, and a friction-device connecting said type-mechanism and stop-mechanism to bring the latter into play when said type-mechanism is actuated.

62. In a type-writing machine, a type-mechanism, an actuating mechanism therefor and a stop-mechanism, and a spring operatively connecting said actuating mechan-

ism and type mechanism to bring the type for impression into position and adapted to be released after action of said stop mechanism.

63. In a type-writing machine, a type-mechanism, an actuating mechanism and a stop-mechanism and a spring connecting said type-mechanism and stop-mechanism to bring the latter into play when said type-mechanism is actuated.

64. In a type-writing machine, a type-mechanism, an actuating mechanism and a stop-mechanism and a spring connecting said type-mechanism and stop-mechanism to bring the latter into play when said type-mechanism is actuated and adapted to release partly such connection when the type-mechanism is stopped.

65. In a type-writing machine, a type-wheel or segment, an actuating mechanism, and a stop mechanism comprising a shaft and a stop-plate connected thereto with means for limiting its movement by the position of the operator's finger, and means including a friction-device connecting said type-wheel and shaft so as to move the stop-plate when the type-wheel is turned until limited and then to release.

66. In a type-writing machine, a type-wheel or segment, an actuating machanism, and a stop mechanism comprising a shaft and a stop-plate connected thereto with means for limiting its movement by the position of the operator's finger, and means including a spring connecting said type-wheel and shaft so as to move the stop-plate when the type-wheel is turned until limited and then to release.

67. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and actuating mechanism therefor operated by said member, and a stop mechanism comprising a shaft connected to said type-wheel having gears thereon and a movable stop-plate having toothed connecting-rods or rack-bars meshing with said gears, movement of the stop-plate being limited by the key depressed.

68. In a type-writing machine, a stop mechanism consisting of a shaft having gears thereon, a slidable stop-plate and means for limiting its movement, and connecting rods or rack-bars pivotally connected to said stop-plate and having teeth in mesh with said gears.

69. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever therefor connected and adapted to turn therewith, and means for actuating said lever.

70. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever therefor connected and adapted to turn therewith, and a reciprocatory device having means for properly actuating said lever in whatever position it turns to.

71. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever therefor connected and adapted to turn therewith, and means for automatically moving the lever in one direction or in an opposite direction according to whether the type-wheel is to be shifted one way or the other.

72. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever therefor connected and adapted to turn therewith, a spring or springs exerting equalized opposite resistances against shift of the type-wheel in either direction, and means for automatically moving the lever in one direction or the other according to whether the type-wheel is to be shifted one way or the other.

73. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever therefor connected and adapted to turn therewith, and means for automatically engaging said lever in the position to which it is turned and by such engagement either shifting and locking or simply locking said type-wheel according to the location thereon of the type for impression.

74. In a type-writing machine, a rotatory type-wheel or segment having circumferential rows of type thereon and shiftable alternately in opposite directions in order to bring successive type for impression into place, a shift-lever connected and adapted to turn with said type-wheel, and automatic means for actuating said lever alternately in opposite directions to accomplish the successive alternate or opposite shifts.

75. In a type-writing machine, a rotatory and shiftable, type-wheel or segment, and a shift mechanism therefor comprising a lever connected thereto and a toothed ring adapted to engage said lever, one of said parts of the shift mechanism turning with the type-wheel.

76. In a type-writing machine, a rotatory and shiftable type-wheel or segment, a shift-lever connected and adapted to turn therewith, and a reciprocatory toothed ring for actuating said lever.

77. In a type-writing machine, a rotatory type-wheel or segment having circumferential rows of type and shiftable in opposite directions to bring type of different rows into place, a shift-lever connected thereto and a reciprocatory ring having teeth or projections arranged to engage said lever when turned so as to move it in one direction or the other in accordance with the shift required, one of said parts of the shift mechanism turning with the type-wheel.

78. In a type-writing machine, a type-wheel or segment having rows of the type thereon arranged in oblique columns or with

adjacent type of different rows offset from each other, said wheel having different turns to bring the successive type into position, a double-arm shift-lever connected and adapted to turn with said type-wheel, and a reciprocatory ring for actuating said lever having teeth or projections disposed to engage the opposite ends of the lever alternately in accordance with the alternate opposite shifts necessary to bring successive type of different rows into proper relation to the printing space.

