J. J. COOPER.

TYPE WRITING MACHINE.

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1,158,985. Patented Nov. 2, 1915.

Fig. 1.

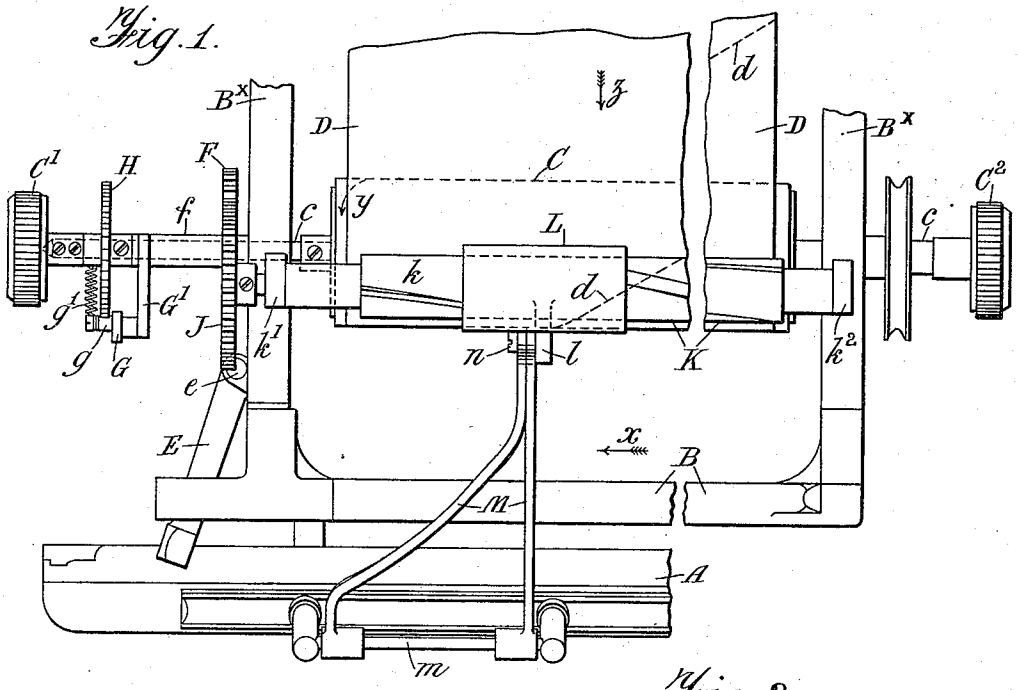
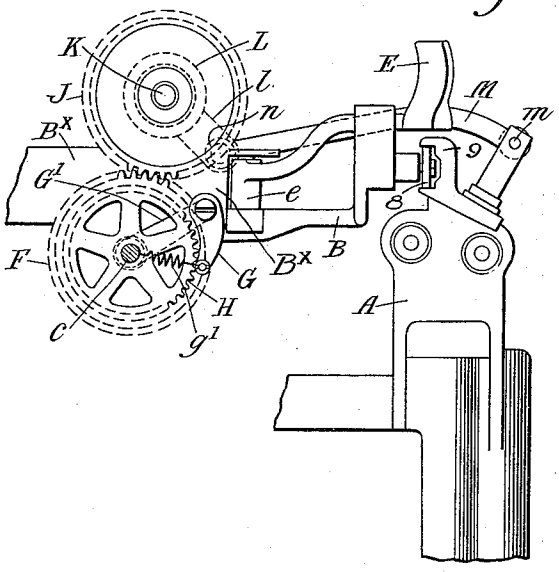


Fig. 2.



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TYPE-WRITING MACHINE.

1,158,985. Specification of Letters Patent. Patented Nov. 2, 1915.

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To all whom it may concern:

Be it known that I, JOHN JOSEPH COOPER, a subject of the King of Great Britain, and resident of 120 Queen Victoria street, London, E. C., England, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to cylindrical platen typewriting machines, and has for an object to provide means for automatically causing the lines of typewritten matter to be inscribed upon the paper obliquely with reference to the axis of the platen (or in other words, obliquely with reference to the parallel edges of the paper), as may be required, for example, in cases where the words of a song are to be written upon a note sheet for a mechanically played piano which is to furnish the accompaniment to the song.

Means are provided for giving to the platen, as it is fed in the direction of its axis, a partial rotary movement independent of that which would be due to the use of the ordinary line-spacing mechanism, with the result that the paper being fed forward (or backward, as may be required) to an extent corresponding to the angular movements thus imparted to the platen, the row of characters constituting a line of typewritten matter is made to cross the paper obliquely. The ordinary line-spacing mechanism, when actuated, operates independently of the device just referred to for automatically rotating the platen.

