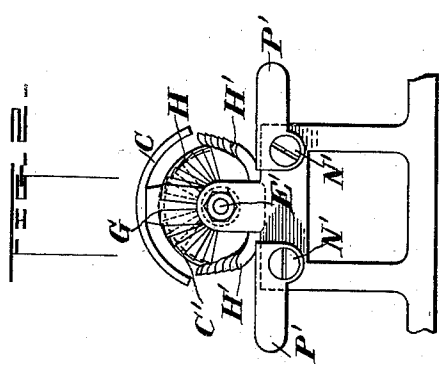
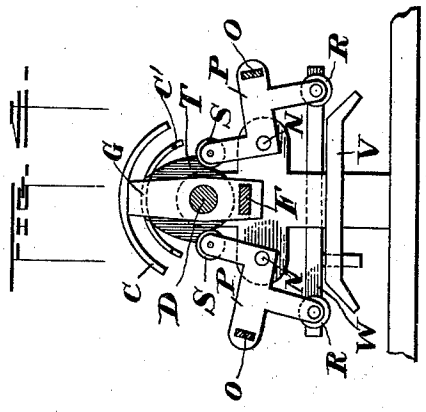
(No Model.) 2 Sheets—Sheet 1.

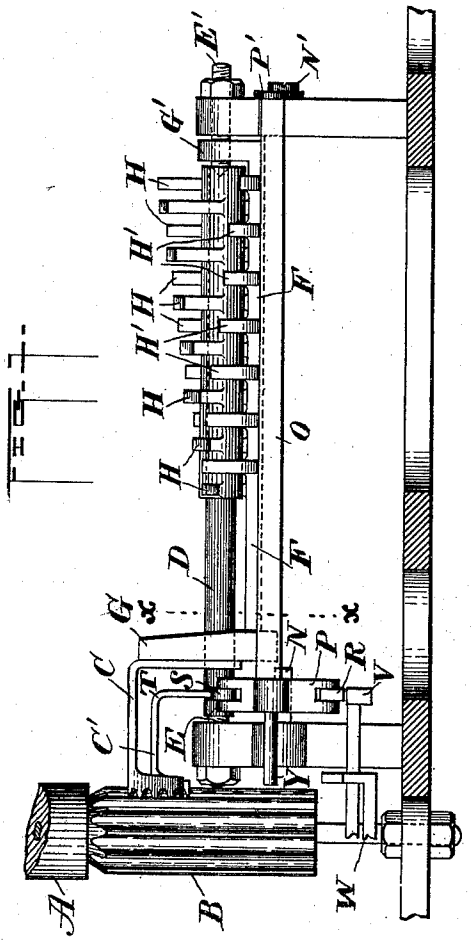
J. GARDNER.

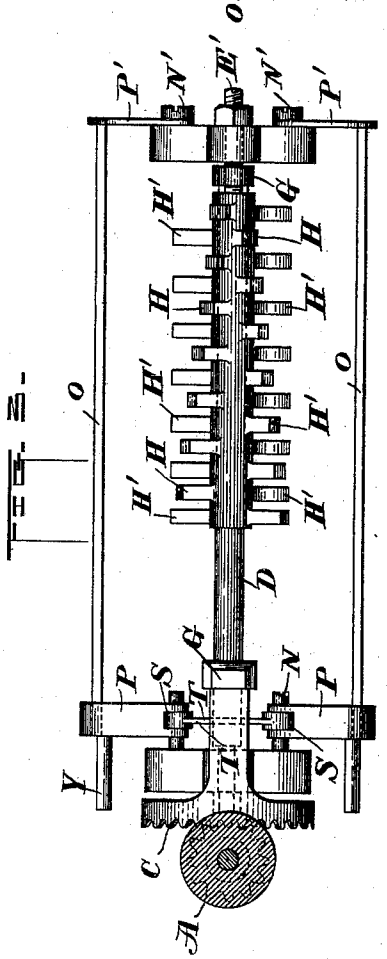
TYPE WRITING MACHINE.

No. 505,547. Patented Sept. 26, 1893.









Witnesses
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A. L. Clark.

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(No Model.)

2 Sheets—Sheet 2.

J. GARDNER.

TYPE WRITING MACHINE.

