

No. 668,465.

Patented Feb. 19, 1901.

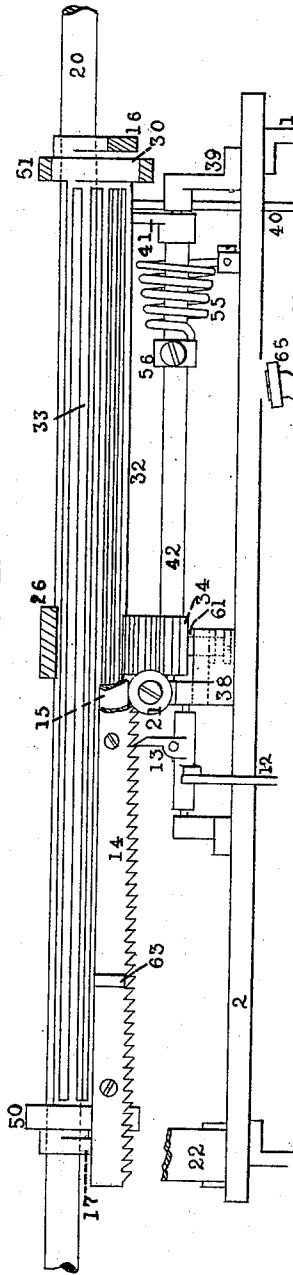
B. C. STICKNEY.  
TYPE WRITING MACHINE.

(No Model.)

(Application filed Aug. 1, 1898.)

4 Sheets—Sheet 1.

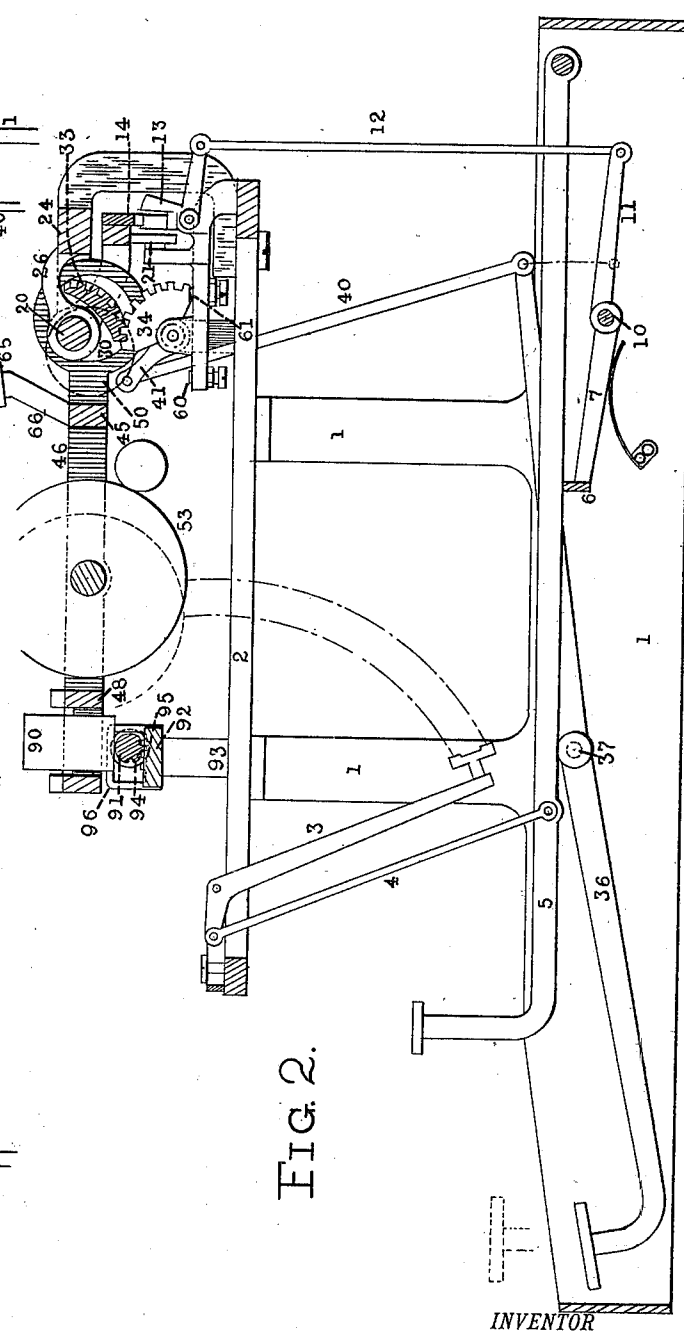
FIG. 1.



WITNESSES:

*Carl Gabrielson*  
*Philip P. Osterman*

FIG. 2.