79. In a type-writing machine, a type-wheel or segment having three rows of type arranged in oblique columns, means for turning said type-wheel different degrees to bring the successive type into place, a double-arm shift-lever connected and adapted to turn and stop with the type-wheel, and a reciprocatory ring for actuating said lever, said ring having teeth or projections arranged so that when a type of the middle row is to be printed the opposite arms will pass between teeth, while when a type of either of the other rows is to be printed one end or the other of the lever will accordingly be engaged.

80. In a type-writing machine, a type-wheel or segment having rows of type thereon arranged in oblique columns or with adjacent type of different rows offset from each other, said wheel having different turns to bring the successive type into position, a double-arm shift-lever connected to said type-wheel, and a reciprocatory ring for actuating said lever having teeth or projections disposed to engage the opposite ends of the lever alternately in accordance with the alternate opposite shifts necessary to bring successive type of different rows into proper relation to the printing space, one of said shift elements being rotated with the type-wheel.

81. In a type-writing machine, a rotatory type-wheel shaft and a type-wheel or segment carried thereby capable of a shift on said shaft but incapable of independent turning, a shift-lever fulcrumed on said shaft and connected with said type-wheel, and automatic means for actuating said lever to effect the shift.

82. In a type-writing machine, a type-wheel or segment, a reciprocatory actuating device or pitman, a rotatory type-wheel-driving element actuated by said pitman, a shift-device, and a link connected to said pitman adapted after turning of the type-wheel to engage and move said shift device, with means for re-shifting said shift device on reverse movement of said pitman.

83. In a type-writing machine, a type-wheel or segment, a reciprocatory actuating device or pitman, a rotatory type-wheel-driving element actuated by said pitman, a shift device having a lug or part for engagement, means connected to said pitman for engaging said lug on direct movement to effect the shift, and a part carried by said pitman adapted on such direct movement to pass to the other side and engage said lug and by such engagement to reverse the shift on reverse movement of said pitman.

84. In a type-writing machine, a pivoted actuating member or lever having a pinion provided with a crank-arm and a pitman connected thereto, a fixed segmental rack in engagement with said pinion, and a type-mechanism actuated by said pitman.

85. In a type-writing machine, a pivoted actuating member or lever having a pinion, a fixed segmental rack in engagement with said pinion, and a type-writing or printing mechanism carried by said member and actuated by said pinion.

86. In a type-writing machine, a pivoted actuating member or lever, and a type-writing or printing mechanism carried by said member and actuated by movement thereof to bring the proper type for impression into printing position.

87. In a type-writing machine, a movable actuating member, a rotatory type-wheel or segment carried thereby and movable thereby against the paper for effecting the printing, and means actuated and controlled by said member for turning and stopping said type-wheel to bring the proper type for impression into position.

88. In a type-writing machine, a movable actuating member, a rotatory and shiftable type-wheel or segment movable thereby to and from the paper, and means controlled by said member for turning and shifting said type-wheel to bring the proper type for impression into position.

89. In a type-writing machine, a movable actuating member having depressible keys or stops, a rotatory type-wheel or segment movable thereby to and from the paper, means actuated by said member for turning said type-wheel to bring the proper type for impression into position, and means controlled by the key or stop depressed for stopping the turn of said type-wheel in such position.

90. In a type-writing machine, a movable actuating member having depressible keys or stops, a rotatory and shiftable type-wheel or segment movable thereby to and from the paper, means actuated by said member for turning said type-wheel, means controlled by the key or stop depressed to stop turning thereof in proper position, and means actuated by said member for shifting said type-wheel to bring the proper type into printing position after such turning and stopping.

91. In a type-writing machine, a pivoted actuating member or lever, a type-wheel or segment carried thereby, and means actuated and controlled by said member for turning

and stopping said type-wheel to bring the proper type for impression into position.

92. In a type-writing machine, a pivoted actuating member or lever having depressible keys or stops, a type-wheel carried by said member, and means actuated by said member and controlled by the key depressed for turning and stopping said type-wheel with the proper type for impression in position.

93. In a type-writing machine, a pivoted actuating member or lever having depressible keys or stops, a rotatory shiftable type-wheel carried by said members, means actuated by said member and controlled by the key depressed for turning and stopping said type-wheel to bring the proper type for impression into position, and means actuated by said member for shifting said type-wheel.