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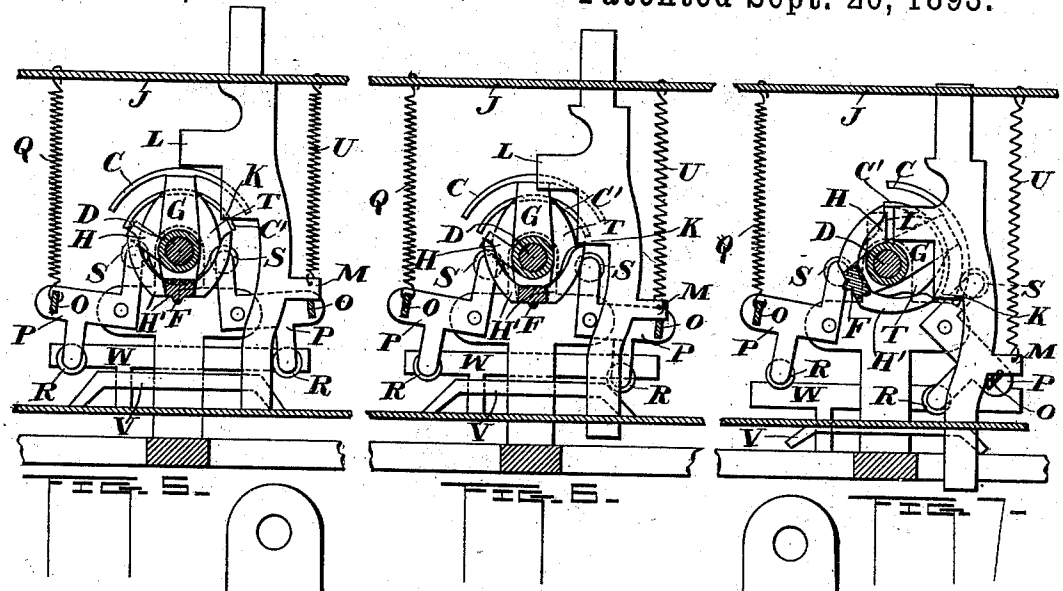

FIG. 5.

FIG. 6.

FIG. 7.

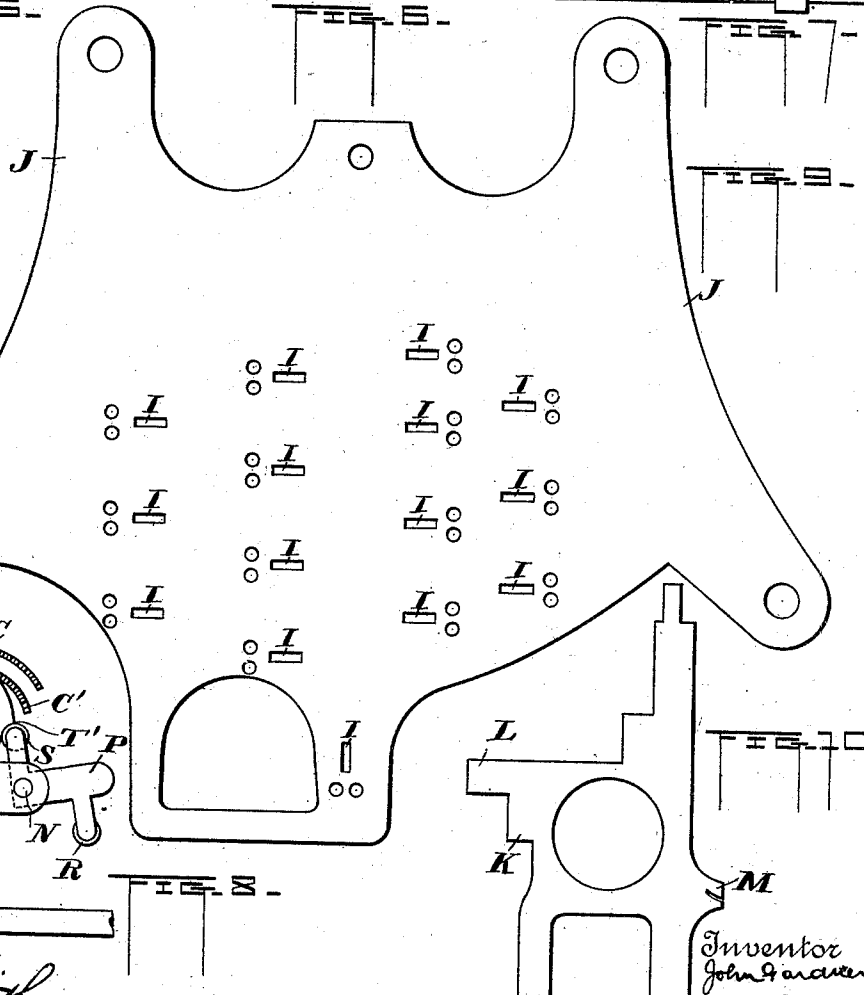

FIG. 9.

FIG. 8.

FIG. 10.