INVENTOR

*Burham C. Stickney*

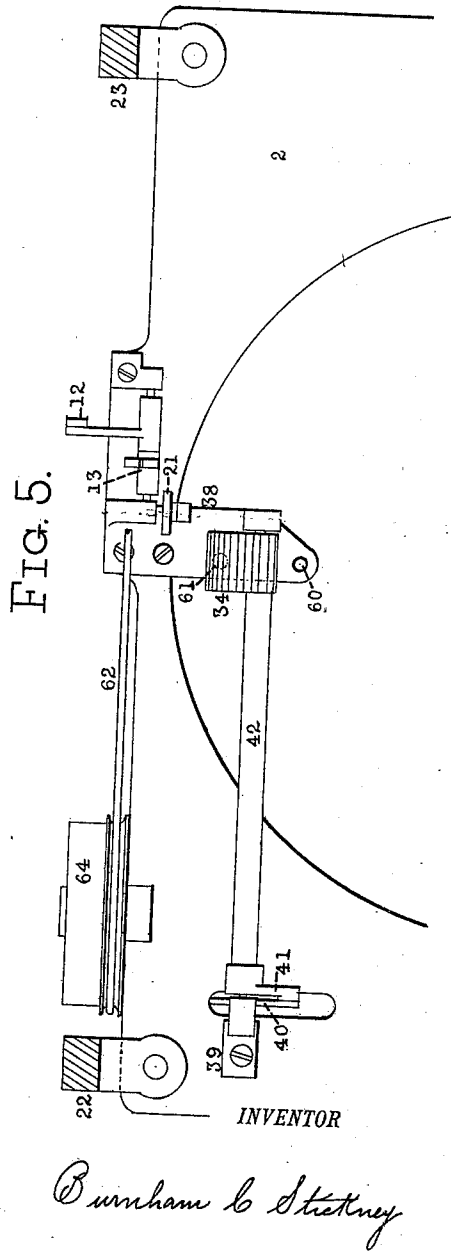
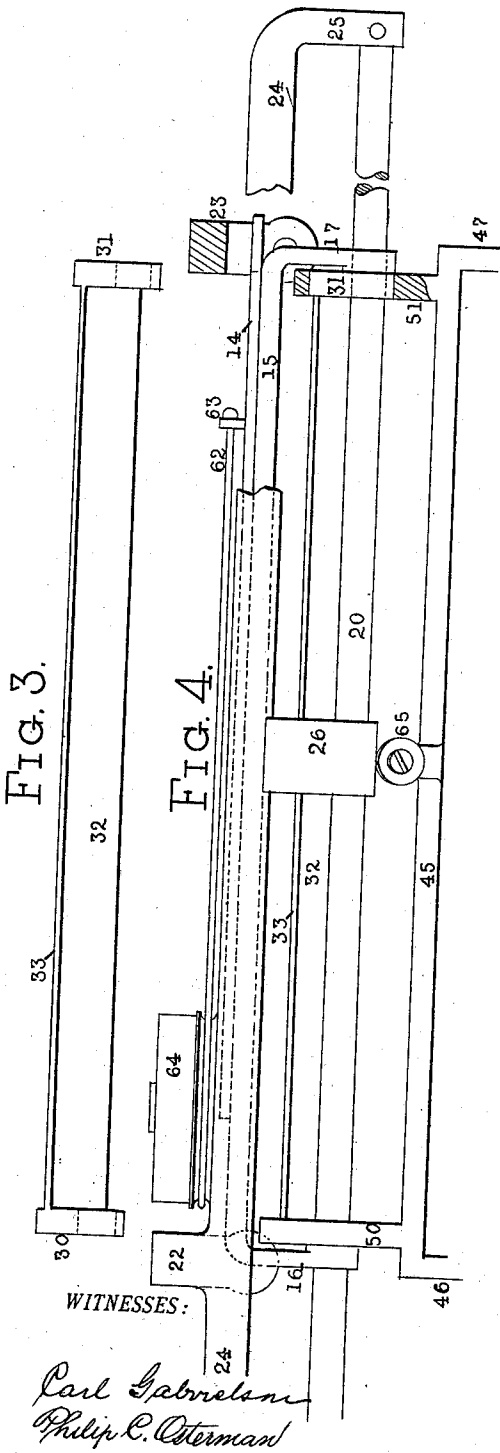
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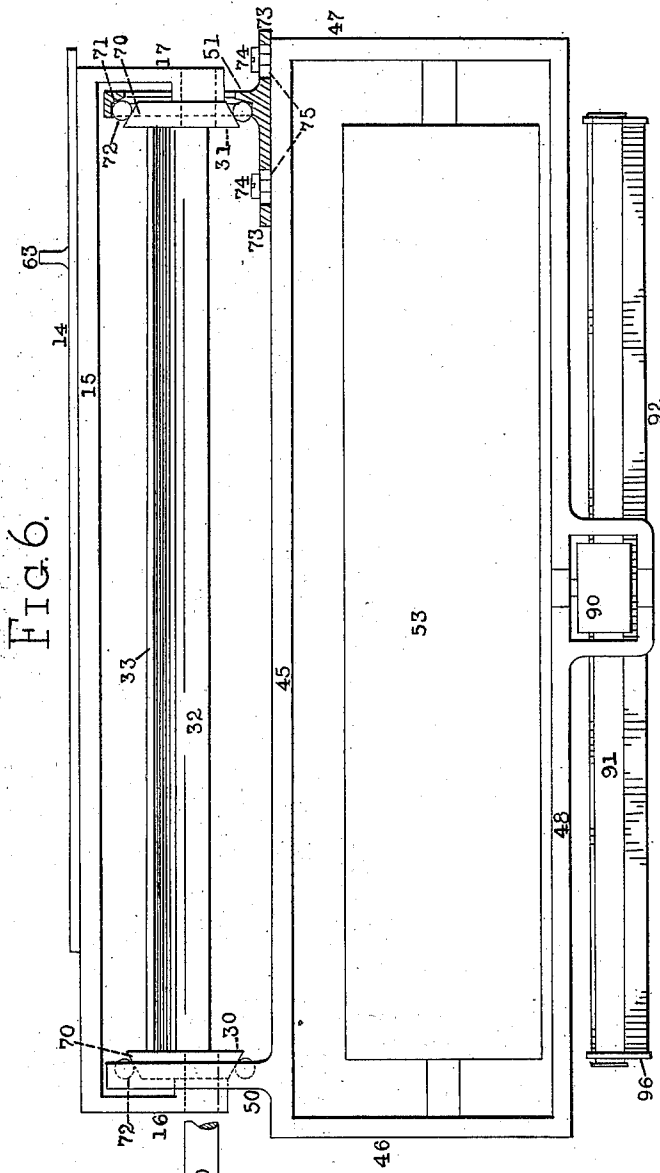


FIG. 6.

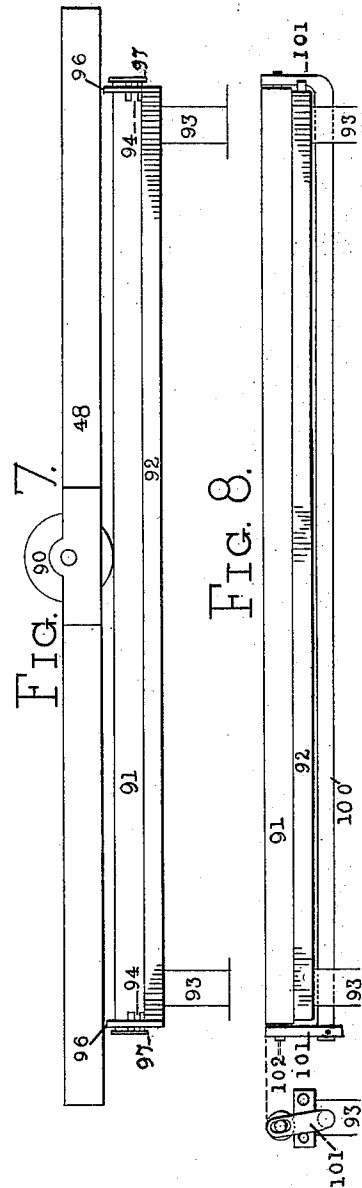


FIG. 7.

FIG. 8.

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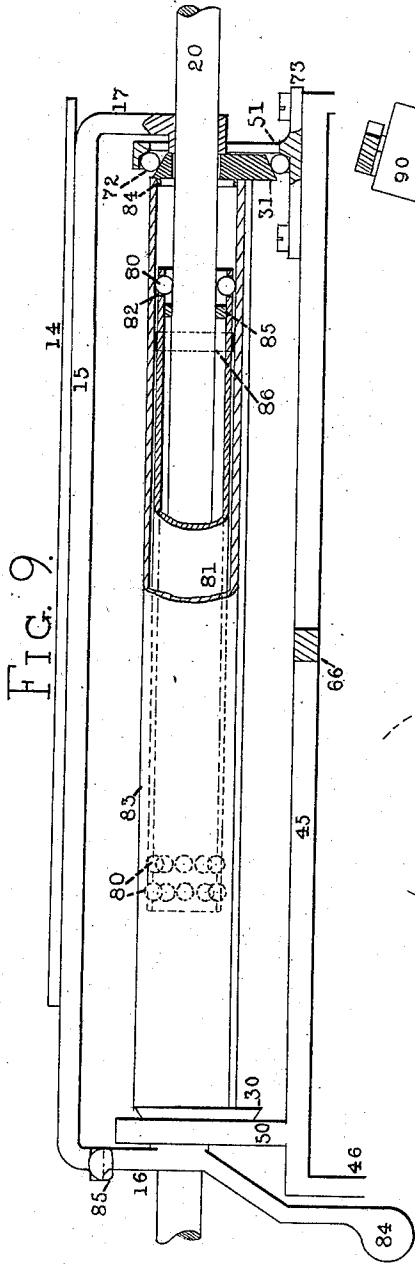


FIG. 9.

