L. D. BROUGHTON.

TYPE WRITING MACHINE.

APPLICATION FILED APR. 9, 1910.

1,067,401.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

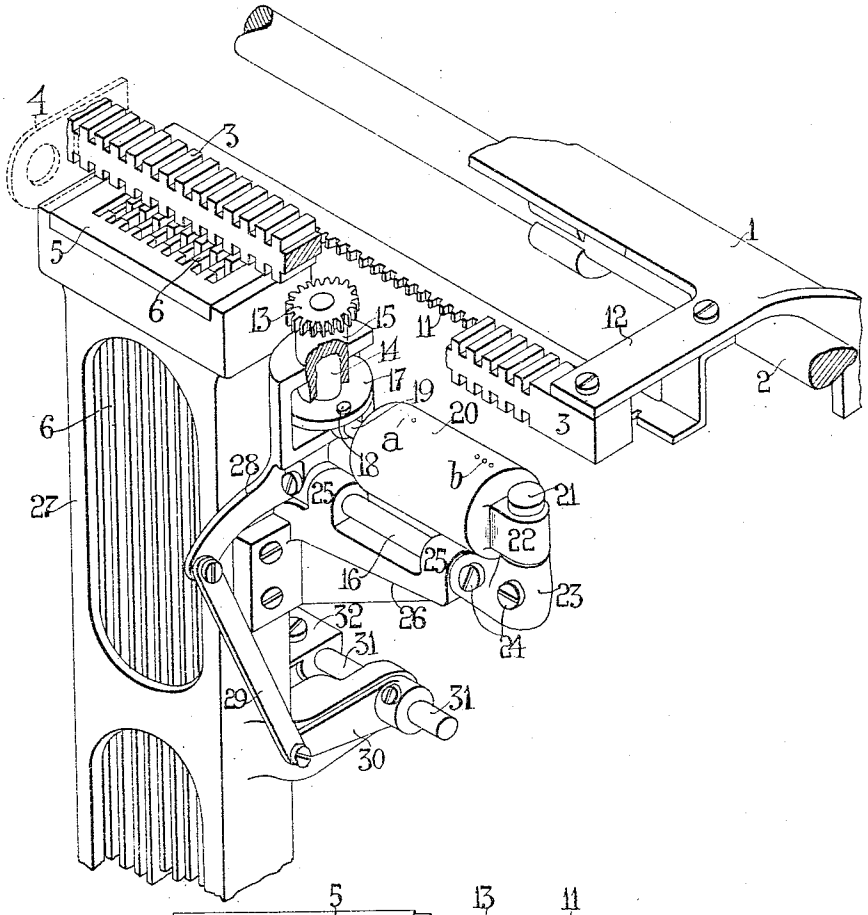
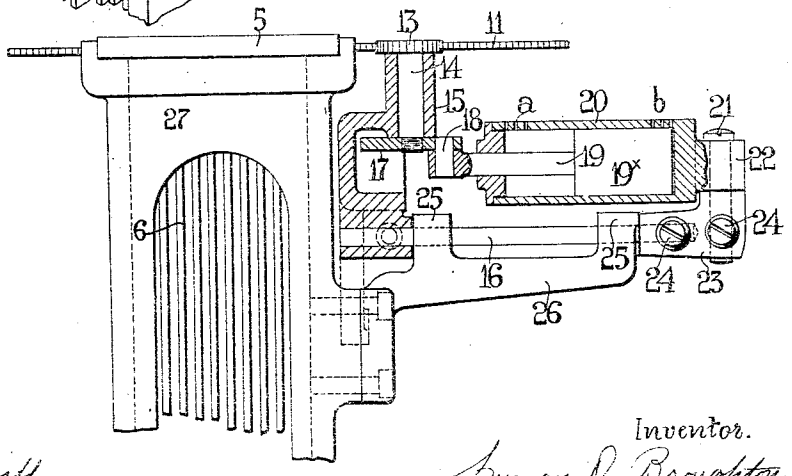


