(No Model.)

4 Sheets—Sheet 1.

O. TYBERG.

TYPE WRITING MACHINE.

No. 589,234. Patented Aug. 31, 1897.

Fig. 1.

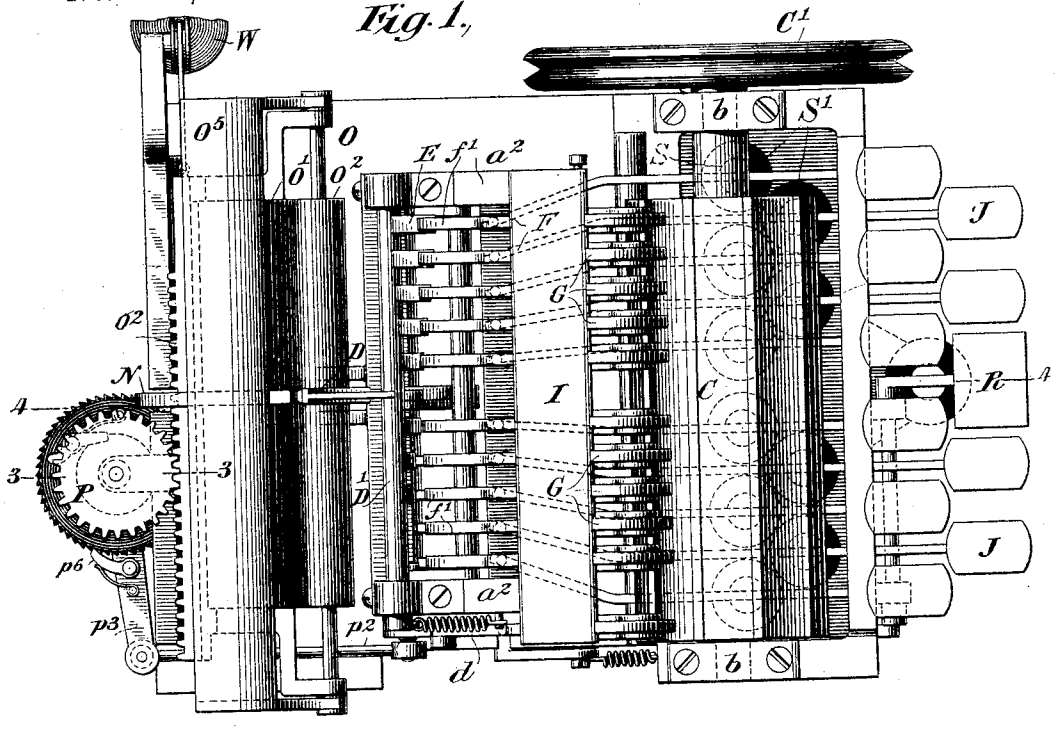


Fig. 2.

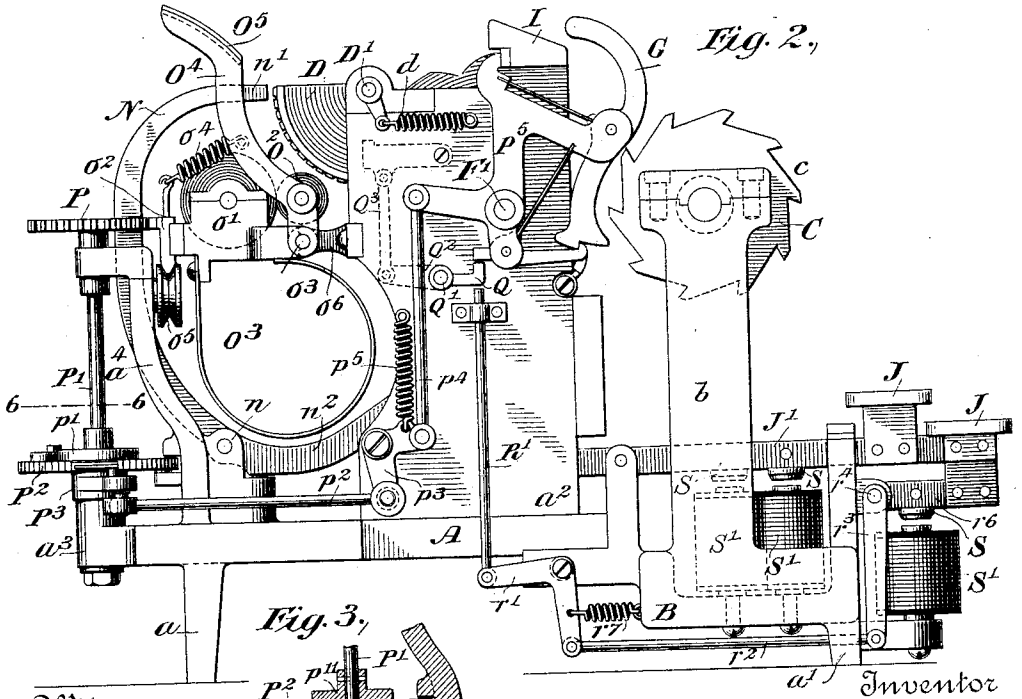
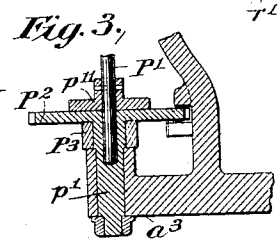


Fig. 3.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 4 Sheets—Sheet 2.