The means for rotating the platen during its letter-feed comprises cam mechanism consisting of a rotary cam shaft mounted on the carriage parallel with the platen and formed on its surface with a helical or spiral cam. The cam shaft runs through a stationary nut having a coöperating cam surface whereby the cam shaft is rotated during the travel of the carriage. The cam shaft is connected through gearing to the platen to impart rotation to the platen. Said gearing comprises a friction clutch in the form of a pawl and ratchet which permits the operation of the line-space mechanism independently of the cam mechanism.

Other objects of the invention will appear hereinafter.

In the accompanying drawings, which illustrate a convenient arrangement embodying the invention, Figure 1 is a plan view showing so much of a typewriting machine as is necessary for explaining the invention; portions of the structure being broken away for the sake of convenience. Fig. 2 is an elevation looking from the left hand end of Fig. 1, the finger-wheel at that end of the platen spindle being removed.

The platen carriage comprises the frame B having a roller 8 running on a guide rail 9 on the machine frame A and the shiftable platen frame B^x which supports a rotary cylindrical platen C secured to a platen spindle c to the right and left hand ends of which are connected the usual finger-wheels C^2 and C^1. The platen is shiftable for writing upper and lower case letters, as is usual and well known in the Underwood machine.

Loosely mounted on the platen spindle c is a toothed wheel F which is normally in driving connection with said spindle through the medium of a pawl G turning as one with the wheel F and held by spring pressure in engagement with a ratchet wheel H fast on the platen spindle. The teeth of the wheel H are preferably V-shaped and radial (as indicated in Fig. 2) and the pawl G is adapted to slip over said teeth in either direction when the power applied exceeds a certain limit. For this purpose, the pawl G carries at its point a roller g adapted to engage between the teeth of the ratchet wheel H; the pawl, which is forced in the direction to cause such engagement by means of a spring g^1, being pivoted to an arm G^1 fast on a sleeve f which is fitted to turn on the platen spindle c, and which also carries the wheel F. The pawl and ratchet wheel thus form a clutch between the wheel F and the platen. The wheel F is constantly in gear with a toothed wheel J fast on the end of a cam or screw shaft K which, extending parallel to the platen spindle c, is mounted to rotate in bearings k^1 and k^2 carried by the movable platen frame B^x. This cam shaft K, which travels with the frame B^x, is provided with cams in the form of spiral or helical threads k, to engage a cam guide shown as a nut L supported by the machine frame A so as to be prevented from participating in the longitudinal movement of

the cam shaft. The screw shaft K and nut or cam-guide L thus constitute the two members of the cam mechanism already referred to.

When the carriage is moved laterally in either direction, the shaft K, in passing longitudinally through the stationary nut L, receives a movement of rotation in the corresponding direction, which rotary movement is transmitted to the platen C through the medium of the toothed wheels J, F and the ratchet mechanism G^1, G, H. When, however, the lever E of the line-spacing mechanism is actuated to rotate the platen C as usual (*i. e.*, without any concurrent lateral movement of the carriage), the ratchet wheel H slips freely under the spring-pressed pawl G by which it is engaged, this pawl G being prevented from rotation in consequence of the screw shaft K being then held against rotation by engagement with the stationary nut L.

In the example illustrated, the paper D represents part of a note sheet for a mechanically played piano, and as such a sheet is usually fed through the instrument in a direction the reverse of that in which the paper is fed through a typewriting machine, it is necessary that the typewritten lines (in order that they may be read with ease) should be inclined upward from left to right of the sheet. Hence the mechanism of the present invention is so designed as to cause the usual step by step travel of the carriage from right to left in the direction indicated by the arrow *x* (Fig. 1) to produce automatic rotation of the platen clockwise or in the direction of the arrow *y*, the paper D consequently being fed forwardly over the top of the platen and then downwardly and backwardly around said platen (*i. e.* in the direction indicated by the arrow *z*) with the result that each line of typewritten matter, being inscribed upon the paper from left to right, assumes the oblique direction indicated by the dotted line *d*.

It will be obvious that after an oblique line of typewritten matter has been inscribed upon the paper, the latter must be advanced longitudinally in either direction to the necessary extent before another line is written, for which purpose any suitable device, as for example, either the ordinary line-space mechanism or the finger-wheels, may be used.

When the carriage is returned from left to right after the completion of a typewritten line, the platen will be rotated in the reverse direction, or counter-clockwise, by the action of the cam mechanism, the same distance that it was rotated clockwise during the writing of the line. If the line-space lever E, which is pivoted at *e* to the carriage be used to return said carriage, the platen will be rotated clockwise to advance the paper to the extent of a line-space by the actuation of the line-space mechanism associated with said lever, before, or substantially before, the action of the cam mechanism commences, since the said lever virtually completes its active or working stroke before the carriage begins to move. Instead of using the lever E to return the carriage, however, the operator may, if he prefers, use the hand-wheel C^1, which can be grasped and held against rotation during the return travel of the carriage, thereby bringing the printing point of the new line in horizontal alinement with the end of the preceding line. From such position, the platen may be rotated in either direction, as desired, by turning the hand-wheel C^1 in the proper direction, or it may be rotated clockwise to advance the paper by operating the line-space lever E.