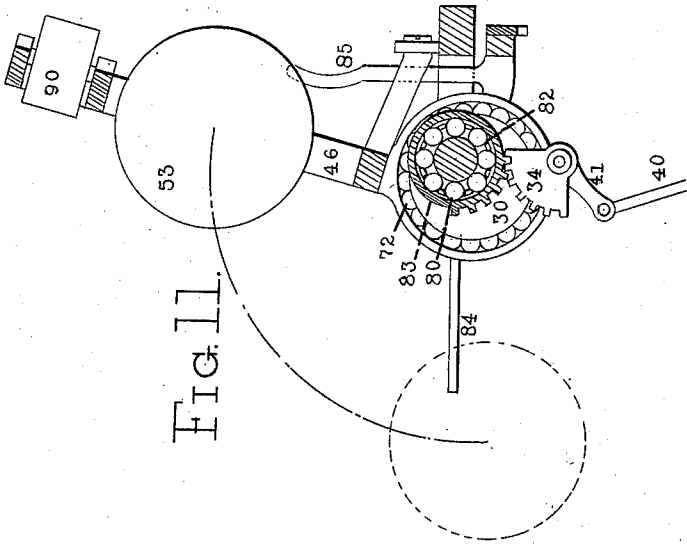


FIG. 11.

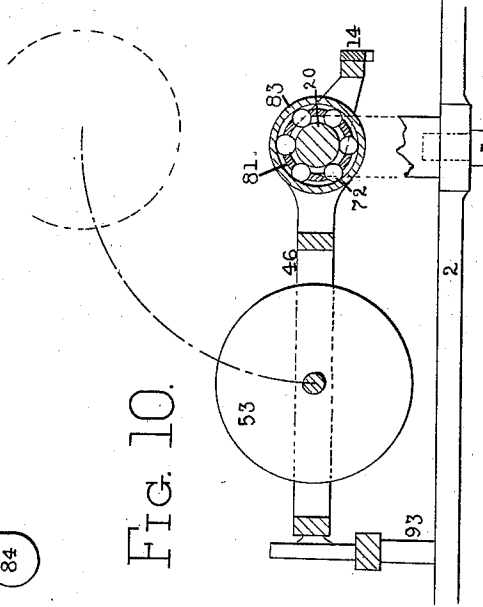


FIG. 10.

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# UNITED STATES PATENT OFFICE.

BURNHAM C. STICKNEY, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO JACOB FELBEL, OF BOROUGH OF MANHATTAN, NEW YORK, N. Y.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 668,465, dated February 19, 1901.

Application filed August 1, 1898. Serial No. 687,383. (No model.)

*To all whom it may concern:*

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates principally to the transverse platen-shifting mechanism of type-writing machines. One of its main objects is to dispense with the shift-rail heretofore usually employed for directly actuating the platen-frame and to guide the platen upon a rigid rail, the latter preferably serving also as a guide for the letter-spacing rack.

To this and other ends my invention consists in hinging the platen-frame upon a key-operated platen-shifter which rides along a laterally-motionless guide-rail; in hinging a key-operated eccentric upon the guide-rail and hinging the platen-frame upon the eccentric, whereby at the operation of the eccentric by the key a transverse movement of the platen-frame is produced; in the provision of a ball-bearing hinge between the platen-shifter and platen-frame; in a novel ball-bearing construction for supporting the paper-carriage upon the guide-rail; in the provision of an antifriction roller-track for supporting the front roll of the shifting platen-frame, and in certain other features of construction and combinations of devices, all as will be hereinafter more fully described, and set forth in the appended claims.

I have illustrated the invention as applied to an under-strike type-bar machine provided with the usual lifting carriage; but many features thereof are applicable to machines of other design.

In the accompanying drawings, in which some parts of the machine are omitted and others broken away to more clearly exhibit the invention, Figure 1 is a rear elevation of the upper portion of the machine, showing letter-spacing dogs, rack, platen-shifter and its operating devices, &c. Fig. 2 is a central longitudinal cross-section of a type-writing machine embodying my invention and showing the position of platen and connected parts when capital letters are being printed. Fig. 3 is a

plan showing one manner of constructing an eccentric platen-shifter. Fig. 4 is a plan illustrating a method of hinging a platen-frame to the shifter shown at Fig. 3 and showing also the spacing-rack, carriage-driving spring-barrel, &c. Fig. 5 is a plan of the rear portion of the top plate, showing letter-spacing dogs and means for operating the platen-shifter. Fig. 6 is a plan of the carriage, showing a front roller-track, also a method of providing ball-bearings at the hinge-joint between the platen-frame and the eccentric platen-shifter. Fig. 7 is a front elevational view showing one form of roller-track. Fig. 8 is a front and end view showing modified means for keeping the roller-track parallel with the platen. Fig. 9 is a plan illustrating a method of arranging antifriction-balls upon the guide-rail. Fig. 10 illustrates a method of guiding a non-shifting carriage by means of ball-bearings, and Fig. 11 is a sectional elevational view showing the shifting platen-frame swung up to exhibit the writing and illustrating the arrangements of antifriction-balls.

Similar numerals designate similar parts throughout the several views.

1 represents the framework of the machine; 2, the top plate; 3, the type-bars, having the usual radial arrangement and each being provided with two characters corresponding to the two working positions of the platen. The type-bars may be connected to the keys by links 4 and levers 5. The letter-spacing movement of the spring-propelled paper-carriage may be produced by the usual transverse universal bar 6, which is depressible by any key-lever and is secured by end arms 7 to a transverse shaft 10, to which is secured a centrally-arranged arm 11, suitably connected by a thrust-rod 12 to spacing-dogs 13 of any suitable construction. The usual letter-spacing rack 14 in mesh with the dogs may be secured to a bail consisting of a bar 15 and end arms 16 17, by which it may be hinged upon the laterally-motionless guide-rail 20, which extends across the machine in rear of the platen. The bar 15 may travel upon a stationary roll 21 and may be swung up, as usual, to enable the rack to clear the spacing-dogs 13. Any other suitable means

may be provided for supporting, guiding, and releasing the spacing-rack, or the dogs may be mounted on the carriage and the rack upon the frame of the machine in a well-known manner.

The guide-rail may be secured at each end in forwardly-extending arms 25 of standards 22 23, which are fastened to the top plate and connected by a long horizontal bar 24 in rear of the guide-rail, and about midway of the bar 24 a third forwardly-extending arm 26 may be arranged so as to furnish additional support for the guide-rail. The guide-rail may be supported in any other suitable manner, and so long as it is laterally motionless it is immaterial to my invention whether it moves endwise or rotates in its bearings or not.