O. TYBERG.

TYPE WRITING MACHINE.

No. 589,234. Patented Aug. 31, 1897.

Fig. 4.

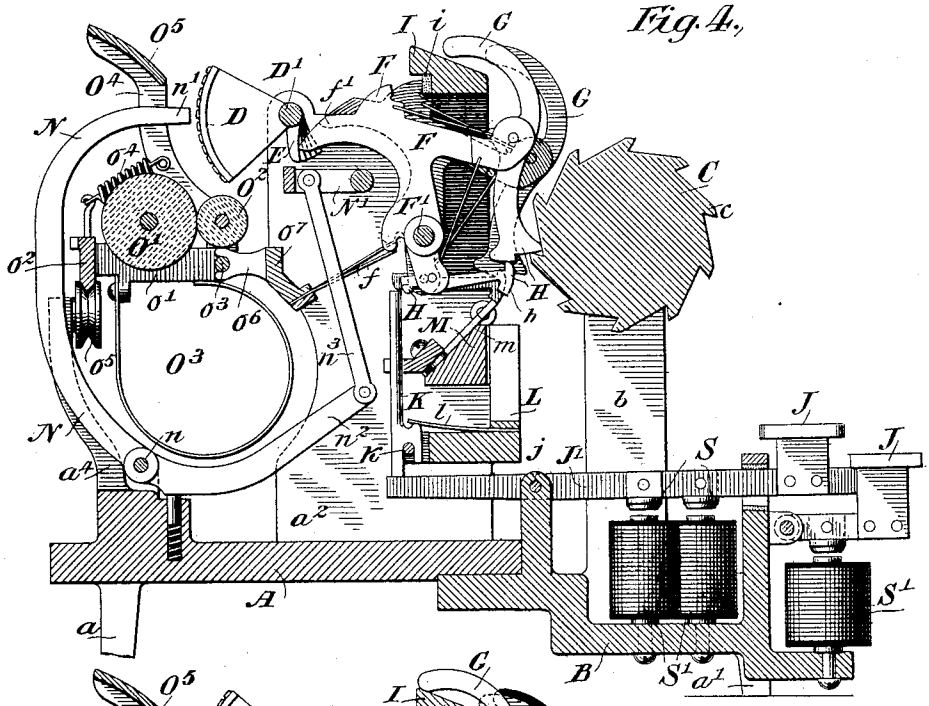


Fig. 5.

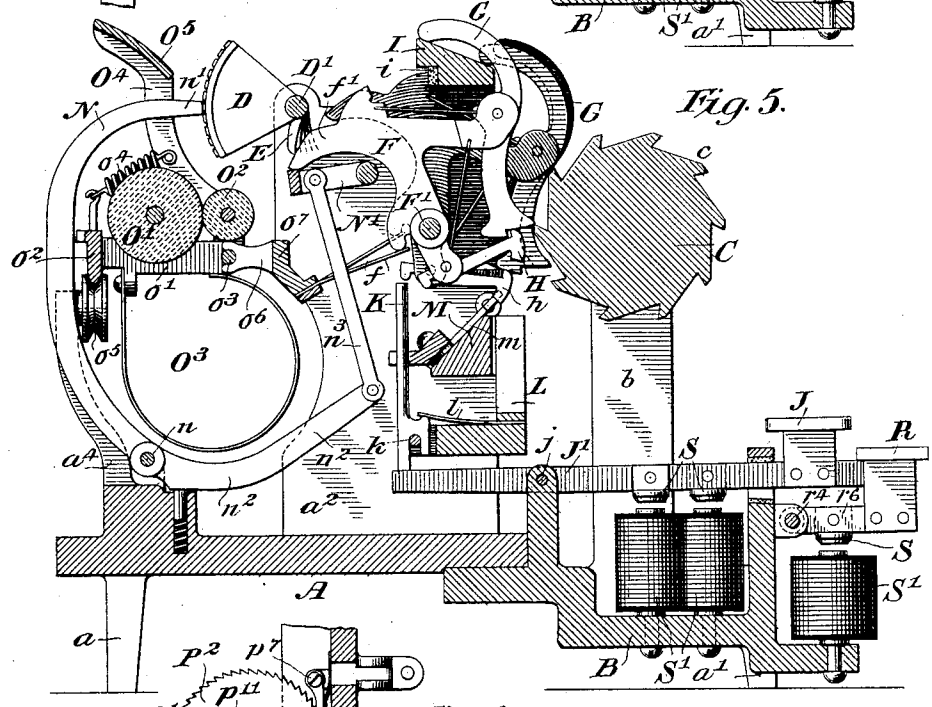
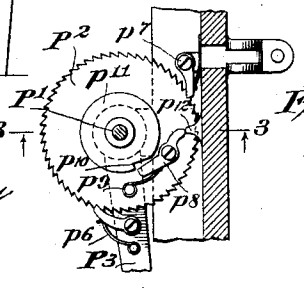


Fig. 6.