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

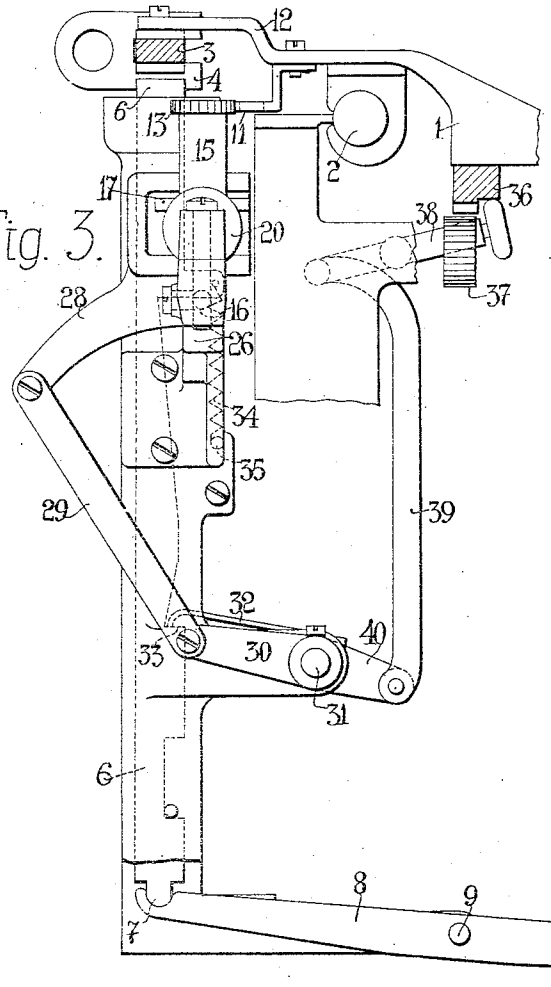


Fig. 4.

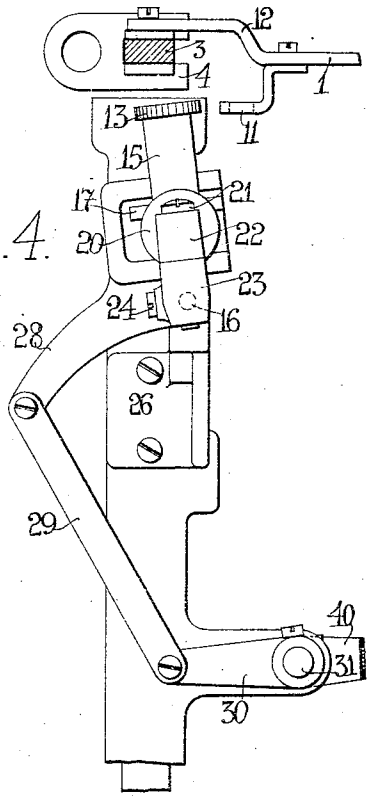
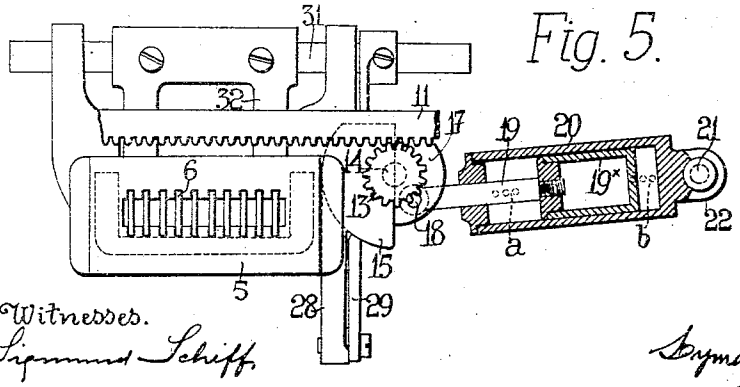


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

LYMAN DAVID BROUGHTON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,067,404. Specification of Letters Patent. **Patented July 15, 1913.**

Application filed April 9, 1910. Serial No. 554,467.

To all whom it may concern:

Be it known that I, LYMAN D. BROUGHTON, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

The present invention relates to brake devices for checking or retarding typewriter carriages when the same are released to run or jump forward in tabulating work, the primary object of the invention being to provide a simple, effective and durable check for this purpose.

