W. P. KIDDER.
TYPE WRITING MACHINE.
(Application filed Nov. 17, 1896.)

Fig. 10.

Fig. 9.

Fig. 11.

Fig. 12.

Inventor:

Witnesses:

Miles J. H. Kidder
by his attorney,

THE NORTON PETERS CO., WASHINGTON, D. C.
To all whom it may concern:

Be it known that I, WELLINGTON PARKER KIDDER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Type-Writing Machine, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a rear elevation of my new type-writing machine. Fig. 2 is a sectional elevation from front to rear thereof on line 2 2 of Fig. 3, showing in full side elevation the preferred arrangement of the type-bar-actuating mechanism, the mechanism for raising and lowering the ink ribbon and the mechanism for actuating the escapement in this view being in normal position of rest. Fig. 3 is a top plan view of said machine. Fig. 4 is a view, partly in section, on a portion of line 2 2 of Fig. 3, showing in side elevation parts of the key-action, escapement, and ribbon-lifting mechanism in positions the opposite of the positions of the corresponding parts shown in Fig. 2. Fig. 5 is a detail of the escapement mechanism, of the drop-rack and air-cushioning marginal stop mechanism, and of the ribbon raising and lowering mechanism. Fig. 6 is an end elevation of a portion of the paper-carryage. Fig. 7 is a side elevation of that end of the paper-carryage which is shown in Fig. 6. Fig. 8 is a detail in plan view of the escapement mechanism provided with a rocking arm and air-cushioning device. Fig. 9 is a top plan view of ribbon-feed mechanism. Fig. 10 is a view, partly in section, on line 10 10 of Fig. 9. Figs. 11 and 12 show details.

The main object of my invention is to produce a type-writing machine which is silent in its operation.

Generally speaking, the objectionable noise produced by type-writing machines in operation is mainly due, first, to impact of a type against the paper; second, to concession of parts of the escapement mechanism; third, to concession in the carriage-shift mechanism arising from contact of a moving part with a stop; fourth, to concession of the paper-carryage (when moved from left to right) with a marginal stop, and, fifth, to concussion, in many constructions, arising from the impact of the impression-key or some connected

part with its arresting mechanism, this concussion being independent of that produced by the impact of the type with the platen.

In constructing my new machine I overcome the objections referred to by air-cushioning the moving member and stop, and in some parts of the machine, which do not readily permit of the use of air-cushions, by mechanical arrangements which embody important features of my invention.

My invention consists in the combinations hereinafter described and claimed.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, A is a main frame, and A' A" stationary rods supported by upright extensions a a' of frame A. (See Fig. 1.) Carriage B slides endwise on rods A' A" and is movable vertically from one impression position to another, there being, preferably, three impression positions and three characters on a type-head. Carriage B is provided with a lengthwise groove b, in which the projection b' (preferably in the form of a roll) of the double rocker-arm b" projects. The platen is shifted from its normal—in this case the highest—impression position to its other impression positions by means of this double rocker-arm and connections with the shift-key 5, as in my older machines. My old movable stop M is also combined herein with the carriage to arrest it at an intermediate impression position. In my present machine each end of the rocker-arm b" is provided with an air-cushioning device in accordance with the main feature of my present invention. Dash-pots B' B" are mounted opposite the end portions of the rocker-arm b", to which rods b" are loosely jointed, each rod carrying a piston b". These dash-pots are provided with valves b" which are seated on the inner surfaces of the dash-pots and are exposed on the outer side. When either end of the rocker-arm is moved toward a dash-pot, the piston b" moving toward the bottom of the dash-pot, compresses the air therein and an air-cushion is formed which prevents the noise that has heretofore arisen from the concession of the ends of the rocker-arm b" with stops provided for arresting it. As the air is being compressed it
forces the valve b snugly on its seat and prevents escape of air through the valve-opening; but when the piston moves away from the bottom of the dash-pot atmospheric pressure on the outer surface of the valve lifts the valve off its seat and prevents in the dash-pot the formation of a vacuum, which would tend to prevent the desired quick action of the machine. For the most effective results it is necessary that the effective air-cushion should be formed at different points in the dash-pot B' corresponding to the different shifted positions of the paper-carriage, and as in this form of my machine the carriage has two shifted positions provision is made for forming an air-cushion at two points in the dash-pot B' in the downstroke of its piston and provision is made for forming an air-cushion in dash-pot B' on the return of the carriage to its normal position. The paper-carriage is shown in its highest position. When the swinging stop m on stop-carrier M is in the path of the projection m' on the double rocker-arm b, the carriage is arrested at its intermediate impression position, and when the stop m is moved out of the path of projection m' the carriage is arrested at its lowest impression position. In these general respects the present machine is like my older machine, and mention is here made of these adjusted impression positions of the carriage to more clearly explain the mode of operation of the present structure.