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O. TYBERG.

TYPE WRITING MACHINE.

No. 589,234. Patented Aug. 31, 1897.

Fig. 7.

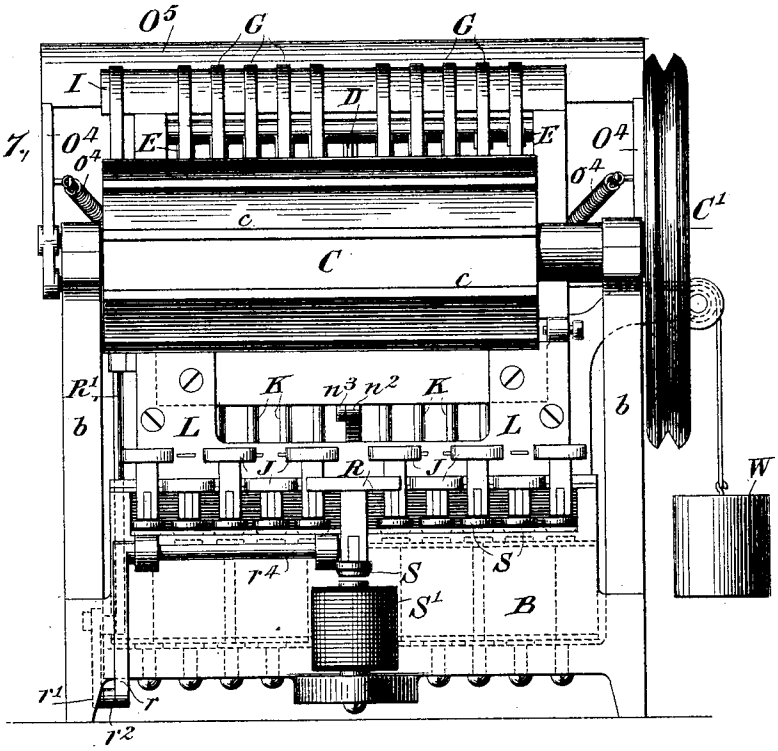


Fig. 8.

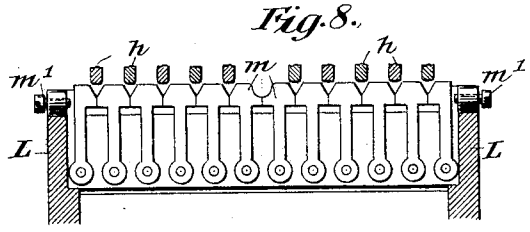


Fig. 9.

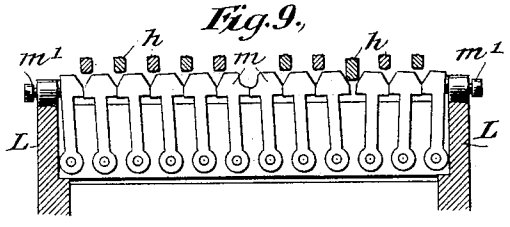


Fig. 10.

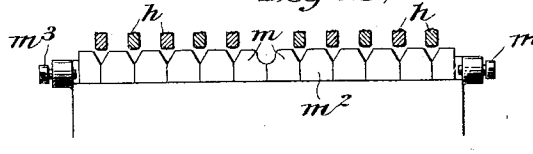
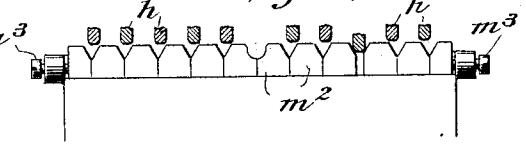


Fig. 11.



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(No Model.) 4 Sheets—Sheet 4.

O. TYBERG.

TYPE WRITING MACHINE.

No. 589,234. Patented Aug. 31, 1897.

Fig. 13.

