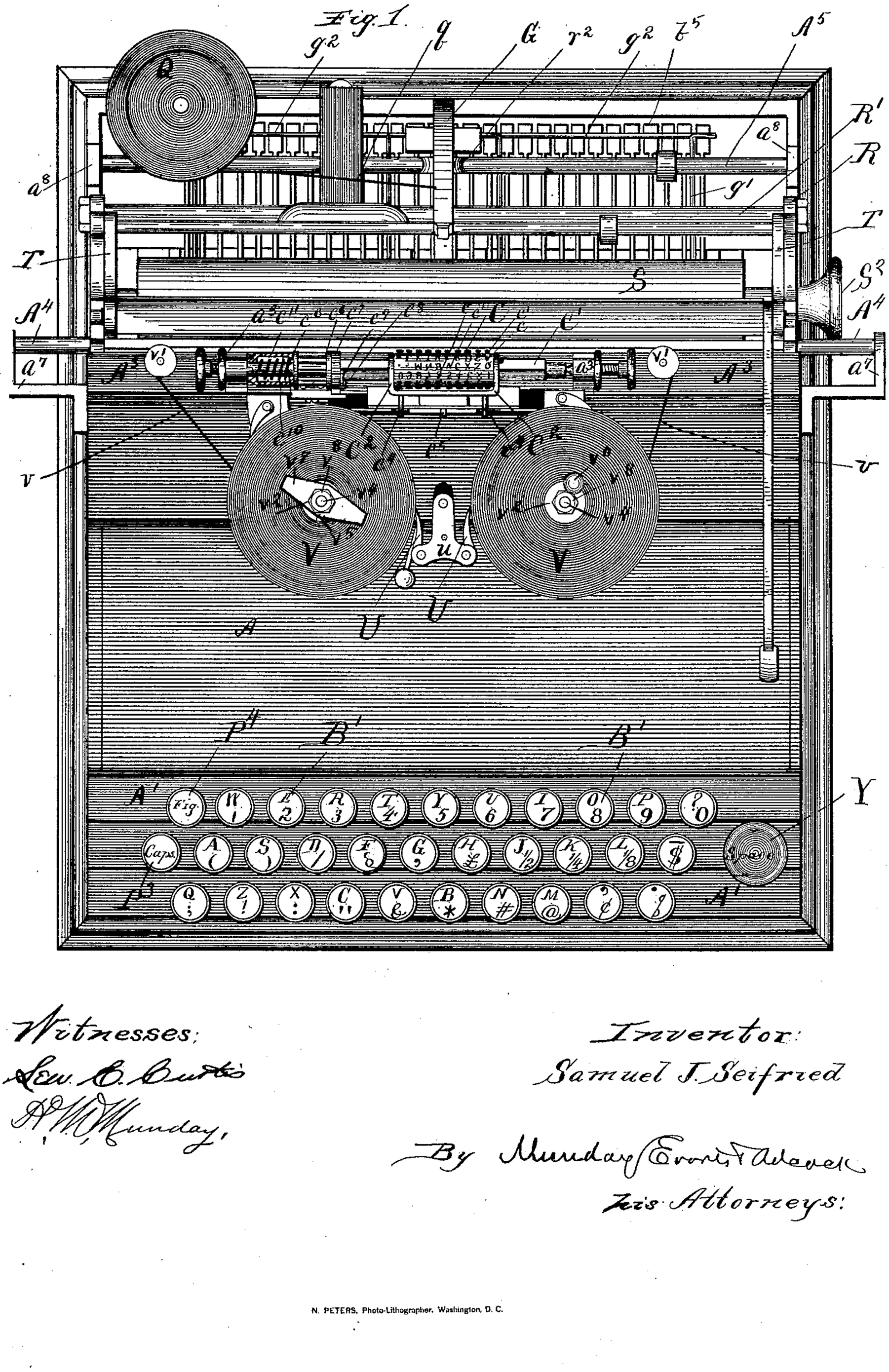
(No Model.) 5 Sheets—Sheet 1.

S. J. SEIFRIED.

TYPE WRITING MACHINE.

No. 411,066. Patented Sept. 17, 1889.

Fig. 1.



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(No Model.) 5 Sheets—Sheet 2.

S. J. SEIFRIED.

TYPE WRITING MACHINE.

No. 411,066. Patented Sept. 17, 1889.

Fig. 3.

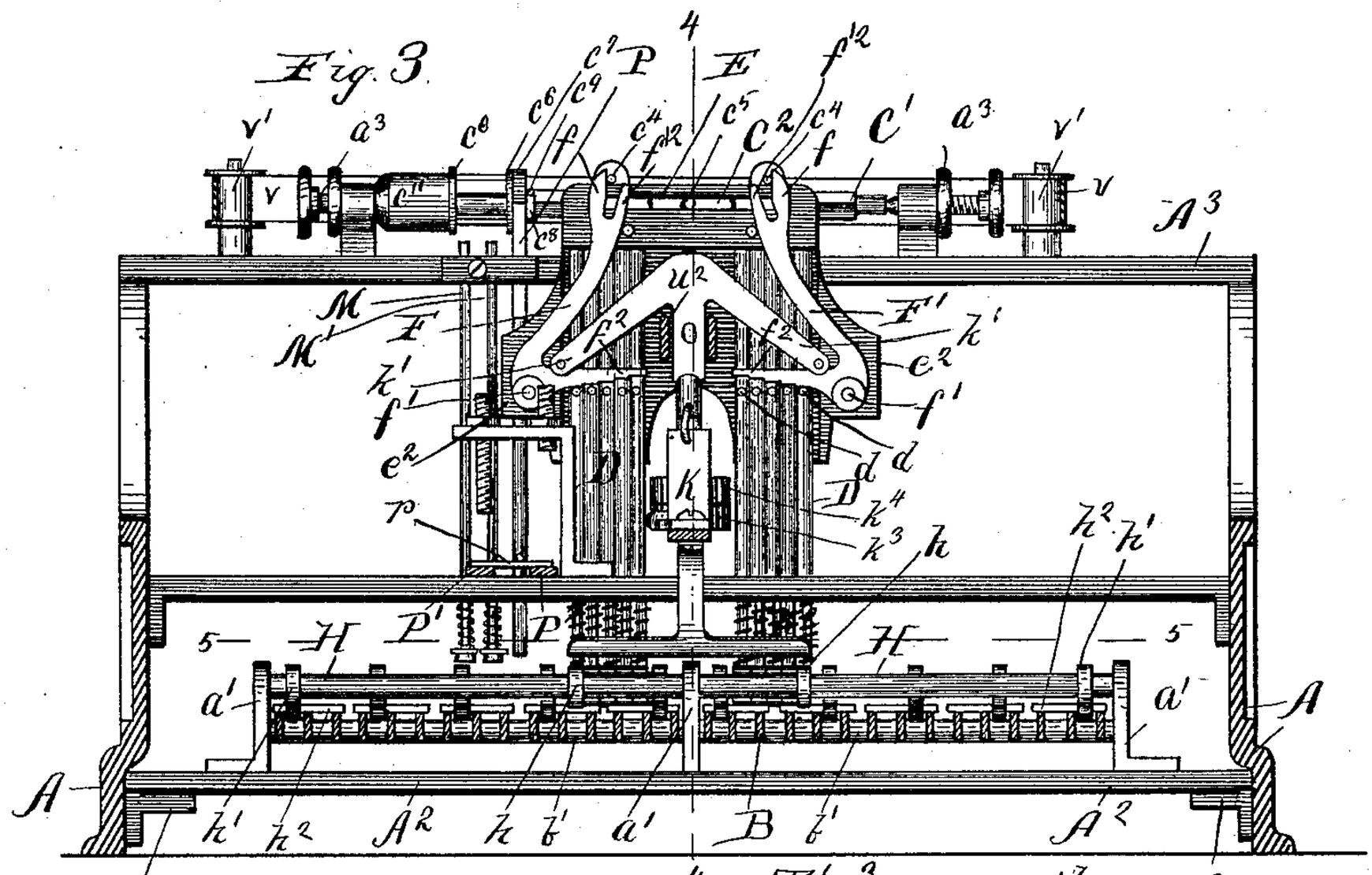

Fig. 2.

3

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(No Model.) 5 Sheets—Sheet 3.

S. J. SEIFRIED.

TYPE WRITING MACHINE.

No. 411,066. Patented Sept. 17, 1889.