Referring now to the dash-pot B' and keeping in mind the fact that an effective air-cushion is to be formed, when the projection m' engages the stop m to minimize the noise of the contact thereon it is to be noted that the wall of the dash-pot has an orifice b, which is covered by the piston b when the carriage is at its intermediate position, (see, for the position of the piston b, Fig. 2,) the inward movement of the piston compressing the air and forming an air-cushion which is effective at the moment the parts m and m' contact. When an air-cushion is to be formed for the lowest impression position of the carriage, it is necessary that an air-cushion should not be formed at the intermediate position, and I accordingly combine with the movable stop mechanism a valve b, which is conveniently formed and operated as follows: Dash-pot B' being formed with an orifice b, (see Fig. 2,) the valve b (preferably in the form of a collar surrounding the dash-pot) is formed with an orifice b, (see Fig. 1,) when the stop m is moved out of the path of projection m', the valve b being connected by a link b to the stop-carrier M, stop m is moved out of the path of the projection m' by moving stop-carrier M to the right, (viewing the machine from the rear, as shown in Fig. 1,) and the collar or valve b is thereby pulled around on the dash-pot B' to bring orifice b in line with orifice b. Consequently as the piston b moves inwardly to make the lowest air-cushion imprisonment of the air is prevented by the open orifices b and then by the coincident open orifices b and b; but when the piston has passed these coincident orifices b and the air is confined between the opposed walls of the piston and the dash-pot, thereby forming an air-cushion for the lowest impression position of the carriage.

Referring now to dash-pot B', wherein an air-cushion is formed to prevent noise on the return of the paper-carriage to its normal or highest position, the orifice b, near the lower end of this dash-pot, prevents the imprisonment of air, and consequently the formation of an air-cushion therein, until the piston b of this dash-pot reaches the position which it takes when the carriage is reaching its highest position. Then the piston b covers the orifice b and an air-cushion is formed. Piston-rod b of this dash-pot B' is a loose fit in the top guide-plate b of this dash-pot, and consequently an air-cushion is not formed between the upper or back side of the piston and the top of the dash-pot B' when the piston of dash-pot B is moved down and the piston of dash-pot B' given a coincident upward movement.

I do not wish to be understood to mean that a valve is in all cases necessary in my air-cushioning devices. In the present form of my invention a rocker-arm b (see Fig. 1) is journaled on a projection a from frame A, and the rocker-shaft A', which forms part of the connection of the rocker-arm b with the shift-key S, is connected with the rocker-arm b by means of a link b, attached at one end to an arm b on rocker-shaft A' and at the other end with the rocker-arm b. This construction enables me to mount the rocker A' lower down in the machine than heretofore and to thereby more conveniently get it out of the way of the other operating mechanism of the machine.

Heretofore much noise has been made by the concussion of the paper-carriage with the stop heretofore at the right-hand or return end of the carriage. In my new machine I provide carriage B with a suitable piston b at its return end and mount a dash-pot b in line with this piston, so that when the carriage is returned an air-cushioning stop is formed, rendering the return noiseless. This dash-pot (see Figs. 1, 3, and 11) is also preferably provided with a valve b, opened by the outward atmospheric pressure, to prevent the formation of a vacuum in the dash-pot b on the return movement of the piston. In its present form the piston b is a centrally-bored block or sleeve sliding on rod A', and forms part of the escapement-rack support and guide for the arm b of the carriage B. From the lengthwise-grooved bar b of carriage arms b and b and project and are connected near their outer ends by the cross-bar b. The cross-bar b connects piston-sleeve b and sleeve b, (see Figs. 1, 6, and 7,) and both sleeves slide on rod A', the arms b and b being formed with grooves b in which...
enter and slide vertically the tongues $b^{p}$ on the rear sides of the piston-sleeve $b^q$ and connected sleeve $b^{r}$. Sleeves $b^{q}$ and $u^{p}$, with the tie-rod or cross-bar $b^r$, constitute a yoke, and in the sleeves or end pieces of the yoke there is journaled a shaft $b^o$, carrying pinions $b^p$, which mesh with racks $b^q$ on the arms $b^q$ and $b^r$. (See Figs. 6, 7, and 2.) This construction is not new in the present machine, but is described to more clearly set forth the operation of my new platen. The platen $P$ (see Figs. 1 and 2) in this new machine is wholly new in principle and embodies a very important feature of my present invention. Referring to the embodiment of this feature of my invention now shown, platen $P$ is a block which projects in front of the feed-rolls $R$, (see Figs. 2 and 7) and over which the paper is fed for impression.