The platen-shifter may be hinged directly upon the guide-rail and may consist of two end disks or working portions 30 31 (which are eccentric to the guide-rail) and an intermediate cut-away portion 32, Fig. 3. As a preferred means for turning the shifter about the shaft-axis a series of longitudinally-extending teeth 33 are cut upon the under side of the body or cut-away portion 32 thereof, Figs. 1 and 2, and a pinion 34 is arranged in mesh therewith, the pinion being operated by a finger-key 35 through a lever 36, which is pivoted between its ends at 37 to the side wall of the machine-base and connected at its rear end by means of a vertically-arranged thrust-rod 40 to the free end of a crank-arm 41, which is secured upon a horizontal shaft 42, extending parallel with the guide-rail 20, to a point about midway of the machine where the pinion 34 is secured thereon, and suitably mounted in brackets 38 39, secured to the top plate.

A suitable rectangular platen-frame 45 46 47 48, in which is supported the usual cylindrical platen 53, may be provided with rearwardly-extending hinge arms or ears 50 51, perforated so as to engage the eccentric disks 30 31, so that the platen-frame is partly supported upon the shifter and so that when the shifter turns upon the rail-axis the platen-frame is caused to move transversely to the line of writing.

For returning the parts to normal position a spiral spring 55 may be arranged upon the shaft 42, one end being fastened to the top plate and the other end secured to the shaft by means of a tension-adjusting collar 56.

If desired, adjustable stops 60 61 may be arranged upon the bracket 38 for limiting the movement in either direction of the pinion, and consequently of the shifter and the platen.

The platen-shifter and the ears 50 51 of the platen-frame are preferably confined between the arms 16 17 of the rack-bar frame, to which the carriage-propelling power is preferably applied, a cord 62 being secured at one end to an ear 63, projecting rearwardly from the rack, and at the other end to the usual spring-drum 64, Fig. 4.

The platen-frame when swung up may be partly supported by a roll 65, which is mounted upon the free end of an arm 66, projecting upwardly from about midway of the rear bar 45 of the platen-frame and which runs upon the bar or rail 24.

In operation when the finger-key 35 is depressed the rear end of key-lever 36 rises and by means of link 40 swings up arm 41, thereby rocking shaft 42 and the pinion 34 thereon, so that the platen-shifter in mesh with the pinion is caused to turn upon the rail 20 and by means of its eccentric construction draws the platen-frame and platen rearwardly. The positions of the parts when the shift-key is depressed are shown in full lines at Fig. 2. The normal positions of the shift-key, eccentric, and platen are indicated by dotted lines. The long teeth 33 upon the shifter enable the platen to be shifted at all positions in its travel. Any wear to which the gear-teeth may be subjected, due to the sliding action thereof, will not perceptibly affect the rigidity of the platen, since the transverse movement of the platen-frame is much less than the peripheral movement of the teeth 33.

It will be observed that the platen-frame when swung up turns upon the eccentrics and remains positively connected to the shifter, such movement of the platen-frame tending to hold the shifter more firmly in normal position, thus avoiding the erratic movements of the platen-frame heretofore experienced by reason of the disconnection of the platen-frame from the shift-rail. The stops for limiting the transverse movements of the platen are preferably arranged upon the framework of the machine instead of upon the shifter or carriage, thus obviating friction between the pinion and the shifter as the latter slides along, such as would occur if a stop were to be placed upon the carriage to limit the movement of the shifter, and hence of the finger-key 36, inasmuch as in such a case the pressure of the finger of the operator would be communicated to the stop through the pinion and the shifter during the lengthwise movements of the latter. To the same end the returning-spring is also arranged upon a non-traveling portion of the machine.

So long as the key-actuated platen-shifter rides along a laterally-motionless guide-rail it is immaterial to my invention, considered in its broad features, whether or not the shifter is supported directly upon the rail or upon some portion of the traveling mechanism or works upon the eccentric principle or is provided with gear-teeth or has a hinge action, as it may vary widely in construction and arrangement without deviating from the invention, considered in its broader features.

*Ball-bearing hinge.*—In the modification illustrated at Fig. 6 a ball-bearing hinge is provided between the shifter and the platen-frame. The eccentric disks are provided with outturned cone-faces 70, and the hinge-arms are cupped at 71, the balls 72 being disposed

between cup and cone in a manner common in bicycle construction. If desired, one of the arms 51 may be made adjustable lengthwise of the rear bar 45 of the platen-frame, so as to secure a nice fit of the hinge and take up subsequent wear, and to this end the arm 51 is provided with one or two slotted ears 73, secured to bar 45 by screws 74, the slots 75 permitting the required adjustment. Other suitable ball-bearing construction and adjustment may be employed.

*Traveling ball-bearing.*—As illustrated at Figs. 9 and 11, the platen-shifter may be of tubular construction, and balls 80 may be arranged about the guide-rail and confined within the tube, so as to travel endwise along the guide-rail and also around the rail, thus securing easy longitudinal and turning movements of the shifter, which is designated as 83 and fits closely over the balls. To hold the balls in position, a cage 81 may be employed, preferably tubular and provided at each end with one or more circular series of perforations 82, within each of which is confined a ball, and also with an internal ring 85 for supporting it upon the guide-rail. The eccentric disks may be provided with inwardly-projecting rims 84 to slip upon and secure to the ends of tube 83, and the perforations in the disks should be larger than the guide-rail.

*Carriage-release.*—At Figs. 9 and 11 the rack-frame is illustrated as provided with the usual forwardly-projecting finger-piece 84. An upwardly-extending integral finger-piece 85 is also provided to be used when the platen-frame is swung up, being so arranged as to be readily drawn forward by the hand that lifts the platen-frame, thereby releasing the rack from the spacing-dogs.

*Roller-track,* Figs. 2, 6, and 7.—The broadened front roll 90 of the platen-frame rides upon a long antifriction-roller track 91, extending parallel with the platen and provided with any suitable stationary support, such as a bar 92, secured upon posts 93, rising from the top plate. The roller 91 rolls to and fro as the platen shifts, and to keep it at all times parallel with the platen each end thereof may be provided with gear-teeth 94, meshing with stationary racks 95, secured at each end of bar 92, the rack being provided with a guard portion 96 to prevent displacement of the roller. The roller may be capped at each end, as at 97, to prevent endwise displacement.

A modified construction for keeping the roller parallel is illustrated at Fig. 8, a rock-shaft 100 being journaled in the standards 93 and provided at its ends with upwardly-extending slotted arms 101, which engage pivots or nipples 102, formed upon the ends of the roller. It is not essential, however, that any means be provided for keeping the roller 91 parallel with the platen.

So far as my platen-shifter is concerned any other suitable support may be provided for the opposite portion of the platen-frame,

and the roller-track is likewise adapted for use in connection with other shifting means.