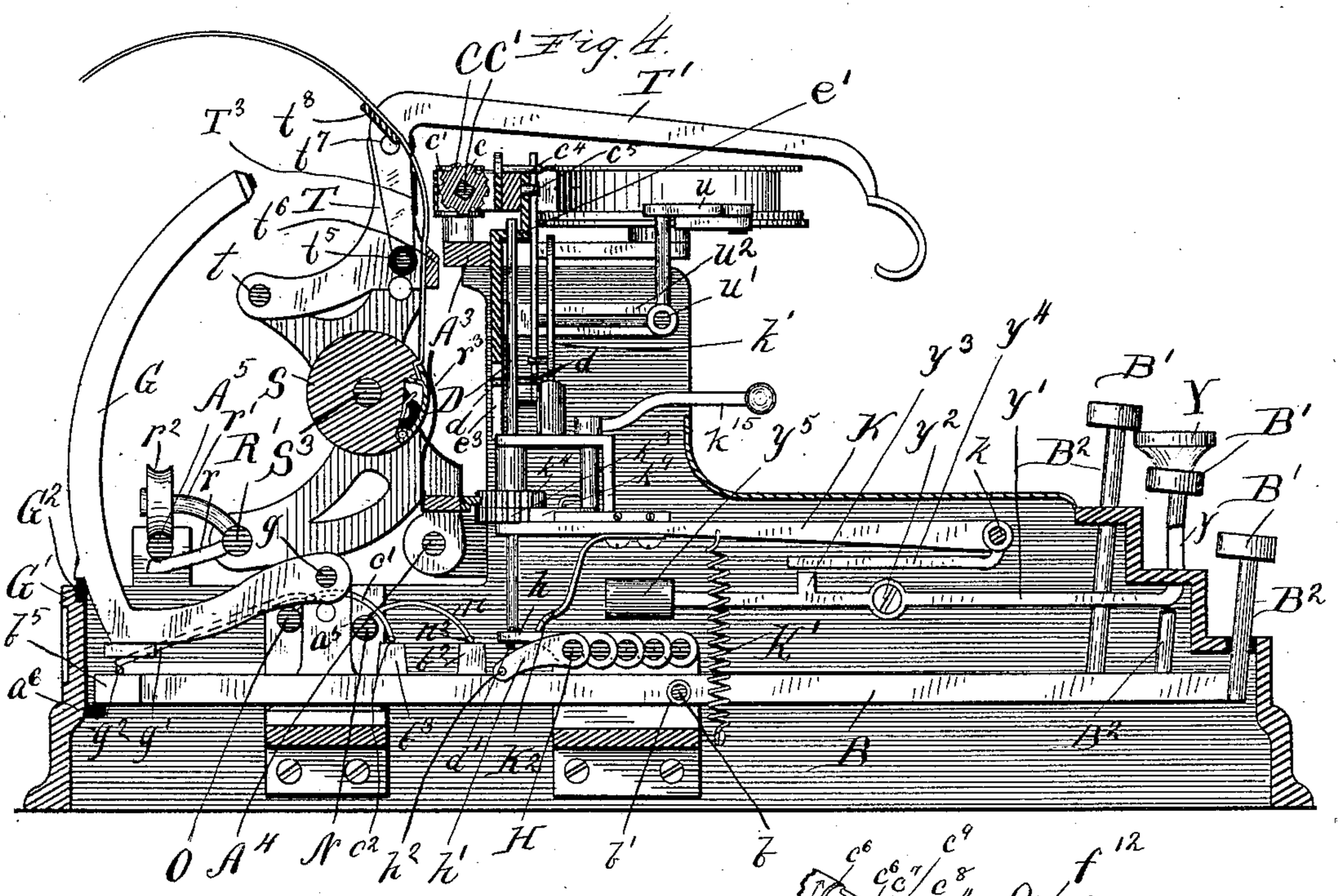


Fig. 7.

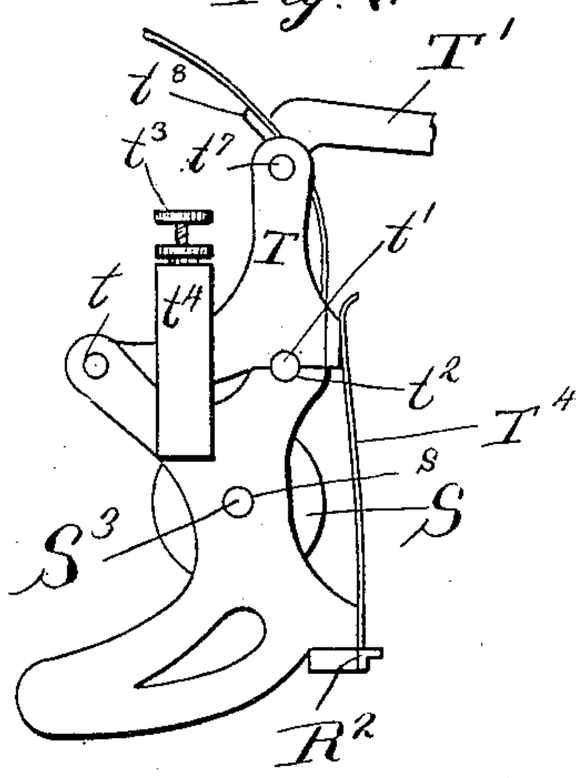
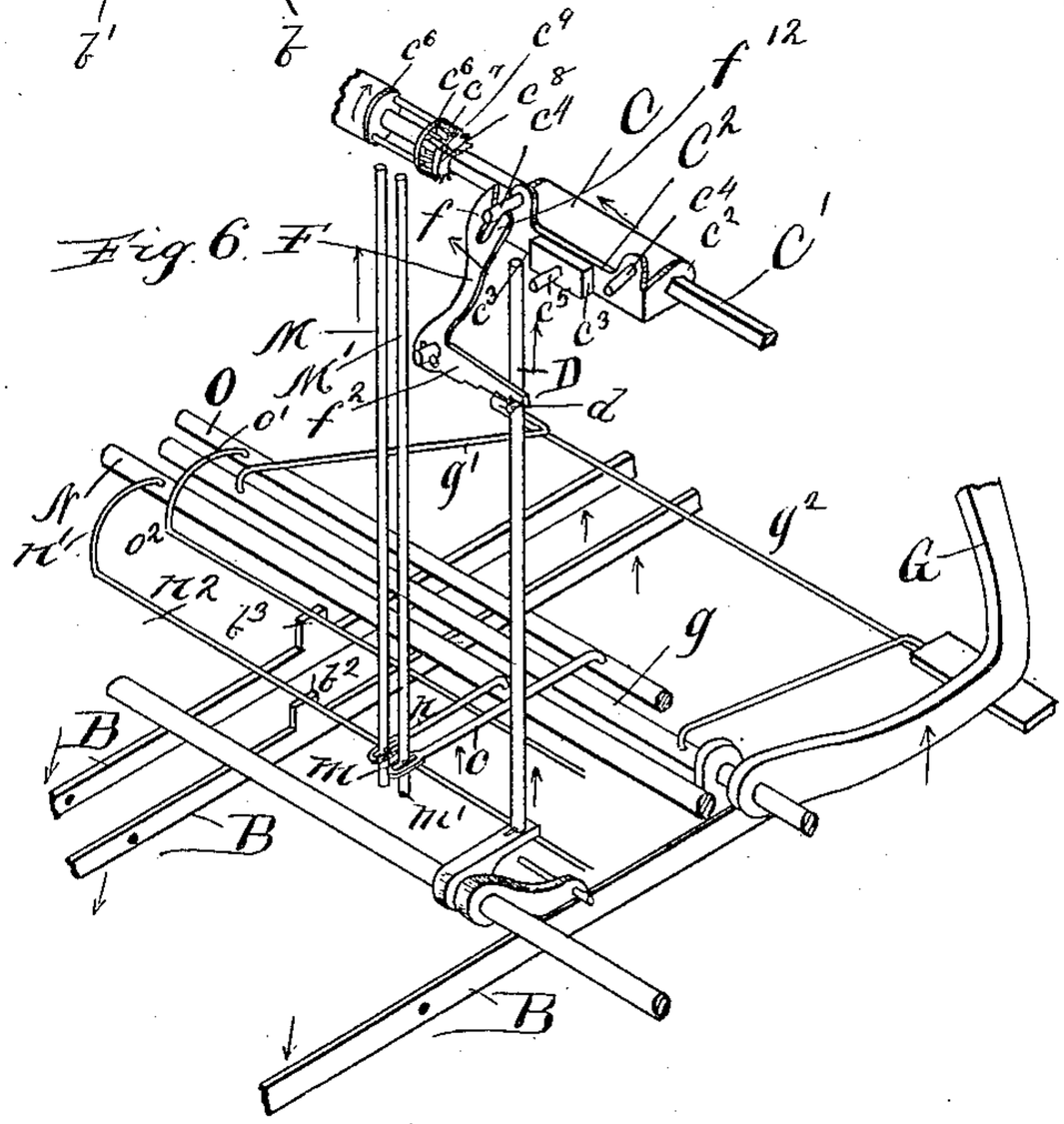


Fig. 6.