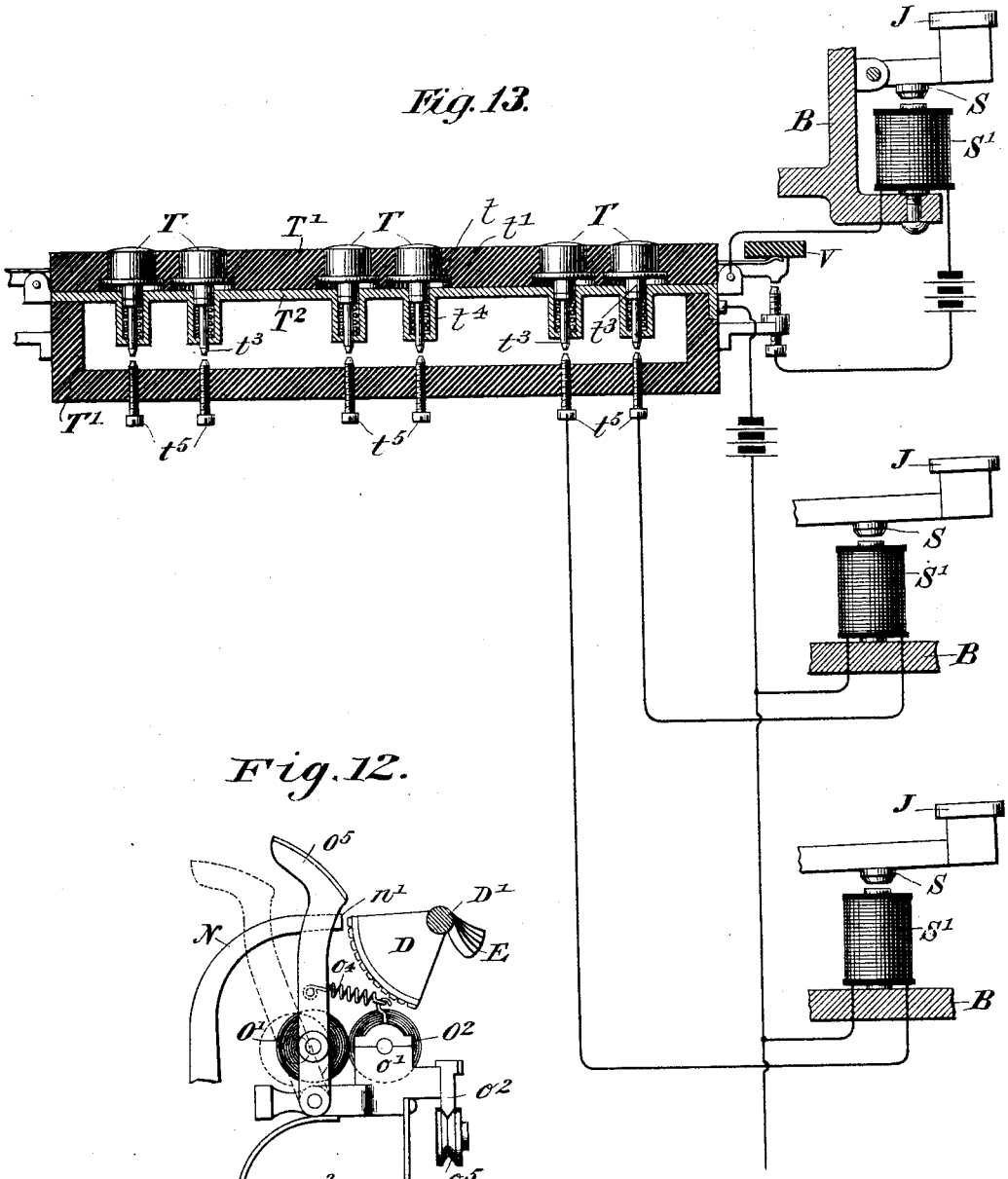


Fig. 12.

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UNITED STATES PATENT OFFICE.

OLUF TYBERG, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE TYBERG TYPEWRITER COMPANY, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,234, dated August 31, 1897.

Application filed November 16, 1891. Renewed July 28, 1897. Serial No. 646,253. (No model.)

To all whom it may concern:

Be it known that I, OLUF TYBERG, a subject of the King of Denmark, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

In my application for Letters Patent of the United States, filed March 17, 1891, Serial No. 385,411, I have shown a type-writing machine in which a normally-stationary type-carrier is operated by a continuously-moving driver through mechanism normally out of operative connection with the driver, but connected therewith at the will of the operator to bring the desired character on the type-carrier into printing position. I have also shown in said application mechanism for operating the carriage from the driver and mechanism for operating a hammer controlled by the type-carrier-operating mechanism. I have embodied my present improvements in a machine of this kind. I do not, however, wish to be limited to any particular class of machines, as some parts of my invention may be applied to machines differing in their construction and mode of operation.

According to my present invention I provide devices which, while they admit of a key being depressed before a previously-depressed key is released, prevent two keys from being depressed simultaneously. I thus avoid the printing of either letter when two keys are simultaneously depressed and the work of the machine is not marred by the carelessness of the operator in this regard. The arrangement is such, however, that any number of keys may be held down at the same time, provided they have been depressed successively. Consequently the operator may rest one finger on the depressed key of a letter just printed until another finger has found the key of the next letter to be printed. This relieves the operator and enables her to attain a higher speed with a decreased demand upon her nervous energy.

My present invention also comprehends novel hammer and carriage operating mechanism and novel electromagnetic devices for operating the impulse mechanism.