Other portions of my invention may be used separately—as, for instance, illustrated in the construction at Fig. 10, in which the ball-bearing tube 83 is rigidly secured to a non-shifting platen-frame, securing a rigid, easy-running, and durable construction, besides permitting the platen-frame to swing up for inspection of the writing.

Numerous other variations in detail construction may be made within the scope of the invention, and although certain claims herein cover preferred specific constructions I do not wish to be considered as being limited thereto as far as the broader features of my invention are concerned.

By the term “shifter,” wherever used in the specification or claims, I mean a device which forms a portion of a carriage and is arranged between a platen-frame and a laterally-motionless guide-rail and which is adapted to cause transverse movements of said platen-frame relatively to said guide-rail and which, further, is connected to a key whose position relatively to the keyboard does not vary at the letter-spacing movements of the machine. Preferably the platen-frame is guided upon the rail by means of the shifter. In carrying out this feature of my invention I prefer to hinge the shifter directly upon the guide-rail, so that the guide-rail is the axis of the hinge; but it is not essential in adapting the invention to other machines that the guide-rail be arranged concentrically with the shifter-hinge, as the shifter may have any suitable hinge, so long as it is enabled to turn upon said hinge to cause a transverse movement of the platen and so long as the shifter is provided with suitable means for enabling it to ride or travel endwise along the laterally-motionless guide-rail. It is not essential that the shifter be given a transverse movement by means of a hinge construction. Many portions of my invention are suitable for machines in which the paper remains stationary while the types are arranged upon a step-by-step-moving frame, and I consider such a type-carrying frame as the equivalent of the platen-frame referred to herein.

It will be observed that I have connected a finger-key to means which are pivoted upon the frame of the machine and directly engage a platen-frame shifter, so as to operate the same at all points in the longitudinal or step-by-step travel thereof, said shifter being adapted to travel along a laterally-motionless guide-rail and said platen-frame being preferably hinged to the shifter, whereby it is enabled to shift transversely and also to swing up to exhibit the writing, whether in its normal or shifted position, that the bar 24 and roller 65 limit the upward movement of the platen-frame, and that a letter-spacing rack or rack-frame is constructed to ride along said rail, together with said shifter and said platen-

frame. It will further be noted that the shifter preferably comprises an eccentric or a pair of eccentrics, the periphery whereof serves as the platen-frame hinge, upon which  
 5 the latter is both shifted and turned up, the eccentrics being key-operated and rigidly united and hinged directly upon the guide-rail, and that the platen-frame is provided with eyes or rings 50 51, which operate as  
 10 straps upon the eccentrics and which surround the guide-rail, so that the platen-frame swings about the guide-rail. It will also be seen that I provide a spring-driven letter-spacing rack or rack-frame which engages or  
 15 is carried upon the guide-rail and is also preferably provided with an independent support, as 21, and which is adapted to move or carry the shifter and platen-frame in letter-space direction, and that preferably the  
 20 eccentric which operates the platen-frame is confined between the arms of the rack or rack-frame. It will also be seen that as an independent front support for the platen-frame I have provided an antifriction cylindrical track, which is adapted to turn or roll  
 25 crosswise of its length during the transverse movements of the platen-frame, that preferably said track rolls upon or over a plane surface or surfaces, and that the turning  
 30 or rolling motion of the track is caused by the pressure or weight of the platen-frame thereon.

What I claim as new, and desire to secure by Letters Patent, is—

35 1. In a type-writing machine, the combination with a platen and platen-frame of a shifter constructed to ride along and directly upon a laterally-motionless guide-rail, and a shift-key mounted upon the frame of the  
 40 machine and operatively connected to said shifter.

2. In a type-writing machine, the combination with a platen and platen-frame of a shifter constructed to ride along and directly  
 45 upon a laterally-motionless guide-rail; means pivoted upon the frame of the machine for operating the shifter at all points in its travel; and a finger-key connected to said operating means.

50 3. In a type-writing machine, the combination with a platen and platen-frame of a hinged shifter partly supporting said platen-frame and constructed to ride along and directly upon a laterally-motionless guide-rail,  
 55 and a shift-key mounted upon the frame of the machine and operatively connected to said shifter.

4. In a type-writing machine, the combination with a platen and platen-frame of a hinged shifter constructed to ride along and directly upon a laterally-motionless guide-rail arranged in rear of said platen; means arranged upon the frame of the machine for turning the shifter at all points in its travel;  
 60 and a finger-key connected to said turning means.

5. In a type-writing machine, the combina-

tion with a platen and platen-frame of a traveling shifter hinged directly upon a laterally-motionless guide-rail, and a shift-key mounted upon the frame of the machine and operatively connected to said shifter.

6. In a type-writing machine, the combination with a platen and platen-frame of a traveling shifter hinged upon a laterally-motionless guide-rail; means arranged upon the frame of the machine and directly engaging the shifter for turning the same at all points in its travel; and a finger-key connected to said turning means.

7. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter to which said platen-frame is hinged, and a laterally-motionless guide-rail along which said shifter is constructed to ride.

8. In a type-writing machine, the combination with a platen of a platen-frame, a shifter to which said platen-frame is hinged, a laterally-motionless guide-rail along which said shifter is constructed to ride, means pivoted upon the frame of the machine for operating the shifter and platen-frame at all points in their travel, a finger-key operatively connected to said shifter-operating means, and a returning-spring.

9. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter to which said platen-frame is hinged, and a laterally-motionless guide-rail to which said shifter is connected by a hinge, and along which rail said shifter is constructed to ride.

10. In a type-writing machine, the combination with a platen of a platen-frame, a shifter to which said platen-frame is hinged, a laterally-motionless guide-rail to which said shifter is connected by a hinge and along which said shifter is constructed to ride, the construction being such that said platen-frame is guided by said shifter, means arranged upon the framework of the machine for turning the shifter and thereby shifting the platen-frame and platen at any point in their travel, and a finger-key connected to said turning means.

11. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated traveling shifter to which said platen-frame is hinged, and a laterally-motionless guide-rail to which said shifter is hinged, the guide-rail being constructed to serve as the axis of hinge motion of the shifter.

12. In a type-writing machine, the combination with a platen, of a platen-frame, a traveling shifter to which said platen-frame is hinged, a laterally-motionless guide-rail to which said shifter is hinged, said guide-rail being constructed to serve as the axis of the hinge motion of said shifter, a support arranged at each end of said guide-rail, a support also arranged about midway thereof, means arranged upon the frame of the machine and directly engaging the shifter for turning the same and thereby shifting the

platen-frame and platen at all points in their travel, and a finger-key operatively connected to said turning means.

13. In a type-writing machine, the combination with a platen and a platen-frame which is constructed to be turned up to exhibit the writing, of a shifter arranged in rear of the platen and constructed to ride along a laterally-motionless guide-rail, and a shift-key mounted upon the frame of the machine and operatively connected to said shifter.