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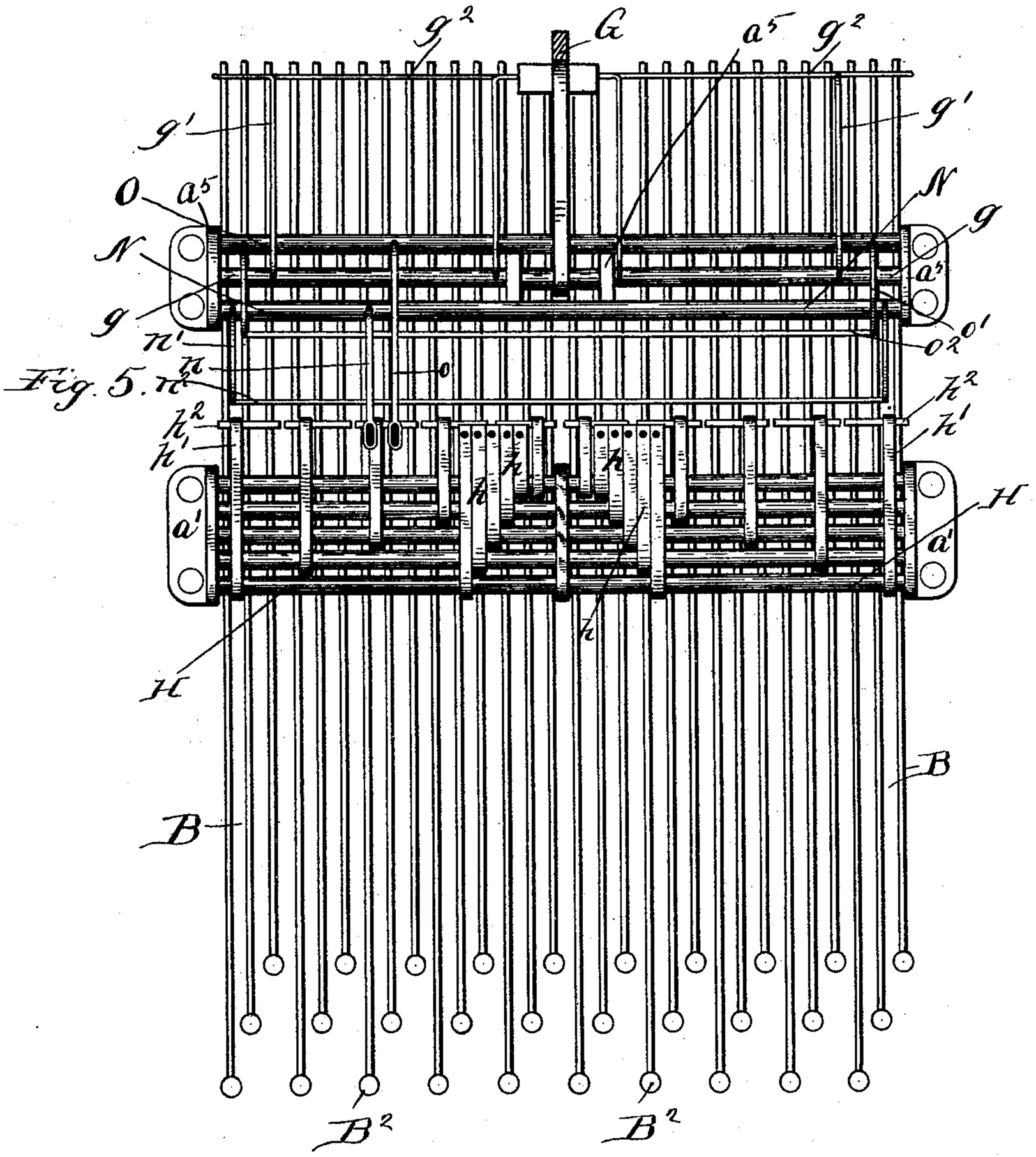
(No Model.) 5 Sheets—Sheet 4.

S. J. SEIFRIED.

TYPE WRITING MACHINE.

No. 411,066. Patented Sept. 17, 1889.

Fig. 5.



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(No Model.) 5 Sheets—Sheet 5.

S. J. SEIFRIED.

TYPE WRITING MACHINE.

No. 411,066. Patented Sept. 17, 1889.

Fig. 8.

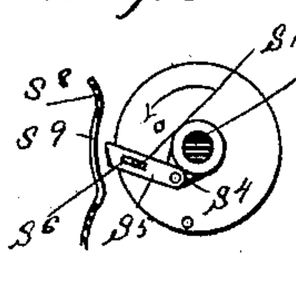


Fig. 9.

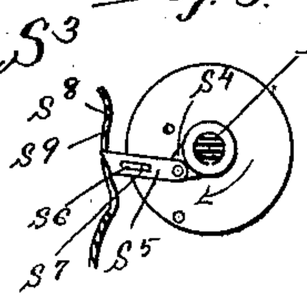


Fig. 10.

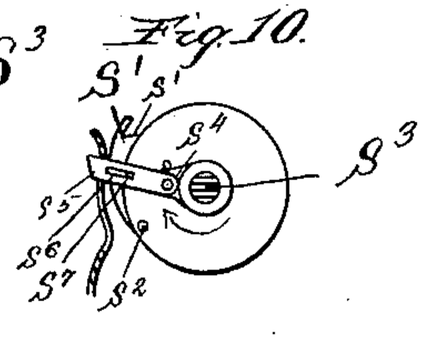


Fig. 12.

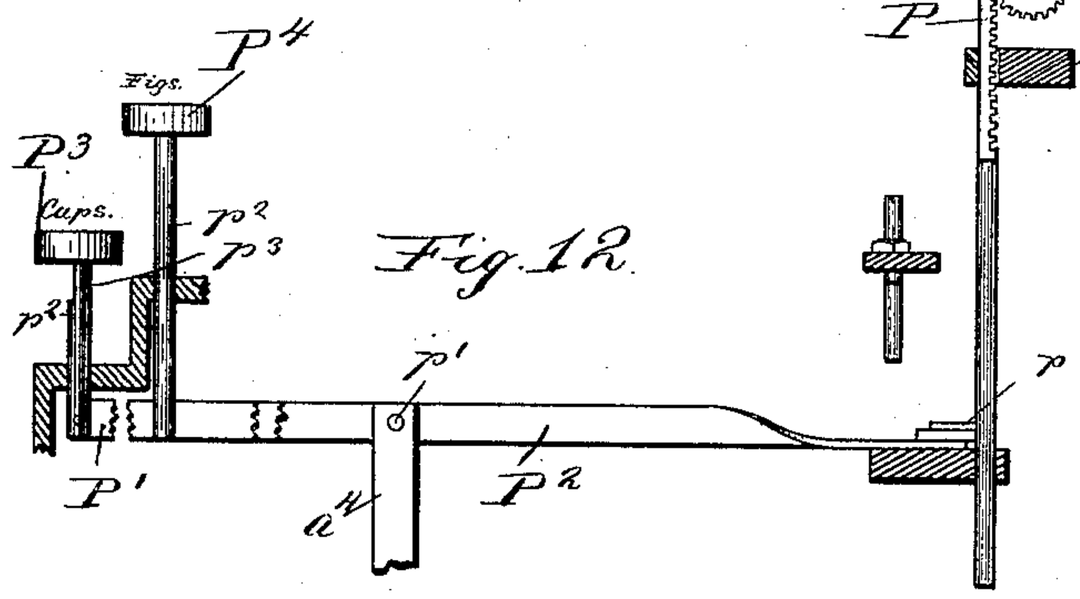


Fig. 13.

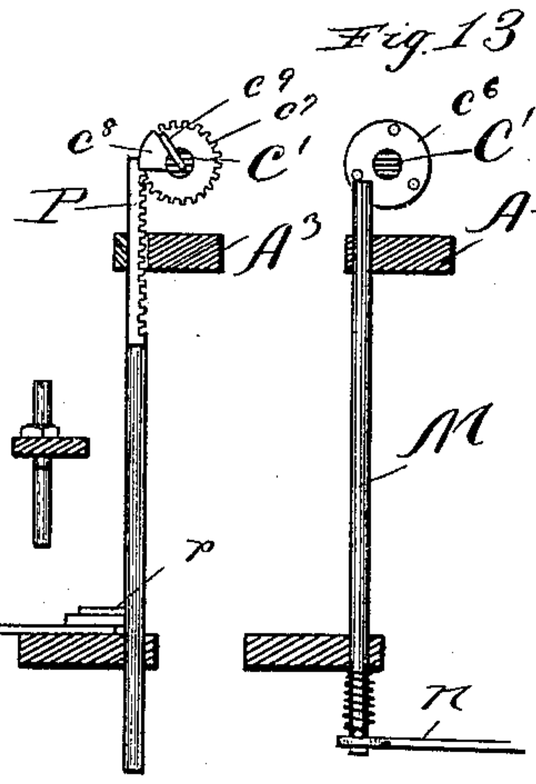


Fig. 14.