To permit the nut L to shift with the carriage for writing upper-case or lower-case characters, the nut L is carried on on approximately horizontal arm M hinged by means of a pivot pin *m* to the framework A. To prevent any material rotation of the nut L taking place when the carriage is raised and lowered, the nut L is provided with a radius arm *l* which is inclined downward at a substantial angle and connected to the arm M by a pivot pin *n*. The pin *n* is preferably a short distance below the pin *m* when the carriage is lowered, and an equal distance above the pin *m* when the carriage is shifted to upper-case position. The upper and lower positions of the pin *n* are thus in vertical alinement and the angular position of the nut L the same for both upper and lower-case writing.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Claims.

1. In a typewriting machine, the combination, with an endwise-movable platen; of cam mechanism for imparting a rotary movement to said platen simultaneously with its endwise movement, said mechanism embodying a part movable endwise with said platen; and a relatively stationary part co-acting with said movable part to rotate the same.

2. In a typewriting machine, the combination, with an endwise-movable platen; of cam mechanism for imparting a rotary movement to said platen simultaneously with its endwise movement, said mechanism embodying a part movable endwise with said platen; a relatively stationary part co-acting with the first-named part to rotate the same; and gearing connecting said first-named part with said platen, to transmit the rotary movement of the former to the latter.

3. In a typewriting machine, the combination of a rotary platen; a line-space

lever for rotating said platen; cam mechanism operating independently of said line-space lever for causing said platen to rotate during its longitudinal movement; and ratchet mechanism intermediate the cam mechanism and the platen operable to permit said platen to be rotated by said line-space lever independently of said cam mechanism.

4. In a typewriting machine, the combination of a rotary platen, a ratchet wheel fast on the platen spindle, a spring-pressed pawl engaging said wheel and rotatable about said spindle as an axis, a screw shaft parallel to said axis and movable longitudinally with the platen, a stationary nut engaging said screw shaft, and gearing interposed between the screw shaft and the rotatable pawl, for imparting motion to the latter, substantially as described.

5. In a typewriting machine, the combination of a rotary platen, a ratchet wheel fast on the platen spindle, a spring-pressed pawl engaging said wheel and rotatable about said spindle as an axis, a screw shaft parallel with said spindle and movable longitudinally with the platen, a nut engaging said screw shaft, an arm pivoted to the machine frame and carrying said nut, said arm being positioned and adapted to permit the platen to be shifted for upper and lower-case writing without any material rotation of said nut, and gearing interposed between the screw shaft and the rotatable pawl for imparting motion to the latter.

6. In a typewriting machine, the combination of a carriage having a step-by-step movement in letter-feeding direction; a rotary platen mounted on said carriage to move endwise therewith; and means for automatically rotating said platen throughout its endwise movement with said carriage in such direction during the printing operation.

7. In a typewriting machine, the combination of a carriage having a step-by-step movement in letter-feeding direction; a rotary platen mounted on said carriage to move endwise therewith; and a helical cam connected to automatically rotate said platen throughout its endwise movement with said carriage in such direction during the printing operation.

8. In a typewriting machine, the combination of a traveling carriage; a rotary platen mounted on said carriage to travel endwise therewith; means for rotating said platen during its movement with said carriage; and a yielding connection between said platen-rotating means and said platen, permitting rotation of the latter independently of the former.

9. In a typewriting machine, the combination of a rotary platen movable during the printing operation in the direction in which its axis extends, means to rotate the platen during such printing operation and movement, and a line-space member to rotate the platen independently of movement in the direction of its axis.

10. In a typewriting machine, the combination of a traveling carriage movable in letter-feeding direction and return; a rotary platen mounted on said carriage to travel endwise therewith in opposite directions; and means for automatically rotating said platen simultaneously with its endwise travel.

11. In a typewriting machine, the combination of a traveling carriage, a rotary platen thereon, a cam on the carriage to travel therewith, said cam being in the form of a helix having its axis parallel with and spaced from the platen, a stationary cam co-operating with said helix, and gearing between said helix and the platen to rotate the latter during the travel of the carriage.

12. In a typewriting machine, the combination with a traveling carriage, of a rotary platen mounted on said carriage to travel therewith, and mechanism to impart a rotary movement to the platen during the travel of the carriage; said mechanism comprising means to permit rotation of the platen independently of the travel of the carriage.