14. In a type-writing machine, the combination with a platen and a platen-frame which is constructed to be turned up to exhibit the writing, of a key-operated shifter hinged in rear of the platen and constructed to ride along a laterally-motionless guide-rail, and a track arranged parallel with said guide-rail, the platen-frame being supported partly upon said guide-rail and partly upon said track.

15. In a type-writing machine, the combination with a platen and a platen-frame which is constructed to be turned up to exhibit the writing, of a key-operated traveling shifter hinged upon a laterally-motionless guide-rail, the construction and arrangement being such that the platen-frame may be shifted at any point in its letter-spacing movements, and may be swung up whether in normal or shifted position.

16. In a type-writing machine, the combination with a platen and a platen-frame which is constructed to be turned up to exhibit the writing, of a traveling shifter hinged upon a laterally-motionless guide-rail; means arranged upon the frame of the machine and directly engaging the shifter for turning the same at all points in its travel; and a finger-key connected to said turning means.

17. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter to which said platen-frame is hinged, said shifter being arranged in rear of the platen and partly supporting the platen-frame, and the platen-frame being constructed to turn up about said hinge to exhibit the writing, and means for limiting the upward movement of the platen-frame about said hinge.

18. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter to which said platen-frame is hinged, the platen-frame being constructed to turn up about its said hinge to exhibit the writing, a rail for limiting the upward movement of the platen-frame, and a laterally-motionless guide-rail to which said shifter is connected by a hinge.

19. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter to which said platen-frame is hinged, the platen-frame being constructed to turn up about its said hinge to exhibit the writing, a rail for limiting the upward movement of the platen-frame, a roll arranged upon the platen-frame and adapted to bear upon said rail, and a laterally-motionless

guide-rail to which said shifter is hinged, said guide-rail being constructed to serve as the axis of the hinge motion of said shifter.

20. In a type-writing machine, the combination of a key-operated traveling shifter which is hinged upon a laterally-motionless guide-rail, and a platen-frame hinged to the shifter, at its rear portion and provided at its forward portion with a track movable crosswise of its length, at the shifting operation.

21. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter therefor and a letter-spacing rack; all constructed to ride along and directly upon a laterally-motionless guide-rail.

22. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter therefor, and a letter-spacing rack; all constructed to ride along a laterally-motionless guide-rail, and the shifter being hinged upon the rail, and a support for said rack independent of said guide-rail.

23. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter therefor, and a letter-spacing rack; all constructed to ride along a laterally-motionless guide-rail, the shifter being hinged upon the rail, and the platen-frame being hinged to the shifter, a support for said platen-frame independent of said guide-rail, and a support for said rack independent of both said guide-rail and said platen-support.

24. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter therefor, and a releasable letter-spacing rack; all constructed to ride along a laterally-motionless guide-rail, the shifter being hinged upon the rail, and the platen-frame hinged to the shifter and constructed to turn up about its said hinge to exhibit the writing, the construction and arrangement being also such that the rack may be released both when the platen-frame is down in working position and when it is turned up.

25. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated shifter therefor, and a letter-spacing rack; all constructed to ride along a laterally-motionless guide-rail; both the shifter and the rack being hinged upon the rail, and the platen-frame being hinged to the shifter.

26. In a type-writing machine, the combination with a platen of a platen-frame adapted to have letter-spacing movements, an eccentric upon which said platen-frame is hinged, and a key mounted upon the frame of the machine and operatively connected to said eccentric.

27. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated eccentric upon which said platen-frame is hinged, and a laterally-motionless guide-rail upon which said eccentric is hinged.

28. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated eccentric upon which said platen-

frame is hinged, said platen-frame being constructed to turn up about the eccentric to exhibit the writing, and a laterally-motionless guide-rail to which said eccentric is hinged.

29. In a type-writing machine, the combination with a platen of a platen-frame, a pair of key-operated and rigidly-united eccentrics upon which said platen-frame is hinged, and a laterally-motionless guide-rail upon which said eccentrics are hinged.

30. In a type-writing machine, the combination with a platen of a platen-frame, a pair of key-operated and rigidly-united eccentrics upon which the said platen-frame is hinged, said platen-frame being constructed to turn up about the eccentrics to exhibit the writing, a laterally-motionless guide-rail upon which said eccentrics are hinged and a track for said platen-frame independent of said guide-rail.

31. In a type-writing machine, the combination with a platen and a platen-frame of a hinged platen-shifter provided with gear-teeth and constructed to ride along and directly upon a laterally-motionless guide-rail; and a key-operated pinion pivoted upon the framework of the machine and in mesh with the teeth of the shifter.

32. In a type-writing machine, the combination with a platen of a platen-frame, a shifter to which said platen-frame is hinged, a series of gear-teeth formed or provided upon said shifter, a laterally-motionless guide-rail upon which said shifter is hinged, and a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with the gear-teeth upon said shifter.

33. In a type-writing machine, the combination with a platen, of a platen-frame, an eccentric upon which said platen-frame is hinged, a laterally-motionless guide-rail upon which said eccentric is hinged, a series of gear-teeth fixed to said eccentric, and a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth.

34. In a type-writing machine, the combination with a platen of a platen-frame, a pair of rigidly-united eccentrics upon which said platen-frame is hinged, a laterally-motionless guide-rail upon which said shifter is hinged, a series of gear-teeth fixed to said eccentrics, and a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth.

35. In a type-writing machine, the combination with a platen of a platen-frame, a pair of eccentrics upon which said platen-frame is hinged, a laterally-motionless guide-rail upon which said eccentrics are hinged, a gear-tooth structure extending from one eccentric to the other and rigidly uniting them together, and a key-operated pinion pivoted upon the framework of the machine and adapted to cooperate with said gear-tooth structure to cause said eccentrics to effect a shifting movement of the platen-frame.

36. In a type-writing machine, the combination

of a spacing-rack provided with a pair of arms whereby it engages a laterally-motionless guide-rail; a platen-shifter hinged upon the rail and confined between the rack-arms; and a platen-frame hinged to the shifter.

37. In a type-writing machine, the combination of a spacing-rack provided with a pair of arms whereby it engages a laterally-motionless guide-rail; an eccentric hinged upon the rail and confined between the rack-arms; and a platen-frame hinged upon the eccentric.

38. In a type-writing machine, the combination of a platen-frame shifter hinged upon a laterally-motionless guide-rail; a platen-frame hinged upon the shifter; and a spring-driven rack engaging the rail for moving the shifter and platen-frame in letter-space direction.

39. In a type-writing machine, the combination of a laterally-motionless guide-rail; an eccentric hinged thereon; a platen-frame hinged to the eccentric; and a spring-driven rack engaging the rail for moving the eccentric and platen-frame in letter-space direction.

40. In a type-writing machine, the combination of a laterally-motionless guide-rail; an eccentric hinged thereon, a platen-frame hinged upon said eccentric, a series of gear-teeth fixed to said eccentric, a key-operated pinion pivoted upon the framework of the machine and arranged in engagement with said gear-teeth, a returning-spring for said eccentric, and a spring-propelled letter-spacing rack adapted to travel upon said rail to move said shifter, together with said platen-frame, along said rail.