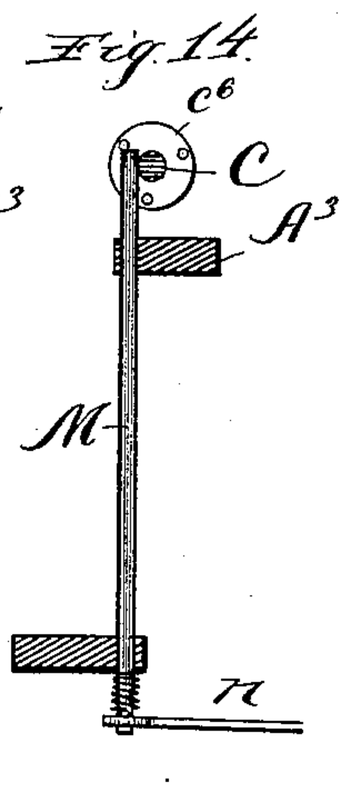


Fig. 11.

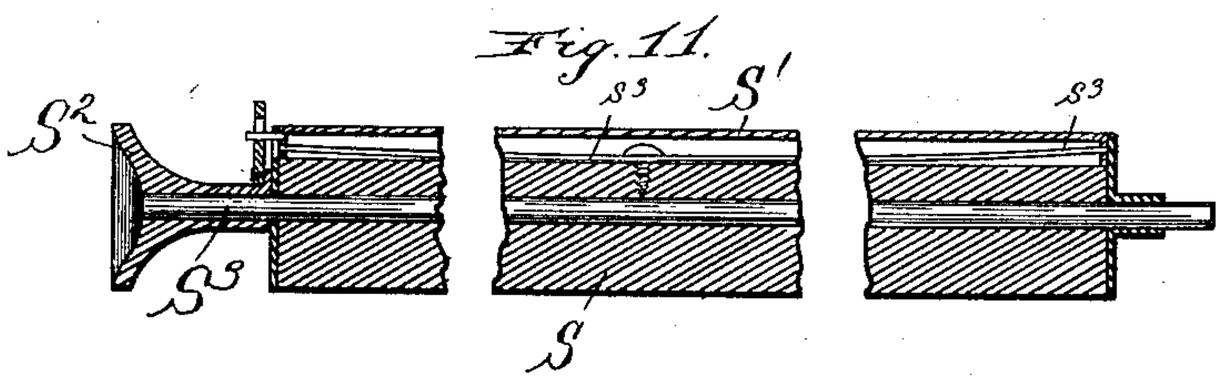


Fig. 15.

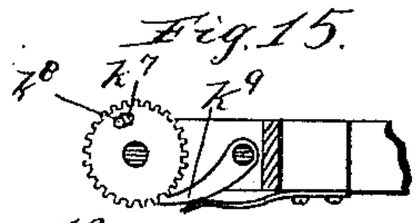
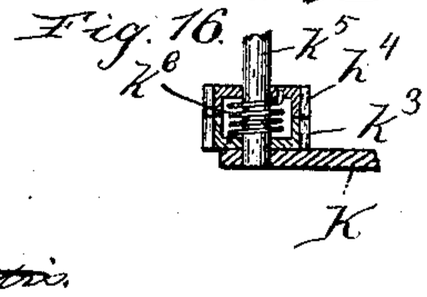


Fig. 16.



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UNITED STATES PATENT OFFICE.

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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,066, dated September 17, 1889.

Application filed August 22, 1888. Serial No. 283,457. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL J. SEIFRIED, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Type-Writing Machines, of which the following is a specification.

My invention relates to that class of type-writers wherein a rotatable sliding type-sleeve, cylinder, or parallelopipedon is employed.

The object of my invention is to provide a type-writer of an efficient, cheap, simple, and durable construction, capable of easy and rapid operation, and whereby the writing or printing may be done in perfect alignment.

In my invention I endeavor to bring each and all the different type or characters on the type-sleeve into position for printing by the least practicable movement of the type-sleeve in each case, to the end that the different characters may be printed in as quick and rapid succession as possible, and also to diminish as far as possible the momentum of the type-sleeve. The type-sleeve reciprocates parallel to the line of printing in either direction from its normal position. This reciprocating movement operates to bring each and all the separate type or characters on the type-sleeve into position longitudinally in front of the impression-hammer. The rotary movement of the type-sleeve serves to bring each of the separate type or characters on the type-sleeve into position radially in front of the impression-hammer. The radial and longitudinal movements of the type-sleeve take place simultaneously, so that the resultant or actual movement of the individual type from its normal position to its printing position takes place in a spiral line. The rotary motion of the type-sleeve may preferably be imparted to it continuously in one direction to bring its several faces into position radially for printing, though it may, if desired, be turned in both directions radially from its normal position. The type-sleeve is preferably a parallelopipedon of nine faces or sides, each face being furnished with ten separate type or characters in a straight line, thus giving ninety separate type or characters upon the sleeve. The twenty-six lower-case characters, the comma, period, interrogation-point, and hyphen are arranged on the first three rows or faces of the type-sleeve. The capital letters occupy the next three rows or faces of the type-sleeve, and Arabic numerals and other characters occupy the remaining three faces of the type-sleeve.

The machine has thirty keys and key-levers. The key-levers are all arranged parallel to each other and in the same horizontal plane, and they have a common pivot or fulcrum. The keys are arranged in three separate rows. All the keys of one row operate to slide the type-sleeve without rotating it. The keys of the next row operate both to turn the type-sleeve and to slide it, and the keys of the third row operate to turn still another face of the type-wheel into radial position for printing, and also to slide it longitudinally. If the second two rows of keys operate to turn the type-sleeve in the same direction, the first of such rows will turn the sleeve one-ninth of a revolution and the other two-ninths of a revolution. The keys or key-levers are arranged in sets of threes, one key of each set being in each of the three rows of keys, so that a single stop device to limit the longitudinal movement of the type-sleeve may be employed for each set of three key-levers. The stop devices which I employ are therefore only ten in number, and they consist of sliding pins arranged in the same vertical plane and adapted to be projected up in the path of the sliding type-sleeve or of the shuttle or frame on which the type-sleeve is carried. Motion is communicated to these vertically-sliding stop-pins from any one of the key-levers of any set by means of bent levers—ten in number, or one for each stop-pin. One end of each of these bent levers spans the space of three key-levers, so that any one of the key-levers of such set of three will operate the stop-pin. Reciprocating or longitudinal motion to the required extent is communicated to the type-sleeve from each of these stop-pins by a pair of bent levers, the horizontal arm of the bent lever being engaged

by shoulders or projections on the vertically-sliding stop-pins, the same engaging or striking against said short arm at different distances from its pivot or fulcrum. The stop-pins are arranged in two sets—five on each side. Five of the stop-pins operate through one bent lever to reciprocate the sleeve in one direction, while the five other stop-pins operate through the other bent lever to reciprocate the type-sleeve in the opposite direction. The type-sleeve is returned after each movement to its normal or middle position by a spring which operates against both the bent levers. The upper ends or arms of each of the bent levers is furnished with a fork that engages a pin on the type-sleeve carriage. The necessary one-ninth rotary movement of the type-sleeve is imparted thereto by each key-lever of the second row of keys through the medium of a bent lever and suitable connecting devices which operate to turn the shaft on which the type-sleeve slides. Each of the key-levers of this second row of keys is furnished with a projection which strikes against the bent lever. In like manner the key-levers of the third row of keys operate to turn the type-sleeve shaft two-ninths of a revolution. The type-sleeve is turned one-third of a revolution by a set-key and lever to bring the rows of upper-case characters into position for operation, and it is turned two-thirds of a revolution by a similar set-key and lever to bring the numeral characters, &c., into the field of operation. When the machine is adjusted by depressing one of the set-key levers to bring the caps or the figure-characters into the field of operation, the key-levers operate in the same manner, as before described, both to slide and to rotate the type-sleeve.