Platen $P$ has no movement toward the ends of the paper-carrige, but is movable in a vertical path, together with the paper-carrige, to keep it always in position to receive impression. The platen is loose on cross-rod $b^{o}$ (see Figs. 1, 2, and 3) and is formed with a vertical guide-piece $p$, mounted in vertical ways $p'$, formed in a block $p^q$, mounted fast on rod $A'$. It is desirable in practice to suit different thicknesses of paper and in manipulation to give a slight adjustment to the plate from and toward the type-bars, and I accordingly mount a truss $p^o$ on frame $A$ opposite block $p^q$ and interpose an adjusting-screw $p$ between the truss and the block.

Turning the screw in one direction springs the bar or rod $A'$ slightly inward, and thereby slightly moves the platen nearer the contact position of the type-heads, and turning the screw in the opposite direction allows the bar or rod to spring back to its normal position. This adjustment is not essential and is always very slight; but it is an advantage readily obtained. The great advantage of my construction springs from the use of a feed-roll for that purpose. When a feed or other roll is used as a platen, it speedily becomes unequally worn and impairs that uniformity of impression which is a recognized desideratum. My new platen, on the contrary, has but one work surface and that is always in the same operative relation to the types. Another advantage due to my new platen is that I am enabled to use very much smaller feed-rolls than heretofore, and this cheapens and lightens the paper-carrige.

The line-space mechanism of my new machine embodies other features of my invention. (See Figs. 7, 6, 1, and 2.) Feed-roll $R$, journaled in arms $b^q$ and $b^r$, is provided with a toothed segment $r$, loosely mounted on the shaft of the roll. A rack $r'$ is mounted in a guide $r^q$. The rack has a slot $r^q$, within which there projects a stud $r'$ from arm $r^q$. The rack-bar $r'$ is preferably provided with a piston $r^p$, working in a dash-pot $r^o$, mounted on arm $b^q$, so that an air-cushion is formed for the rack-bar when brought to its normal position. The shaft of roll $R$ is provided with a ratchet $r^q$, fast thereon, and toothed segment $r$ carries a pawl $r^p$, which meshes with the ratchet. The line-space lever $R^q$ has a tooth $r^q$ that enters a recess $r^q$ in rack-bar $r'$, and when lever $R^q$ is moved inwardly the rack-bar $r'$ is moved downwardly, and as the rack-bar is in engagement with pinion $r'$ this pinion is rocked to bring pawl $r^p$ against a tooth of ratchet $r^q$, fast on the shaft or journal of feed-roll $R$, which is thereby rotated to feed the paper between itself and roll $R'$ over platen $P$, the upper end of the paper being turned 90 degrees backward. A spring $r^q$ is used to keep pawl $r^p$ in working position relatively to the ratchet $r^q$. An auxiliary line-space lever $R^q$ (see Fig. 1) is provided at the other end of the carriage, so that the carriage may be conveniently returned. Lever $R^q$ is pivoted to an ear of arm $b^q$ and is connected to lever $R'$ by a tie-rod $b^q$ so that movement given to either one of the levers is communicated to the other lever. Escapement-rack $R^q$ (see Figs. 5 and 8) is provided with lugs $r^q$ (see Figs. 5 and 9) near its ends, and these lugs are pivoted on portions of sleeves $b^q$ and $b^r$, which slide on rod $A'$. Rack $R'$ is so mounted that it falls downwardly into the path of escapement $R^q$, Figs. 5 and 8, of its own weight. One arm of a double rocker-lever $r^q$, Figs. 3 and 5, which is pivoted on piston-sleeve $b^r$, enters a notch in an end portion of the rack $R'$. The other arm of this lever $r^q$ is formed with an upturned eye $x^{p}$. Lever $R^q$ is provided with a projection $p^{q}$, Fig. 1, which is straddled by the slotted push-rod $R'$, the farther end of which lies in the eye $p^{q}$ and has a shoulder $r^{o}$, adapted to engage an adjacent portion of lever $r^q$. A push on rod $R'$ when its shoulder is in position to engage the lever $r^q$ rocks lever $r^q$, and rack $R'$ is thereby rocked on its pivots and out of the path of the escapement. A spring (not shown) returns the push-rod to its normal position. The eye $r^{q}$ is large enough to permit the shoulder end portion of the rod $R'$ to move freely and to be lifted so as to carry its shoulder out of engagement with the lever $r^q$. This shoulder end of rod $R'$ projects beyond eye $r^{q}$ and is upturned to ride up over dash-pot $b^q$, which serves as an abutment, so that the shoulder is carried out of engagement with the lever when the paper-carrige is moved to the extreme right of the machine and the rack-bar allowed to drop back into the path of the escapement.