In the accompanying drawings, Figure 1 is a plan view of a type-writing machine embodying my invention. Fig. 2 is a side elevation. Fig. 3 is a detailed view in section on the line 3 3 of Fig. 1, showing a portion of the carriage-operating mechanism. Fig. 4 is a longitudinal section on the line 4 4 of Fig. 1, showing particularly the operative connections between the driver, the type-carrier, and the hammer. It also shows the impulse mechanism and the electromagnets for operating it. Fig. 5 is a similar view, the parts being shown in a different position. Fig. 6 is a detail view in section on the line 6 6 of Fig. 2, showing a portion of the carriage-operating mechanism. Fig. 7 is a front view of the machine. Figs. 8 and 9 are detail views of the stop mechanism. Figs. 10 and 11 illustrate a modification of the same. Fig. 12 shows a modified construction of the carriage. Fig. 13 is a diagram showing the keyboard and circuit connections that may be employed.

The frame may be of any suitable construction adapted to support the mechanism. As shown, the bed-plate A is supported at the rear by standards a, and at its front end is secured the keyboard-frame B, having front standards a'. Uprights a^2, on opposite sides of the bed-plate A, support the type-carrier and its actuating mechanism, and also the actuating mechanism of the hammer and the carriage.

The rotary driver C is mounted in bearings or standards b, rising from opposite sides of the keyboard-frame B. The driver is of a general cylindrical form and is provided with teeth or cams c on its periphery and is driven by power applied to the pulley C'. The type-carrier D, as shown, is of segmental form, having a single row of type on its periphery and is secured to the shaft D', mounted in bearings on the uprights a^2. A spring d tends to hold the type-carrier and its shaft in their normal position.

Arranged at different angles along the shaft D' is a series of arms E. They may be either a part of the shaft or fastened thereto in any suitable way. The type-carrier-actuating mechanism, as shown, consists of a series of dog-carriers F, mounted on a common shaft F', having its bearings in the uprights a^2.

The dog-carriers are somewhat similar in construction to those shown in my beforementioned applications. Each carries a spring-dog G and a spring-pawl H. Springs *f* tend to hold the dog-carriers in their normal position against a cushion *i*, fastened to a cross-piece I, which is supported at its ends by the uprights a^2.

The dogs G are held normally out of the path of the driver by the pawls H. The dog-carriers F are free to turn independently on their shaft, and their rearwardly-projecting arms *f'* are adapted to engage with the arms E on the type-carrier shaft. When the pawls H release the dogs G, they are allowed to enter the cams on the rotary driver C, and they are pushed forward by the driver until they are released, which takes place when their tail ends engage the upper surface of the cross-bar I.

Before the dogs are released from the driver they are made to engage with the spring-pawls H, and thus as the dog-carriers return to their normal position the dogs will remain out of engagement with the revolving cylinder or driver until the pawls are again released by the depression of a key in the keyboard—that is to say, when a key is depressed the inner end of its lever J' rises and the end of the rod K strikes the end of the pawl H on its under side, thus tripping the pawl and releasing the dog. If now the key is held down until the dog-carrier has been acted upon by the driver and while the parts are returning to the normal position, then the end of the pawl H strikes against the side of the rod K, which yields, turning on its pivot *k* and sliding on the top of the key-lever J' without interfering with the return of the parts to their normal position. The particular letter or character will therefore not be printed again, no matter how long the key is held depressed, until the key has first been released, so that the rod K is drawn down into its normal position under the end of the pawl H, and then when the key is again depressed the action described is repeated.

The dog-carriers all move through the same distance, but as the arms on the type-carrier shaft are arranged at different angles relatively to the axis of the shaft a different amount of movement is given to the type-carrier by the dog-carrier, and the arrangement is such that each dog when operated will bring the corresponding character on the type-carrier into printing position.

As shown in the drawings, there are ten dogs for operating the type-carrier and ten finger-keys, one for each dog and for each type of the type-carrier. This number may be varied to suit any purpose and the type-carrier may be enlarged to adapt it to carry a larger number of characters.

The keys J are arranged in two rows and are fastened to a series of levers J', pivoted at *j* in the keyboard-frame B. Their rear ends engage with pawl-tripping rods K, which are adapted to engage directly with the tails of the pawls H, so as to disengage the dogs whenever the keys are depressed and allow them to move into the path of the rotary driver. The rods K are mounted in a frame L, secured to the front of the uprights a^2, their lower ends being formed with open bearings where they are guided by pivots *k*, held in the frame L, and at their upper ends they are guided in a slotted frame M, and are held normally down, as well as against the end of the open slot, by springs *l*, fastened to the frame L. The rods are thus free to move vertically when acted upon by the impulse mechanism and free to swing on the pivots *k* when acted upon by the pawls H whenever they return to their normal position before the fingers of the operator have been removed from the keys.