My invention consists in the novel devices and novel combinations of parts and devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is an end view. Fig. 3 is a vertical section taken on line 3 3 of Fig. 2, the ink-ribbon rollers and some of the other parts being removed, so as to show the stop-pins and mechanism for operating the sliding sleeve. Fig. 4 is a vertical longitudinal section taken on line 4 4 of Fig. 3. Fig. 5 is a plan view of the keys and key-levers, looking down from line 5 5 of Fig. 3. Fig. 6 is a detail perspective view showing only three of the key-levers and their connections to more clearly illustrate the operation. Fig. 7 is a detail end view of the paper-holder roll and frame. Figs. 8, 9, and 10 are detail end views of the paper-holder roll and clamp, showing the same in different positions. Fig. 11 is a section of the paper-roll. Fig. 12 is a detail view showing the set-keys and levers for setting or adjusting the type-sleeve shaft in position for the caps and figures. Figs. 13 and 14 are detail views showing the key-lever operating devices for turning the type-wheel shaft. Figs. 15 and 16 are detail views of the spacing device for moving the paper-roll carriage longitudinally the space of one letter.

In said drawings, A represents the frame of the machine, which may be of any suitable construction adapted to give support and bearing to the various movable parts or devices of the machine. The frame preferably consists of a rectangular box-shaped portion A, having vertical sides, and a stepped front A′, for the key-shanks to pass through. This portion of the frame has interiorly-projecting horizontal ledges or brackets a, upon which the key-lever frame A^2 is secured by suitable screws or bolts.

The key-lever frame A^2 is provided with vertical angle-plates or brackets a', to which the pivot bar or pin b of the key-levers B is secured. All the key-levers B extend in the same horizontal plane, and have the same fulcrum or pivot pin b.

The key-levers consist of flat steel bars arranged parallel to each other and separated from each other by short sleeves or washers b' on the pivot-pin b.

The keys B′ are arranged in three ranks or rows, as indicated at Fig. 1 in the drawings, and the keys are connected to the key-levers by the key-shanks B^2, the lower ends of the key-shanks being pivoted to the key-levers. The key-shanks B^2 extend through suitable holes in the key-board or step portion A′ of the frame.

The three keys B′ of each set of three contiguous key-levers are found one in each of the three rows or ranks of keys in the key-board.

C is the sliding rotatable type-sleeve, preferably about an inch in length and about one-half inch in diameter. This type-sleeve preferably has nine faces c or lines of type, the separate type or characters c' being arranged in straight lines, extending from one end of the sleeve to the other.

The type-sleeve C is mounted to reciprocate or slide upon a revoluble shaft C′, which is journaled in suitable bearings a^3 on the top cross-bar A^3 of the frame. The bearings a^3 may be of any suitable construction; but I preferably employ ordinary screw-point bearings, as indicated in the drawings, as the screws a^3 afford a ready and easy means of adjusting the shaft longitudinally.

The type-wheel shaft C′ is preferably square in cross-section It, however, may be given any desired cross section or shape which is adapted to permit the type-sleeve C to slide thereon and prevent the sleeve from revolving thereon.

For convenience in communicating the necessary longitudinal reciprocating or sliding movements to the type-sleeve, I provide the same with a reciprocating carriage, shuttle, or slide C^2. This slide or shuttle C^2 has per-

forated ears c^2, through which the shaft C′ passes, and which fit against each end of the type-sleeve, so that whatever movement is given the slide will be imparted to the type-sleeve. This type-sleeve shuttle or slide C^2 is also furnished with shoulders c^3 c^3, which abut against the vertically-sliding stop-pins D. It is further provided with horizontally-projecting pins c^4, which engage the forked ends f of the bent levers F F′.

The type-sleeve slide C^2 is further provided with a horizontally-projecting guide-pin c^5, that works in the horizontally-slotted guide E, which is fixed rigidly to the frame-bar A^3.

The vertically-sliding stop-pins D are all arranged in the same vertical plane, five on each side of the median line of the machine, there being ten of these stop-pins in all, or one for each longitudinal division or set of three type-keys and levers. It should here be understood that there are ten type or characters C′ in each of the nine faces of the type-sleeve. The distance between the consecutive stop-pins D is equal to the space between the types or characters c' c' longitudinally on the type-sleeve. The stop-pins D extend up through guide-holes in the horizontal portion e' of the guide-plate E. These guide-holes are all arranged in a straight line.

The stop-pins D are preferably made of round steel wire, and are each provided with a horizontally-projecting pin or shoulder d to engage and operate the bent levers F F′. When the stop-pins D are all in their normal position, the shoulders or projections d thereon all stand in the same horizontal plane or line.

The type-sleeve-operating levers F F are pivoted by pins f' to suitable projections e^2 on the vertical depending portion of the guide-plate E, and this depending portion of the guide-plate E is furnished with vertical guide-slots e^3, through which the pins d on the stop-pins D project, in order to afford suitable guides for the sliding pins D.

The levers F F′ are pivoted one on each side of the center line of the machine, and their horizontal arms f^2 f^2 project over the shoulders d of the stop-pins D. In this way it will be observed that the stop-pin D on each side which is farthest from the normal or middle position of the type-sleeve is nearest the pivot or fulcrum of the lever F or F′, so that this extreme stop-pin will impart the greatest movement to the bent lever F or F′ and to the type-sleeve actuated thereby; and in like manner the two inner stop-pins which are nearest the central position of the type-sleeve are farthest from the fulcrum of the operating-levers F or F′, so that the movement of these inner stop-pins communicates a correspondingly less movement to the type-wheel. By this simple arrangement of the levers F F′ on opposite sides the proper longitudinal movement is communicated from and by each stop-pin to the type-sleeve to bring each separate type or character on the type-sleeve longitudinally into position for printing—that is to say, in front of the impression-hammer G.

The ten stop-pins D are operated each by their appropriate set of three type-levers B by a series of bent levers H. The bent levers or rock-shafts H are ten in number—one for each stop-pin D. One arm h of each lever H is furnished with a suitable hole, in which fits the shouldered end d' of the stop-pin D. The other arm h' of each bent lever or rock-shaft H is furnished with a pin or broad foot h^2, adapted to span the set of three contiguous type-levers B, by which or either of which it is operated. The pivots of these levers are journaled in the brackets a' on the key-lever frame A^2.

The inner prongs f^{12} of the forks f on the upper ends of the levers F F′ are made short enough so that the pins c^4 on the type-sleeve shuttle will pass over such inner short prong when the levers F F′ occupy their normal position, while at the same time these short prongs of the fork are long enough to engage said pins c^4 c^4 when the lever F or F′ is raised sufficiently to overcome the lost motion. This permits the pins c^4 at one end of the type-sleeve carriage C′ to pass over the short prong f^{12} of the fork f of the sleeve F, which is not being operated and which remains in its normal position, while at the same time the pin c^4 at the opposite end of the sleeve-carriage C^2 will be engaged by the short prong f^{12} of the fork f of the other lever F′ as said lever is being raised. The space between the two prongs of the fork f give sufficient lost motion to allow the short prong of the fork to rise into the path of the pin c^4 before it passes under the pin.

The reciprocating type-sleeve C or its carriage C^2 is returned to its middle or normal position after each impression by a spring-actuated arm or lever K, pivoted at k to the frame of the machine and provided with a T-shaped or forked end k', which rests upon or strikes against the horizontal arm f' of the levers F F′. The spring K′, which actuates the lever K, is attached to the key-lever frame. This spring-lever is further provided with a foot or projecting blade or bar K^2, which rests against the horizontal or upper arms h of the bent levers or rock-shafts H, and thus serves to actuate the lever K from these levers H at each impulse of any of the key-levers B. To communicate its one-ninth or two-ninths rotary movement to the type-sleeve, its shaft C′ is furnished with a three toothed or sided gear or cam wheel c^6. This gear c^6 may be an ordinary lantern-pinion consisting of two disks with three pins extending between them, the pins being located equidistant apart radially, as is clearly shown in Figs. 1, 3, 6, 13, and 14. This three-toothed gear c^6 is engaged by the vertically-sliding pins M M′. The type-sleeve-turning pin M is actuated by the key-levers whose keys are in the second rank or row on the key-board, and it operates to

turn the type-sleeve one-ninth of a revolution, and thus bring the second row or face of the type on the type-sleeve radially in position for printing. The type-sleeve-rotating pin M′ is actuated by the type-levers of the third or last row of keys, and it operates to turn the type-sleeve two-ninths of a revolution, and thus bring the third row or face of type on the type-sleeve radially into position for printing. To thus turn the type-wheel shaft it will be observed that the sliding pins M M′ only engage one of the three pins of the lantern-gear c^6. The other two pins of the lantern-gear are in like manner operated upon by the type-sleeve-turning pins M M′ when the type-sleeve has been first turned one-third of a revolution to bring the caps into the field of operation, or two-thirds of a revolution to bring the Arabic numerals, &c., into the field of operation by the cap and numeral set-key levers, as will be hereinafter described.