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UNITED STATES PATENT OFFICE.

JOHN GARDNER, OF MANCHESTER, ENGLAND.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 505,547, dated September 26, 1893.

Application filed February 3, 1893. Serial No. 460,905. (No model.) Patented in England January 13, 1893, No. 787.

To all whom it may concern:

Be it known that I, JOHN GARDNER, a subject of the Quenn of Great Britain and Ireland, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Type-Writing Machines, (patented in Great Britain January 13, 1893, No. 787,) of which the following is a specification.

This invention relates to that type of writing machines in which the type for the characters to be written or produced thereby is carried on a cylinder or segment of a cylinder, and these improvements consist in the construction, arrangement and combination of parts and devices whereby (*a*) the cylinder or segment of a cylinder is restored to absolute zero after each movement in either direction; (*b*) the cylinder or segment of a cylinder is locked or stopped in position while the impression is made; and (*c*) a single driving lever or bar is operated to rotate the cylinder in both directions.

A machine of the type described and that to which my improvements are more especially intended to be applied is described in the specification Letters of Patent granted to me No. 463,860, dated November 24, 1891.

I will describe my present invention with reference to the accompanying drawings, in which—

Figure 1 is a side view; Fig. 2 an end view; Fig. 3 a plan; and Fig. 4 a transverse section along the line *x*—*y* Fig. 1. Figs. 5, 6, and 7 are transverse sections showing the stem of an operating key in three successive positions. Fig. 8 is an end view showing the device for restoring the cylinder or segment to zero after each movement. Fig. 9 is a plan of the key plate; and Fig. 10 is an elevation of one of the outer keys.

The rotating type cylinder or segment of a cylinder (hereinafter called the cylinder) is constructed in a similar manner to that described in my former specification or in any other suitable manner, as are also the remaining parts of the machine not fully illustrated or represented in and by the accompanying drawings. The lower part of the cylinder only is represented at A, Fig. 1.

B is the long pinion through the teeth of which the cylinder A is rotated by the motion of the toothed quadrant C. In my former machine I employed two toothed quadrants, one to drive the cylinder through the pinion B, and the other, driven by that pinion, to bring a stop finger into contact with the keys. Since the stop finger necessarily moved through the arc of a circle it followed that the keys must also be arranged in the arcs of concentric circles, an arrangement which, although perfectly convenient and commonly adopted in writing machines, is objectionable to some operators and less advantageous than the linear arrangement of keys which my present invention enables me to employ. In either case, when the cylinder is in the printing position, so long as pressure is applied to the keys, the driving quadrant tends to rotate the pinion B, while the driven quadrant being stopped, prevents the rotation, and it follows that all backlash between the teeth of the pinion and quadrant is taken up, and the cylinder will be brought into the precise printing position without shake or vibration.

C is the driving quadrant, and C′ is the driven quadrant. These two quadrants are secured respectively C to the driving bar or lever F, and C′ to the stop bar or lever D. The stop bar D is mounted between the pivots E E′ so that it may be oscillated freely by the motion of the pinion B, transmitted through the quadrant C′. The driving bar F is parallel with and below the bar D, and is carried by the brackets G G′ which may be supported or suspended on the pivot E′, and the bar D respectively, as shown, so that in the absence of any restraint, each of the bars may be oscillated independently. The driving quadrant C is firmly secured to the bracket G so that any motion imparted to the driving bar is directly transmitted to the pinion B.

On each of the bars D, F, I form wings or projections, in such a manner that in plan, the wings H′ on the driving bar preferably alternate with the wings H on the stop bar. (Figs. 1 and 2.) The construction and operation of these wings will be hereinafter fully described with reference to Figs. 5, 6, and 7.

Upon each side of the bars D, F, there are arranged two rows of keys, the upper ends of which pass through the slots I I, in the key plate J, Fig. 9. The upper ends of these keys

are provided with index tablets denoting the letters which they respectively produce as in my former machine. The keys are each provided with a driving shoulder K and with a stop L, the positions of these driving shoulders and stops being relatively to the axis of the pivots E E′, precisely alike on every key stem, and all of them facing toward the bars D F. As the two outer rows of keys are at a greater distance from the bars than the inner rows, these rows of keys are made wider as shown in Fig. 10, so as to bring the parts K L into the required position relatively to the bars. On the back of each key there is a projection or part M the use of which will be described also with reference to Figs. 5, 6, 7.

On each side of the bars D F, and parallel therewith, there is a light rail O, carried in the brackets P P′ freely pivoted at N N′. The frame thus composed is normally pulled upward by the springs Q. The under sides of the brackets P P′ have projections carrying the small friction rollers R R and at their upper sides other similar projections carrying the small friction rollers S S. On or forming the stem of the quadrant C′ there is a cam shaped plate T, having the two shoulders T′ T′.