In order that no two keys may be operated simultaneously and in order that the printing of the wrong character or the possible interference of the different parts of the type-carrier mechanism may be avoided, I provide means whereby no two or more dogs can be operated by the same tooth, cam, or rib of the rotary driver at the same time. This I accomplish by preventing more than one dog from being disengaged at the same time from the devices which hold it out of the path of the driver. Figs. 8, 9, 10, and 11 illustrate the device which may be employed for this purpose.

Referring to Figs. 8 and 9, a series of stop-pieces *m*, placed directly under the pawls H, (see Figs. 4 and 5,) are held in a frame M, secured to the frame L. In Figs. 8 and 9 the stops are shown as pivoted at their lower ends and free to swing on their pivots to a limited extent, which is regulated by set-screws *m'*. The upper parts of the stops are formed with inclined heads, between which the projections *h* of the pawls H enter. The limit of motion given to the stop-pieces *m* is just sufficient to permit one of the pawls H or its projection *h* to enter between the stop-pieces to release its dog G. If two pawls should be pushed against the stop-pieces simultaneously, neither of them would be allowed sufficient movement to permit the release of the corresponding dog, because the stop-pieces would not spread apart sufficiently to allow a sufficient movement of the pawls on their pivots to effect its disengagement from the corresponding dog.

As soon as a dog is released it engages with the driver, which, through the dog-carrier, pushes the pawl H out of engagement with the stop-pieces and therefore at once permits another dog to be released, which must fall into one of the next succeeding cams on the driver—that is to say, when a key has been depressed and its pawl H has entered a sufficient distance between two of the stop-pieces its dog is tripped and engages the driver, which, acting thereupon, as described, moves the dog-carrier, that in turn lifts the pawl from between the stop-pieces, and upon the

printing of the letter the parts assume their normal position. This key, as before explained, may now be held down without interfering with the depression of one or more keys; but at no time, for the reason explained, can two keys be depressed simultaneously, because the parts h of two pawls H can never simultaneously enter between the stop-pieces a sufficient distance to effect the tripping of the dogs. Thus no matter how fast the fingers of the operator are moved over the keyboard the dogs will be released only one at a time, and only when two keys are touched simultaneously does no action take place.

Fig. 9 shows how the stop-pieces lock the rest of the pawls when one of them has entered between the stop-pieces sufficiently to disengage its corresponding dog.

In Figs. 10 and 11 a modified form of the stop mechanism is illustrated. In this instance stop-pieces m^2 are loosely mounted in a groove, where they are free to slide lengthwise to a sufficient extent to permit the operation, as above described. The distance through which the stops move may be regulated by set-screws m^3.

The hammer N is pivoted to the frame A at n, and its upper end n' is adapted to press the paper against the type-carrier. Its inner or lower end n^2 is connected with a rocking hammer-operating frame N' by a connecting-rod n^3. The frame N' is pivotally connected at each end to the uprights a^2, and with this frame all the dog-carriers F are adapted to engage.

Each time that a dog-carrier is actuated its rearwardly-extending arm f', after having acted upon one of the arms E on the type-carrier shaft and brought the corresponding letter on the type-carrier into printing position, abuts against the frame N', and through the connecting-rod moves the hammer against the paper, causing it to take an impression from the type-carrier.

The carriage O carries two feed-rollers O' O^2. The roller O' is mounted in bearings o', which are connected at the rear by a rack-bar o^2 and at the front by a rod o^3. The roller O^2 is carried in a rocking frame O^4, pivoted at its lower end to the end pieces o'. A spring o^4 holds the roller O^2 against the roller O'. The upper part of the frame O^4 carries a cross-piece or table O^5, on which the paper may rest when mistakes are being corrected or erasures made. The paper is coiled up in the paper holder or receptacle O^3 and is fed up through the rollers between the end pieces o' and is then passed between the hammer and the type-carrier.

The frame of the carriage is supported at the rear by grooved rollers o^5, upon which the rack-bar o^2 rests, the lower part of which is V-shaped, as shown in Fig. 4. The rollers are free to turn on their studs, which are fastened in a projection a^4 of the main frame A. The front of the carriage-frame is guided by an arm o^6, having a bifurcated end embracing the rod o^3, its front end being attached to a bar o^7, secured to the uprights a^2.

Fig. 12 shows a modified construction in which the parts are practically reversed, the position of the erasing-plate, however, remaining the same.

It will be observed that whenever the paper is inserted between the rollers in the construction shown in the other figures of the drawings the erasing-plate is drawn forward, while in the modified construction the erasing-plate is moved backward, as indicated by dotted lines.

The carriage is operated by the following mechanism: A gear-wheel P, mounted on a vertical shaft P', engages with the rack-bar o^2 on the carriage. The diameter of the gear-wheel is determined by the length of travel of the carriage, one revolution of the gear being equal to the entire stroke. The lower end of the shaft P' extends into a sleeve p' on the ratchet-wheel P^2, mounted in a bracket a^3 of the main frame A, as shown clearly in Fig. 3. On the sleeve p' is loosely mounted an arm P^3, which is connected by a connecting-rod p^2, a bell-crank p^3, and a connecting-rod p^4 to a dog-carrier P^5, somewhat similar in construction to the dog-carriers F, and mounted on the same shaft F' outside of the uprights a^2. The dog-carrier P^5 is held in its normal position at rest by a spring p^5, acting upon the bell-crank lever p^3.