13. In a typewriting machine, the combination of a traveling carriage; a rotary platen mounted on said carriage to travel therewith; cam mechanism for rotating said platen including a helical cam; and transmission gearing between said cam and the platen.

14. In a typewriting machine, the combination with a traveling carriage, of a rotary platen thereon, a device to effect rotation of the platen during the travel of the carriage in letter-feeding direction, and gearing connecting said device to the platen; said gearing comprising means to permit the platen to be held against rotation during the return travel of the carriage.

15. In a typewriting machine, the combination with a traveling carriage, of a platen journaled in said carriage to travel endwise therewith, said carriage being shiftable for upper and lower-case writing, a shaft parallel with the platen, a spiral cam on the shaft, a nut through which the cam is guided, an arm carrying said nut and pivoted to the machine frame, and gearing between said shaft and the platen.

16. In a typewriting machine, the combination with a traveling carriage, of a horizontal rotary platen mounted in the carriage to travel endwise therewith, a shaft journaled in the carriage and located above and parallel with the platen, a spiral cam on said shaft, a nut through which said cam moves, a depending arm on said nut, a substantially horizontal link pivoted at its ends

to said arm and the machine frame respectively, and intermeshing gears mounted on the platen axle and said shaft respectively.

17. In a typewriting machine, the combination of a rotary platen, a traveling carriage on which the platen is mounted, a cam to impart a rotary movement to the platen during the travel of the carriage, and gearing comprising a pawl and ratchet between said cam and the platen.

18. In a typewriting machine, the combination with a traveling carriage, of a rotatable platen thereon, a shaft on the carriage parallel with the platen, means to rotate said shaft during the travel of the carriage, a gear secured to said shaft, a sleeve loose on the platen axle, a gear carried by said sleeve and meshing with said first-named gear, a ratchet wheel fixed to the platen axle, and a pawl carried by said sleeve and engaging said ratchet wheel.

19. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a shaft arranged parallel with the platen and movable endwise therewith, a device co-acting with said shaft to rotate the same when moved endwise, and gearing between said shaft and said platen to transmit the rotary movement of the former to the latter.

20. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a cam shaft arranged parallel with the platen and movable endwise therewith, and a relatively stationary cam-guide co-acting with said shaft to rotate the latter when moved endwise.

21. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a cam shaft arranged parallel with the platen and movable endwise therewith, and a relatively stationary, hollow cam-guide through which said shaft travels when moved endwise, said guide co-acting with said shaft to rotate the latter during such travel.

22. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a cam shaft arranged parallel with the platen and movable endwise therewith, a relatively stationary cam-guide co-acting with said shaft for rotating the latter when moved endwise, and gearing between said shaft and said platen to transmit the rotary movement of the former to the latter.

23. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a cam shaft arranged parallel with the platen and movable endwise therewith, a relatively stationary, hollow cam-guide through which said shaft travels when moved endwise, said guide co-acting with said shaft to rotate the latter during such travel, and gearing between said shaft and said platen to transmit the rotary movement of the former to the latter.

24. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a spirally threaded shaft arranged parallel with the platen and movable endwise therewith, and a relatively stationary nut through which said shaft travels when moved endwise, said nut having means co-acting with the threads on said shaft to rotate the latter during such travel.

25. In a typewriting machine, the combination, with an endwise-movable platen; of mechanism for imparting a rotary movement to said platen during its endwise movement, said mechanism embodying a spirally threaded shaft arranged parallel with the platen and movable endwise therewith, a relatively stationary nut through which said shaft travels when moved endwise, said nut having means co-acting with the threads on said shaft to rotate the latter during such travel, and gearing between said shaft and said platen to transmit the rotary movement of the former to the latter.

26. In a typewriting machine, the combination, with a traveling carriage movable in letter-feeding direction and return; of a rotary platen mounted on said carriage to travel endwise therewith; a helical cam movable with said carriage; a cam-guide connected to rotate said cam when said carriage is moved; and a driving connection between said cam and said platen, to rotate the latter from the former.

27. In a typewriting machine, the combination, with a traveling carriage movable in letter-feeding direction and return; of a rotary platen mounted on said carriage to travel endwise therewith; a helical cam mounted on said carriage in spaced parallel relation with said platen, said cam being arranged to travel endwise with said carriage; a member co-acting with said cam, to rotate the same when said carriage is moved; and a driving connection between said cam and said platen, to rotate the latter from the former.

28. In a typewriting machine, the combination, with a traveling carriage movable in

letter-feeding direction and return; of a rotary platen mounted on said carriage to travel endwise therewith; a threaded shaft mounted on said carriage to move therewith; a stationary nut in which said shaft works during the movement of the carriage, to rotate said shaft; and a driving connection between said shaft and said platen, to rotate the latter from the former.

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