41. In a type-writing machine, the combination with a platen and platen-frame of a shifter constructed to ride along a laterally-motionless guide-rail, a shift-key mounted upon the frame of the machine and operatively connected to said shifter, and a stop for the shifter arranged upon the framework of the machine.

42. In a type-writing machine, the combination with a platen and platen-frame of a shifter constructed to ride along a laterally-motionless guide-rail, a shift-key mounted upon the frame of the machine and operatively connected to said shifter, and an adjustable stop for the shifter arranged upon the framework of the machine.

43. In a type-writing machine, the combination with a platen and a platen-frame of a hinged platen-shifter provided with gear-teeth and constructed to ride along a laterally-motionless guide-rail; a key-operated pinion pivoted upon the framework of the machine and in mesh with the teeth of the shifter; and a stop for the pinion arranged upon the framework of the machine.

44. In a type-writing machine, the combination with a platen of a platen-frame hinged upon a pair of rigidly-united eccentrics which are provided with gear-teeth and are hinged

upon a laterally-motionless guide-rail; a key-operated pinion pivoted upon the framework of the machine and in mesh with the teeth of the eccentrics; and adjustable stops for the pinion arranged upon the framework of the machine.

45. In a type-writing machine, the combination with a platen and a platen-frame of a hinged platen-shifter provided with gear-teeth and constructed to ride along a laterally-motionless guide-rail; a key-operated pinion pivoted upon the framework of the machine and in mesh with the teeth of the shifter, the peripheral movement of the pinion being greater than the corresponding shift movement of the platen-frame; and a stop for the pinion arranged upon the framework of the machine.

46. In a type-writing machine, the combination with a platen and platen-frame of a key-operated shifter constructed to ride along and directly upon a laterally-motionless guide-rail, and a spring for returning the shifter and platen-frame to normal position.

47. In a type-writing machine, the combination with a platen and a platen-frame of a hinged platen-shifter provided with gear-teeth and constructed to ride along a laterally-motionless guide-rail; a key-operated pinion pivoted upon the framework of the machine and in mesh with the teeth of the shifter; a stop for the pinion arranged upon the framework of the machine; and a returning-spring, one end whereof is connected to the framework of the machine and the other end to some part of the shifter-operating mechanism.

48. In a type-writing machine, the combination with a platen of a platen-frame adapted to make letter-spacing movements in a direction longitudinally of the platen, an eccentric to which said platen-frame is hinged by ball-bearings, and a key mounted upon the frame of the machine and operatively connected to said eccentric.

49. In a type-writing machine, the combination with a platen of a key-operated eccentric to which said platen-frame is hinged by ball-bearings, and a laterally-motionless guide-rail upon which the said eccentric is hinged.

50. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated eccentric device upon which said platen-frame is hinged by a ball-bearing, so that the platen-frame may turn up about the eccentric to exhibit the writing, a laterally-motionless guide-rail upon which said eccentric is hinged, and means for supporting the platen in its upturned position.

51. In a type-writing machine, the combination with a platen of a platen-frame, a pair of arms thereon, a pair of key-operated and rigidly-united eccentrics upon which said arms are hinged by ball-bearings, and a laterally-motionless guide-rail upon which said eccentrics are hinged.

52. In a type-writing machine, the combi-

nation with a platen of a platen-frame, a pair of key-operated and rigidly-united eccentrics to which said platen-frame is hinged by ball-bearings, the platen-frame being constructed to turn up about the eccentrics to exhibit the writing, a laterally-motionless guide-rail upon which said eccentrics are hinged, a fixed rail as 24, and a roll as 65 arranged upon the platen-frame and adapted to run upon said rail 24 when the platen-frame is turned up.

53. In a type-writing machine, the combination with a platen, of a platen-frame, a pair of key-operated eccentrics upon which said platen-frame is hinged by adjustable ball-bearings, and a laterally-motionless guide-rail upon which said eccentrics are hinged.

54. In a type-writing machine, the combination with a platen of a platen-frame, a pair of eccentrics upon which said platen-frame is hinged by ball-bearings, a laterally-motionless guide-rail upon which said shifter is hinged, a series of gear-teeth fixed to said eccentrics and substantially equal in length to the endwise travel of the platen-frame, and a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth.

55. In a type-writing machine, the combination of a spacing-rack provided with a pair of arms whereby it engages a laterally-motionless guide-rail; an eccentric hinged upon the rail and confined between the rack-arms; and a platen-frame hinged by ball-bearings upon the eccentric.

56. In a type-writing machine, the combination of a platen-frame shifter hinged upon a laterally-motionless guide-rail; a platen-frame hinged by ball-bearings upon the shifter; a spring-driven rack adapted to move along the rail and to carry the shifter and platen-frame in letter-space direction; a bar, as 15, united to said rack, and a roll, as 21, upon which said bar is adapted to ride.

57. In a type-writing machine, the combination of a cylindrical guide-rail, a tube forming part of a paper-carriage and surrounding the rail, and a series of balls interposed between the rail and the tube, said balls being constructed to roll along said rail at the letter-spacing movements of the carriage and to constantly support the tube upon the rail.

58. In a type-writing machine, including a paper-carriage adapted to move endwise for letter-spacing, the combination of a cylindrical guide-rail; a tube forming part of the paper-carriage and surrounding the rail; a series of balls interposed between the rail and the tube and constructed and arranged to move along said rail at the letter-spacing movements of the carriage; and a traveling cage for confining the balls.

59. In a type-writing machine, including a paper-carriage adapted to move endwise for letter-spacing, the combination of a cylindrical guide-rail, and a tube forming part of the paper-carriage and hinged by ball-bearings upon the rail, the balls being adapted

both to move endwise along the rail at the letter-spacing movements of the carriage, and to move around said rail at the hinge movements of said tube.

5 60. In a type-writing machine, including a paper-carriage adapted to move endwise for letter-spacing, the combination of a cylindrical guide-rail; a tube forming part of the paper-carriage and hinged upon the rail, balls  
10 being interposed between the rail and the tube and adapted both to move along said rail at the letter-spacing movements of the carriage, and to move around said rail at the hinge movements of said tube; and a travel-  
15 ing cage for confining the balls.

61. In a type-writing machine, the combination with a platen and platen-frame of a key-operated shifter adapted to travel with said platen-frame, a laterally-motionless  
20 guide-rail to which said shifter is connected by a hinge, and a series of balls interposed between the shifter and the rail.

62. In a type-writing machine, the combination with a platen of a platen-frame, a key-  
25 operated shifter to which said platen-frame is hinged, a laterally-motionless guide-rail to which said shifter is directly hinged, and a series of bearing-balls arranged between the shifter and the rail, and adapted both to move  
30 along said rail at the letter-spacing movement of the platen-frame and to move around said rail at the hinge movements of the shifter.