The carriage is provided with a rack parallel to the letter-feed motion thereof; a pinion on the framework of the machine is movable into and out of mesh with said rack, and is connected with an air-check device, whereby upon the engagement of the pinion with said rack and the release of the carriage from the control of its escapement mechanism, to run freely under the influence of its driving spring, said air-check will retard the carriage to the desired extent.

The device is effective at every stroke of the piston, and an approximately uniform resistance (dependent upon the speed of the carriage) is secured to the carriage movement during the piston strokes.

In the accompanying drawings, Figure 1 is a rear perspective view, with parts omitted and broken away. Fig. 2 is a rear elevation, partly in section and with parts omitted. Fig. 3 is a side elevation, showing the pinion engaged with the rack. Fig. 4 is a similar view, but with the pinion disengaged from the rack. Fig. 5 is a plan view, partly in section and with parts omitted.

The paper carriage 1 of the front strike Underwood typewriting machine runs on a rail 2, and has the usual rack-bar 3 on which the usual column-stops 4 are adjustable. A series of guides 5 is provided for the vertically movable thrust rods or denomination stops 6 which co-act with the stops 4. The rods 6 are articulated at 7 with key-levers 8 which are fulcrumed at 9 and have buttons 10.

The reference numeral 11 denotes a rack-bar attached to or borne by arms 12, (by which the rack 3 is supported) the rack-bar 11 being parallel to the line of letter-feeding motion of the carriage.

13 designates a pinion which is fast on a vertically-disposed shaft 14, which is journaled in a bearing-sleeve 15 forming part of a frame rigidly secured to the shaft 16. The shaft 16 is journaled in lugs or bearings 25 on or forming part of a bracket 26 which forms part of the framework of the machine. The lugs 25 also form abutments to receive the thrust of the carriage. The shaft 14 below the bearing 15 has a disk 17 fast thereon, which disk is provided with a crank pin or wrist 18. A piston rod 19 is connected with said pin 18 and with a piston 19ˣ which is adapted to move in the cylinder 20. The cylinder 20 is pivotally connected by a screw 21, which passes through an eye 22 on the cylinder 20, with the block 23, which is connected by set screws 24 with the shaft 16 and the screw 21 in order to cause the block 23 to move as one with the bearing 15 aforesaid.

It will be observed that the described construction enables the parts named to rock with the shaft 16 while permitting them to operate in all positions.

The rod 19 passes through a cylinder-head, as shown, and the cylinder 20 is provided with perforations *a b* near its heads to allow air to enter thereinto and escape therefrom. Or other ways of establishing communication between the opposite sides of the piston may be used, the object being to have a slow escape of air from in front of the moving piston so that the piston may act as an air-check device for controlling the motion of the free carriage 1 in tabulating work.

An arm 28 projects rearwardly from the frame formed by the sleeve 15, shaft 16 and block 23, and said arm is connected by a link 29 with an arm 30 of the rock-shaft 31, journaled on the framework of the machine.

The shaft 31 has a universal bar 32 rigidly connected thereto, which bar 32 normally rests on shoulders 33 on the thrust-rods 6 so as to be moved upwardly by any of said rods 6 that may be operated.

Springs 34, connected at their upper ends to the rods 6 and at their lower ends to a rod 35, draw the thrust-rods 6 downwardly, while the weight of the parts may be relied upon to return the frame 15, 16, 23 to the normal position thereof shown in Fig. 4.

The operation is as follows: On the depression of any key 10, the corresponding denomination stop 6 is raised to intercept the next stop 4, while at the same time the carriage 1 is freed, as usual in machines of the kind, from the control of the escapement mechanism and is drawn toward the left by the usual spring drum and connections (not shown). The escapement mechanism comprises a rack 36, which is lifted from an escapement pinion 37 by means of a lever 38, connected by link 39 to arm 40, extending from rock-shaft 31. The speed of the carriage toward the left when so freed, is checked or controlled by the action of the air-check devices hereinbefore described, since the pinion 13 is thrown forward into mesh with the rack 11 whenever any key 10 is depressed, whereby the power of the carriage-moving spring is caused to rotate the pinion 13, its shaft 14, and the crank 18, and to work the piston 19ˣ back and forth in the cylinder 20, the cylinder 20 rocking on the pin 21 during such action. The movement of the air through the holes *a*, *b*, being relatively slow, the carriage-spring is prevented from driving the carriage toward the left with undue speed, as long as the key 10 is kept depressed to the full extent; but the carriage moves (with sufficient speed) until stop 4 collides with the up-raised stop 6 whereupon the carriage is brought to rest. On the release of the depressed key 10, the parts are returned to their normal positions, and the carriage again put under the control of the letter-space feed mechanism.