94. In a type-writing machine, a pivoted actuating member or lever, a type-wheel or segment carried thereby, and mechanism for actuating said type-wheel to bring the proper type for impression into position also carried by said member and operated by movement thereof.

95. In a type-writing machine, a pivoted actuating member or lever, a rotatory shiftable type-wheel or segment carried thereby, and mechanism for turning, stopping and shifting said type-wheel carried by said member and actuated by movement thereof.

96. In a type-writing machine, a pivoted actuating plate or lever having depressible keys or stops, and a type-wheel and actuating mechanism therefor carried by said member, operated by movement of said member and controlled by the key depressed.

97. In a type-writing machine, a pivoted actuating member or lever, a transverse shaft journaled coaxially with the pivots or fulcrum thereof, means for turning the same, and a type-writing or printing mechanism actuated and controlled by suitable connections with said shaft.

98. In a type-writing machine, a pivoted actuating member or lever, a transverse shaft journaled coaxially with the pivots or fulcrum thereof, a type-wheel or segment having its shaft geared to said transverse shaft, and actuating mechanism operated and controlled by said member.

99. In a type-writing machine, a pivoted actuating member or lever, a transverse shaft journaled coaxially therewith, a type-wheel or segment having its shaft carried by said member at right-angles to said transverse shaft and geared thereto, and actuating mechanism carried by said member.

100. In a type-writing machine, a pivoted actuating member or lever having depressible keys or stops at its free or swinging part, a transverse shaft journaled in and coaxially with the pivots or trunnions of said member, a type-wheel having its shaft carried by said member at right-angles to said transverse shaft and connected thereto, and mechanism for turning and stopping the type-wheel carried by said member and actuated thereby and controlled by the key depressed.

101. In a type-writing machine, a movable actuating member or lever, a type-wheel or segment carried thereby, means actuated and controlled by said member for turning and stopping the type-wheel in proper position, and an inking ribbon passing under or before the printing portion of said type-wheel and feeding mechanism therefor supported and actuated by said member.

102. In a type-writing machine, a pivoted actuating plate, a type-wheel or segment carried thereby, ribbon reels or pulleys carried by and under said plate and with their axes transverse thereof, a ribbon wound on said reels and guided under or before the printing portion of the type-wheel, and means for actuating and controlling said type-wheel and feeding said ribbon by movement of said plate.

103. In a type-writing machine, a pivoted actuating plate or lever having a rest for the palm near or over its fulcrum and means for controlling the type-mechanism within reach of the fingers at the free or swinging part of said member, with a type-mechanism and means for actuating it by movement of said member.

104. In a type-writing machine, a pivoted actuating plate or lever having a rest for the palm near or over its fulcrum and closely arranged depressible keys or stops at its free or swinging part within reach of the fingers, with a type-mechanism and actuating mechanism therefor operated by said member and controlled by the key depressed.

105. In a type-writing machine, a type-mechanism, a key-board with means for actuating said mechanism therefrom, and means for shutting out from operation the type corresponding to the characters of infrequent use and operating the remaining type through lesser range of movement.

106. In a type-writing machine, a type-mechanism, a key-board and means for actuating said mechanism therefrom, the characters of frequent and infrequent occurrence being separately grouped on the key-board, and means for shutting out from operation the type corresponding to the infrequent characters and operating the remaining type through a lesser range of movement.

107. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-mechanism and actuating mechanism therefor operated by said member, a stop-plate for controlling said mechanism movable across the series of keys

and having its movement limited by the key depressed, and means for reducing the limit of reverse movement of said actuating member and thereby taking up a part of the operative movement so as to shut off from operation the keys first crossed by said stop-plate and operate the remaining keys through a lesser range of movement.

108. In a type-writing machine, the combination with a shiftable type-wheel or segment having rows of type and a key-board of shifting mechanism including a ring movable axially and having V-shaped teeth, a shift-lever adapted to vibrate or rock transversely of the axis of said ring, and means controlled by the key-board for turning one of them variant degrees, according to the type pressed on the key-board, so as to cause engagement of different teeth with said lever and effect its movement to shift the type-wheel when the ring is shifted.

109. In a type-writing machine of the character described, a rotatory type-wheel or segment, a driving shaft connected therewith, a stop-mechanism, an element on said shaft connected with said stop-mechanism, and drag or resistance device connected with said element so as to exert no resistance on direct movement of said shaft but to exert resistance on reverse movement thereof.