Escapement-tooth $R^{o}$ is pivoted on a block $r^q$, on the rocker-bar $r^q$, journaled in up rights $r^{o}$. This rocker-bar $r^{o}$ has arms $r^p$, from which links $r^q$ extend to support the universal bar $r^q$, upon which impression-keys $K$ rest. An abutment $r^o$ on block $r^q$ keeps the escapement-tooth $R^{o}$ from displacement, and the block is provided with a tooth $r^q$, which rocks into engagement with teeth of the rack $R'$ when escapement-tooth $R^{o}$ is rocked out of engagement with the
teeth of the rack. Block \( r^{22} \) also supports an oscillating cam \( r^{20} \), which is in constant engagement with a side of the laterally-oscillating escapement-tooth \( R^{20} \) and this cam is connected with a piston \( r^{21} \), playing in dash-pot \( r^{28} \). When the escapement-tooth \( R^{20} \) is in engagement with rack \( R^4 \), tooth \( r^{32} \) is out of engagement with the rack, as shown in Fig. 2, and in engagement in Fig. 4. In Fig. 8, which is a top plan view, the escapement-tooth \( R^{20} \) is shown out of engagement with the rack and tooth \( r^{29} \) in engagement with the rack. In this position piston \( r^{22} \) is in its extreme position away from the bottom of the dash-pot \( r^{28} \). As shaft \( r^{23} \) is rocked to carry tooth \( r^{23} \) out of engagement with, and escapement-tooth \( R^{20} \) into engagement with, rack \( R^4 \) the paper-carriage is pulled along to the left by its actuating mechanism, and as the rack is carried to the left, with the paper-carriage, the oscillating escapement-tooth \( R^{20} \) is swung to the left against the cam \( r^{22} \), thereby forcing the piston toward the bottom of its dash-pot and forming an air-cushion.

When escapement-tooth \( R^{20} \) is rocked out of engagement with the rack and tooth \( r^{23} \) rocked into engagement therewith, the compressed air in the dash-pot expands, and as the laterally-oscillating escapement-tooth \( R^{20} \) is now free to move it is pressed back against its abutment \( r^{21} \) into the position to enter the next space between teeth of the rack \( R^4 \) by the expansion of air against piston \( r^{35} \).

Block \( r^{23} \), which is, in effect, a part of rocker-shaft \( r^{23} \), is connected by arm \( r^{36} \) and a link \( r^{32} \), attached to the arm, with a spring \( r^{34} \), which is secured to any suitable part of frame \( A \). Whenever the universal bar \( r^{23} \) is depressed by depression of an impression-key \( K \) or by depression of the spacing-frame \( K \), (see Fig. 3,) members of which also rest on the universal bar, shaft \( r^{35} \) is rocked, throwing escapement-tooth \( R^{20} \) upwardly against the tension of spring \( r^{36} \), which serves to rock the escapement-tooth back into engagement with the rack when the key or spacing-frame is released.

In my present machine (see Fig. 2) each key-lever \( K \) rests on a rocking cam \( k \), journaled on a cross-rod \( k \) and held in place against its key by a spring \( k \), one end of which is conveniently attached to the lever-arm \( k \) of the cam and the other end to a cross-bar \( k \). Cross-rod \( k \) and cross-bar \( k \) are conveniently mounted in opposite sides of frame \( A \). When a key-lever is depressed, the rocker-cam supports it during its downward motion and at the end of the downward motion silently arrests the key-lever without any concussion whatever. This is a very important feature of my invention and is one of the most important factors in the production of my present silent type-writing machines.