The type-sleeve-turning sliding pin M is operated by a bent lever or rock-shaft N, one arm n of which is furnished with a hole at its end, in which fits the shouldered end m of the sliding pin M. The other arm n' of this bent lever or rock-shaft N is furnished with a cross-bar or foot n^2, spanning all the key-levers B. Each successive third key-lever B is provided with an upwardly-projecting shoulder b^2, which engages the cross-bar or foot n^2 of the bent lever or rock-shaft N. The height of the projection b^2 on these key-levers B above the general surface of the other key-levers is such as to permit such other key-levers to be raised to their full extent without striking or operating the bent lever N. In this way it will be seen that each third key-lever B, having the projection b^2, and whose keys are in the second row or rank on the key-board, would operate the bent lever N, and, through the sliding pin M and three-toothed gear c^6, turn the type-sleeve one-ninth of a revolution and bring its corresponding face into position for printing. In like manner the type-sleeve-turning pin M′ is operated by projections b^3 on the key-levers B, whose keys are in the third or last row on the key-board. The projections b^3 on the key-levers of this third rank of keys impinge against a bent lever O, having a horizontal upper arm o, in the end of which fits the shouldered end m' of the pin M′. The other arm o' of this bent lever or rock-shaft O is furnished with a cross-bar or foot o^2, which spans all the key-levers, and is engaged by said projections b^3 on each third key-lever.

The type-sleeve is turned one-third or two-thirds of a revolution to set it into position for printing caps or figures by means of a loose gear c^7 on the shaft C′. This gear c^7 is loose on the type-sleeve shaft C′, so that the type-sleeve shaft may be readily turned one-ninth or two-ninths of a revolution by the lantern-gear c^6 when actuated by the key-levers B in the ordinary operation. The loose gear c^7 has a projection c^8 on its side, which is engaged by a radial pin c^9, secured to the type-wheel shaft C′, so that the type-wheel shaft may be turned by the revolution of the loose gear c^7. The gear c^7 is rotated by a sliding rack P, having a projecting step or ledge p, which is engaged by the cap set key-lever P′ and also by the numeral set key-lever P^2. The numeral set key-lever P^2 is adapted to give the rack P twice the movement that is given it by the cap set key-lever P′, the one turning the shaft C′ two-thirds of a revolution, while the other turns it but one-third of a revolution. The set key-levers P′ and P^2 both have a common pivot or fulcrum p', which is secured to a bracket a^4 on the frame. The shanks p^2 of the set key-levers P′ P^2 are pivoted to said levers and each furnished with notches p^3, which are adapted to engage the metal plate A′ of the key-board, and thus hold the set key-levers permanently depressed. This is sometimes a convenience, especially where a number of capital letters or figures are to be struck consecutively. A slight lateral pressure or movement on the shank p^2 will engage or disengage this holding-notch p^3 from the key-board. Where only a few caps or figures are to be struck or printed consecutively, the cap or figure set key-lever may be held depressed by the finger of one hand, while the keys B^2 are struck with the fingers of the other hand.

P^3 P^4 are the keys of the cap and numeral set key-levers, respectively.

The type-sleeve shaft C′ is returned to its normal position radially after each impulse by a spring c^{10}. This spring may operate directly or indirectly upon the type-sleeve shaft. If it is arranged to operate directly without any intermediate devices, it may preferably be a spiral spring, as shown in the drawings, and inclosed within a suitable barrel or case c'', surrounding the shaft C′.

The impression-hammer G is secured to a rock-shaft or bent lever g, which is pivotally mounted in suitable bearings on the brackets a^5, which project up from the key-lever frame A^2 at each side. The bent levers N and O are pivoted to the same brackets a^5.

The rock-shaft g, which actuates the impression-hammer, is furnished with an arm g', having a foot or cross-bar g^2, which spans or extends across all the key-levers at the rear ends thereof, so that as the key-levers are moved through the last portion of their throw they will strike against the hammer G and impart the necessary impulse thereto.

The frame A is provided with a ledge a^6 at its rear end for the rear ends of the key-levers B to rest upon, and thus keep them all in their normal position. To return the key-levers B to place, their rear ends are furnished with weights b^5. The hammer G is thus operated by each movement of each key-lever, but the impulse is not given to the hammer until after the first movement of the key-lever, through the connecting mechanism before described, brings the appropriate type

or character on the type-sleeve into position for printing in front of the hammer G. The shape of the hammer is such, as indicated in the drawings, in relation to its fulcrum or pivot and to the position of the type-sleeve that the hammer returns to place by its own gravity. The hammer is also so mounted, as shown, as to require a sharp or staccato blow on the key-lever to strike a blow against the type-sleeve. It may, however, be so adjusted or mounted as to strike a slow or pressure blow. Better work, however, will ordinarily be done when the hammer is so mounted and adjusted as to require a sharp blow on the key-lever.

G′ is a stop or rest to support the hammer in position. It is attached to the frame A and is or should be furnished with a cushion G^2 to prevent noise.

R is the paper-holder slide or carriage, mounted to reciprocate back and forth on suitable guide rods or ways A^4 A^5, which are attached to suitable brackets a^7 a^8, secured to the frame of the machine. The rear frame-bar R′ of this paper-holder carriage is furnished with a guide lip or pin r, that fits under the guide-bar A^5, and with a stud r', furnished with a friction-roller r^2, that rides upon the guide-bar A^5. The frame A is furnished with a spring barrel or drum Q, around which a cord or line q is wound, the same being attached at one end to the stud r', so as to pull the paper-holder carriage across the machine.

The paper-holder carriage R is furnished at its front side with a rack-bar R^2, extending entirely across said carriage. The teeth of this rack R^2 are the space of one letter or character apart, and the paper-holder carriage is moved the distance of one tooth at each movement of any of the key-levers B. This movement of the paper-holder carriage is effected by the spring barrel or drum Q and the pawl-like acting gears k^3 k^4, which are journaled on a pin or stud k^5 on the lever K.

The upper gear k^4 is connected to the lower gear k^3 by a spiral spring k^6, which tends to turn the gear k^4 on the gear k^3 the distance of one tooth, or so far as the slot k^7 in the gear k^4, in which the pin k^8 fits, will permit. The lower gear k^3 is held from revolving in the wrong direction by the pawl k^9 and its spring k^{10}. The upper gear k^4 is normally in engagement with the teeth of the rack R^2, and as the gears k^3 k^4 are connected together by the pin k^8 on the gear k^3 fitting in the slot k^7 of the gear k^4 the pawl k^9 will prevent the spring-barrel Q from moving the carriage R. The moment, however, the lever K is raised by one of the key-levers B (through the connecting mechanism before described) the gear k^4 will be raised above and free from the rack R^2, and then the spring k^6 will turn the gear k^4 backward the distance of one tooth, so that when the lever K again descends and the gear k^4 again engages the rack R^2 the gear k^4 will turn forward one tooth, and thus permit the rack R^2 and carriage R to advance the distance of one tooth.

The detaching lever or handle k^{15} consists simply of an arm projecting from the shaft of the pawl k^9, and serves as a means of holding the pawl k^9 out of engagement with the gear k^3 when it is desired to move the paper-carriage back and forth by hand. The pawl-like gears k^3 k^4 are much more convenient than the ordinary Remington escapement, as they permit the paper-carriage to be pulled directly back without lifting any pawl or escapement. When the paper-carriage is being pulled back, the gears k^3 k^4 simply rotate on their shaft like ordinary gears and permit the carriage and its rack to slide back freely. The pawl-like acting gears k^3 k^4 also, as they rotate continuously, are not subject to get out of order by wear like ordinary pawls.

The paper-holding roller S is journaled in suitable bearings s on the paper-carriage R.

The paper-roller S is provided with a hinged clamp S′ for clamping and holding the front edge of the paper. This clamp S′ is provided with an interior shoulder s' for the end of the paper to rest against, and thus insure the winding of the sheet squarely on the roller. The clamp S′ when closed completes the circle of the roller. It is hinged at s^2 to the roller, and is furnished with an internal spring s^3, that serves to hold the clamp closed against the roller.

The roller S is revolved by a thumb-wheel S^2, the sleeve of which fits over or around the shaft S^3 of the paper-roller S. The sleeve of this thumb-wheel S^2 is furnished with a crank-arm s^4, to which is pivoted a link s^5. The link s^5 has a slot s^6, in which fits a pin or projection s^7 on the clamp S′. The sleeve of the thumb-wheel S^2 is thus so connected to the clamp S′ that when the sleeve is turned in the direction to wind up the sheet of paper on the paper-roller the link s^5 will tend to hold the clamp S closed. When the thumb-wheel, however, is turned in the opposite direction, the slotted link s^5 will open the clamp S′.