63. In a type-writing machine, the combination with a platen of a platen-frame, a  
35 shifter to which said platen-frame is hinged, a laterally-motionless guide-rail to which said shifter is directly hinged, bearing-balls arranged between the shifter and the rail, means  
40 for retaining said balls in working position, means arranged upon the frame of the machine and directly engaging the shifter for turning the same and shifting the platen-frame and platen at all points in their travel,  
45 a finger-key connected to said turning means, and a returning-spring.

64. In a type-writing machine, the combination with a platen of a platen-frame which  
50 is constructed to be turned up to exhibit the writing, a key-operated tubular shifter adapted to travel together with said platen-frame, a laterally-motionless guide-rail upon which said shifter is hinged, and a series of bearing-balls arranged between the shifter and  
55 the rail.

65. In a type-writing machine, the combination with a platen of a platen-frame, a tubular shifter to the ends of which said platen-  
60 frame is hinged, said platen-frame being constructed to turn up about said hinge to exhibit the writing, a laterally-motionless guide-rail to which said shifter is directly hinged, and a series of bearing-balls arranged between the shifter and the rail.

66. In a type-writing machine, the combination with a platen of a platen-frame, a key-

operated tubular shifter to which said platen-frame is hinged, a laterally-motionless guide-rail to which said shifter is directly hinged, bearing-balls arranged between the shifter and the rail, and a letter-spacing rack connected to said shifter and adapted to travel therewith along said rail.

67. In a type-writing machine, the combination with a platen of a platen-frame, a key-operated tubular shifter to which said platen-  
65 frame is hinged, the platen-frame being adapted to turn up about its said hinge to exhibit the writing, a laterally-motionless guide-rail upon which said shifter is hinged, bearing-balls being arranged between the shifter and the rail, and a spring-driven letter-spacing rack having forwardly-extending arms connected to said shifter and adapted to move  
it together with the platen-frame along said rail.

68. In a type-writing machine, the combination with a platen of a platen-frame, a pair of key-operated eccentrics to which said  
70 platen-frame is hinged by ball-bearings, a laterally-motionless guide-rail upon which said eccentrics are hinged, and bearing-balls arranged between the eccentrics and the rail.

69. In a type-writing machine, the combination with a platen of a platen-frame, a pair of key-operated eccentrics upon which said  
75 frame is hinged by ball-bearings, a tube rigidly uniting said eccentrics, a laterally-motionless guide-rail upon which said tube is hinged, and a series of bearing-balls arranged between the tube and the rail.

70. In a type-writing machine, the combination with a platen of a platen-frame, a tubular shifter to which said platen-frame is  
80 hinged, a laterally-motionless guide-rail to which said shifter is hinged, bearing-balls being arranged between the shifter and the rail, a series of gear-teeth formed or provided upon the tubular portion of said shifter, and a key-operated pinion pivoted upon the framework of the machine and arranged in  
85 mesh with said gear-teeth.

71. In a type-writing machine, the combination with a platen of a platen-frame, a pair of eccentrics upon which said platen-frame  
90 is hinged by adjustable ball-bearings, a tube to the ends of which said eccentrics are secured, a laterally-motionless guide-rail to which said tube is hinged, a series of bearing-balls arranged between the tube and the rail, and a key mounted upon the frame of the machine and adapted to turn said tube upon  
95 said rail.

72. In a type-writing machine, the combination with a platen of a platen-frame, a pair of eccentrics upon which said platen-frame  
100 is hinged by ball-bearings, a tube rigidly uniting said eccentrics, a laterally-motionless guide-rail upon which said tube is hinged, a series of balls arranged between the tube and the rail, a series of gear-teeth formed or provided upon said tube between said eccentrics,

and a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth.

73. In a type-writing machine, the combination with a platen of a platen-frame, a pair of eccentrics upon which said platen-frame is hinged, a tube to the ends of which said eccentrics are secured, a laterally-motionless guide-rail upon which said tube is hinged, a series of bearing-balls arranged between the tube and the guide-rail, a series of gear-teeth formed or provided upon the tube and extending longitudinally thereof, a key-operated pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth, fixed stops for said pinion, and a returning-spring, one end of which bears upon a fixed point in the machine.

74. In a type-writing machine, the combination of a laterally-motionless guide-rail, a shifter hinged thereon and provided with an eccentric, a platen-frame hinged upon the eccentric, a series of gear-teeth formed or provided upon said shifter, a pinion pivoted upon the framework of the machine and arranged in mesh with said gear-teeth, a lever of the first order pivoted in the base of the machine, a key provided upon the forward end of said lever, and a thrust-rod connecting the rear end of said lever to said pinion.

75. In a type-writing machine, the combination with a platen of a transversely-shifting platen-frame, an antifriction cylindrical track upon which said platen-frame is partly supported, and a plane surface upon which said track is adapted to roll during the transverse movements of the platen-frame.

76. In a type-writing machine, the combination with a platen of a transversely-shifting platen-frame, an antifriction cylindrical track upon which said platen-frame is partly supported, and a plane bearing-surface upon which said platen-frame is constructed to roll during the transverse movements of the platen-frame by reason of the pressure of the platen-frame thereon.

77. In a type-writing machine, the combination with a platen of a transversely-shifting platen-frame, a cylindrical track arranged forwardly of the platen and affording a support for the front portion of the platen-frame, said track being adapted to roll as the platen-frame shifts, and guards for preventing displacement of said track.

78. In a type-writing machine, the combination with a platen of a transversely-shifting platen-frame, a cylindrical track upon which said platen-frame is partly supported, said track being adapted to roll as the platen-frame shifts, a plane surface upon which said track is adapted to roll, and means for keeping said track at all times parallel with the platen.

79. In a type-writing machine, the combination with a platen of a transversely-shifting platen-frame, a cylindrical track upon which said platen-frame is partly supported and which is adapted to roll as the platen-frame shifts, a series of teeth provided or formed upon each end of said cylindrical track, and stationary racks with which said teeth are adapted to mesh, whereby the cylindrical track is maintained at all times in parallelism with the platen.

80. In a type-writing machine, the combination with a platen-frame of a key-operated shifter to which said platen-frame is hinged in rear, a laterally-motionless guide-rail along which said shifter is constructed to ride, and a cylindrical track upon which the front portion of the platen is adapted to ride, said cylindrical track being adapted to roll as the platen-frame shifts.

81. In a type-writing machine, the combination of a key-operated platen-shifter, a platen-frame hinged thereto, a hinged rack provided with a finger-piece whereby it may be vibrated to release the paper-carriage from the spacing-dogs; and a laterally-motionless guide-rail for the platen-frame, shifter and rack.

82. In a type-writing machine, the combination of a platen-frame which swings up rearwardly to exhibit the writing; and a hinged spacing-rack therefor to which is fixed a forwardly-extending finger-piece for use when the platen-frame is down in working position, and to which is also fixed an upwardly-extending rear finger-piece for use when the platen-frame is swung up.

Signed at Elizabeth, in the county of Union and State of New-Jersey, this 28th day of July, A. D. 1898.

BURNHAM C. STICKNEY.

Witnesses:

JOSEPH F. JAQUITH,  
JOSEPH RUSHTON.