The ink-ribbon \( I \) is supported between the platen and type-heads by swinging guides \( i \), hinged to levers \( i \), which are hinged at \( i \) conveniently to the under side of the type- head-supporting plate. These levers \( i \) rest, preferably, on flange-guide roller \( i \), journaled in rocker-arms \( i \), one for each lever \( i \), from rocker-shaft \( r^{23} \). Ribbon \( I \) is wound from one spool \( I \) by means of a pawl \( i \), engaging the ratchet \( i \) of a spool. Pawl \( i \) is attached to a swinging lever \( i \), fulcrumed at \( i \), and connected by link \( i \) with rocker-arm \( i \). Pawl \( i \) is loosely jointed to the actuating-lever \( i \), so as to be swung into working position with either spool \( I \). The pawl \( i \) is supported by and slides down the inclines \( i \), as shown in Figs. 9 and 10.

It will be obvious to all skilled in the art that my machine may be widely varied in many respects without departure from my invention, and I wish to be understood as claiming my invention in the broadest legally permissible manner.

1. In a type-writing machine, the combination of a feed-ram, an escapement device comprising a rolling cam, a piston and dash-pot, the piston being connected to a rolling cam.

2. In a type-writing machine, the combination of a vertically-adjustable, endwise-moving paper-carriage; a stop-carrier; a double rocker-lever; a pair of piston-rods and pistons and cooperating dash-pots, one piston-rod, piston and dash-pot being provided for each arm of said double rocker-lever.

3. In a type-writing machine, the combination of a feed-roll with a pinion loose on the roll; a sliding rack; a ratchet fast on the feed-roll; a pawl on said pinion; and a line-space lever engaging said rack.

4. In a type-writing machine, the combination of a feed-roll with a pinion loose on the roll; a sliding rack; a ratchet fast on the feed-roll; a pawl on said pinion; a line-space lever engaging said rack; a piston on the rack and a dash-pot for the piston.

5. In a type-writing machine, the combination of a paper-carriage; a toothed rack extending endwise thereof; a rocking block carrying a plurality of escapement-teeth one of which is pivoted on the block and carrying also a rocking cam which engages the pivoted escapement-tooth; and means for actuating the cam.

6. In a type-writing machine, the combination of a paper-carriage; a toothed rack extending endwise thereof; a rocking block carrying a plurality of escapement-teeth one of which is pivoted on the block; a rocking cam mounted on said block; and a device for silently operating the rocking cam and pivoted escapement-tooth, said device comprising as complementary members a piston and dash-pot, one of which is connected with the rocking cam.

7. In a type-writing machine, the combination of a plurality of type-carriers; a plurality of impression-key levers connected with said type-carriers; a universal bar in
the path of said key-levers; and a plurality of rolling cams one for each key-lever.

8. In a type-writing or like machine, the combination of an endwise-reciprocating and vertically-adjustable paper-carriage; a double rocker-arm connected therewith; a piston and dash-pot, one of which is carried by an arm of the double rocker-arm; a movable stop mechanism; and a valve connected therewith; said dash-pot having an orifice controlled by said valve.

9. In a type-writing or like machine, the combination of a loosely-mounted escape-ment-rack with a double rocker-lever, an arm of which is connected with said rack; and a push-rod engaging with said double rocker-lever; and extending crosswise the machine.

10. In a type-writing or like machine, the combination of a loosely-mounted escape-ment-rack with a double rocker-lever, an arm of which is connected with said rack; a push-rod engaging with said double rocker-lever; and an abutment; said push-rod having a projecting end which rides on said abutment when the paper-carriage is at an end of the machine.

11. In a type-writing machine, the combination of an endwise-movable and vertically-adjustable paper-carriage with a series of endwise-movable type-bars, each carrying a plurality of types; a series of impression-keys and of toggle connections for the impression-keys and type-bars; silently-operating supports, substantially as set forth, for the impression-keys; a silently-operating stop device substantially such as described for arresting the paper-carriage when it is returned; silently-operating stop devices, substantially as described, for both the upward and downward movement of the paper-carriage; and an intermittent feed mechanism for the paper-carriage comprising a rack and escapement with silently-actuating devices therefor said devices being substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 31st day of October, A. D. 1896.

WELLINGTON PARKER KIDDER.

Witnesses:
EDWARD S. BEACH,
E. A. ALLEN.