A flat spring s^8, secured to the paper-carriage frame R and having a slot s^9, through which the end of the link s^5 may project, serves to hold the paper-roller in proper position for the insertion of the sheet of paper, and also to hold the clamp S′ open.

The paper-frame R is furnished with a curved spring-shield r^3, of sheet metal, to give friction to the paper-roller S, and prevent its turning.

The paper-carriage frame R is furnished with a hinged paper-feed frame T, which is provided with a hinged paper-clamp lever T′. The feed-frame T is pivoted at t to the carriage R, and it is provided with studs t', that rest in the sockets t^2 on the frame R, in order to hold the pivoted feed-frame in position. An adjusting-screw t^3, mounted on the bracket t^4, limits the movement of the feed-frame T. By simply turning this adjusting-screw t^3 the

lines may be printed any desired distance apart on the paper. The clamp-lever T′ is preferably provided with a rubber-covered rod or bar t^5 at its lower end, which operates to clamp the paper against the flat bar t^6 of the feed-frame T. The pivot-bar t^7 of the clamp-lever T′ is furnished with a flat blade t^8, for the free end of the sheet of paper to rest upon.

The feed-frame T is furnished with an elastic ribbon T^3, preferably of rubber, which acts as a platen for the hammer G to strike against. This rubber band serves to cushion the blow of the hammer against the type-sleeve C.

V and V′ are the spools upon which the inking tape or ribbon v is wound. The inking-ribbon v passes around the guide-pulleys v' v', and extends in a vertical plane between the type-sleeve C and the sheet of paper or the rubber platen T^3. The ribbon-spools V V′ fit on the hubs v^2 of the toothed or ratchet wheels v^3. The ratchet-wheels v^3 are journaled on vertical studs v^4 on the frame of the machine. The hub v^2 of each of the ratchet-wheels v^3 is furnished with a groove v^5, in which a plug or pin v^6 may be inserted to fix either of the spools rigidly to the hub. A spring friction-clamp v^7 is secured by a nut v^8 to one of the studs v^4, in order to give the requisite tension to the inking-ribbon. The ratchet-wheels v^3 are constantly revolved in opposite directions by spring-pawls U U, which are pivoted to a forked lever u, which is pivoted at u' to a bracket u^2, secured to the frame, and which lever is connected to and operated by the lever K. When the pin or plug v^6 is inserted in one of the spools, such spool will of course revolve with its ratchet-wheel, and the inking-ribbon will then slowly wind onto this spool and wind off of the other one, which revolves freely on the hub of its ratchet-wheel. When the inking-ribbon by thus winding is transferred entirely to the one spool, by simply pulling out the plug v^6 and inserting it in the other spool this other spool will then, of course, revolve with its ratchet-wheel, and thus reverse the movement of the ribbon and wind it upon the other spool.

Y is the spacing-key. Its shank y is pivoted to the spacing-lever y', which is fulcrumed upon a stud y^2, projecting from the side of the frame A. This spacing-lever y' has a projection y^3, which impinges against the short arm y^4 of the lever K, whereby the spacer-lever K is operated independently of the key-levers B. This spacer-lever y' has a weight y^5 upon its end to return it to place. I usually employ an inking-ribbon of several feet—preferably twenty or thirty feet in length—and as the ratchet-wheels are finely toothed and turn only the space of one tooth at each stroke of the key-lever the plug v^6 requires to be shifted from the one spool to the other but infrequently.

While I have shown and described my invention as provided with a type-sleeve having nine faces and the type-keys arranged in three rows or ranks, it will of course be understood that my invention is not confined to the use of a type-sleeve having any particular number of faces, nor to the arrangement of the type-levers in sets or groups of threes. Other multiples than three may be employed without departing from the principle of my invention. If the type-sleeve, for example, were provided with sixteen faces, the key-levers would be arranged in groups or multiples of four.

The paper-carriage R is provided with a spring T^4, which bears against the hinged paper-feed frame T, and serves to hold the same closed, so that the clamp-levers T′ will grip the paper before the paper-feed frame T begins to rise.

I claim—

1. The combination, with a rotatable sliding type-sleeve, of a series of stop devices for limiting the longitudinal movement of said type-sleeve and a multiple number or set of two or more key-levers for actuating each of said stop devices, substantially as specified.

2. The combination, with a series of key-levers arranged in sets of two or more in each set, of a series of levers H—one for each set of type-levers—a series of stop devices D, a longitudinally-sliding type-sleeve C, and mechanism for connecting said stop devices D with said type-sleeve, substantially as specified.

3. The combination of rotatable longitudinally-sliding type-sleeve C, rotatable shaft C′, upon which said type-sleeve reciprocates, type-sleeve frame or shuttle C^2, stop-pins D, bent levers F F′, a series of bent levers H—one for each stop-pin—and a series of key-levers B, arranged in sets with two or more in each set adapted to operate a single bent lever H, substantially as specified.

4. The combination of rotatable longitudinally-sliding type-sleeve C, its shaft C′, and carriage or shuttle C^2, having pins c^4 c^4, and forked levers F F′, for reciprocating said sleeve in either direction, substantially as specified.

5. The combination, with rotatable horizontally-sliding type-sleeve C, its shaft C′, and carriage C^2, of bent levers F F′ and a series of vertically-sliding stop-pins D, adapted to engage said carriage C^2 and limit its movement, and provided with shoulders or projections d to engage and operate said bent levers F F′, substantially as specified.

6. The combination, with a rotatable sliding type-sleeve having type arranged in longitudinal rows or lines thereon, of a series of sliding stop-pins D, for limiting the longitudinal movement of said type-sleeve, a series of key-levers, and connecting mechanism for sliding said type-sleeve to bring the separate type longitudinally into position for printing and actuating said stop-pins by the movement of said key-levers, substantially as specified.

7. The combination, with a reciprocating

type-sleeve, of a series of stop-pins D to limit the longitudinal movement of said sleeve and connecting mechanism for operating said type-sleeve from said stop-pins, substantially as specified.

8. The combination, with a series of stop-pins D, having pins or projections *d*, of the bent levers F F′, having arms f^2 extending over said projections *d*, and a sliding type-carriage connected with and operated by said bent levers F F′, substantially as specified.

9. The combination, with a series of stop-pins D, having pins or projections *d*, of the bent levers F F′, having arms f^2 extending over said projections *d*, and a sliding type-carriage connected with and operated by said bent levers F F′, said type-carriage being provided with shoulders adapted to engage said stop-pins, and thereby limit the movement of the type-carriage, substantially as specified.

10. The combination, with type-carriage or shuttle C^2, having pins or projections c^4, of forked bent levers F F′, pivoted on opposite sides of the normal position of said type-carriage, whereby the type-carriage can be moved in either direction, substantially as specified.

11. The combination, with a reciprocating type-carriage C^2, having pins c^4, of bent levers F F′, having forked upper ends *f* and horizontal arms f^2, the inner prongs f^{12} of said forks *f* being shorter than the outer ones, and vertically-sliding pins D, having shoulders *d*, for operating said bent levers, substantially as specified.

12. The combination, with a rotatable shaft C′, mounted in fixed bearings, of a type-sleeve C, reciprocating thereon and having two or more faces or lines of types, a series of key-levers arranged in transverse rows or ranks and in sets of two or more keys in a set, a single connecting mechanism for each set of key-levers to reciprocate the type-sleeve, and an impression-hammer G, operated by said key-levers and adapted to strike said type-sleeve, substantially as specified.

13. The combination, with a rotatable sliding type-sleeve having two or more faces or lines of types, of a series of key-levers arranged in transverse rows or ranks in sets of two or more keys in a set, a single connecting mechanism for each set of key-levers to reciprocate said type-sleeve, and an impression-hammer G, operated by said key-levers, substantially as specified.

14. The combination, with a rotatable shaft C′, journaled in fixed bearings on the frame of the machine, of a type-sleeve C, reciprocating thereon and having two or more faces or lines of types, a series of key-levers arranged in transverse rows or ranks and in sets of two or more keys in a set, a single connecting mechanism for each set of key-levers to reciprocate the type-sleeve, a single type-sleeve-rotating mechanism for each rank or row of keys, and an impression-hammer G, operated by said key-levers and adapted to strike said type-sleeve, substantially as specified.

15. The combination, with a rotatable sliding type-sleeve having two or more faces or lines of type, of a series of key-levers arranged in transverse rows or ranks and in sets of two or more keys in a set, a single connecting mechanism for each set of key-levers to reciprocate the type-sleeve, and a single type-sleeve-rotating mechanism for each rank or row of keys, substantially as specified.