On the arm P^3 is a spring-pawl p^6, which engages with the ratchet-wheel P^2. As the arm P^3 is oscillated the ratchet-wheel P^2 is revolved step by step. A spring-pawl p^7 (see Fig. 6) prevents the backward movement of the ratchet-wheel P^2. The ratchet-wheel P^2 carries a pawl p^8, which, by means of a spring p^9, engages a notch p^{10} in the sleeve p^{11}, which is rigidly secured to the shaft P'. As long as the pawl p^8 is thus engaged with the sleeve P^{10} the shaft P', and consequently the carriage, through the gear is moved correspondingly.

Whenever the carriage has reached the limit of its forward movement the tail of the pawl p^8 engages the stop p^{12}, which effects a disengagement of the pawl p^8 and the sleeve p^{11}, and the carriage is automatically returned to the starting-point by means of a spring or weight W, attached to the carriage. The carriage is automatically fed forward step by step each time that a character is printed and by power derived from the rotary driver. In other words, whenever a dog is thrown into engagement with the driver an impulse is given to the pawl on the dog-carrier P^5, whereby its dog is thrown into engagement with the rotary driver and motion is given to the feed mechanism. The mechanism employed for this purpose is particularly shown in Fig. 2.

An arm Q, fastened to a shaft Q' in the uprights a^2, is made to engage with the pawl of the dog-carrier P^5. On the other end of the shaft Q' is another arm Q^2, which, through a rod Q^3, connects with the rocking frame N',

so that whenever the hammer-actuating mechanism is operated the dog on the dog-carrier P^5 is thrown into engagement with the driver.

In order that the carriage may be fed forward for spacing without printing, I provide a key R, connected with a vertically-moving rod R′ by a bell-crank r', which is connected to the inner end of a rod r^2, the other end of which is connected with a rocking arm r^3, pivoted on a shaft r^4, which carries an arm r^6, to which the key R is secured.

The rod R′ is held normally free from the arm Q by a spring r^7, attached to the main frame and the bell-crank lever r', and is made to trip the pawl of the carrier through the arm Q each time that the spacing-key is depressed.

The machine is operated as readily from a distance as by the direct manipulation of the keys on the machine by means of electromagnetic devices. Each of the keys for this purpose is provided with an armature S, having a corresponding electromagnet S′ arranged directly beneath it. Circuit-wires including a source of electric energy lead from each of the magnets to contact-pieces connected with a keyboard provided with circuit making and breaking devices and located at any desired place.

The keys T may be made of hard rubber or other insulating material, and they are flanged at their lower ends t and seated in a keyboard T′, also of insulating material. Recesses t', in which the flanges t are arranged, permit the keys to have a slight vertical movement. The keys project only a short distance above the surface of the board, so that by merely passing the hand lightly over the board the keys may be actuated. At the lower ends the keys are provided with projections t^2, which bear against the upper ends of spring-actuated contact-pieces t^3, mounted in a metallic frame T^2. This frame may be made of a single piece of metal formed with depressions or sockets t^4 to receive the contact-pieces t^3. Below the contact-pieces t^3 a series of contact-pieces t^5 is held in an insulating-frame, to which the wires from the electromagnets on the machine are respectively connected. A wire from all the opposite terminals of the magnets is connected through the battery with the metallic frame T^2.

When a contact-piece t^3 is depressed, it makes an electrical connection with the corresponding contact-piece t^5. The electric circuit thus completed acts upon its key or impulse-lever through its corresponding armature, and as all the movements of the machine are controlled by the keys or impulse-levers the mechanism may be perfectly controlled by the manipulation of the keyboard at a distant point.

The type-carrier is normally stationary and is normally disconnected from the continuously-rotating driver; but the mechanism which connects the type-carrier with the driver may be under perfect control by means of the electromagnetic devices above described, so that any desired character on the type-carrier may be brought into printing position and each time that a character is printed the hammer mechanism and the carriage-feed mechanism is automatically operated.

I have described my invention as embodied in a machine which is simple and operative; but my invention involves certain broad features which may be used in connection with machines differing in organization and details of construction from that herein shown.

I claim as my invention—

1. In a power-driven type-writing machine, the combination of a driver, a series of character-keys, a series of printing-controlling devices, actuated by the driver and controlled by the keys, and interposed between the keys and driver, means for preventing the simultaneous action of two of said interposed devices by the simultaneous depression of their respective keys, means for permitting the depression of a second key while a previously-depressed key is held down, and means for automatically restoring the printing-controlling devices to their normal position after their keys have been depressed.

2. The combination of a series of keys, and devices for permitting a key being depressed before a previously-depressed key is released, but which prevent two keys being simultaneously depressed, substantially as hereinbefore set forth.