When the machine is at rest, the friction rollers S S rest against the shoulders T′ T′, and by their means the cylinder is always brought to the zero or central position after each excursion, and it will be obvious that the cylinder cannot be moved until one of the rollers S has been disengaged from its shoulder T′.

I will now describe the operation of the apparatus with reference to Figs. 5, 6, and 7. In Fig. 5 the apparatus is shown as its parts exist in relationship to each other during rest. The springs U now hold the keys in their highest position. Immediately upon the depression of a key, its projection M comes into contact with the rail O and depresses it, thus releasing the cam plate T and permitting the pinion B and the cylinder to be turned (Fig. 6). As the motion of the key is continued, its projecting shoulder K comes into contact with its appropriate wing H′ on the bar F, thereby depressing it and rotating the bar through an angle determined partly by the amount of lost motion in the key before the shoulder comes into contact with the wing, and partly by the vertical distance of the contact point of the wing from a vertical plane passing through the axis of the bar. The tips of the wings are therefore on an inclined plane and they serve the same purpose as the stepped or diagonal lever of my former construction, the full depression of each wing bringing a particular type of the cylinder into the printing position. As the two bars D F are geared together through the pinion B and the quadrants C C′ it follows that an oscillatory motion in the bar F will produce without backlash a corresponding motion of the bar D, in the same direction. In consequence, when a driving wing is depressed by one of the keys, the stop wings on the rod D will be moved and the appropriate wing H will ultimately come into contact with the stop L on the depressed key, beyond which motion of the bars D F is impossible and the cylinder is securely locked in the impression position. During the depression of the key, the roller R carried on a stud projecting from the frame is brought into contact with and depresses the lever V Fig. 7. This lever communicates motion to the letter spacing dogs which control the motion of the paper carriage, and which are constructed as in my former machine. The rail O also communicates motion by the stud Y (Fig. 3) to the lever W which also is of somewhat similar construction to the corresponding part of my former machine, and which releases the impression hammer. The stop wings H are arranged in an inclined plane as is the case with the driving wings, and consequently the driving bar will rotate the cylinder for a different distance for each stop wing before it comes into action, this distance being that at which the type corresponding to the key in action comes into the printing position. There are as many wings H and H′ respectively as there are keys, and they are preferably formed as hereinbefore described, upon the two bars D F, but they may if desired, be formed upon a single bar when they will have the appearance represented in plan by Fig. 3. In this case only one quadrant C′ will be required and a detent might be employed to overcome the backlash between the teeth of the pinion and of the quadrant, this detent being actuated in an obvious manner by the rails O at the bottom of their strokes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a typewriting machine the combination with a shaft, of a quadrant gear carried thereby, an inclined series of contact points on both sides of said shaft, and an oscillating bar hung on said shaft and having an inclined series of contact points on both sides of said bar, substantially as described.

2. In a typewriting machine the combination with a shaft, of a quadrant gear carried thereby, an inclined series of contact points on both sides of said shaft, an oscillating bar hung on said shaft, an inclined series of contact points on both sides of said bar alternating with those on the shaft, and a quadrant gear carried by said bar and concentric with the gear on the shaft, substantially as described.

3. In a typewriting machine the combination with a shaft D having the wings H projecting alternately from each side thereof, and having their tips in a plane inclined toward one end of the shaft, of the bar F hung on the shaft D and carrying the alternating wings H′ on both sides, whose tips lie in a plane in-

clined toward the other end of the shaft, said wings H′ each lying opposite a wing H, substantially as described.

4. In a typewriting machine the combination with a shaft, of the cam plate, T, thereon, having two shoulders upon its periphery, two rocking frames on either side of said cam, an arm on each frame adapted to engage with a shoulder on the cam, and springs for holding said arms normally in contact with the cam to lock the shaft, substantially as described.

5. In a typewriting machine the combination with a shaft, of the cam plate T thereon, having two shoulders, two rocking frames on either side of said shaft, an arm on each frame engaging a shoulder on the cam, a stud projecting from each frame, and a lever adapted to be actuated by the stud upon the rocking of either frame, substantially as described.

6. In a writing machine of the type herein set forth, keys having formed thereon stops arranged to co-operate with an inclined series of contact points on an oscillating bar or lever for the purpose of arresting the motion of the type cylinder, substantially as hereinbefore described and as illustrated by the accompanying drawings.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 10th day of January, 1893.

JOHN GARDNER.

Witnesses:
WM. GEO. HEYS,
ARTHUR H. PULMAN.