110. In a type-writing machine of the character described, a pivoted depressible actuating plate or lever mounted on trunnions, a rotatory type-wheel or segment, a driving shaft therefor mounted between and co-axially with said trunnions, actuating mechanism for turning said shaft on movement of said actuating member, stop-mechanism for controlling the movement of the type-wheel, an element on said shaft connected to said stop-mechanism, and a clutch device mounted on one of said trunnions and connected with said element adapted to rotate therewith only on reverse movement and a friction device bearing against said clutch device.

111. In a type-writing machine, a type-wheel or segment, a shaft on which it is axially mounted said shaft having a slot and a spring-pressed latch contained in said slot normally projecting therefrom and holding the type-wheel on the shaft and adapted to be pressed wholly into said slot to permit detachment of said type-wheel endwise of the shaft.

112. In a type-writing machine, a driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a sleeve on said shaft capable of a limited independent turn thereon, and a friction-spring carried by said sleeve for operatively connecting it with said driving element.

113. In a type-writing machine, a driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a sleeve on said shaft capable of a limited independent turn thereon, a friction-device carried by said sleeve for operatively connecting it with said element, and means on said shaft for releasing such connection after the limit of rotation of the type-wheel turning shaft.

114. In a type-writing machine, a driving element, a type-wheel turning shaft capable of a limited rotation to turn the type-wheel to proper position, a sleeve on said shaft capable of a limited independent turn thereon, a friction-device carried by said sleeve for operatively connecting it with said element, and means on said shaft for releasing such connection after the limit of rotation of the type-wheel turning shaft, and means on said shaft for adjusting the limit of independent turn of said sleeve.

115. In a type-writing machine, a type-wheel turning shaft, a rotary driving element, a driven element connected to said shaft, and a curved spring on the face of one element carrying a pin connected to the corresponding face of the other element and serving as a cushion.

116. In a type-writing machine, a type-wheel or segment, operating mechanism therefor actuated by stroke of the key depressed, an automatic shift-controller, and means for driving and releasing the same at the same period during the stroke of each key of the key-board.

117. In a type-writing machine, a type-wheel or segment capable of axial shift, a shift controller therefor, a reciprocatory device for moving said controller at each stroke of a key to effect or control the shift, and a link carried thereby having a pawl adapted to engage and release said controller at the end of each stroke.

118. In a type-writing machine, a swinging or movable key-board, a type-wheel or segment supported thereby, actuating mechanism therefor, an inking ribbon surrounding the impression portion of the type-wheel, and a ribbon-yoke supported by the key-board and adapted to guide said ribbon and having guide-rollers therefor.

119. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a driving element on said shaft actuated by said member, means for operatively connecting said element with said shaft, and means for checking the rotation of said shaft by the key depressed, such stoppage causing a release of said shaft from said driving element.

120. In a type-writing machine, a movable actuating member having depressible keys or stops, a type-wheel or segment and driving shaft therefor, a movable stop-plate connected to said shaft having its movement

limited by the key depressed, a driving pinion loosely mounted on said shaft and a toothed pitman or rack-bar engaging the same actuated by said member, a clutch device adapted to connect said pinion on direct rotation with said shaft until the latter is checked by said stop-plate and then to release the same, and a shift-mechanism actuated by said pitman.

121. A type-writing machine having, in combination, a type-wheel with three circumferential rows of type, a key-board, and means controlled by any key of the key-board for imparting a combined rotary and shift movement to said type-wheel during a single stroke, said shift being at right-angles to the plane of rotation and of equal range for any key.

122. In a type-writing machine, a swinging or movable key-board, a rotatory type-wheel or segment carried thereby, actuating mechanism therefor, an inking-ribbon passed circumferentially around the impression portion of the type-wheel, and a ribbon-yoke supported by the key-board guiding said ribbon around said type-wheel.

123. In a type-writing machine, a key-board having for keys depressible collared pins or pegs the upper ends of which protrude through the key-board and are adapted to be depressed flush therewith, in combination with a type-mechanism, actuating mechanism, and a stop-mechanism controlled by the lower end of the key depressed.

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

FERDINAND G. STALLMAN.

Witnesses:

GEO. H. NEUTITER,

ELLA FITZPATRICK.