The keys 10 usually represent the order of places from units to hundred millions, the "point" and two decimals, and as many column-stops 4 are provided as there are "fields" or columns to be written.

It will be noted that there are several holes, *a*, *b*, at each end of the cylinder, and that the moving piston covers them in succession toward the end of its motion, thus increasing the compression at such time over what it is when such apertures are still uncovered. The apertures being small, there is compression in front of the moving piston, as the smallness of such apertures allows air to escape slowly, only from such front. The relatively slow movement of the piston as it nears the end of its stroke, is compensated for by the automatic reduction in the number or area of the vents, so that an approximately uniform retarding force is exerted in opposition to the progress of the carriage.

Having thus described my invention, I claim:

1. In a typewriting machine tabulator mechanism, the combination with the carriage, of a rack thereon, a rocking frame, a pinion journaled on said rocking-frame and adapted to engage with said rack, a crank-pin connected with said pinion, a piston connected with said crank-pin, an air-check cylinder in which said piston moves; said cylinder closed at both ends, and means providing an escape of air from in front of the piston at every stroke thereof varying the escape as the piston reaches the end of its stroke.

2. In a typewriter tabulating mechanism, the combination with the carriage, of a rack thereon, a pinion movable into and out of mesh with said rack, a crank-pin connected with said pinion, a piston connected to said crank-pin, a cylinder in which said piston moves; said cylinder closed at both ends, and means providing an escape of air from in front of the piston varying the escape as the piston reaches the end of its stroke.

3. In a typewriter tabulator mechanism, the combination with the carriage, of a rack thereon, a rocking frame, a pinion journaled on said rocking frame and moved thereby into and out of mesh with said rack, a rocking air-check cylinder on said frame, a piston therein, connections between said pinion and said piston; said cylinder closed at both ends, and means providing an escape of air in front of the piston varying the escape as the piston reaches the end of its stroke.

4. In a typewriter tabulator mechanism, the combination with the carriage, of a rack, a pinion movable into and out of mesh with said rack, an air-check device including a piston and cylinder and controlling the rotation of said pinion and connected therewith through a crank-pin, a column-stop, a counter stop movable into and out of the path of the column stop, and connections whereby on the operation and release of the counter stop said pinion is moved bodily toward and from said first-named rack; said cylinder closed at both ends, and means providing a slow escape of air from in front of the piston at every stroke thereof and varying said escape as the piston reaches the end of its stroke.

5. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a rock-shaft on the framework of the machine, a bearing at right angles to said

shaft, a shaft journaled in said bearing, a pinion and a crank connected to said last-named shaft, a cylinder, a pivotal connection between said cylinder and said rock-shaft whereby said cylinder moves bodily on the rocking of said rock-shaft and also swings independently thereof, a piston in said cylinder and connected with said crank to be moved thereby, and means providing a slow escape of air from in front of the moving piston.

6. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a rock-shaft parallel to said rack, an arm from said shaft provided with a bearing at right angles to said shaft, a shaft in said bearing, a pinion on said shaft adapted to mesh with said crank, a crank-pin connected with said pinion-carrying shaft, a piston-rod connected with said crank-pin, a cylinder for said piston, a pivot connection between said cylinder and said rock-shaft, means for allowing a slow escape of air from in front of said piston as it moves to and fro in said cylinder, a series of thrust-rods, column-stops for co-action with said rods, and means whereby said thrust-rods actuate said rock shaft.

7. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a pinion adapted to mesh with said rack, a crank-pin connected with said pinion, an air-check cylinder and piston, a rod connecting said piston with said crank-pin, a rock-shaft connected by a bearing with said pinion and by a pivot with said cylinder, column-stops on said carriage, thrust-rods for co-action with said stops, and means whereby said thrust-rods actuate said rock shaft.

8. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a rocking frame, a pinion journaled on said frame and moved thereby into and out of mesh with said rack, a rocking air-check cylinder and piston on said frame, a connection between said piston and said pinion, and means providing a slow escape of air in advance of said piston at every stroke thereof and varying said escape as the piston reaches the end of its stroke.

9. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a rocking-frame, a pinion journaled on said rocking frame and adapted to mesh with said rack, a crank-pin connected with said pinion, a piston connected with said pin, an air-check cylinder in which said piston moves, and means for allowing of a slow escape of air from in front of said pinion during each stroke thereof and varying said escape as the piston reaches the end of its stroke.

10. In a tabulator mechanism, the combination with the carriage, of a rack thereon, a pinion movable into and out of mesh with said rack, a crank-pin connected with said pinion, and an air-check device including a piston and cylinder and connected with said crank-pin, and having means to vary the air pressure on the piston to correspond with the varying leverage between the rack and piston, and thereby provide an approximately uniform resistance to the carriage movement throughout every stroke of the piston.

11. The combination of a carriage, a rack, a pinion normally out of mesh with said rack, a frame whereon said pinion is mounted for movement into mesh with said rack, a cylinder swiveled upon said frame, a piston in said cylinder, a wrist connected to said pinion, and a piston rod pivoted to said wrist and working in said cylinder to form a check or governor for said carriage.

12. The combination of a carriage, a rack, a pinion normally out of mesh with said rack, a frame whereon said pinion is mounted for movement into mesh with said rack, a cylinder swiveled upon said frame, a piston in said cylinder, a wrist connected to said pinion, a piston rod pivoted to said wrist and working in said cylinder to form a check or governor for said carriage, and a carriage releasing mechanism connected to said frame to move said pinion into mesh with said rack when the carriage is released.

13. A governor for a typewriter carriage comprising an air cylinder, a piston therein, and means dependent upon the movement of said carriage to reciprocate said piston; said cylinder closed at its ends and having perforations at said ends, one perforation at each end being nearer said end than another.

14. A governor for a typewriter carriage comprising an air cylinder, a piston therein, and means dependent upon the movement of said carriage to reciprocate said piston; said cylinder closed at its ends and having perforations at said ends; the perforations at each end of the cylinder being placed one in advance of another, so that said piston shall close one opening before reaching another.

15. The combination with a typewriter carriage, of a governor therefor, comprising a cylinder, a piston therein, and means dependent upon the movement of the carriage to reciprocate said piston, said cylinder closed at its ends; and means providing escape of fluid varying with the position of the piston in advance of said piston upon both strokes thereof.

16. The combination with a typewriter carriage, of a governor therefor, comprising a cylinder, a piston therein, and means dependent upon the movement of the carriage to reciprocate said piston, said cylinder

closed at its ends; and means providing slow escape of air varying with gradually increasing air pressure in advance of said piston upon both strokes thereof.

17. The combination with a typewriter carriage, of means to govern its speed including a piston, means to connect said piston to said carriage to cause the piston to reciprocate while the carriage travels, the speed of the piston relative to that of the carriage being variable, and means to increase the pressure on the piston as its speed decreases and thereby enable said piston throughout each stroke thereof to uniformly check the speed of said carriage.

18. In a typewriting machine, the combination with a traveling platen and means driving it, of an escapement controlling it, an escapement release, a piston to retard the carriage, a cylinder in which said piston travels, and a plurality of passages to permit a fluid in front of the piston to travel through them and arranged to be successively rendered inoperative as the piston travels.

19. In a typewriting machine, the combination with a traveling platen and means driving it, of an escapement controlling it, an escapement release, a shaft turned by said carriage, a piston reciprocated by said shaft, and a cylinder in which said piston moves, having means for increasing the resistance to travel of said piston as it approaches each end of its stroke faster than that due to the compression of fluid in it.

20. In a typewriting machine, the combination with a traveling carriage, of a reciprocating piston, and a cylinder in which said piston travels, comprising means for letting a fluid escape from the front of said piston; said means varying in area as the piston approaches the end of its stroke.