16. The combination, with a rotatable sliding type-sleeve, of a series of keys arranged in transverse rows or ranks and in sets, a series of corresponding key-levers, a common mechanism for communicating longitudinal reciprocating movement to said type-sleeve from each set of key-levers, and a common mechanism for communicating a rotary movement to said type-sleeve from each row or rank of keys excepting one, substantially as specified.

17. The combination, with a rotatable type-sleeve C, its shaft C′, and carriage or shuttle C^2, of a three-toothed gear c^6, secured to said shaft C′, the shaft-turning device M, and a bent lever N, having an arm extending over an alternating series of key-levers B, substantially as specified.

18. The combination, with a rotatable type-sleeve C, its shaft C′, and carriage or shuttle C^2, of a three-toothed gear c^6, secured to said shaft C′, shaft-turning device M, and a bent lever N, having an arm extending over alternating series of key-levers B, said series of key-levers B having projections b^2, adapted to engage the cross-bar of said lever N, substantially as specified.

19. The combination of rotatable sliding type-sleeve C, its shaft C′, and carriage or shuttle C^2, with bent levers F F′, vertically-sliding stop-pins D, bent levers H, key-levers B, arranged in sets, each set of key-levers operating one of said bent levers H, bent lever N, an alternating series of said key-levers B, having projections b^2, engaging said lever N, type-sleeve-turning device M, and gear c^6 on said shaft C′, substantially as specified.

20. The combination of rotatable sliding type-sleeve C, its shaft C′, and carriage or shuttle C^2, with bent levers F F′, vertically-sliding stop-pins D, bent levers H, key-levers B, arranged in sets, each set of key-levers operating one of said bent levers H, bent lever N, an alternating series of said key-levers B, having projections b^2, engaging said lever N, type-sleeve-turning device M, and gear c^6 on said shaft C′, bent lever O, an alternating series of said key-levers B being provided with projections b^3 to engage said lever O, and a type-sleeve-turning device M′, operated by said lever O, substantially as specified.

21. The combination, with the rotatable sliding type-sleeve and its shaft C′, furnished with three-toothed gear or cam c^6, of the key-levers and connecting mechanism engaging said three-toothed gear for turning the type-

sleeve shaft, and a set-key lever and connecting mechanism for rotating the type-sleeve shaft to bring another series of the type-sleeve faces into operation, substantially as specified.

22. The combination, with rotatable sliding type-sleeve C and its shaft C′, furnished with gear c^6, of the key-levers and connecting mechanism engaging said gear c^6 for turning the type-sleeve shaft, and a loose gear c^7 on said shaft C, for setting or adjusting the radial position of the shaft and allowing the shaft to rotate freely when operated by the key-levers, substantially as specified.

23. The combination, with rotatable sliding type-sleeve C and its shaft C′, furnished with gear c^6, of the key-levers and connecting mechanism engaging said gear c^6 for turning the type-sleeve shaft, and a loose gear c^7 on said shaft C′, for setting or adjusting the radial position of the shaft and allowing the shaft to rotate freely when operated by the key-levers, and a sliding rack for revolving said gear c^7, substantially as specified.

24. The combination, with rotatable sliding type-sleeve C and its shaft C′, furnished with gear c^6, of the key-levers and connecting mechanism engaging said gear c^6 for turning the type-sleeve shaft, and a loose gear c^7 on said shaft C′, for setting or adjusting the radial position of the shaft and allowing the shaft to rotate freely when operated by the key-levers, and a sliding rack for revolving said gear c^7, and two set-key levers P′ P², for giving different movements to said rack, substantially as specified.

25. The combination, with a sliding rotatable type-sleeve, its shaft, the key-levers, and mechanism for operating said sleeve from the key-levers, of a loose gear c^7, for adjusting the radial position of the type-sleeve shaft, a sliding rack P, set-key lever P′, its shank p^2 furnished with notch p^3 to engage the key-board and hold the set-key lever in position, substantially as specified.

26. The combination, with a sliding rotatable type-sleeve, its shaft, the key-levers, and mechanism for operating said sleeve from the key-levers, of a loose gear c^7 on said shaft C′, sliding rack P, having projection p, and set-key levers P′ and P², engaging said projection p, substantially as specified.

27. The combination, with a sliding rotatable type-sleeve, its shaft, the key-levers, and mechanism for operating said sleeve from the key-levers, of a loose gear c^7 on said shaft C′, said gear c^7 having a projection c^8, and said type-sleeve shaft having a pin or projection c^9, substantially as specified.

28. The combination, with sliding rotatable type-sleeve C, shaft C′, and shuttle C², of vertically-sliding stop-pins D, having pins or projections d, pivoted bent levers F F′, operated by said stop-pins and connected to said shuttle, and spring-lever K, having a forked or T-shaped end adapted to bear against both said bent levers, substantially as specified.

29. The combination, with sliding rotatable type-sleeve C, shaft C′, and shuttle C², of vertically-sliding stop-pins D, having pins or projections d, pivoted bent levers F F′, operated by said stop-pins and connected to said shuttle, and spring-lever K, having a forked or T-shaped end adapted to bear against both said bent levers, and operating-levers H, having horizontal arms h, said lever K being provided with a foot K², adapted to be operated by horizontal arms h of said levers H, substantially as specified.

30. The combination, with the paper-holder carriage R, having rack R², of the vertically-vibrating lever K, having gears k^3 k^4, one adapted to oscillate upon the other the distance of one tooth, and a pawl k^9, substantially as specified.

31. The combination, with the paper-holder carriage R, having rack R², of the vertically-vibrating lever K, having gears k^3 k^4, one adapted to oscillate upon the other the distance of one tooth, a pawl k^8, and a spring k^6, connecting said gear k^3 k^4, substantially as specified.

32. The combination, with the paper-holder carriage R, having rack R², of the vertically-vibrating lever K, having gears k^3 k^4, one adapted to oscillate upon the other the distance of one tooth, a pawl k^8, and a spacing key-lever connected with and adapted to operate said lever K, substantially as specified.

33. The combination, with a sliding rotatable type-sleeve, of a series of stops for limiting its longitudinal movement, a series of key-levers, and connecting mechanism for both rotating and sliding said type-sleeve by the movement of one and the same key-lever, substantially as specified.

34. The combination of a sliding rotatable type-sleeve C, a horizontal shaft upon which said type-sleeve reciprocates in a line parallel to the paper-roller, the paper-carriage and paper-roller, and an impression-hammer, the key-levers, and mechanism for reciprocating and rotating said type-sleeve from and by the key-levers, one and the same key-lever operating to both rotate and slide the type-sleeve, substantially as specified.

35. The combination of a sliding rotatable type-sleeve C, a horizontal shaft upon which said type-sleeve reciprocates in a line parallel to the paper-roller, the paper-carriage and paper-roller, and an impression-hammer, the key-levers, and mechanism for reciprocating and rotating said type-sleeve from and by the key-levers, said key-levers having rear ends which strike against and operate said impression-hammer, one and the same key-lever both rotating and sliding said type-sleeve, substantially as specified.

36. The combination of a sliding rotatable type-sleeve with key-levers B, impression-

hammer G, its pivot or rock-shaft g, and foot or cross-bar g^2, and connecting mechanism through which said type-sleeve is both rotated and slid by one and the same key-lever, substantially as specified.

37. The combination, with a sliding rotatable type-sleeve, of a paper-carriage, a storage paper-roller mounted thereon, having a hinged clamp for clamping the edge of the paper, a hinged paper-feed frame having a limited opening movement to feed the paper the space of one line, and a paper-clamp lever pivoted to said paper-feed frame, substantially as specified.

38. The combination, in a type-writer, of a paper-carriage R with paper-roller S, hinged paper-clamp S′, thumb-wheel S^2, crank s^4, and slotted link s^5, connected to said hinged clamp S, whereby said clamp is opened and held open when the paper-roller is turned in the reverse direction, substantially as specified.

39. The combination, in a type-writer, of a paper-carriage R with paper-roller S, hinged paper-clamp S′, thumb-wheel S^2, crank s^4, and slotted link s^5, connected to said hinged clamp S′, whereby said clamp is opened and held open when the paper-roller is turned in the reverse direction, and a spring s^3, for holding said clamp S′ closed, substantially as specified.

40. The combination of spools V V′, ribbon v, ratchet-wheels v^3, having hubs v^2, pawls U, lever u, vibrating lever K, said hubs v^2 having grooves v^5, and plug v^6, substantially as specified.

SAMUEL J. SEIFRIED.

Witnesses:
H. M. MUNDAY,
EDMUND ADCOCK.