3. The combination of a type-carrier, a series of keys or impulse-levers, connections between the keys or impulse-levers and the type-carrier, means for permitting the depression of one key before a previously-depressed key is released, and devices for preventing two or more keys from being simultaneously depressed, substantially as hereinbefore set forth.

4. The combination of a type-carrier, a driver, a series of dog-carriers, dogs thereon adapted to engage with the driver, pawls for normally holding the dogs out of engagement with the driver, a series of keys or impulse-levers, and stops with which the pawls engage and which prevent two or more keys from being simultaneously depressed, substantially as hereinbefore set forth.

5. The combination of a driver, a series of mechanisms actuated by the driver and controlled by a corresponding series of keys or impulse-levers, and devices preventing more than one mechanism being actuated simultaneously by the driver through the simultaneous depression of two or more keys, but permitting the actuation of a mechanism before previously-depressed keys have been released.

6. The combination of a type-carrier, a driver, a series of dog-carriers, dogs thereon adapted to engage with the driver, a hammer, and a hammer-operating frame with which the dog-carriers engage, substantially as hereinbefore set forth.

7. The combination of a type-carrier, its shaft, arms arranged at different angles on the shaft and respectively determining the extent of its movement, a continuously-moving driver, and mechanism interposed between the driver and type-carrier shaft operated by the driver and acting upon the arms on the shaft to effect the required movement of the type-carrier, substantially as hereinbefore set forth.

8. The combination of a carriage, a shaft operatively connected therewith, an oscillating arm, a ratchet-wheel driven thereby, a pawl operatively connected with the shaft, and carried by the ratchet-wheel, a stop for releasing the pawl from the shaft, and means for returning the carriage to the starting-point, substantially as hereinbefore set forth.

9. The combination of a carriage, a shaft and pinion thereon gearing with a rack on the carriage, an oscillating arm, a ratchet-wheel driven thereby, a pawl carried by the ratchet-wheel, and operatively connected with the shaft, and a stop for releasing the pawl, substantially as hereinbefore set forth.

10. The combination of a carriage, a roller carried thereby, a paper holder or receptacle connected with and carried by the carriage, an independent frame pivoted to the carriage and carrying a second roller, the paper being fed between the two rollers, substantially as set forth.

11. The combination of a carriage, a roller carried thereby, a frame pivoted to the carriage, and carrying a second roller, a cross-piece or table secured to said frame, and a paper-holder from which the paper is fed between the rollers, substantially as hereinbefore set forth.

12. The combination of a continuously-rotating driver, a type-carrier, type-carrier-actuating mechanism normally disconnected from the driver but connected therewith at the will of the operator, keys or impulse-levers for controlling the type-carrier-actuating mechanism, a keyboard provided with circuit making and breaking devices, and connected with electromagnetic devices for operating the keys or impulse-levers, substantially as hereinbefore set forth.

13. In a type-writing machine, a continuously-rotating driver, a normally stationary type-carrier, type-carrier-actuating mechanism, normally disconnected from the driver, hammer and carriage actuating mechanism, keys or impulse-levers controlling the type-carrier-actuating mechanism, a keyboard provided with circuit making and breaking devices, electromagnetic devices for operating the keys or impulse-levers, and electrical connections between the electromagnetic devices, and the circuit making and breaking devices and the keyboard, substantially as hereinbefore set forth.

14. In a type-writing machine, the combination of a driver, a series of devices that select or determine the character to be printed, a series of printing-controlling devices actuated by the driver and controlled by said selecting devices, electromagnetic devices for actuating any selecting device at will, and a keyboard having keys and electrical contacts controlling the circuits of the electromagnetic devices, substantially as set forth.

15. In a type-writing machine, the combination, of a driver, a normally stationary intermittently progressively rotatable type-carrier, a series of type-carrier-actuating devices normally disconnected from the driver, a series of selecting devices controlling the type-carrier-actuating devices and determining their respective engagement with the driver, electromagnetic devices for actuating any of said selecting devices at will, a keyboard having keys and contacts controlling said electromagnetic devices, a paper-carriage, its forward-feed devices, and its automatic returning or retracting devices.

16. A keyboard having the character-keys arranged in groups, each group containing more than four, some of the keys being common to two or more groups, and the keys of each group surrounding a space unoccupied by a character-key.

17. A keyboard having the character-keys arranged in groups, each group containing more than four, some of the keys being common to two or more groups, and the keys of each group surrounding a space unoccupied by a character-key, and one or more of said spaces containing a spacing-key.

18. In a type-writing machine, the combination with a rotary driver and a type-carrier having a series of surfaces in different planes, of mechanism interposed between the driver and carrier and operating the latter, the extent of movement of the carrier being determined by the surface acted upon and key-levers controlling said mechanism.

In testimony whereof I have hereunto subscribed my name.

OLUF TYBERG.

Witnesses:
EDWARD C. DAVIDSON,
FRANK S. OBER.