21. In a typewriting machine, the combination with tabulator keys and a universal bar operated thereby, of a traveling carriage releasable by said universal bar, an arm fast to said universal bar, a rack fixed on the carriage, a pneumatic brake for said carriage comprising a gear wheel meshing with said rack, a piston connected to the gear wheel, a cylinder, and a link joining said universal bar arm to said cylinder for positively moving said brake into and out of mesh with said rack as the tabulator keys move.

22. In a typewriting machine, the combination with a traveling carriage, a tabulating key and a rack on said carriage, of a universal bar moved by said tabulating key, a brake comprising a piston reciprocating within a cylinder, a gear wheel driving said piston, a link joining said universal bar to positively shift said gear wheel into mesh with said rack with the operation of said key, and means operated by the universal bar independently of said link to release the carriage.

23. In a typewriting machine, the combination with a traveling carriage and tabulating keys therefor, of a rack on said carriage, a universal bar moved by said tabulating keys, a rock frame, a gear wheel mounted in said rock frame, a link extending from said universal bar to swing said rock frame to cause said gear wheel to mesh with said rack at every operation of a tabulating key, and a cylinder pivoted in said rock frame comprising a piston actuated by said gear wheel.

24. In a typewriting machine, the combination with a traveling carriage and tabulating keys therefor, of a universal bar operated by said tabulating keys, a rack on said carriage, a rock frame on the frame of the typewriter, a cylinder pivoted in said rock frame, a piston in said cylinder, a gear wheel operating said piston and adapted to engage said rack, and a link extending from said universal bar to said rock frame to positively move said gear wheel into and out of mesh with said rack.

25. In a typewriting machine, the combination with a traveling carriage and a tabulator key for positioning said carriage, of a rack upon said carriage, a gear wheel adapted to mesh with said rack, a piston operated by said gear wheel, a substantially symmetrical cylinder within which said piston reciprocates, and a series of vents at each end of the cylinder in position to be successively cut off by the piston.

26. In a typewriting machine, the combination with a traveling carriage and a tabulator key for positioning said carriage, of a universal bar operated by said tabulator key, a rack upon said carriage, a gear wheel adapted to mesh with said rack, a pin having a fixed relation to said gear wheel, a piston rod engaging said pin, a cylinder in which said piston rod plays, a pivot around which said cylinder vibrates as the piston is moved by said pin, and a link extending from said universal bar for positively moving said gear wheel into mesh with said rack.

27. In a typewriting machine, the combination with a traveling carriage and a tabulator key for positioning said carriage, of a universal bar operated by said tabulator key, a rack upon said carriage, a rock frame, a gear wheel on said rock frame adapted to mesh with said rack, a pin having a fixed relation to said gear wheel, a piston rod engaging said pin, a cylinder in which said piston rod plays, a pivot around which said cylinder vibrates as the piston is moved by said pin, and a link extending from said universal bar to said rock frame for posi-

tively moving said gear wheel into mesh with said rack.

28. In a typewriting machine, the combination with a traveling carriage and a rack thereon, of a gear wheel, a rock frame on which said gear wheel is journaled, a pin having a fixed connection with said gear wheel, a piston driven by said pin, a cylinder in which said piston plays, and a pivot on said rock frame on which said cylinder swings.

29. In a typewriting machine, the combination with a traveling carriage and a rack thereon, of a rock frame, a gear wheel journaled in said rock frame, a pin having a fixed relation to said gear wheel, a piston rod journaled on said pin, a cylinder in which said piston operates, and a pivot on said rock frame perpendicular to the axis of the rock frame and on which said cylinder swings.

30. In a typewriting machine, the combination with a traveling carriage and a rack thereon, of a gear wheel adapted to be driven by said rack, a pin having a fixed relation to said gear wheel, and a pneumatic piston driven directly by said pin.

31. In a typewriting machine, the combination with a traveling carriage and a rack thereon, of a gear wheel adapted to mesh with said rack, a rock frame on which said gear wheel is mounted, a shaft on said rock frame parallel to the carriage, a lug forming a bearing for said shaft and also receiving the trust of said carriage, and a braking device of which said gear wheel forms a part.

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*Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."