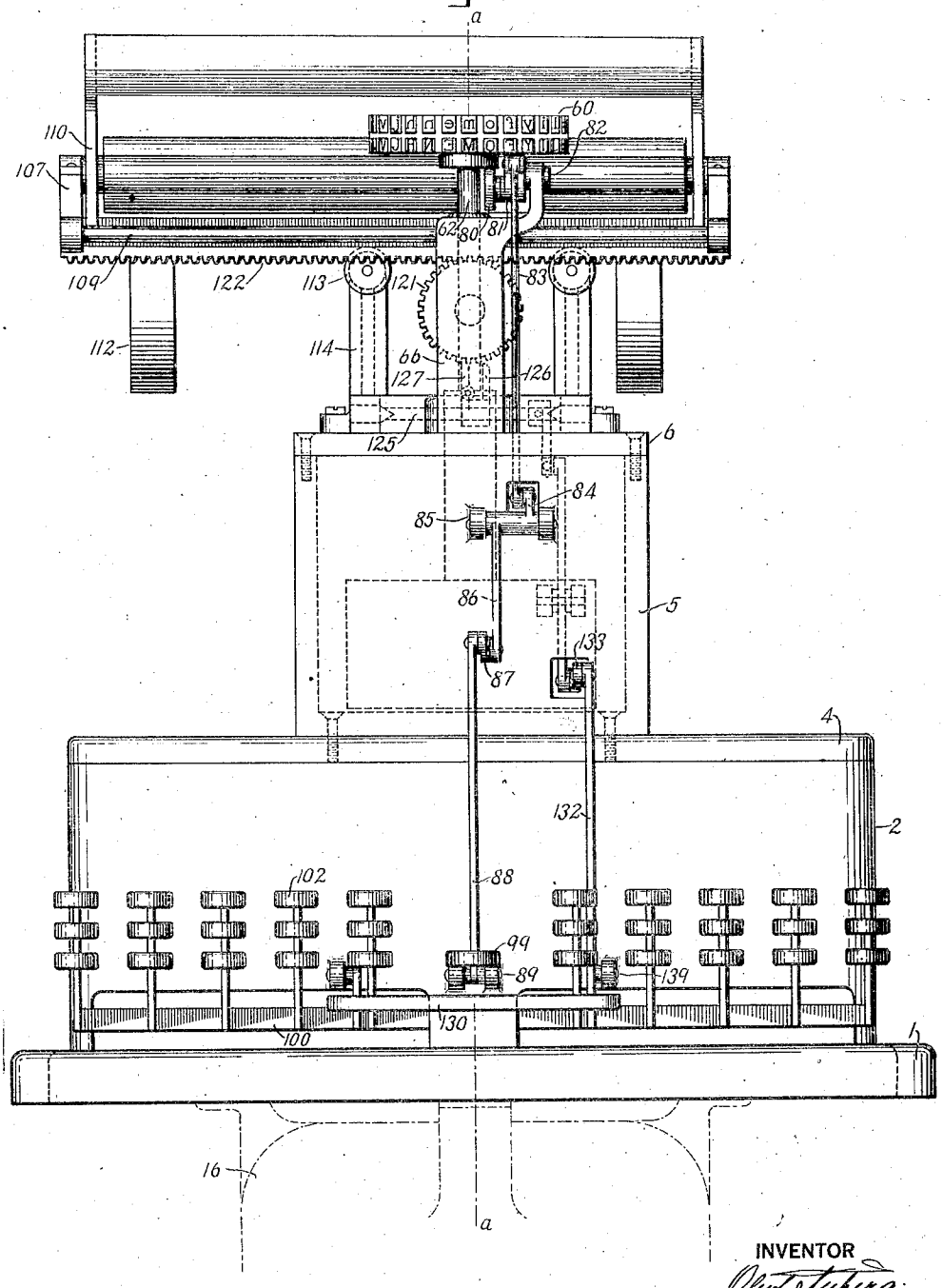
Aug. 31, 1926. 1,598,028

O. TYBERG

TYPEWRITER MOVEMENT

Filed May 29, 1922 3 Sheets-Sheet 1

Fig. 1.



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Olof Tyberg

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Fig. 5.

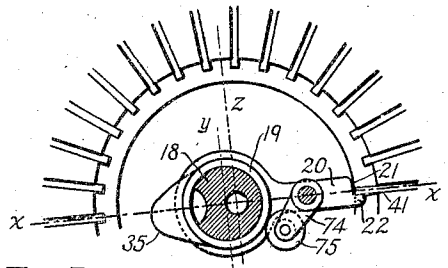

Fig. 2.

Fig. 6.

Fig. 7.

Fig. 8.

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Fig. 4.

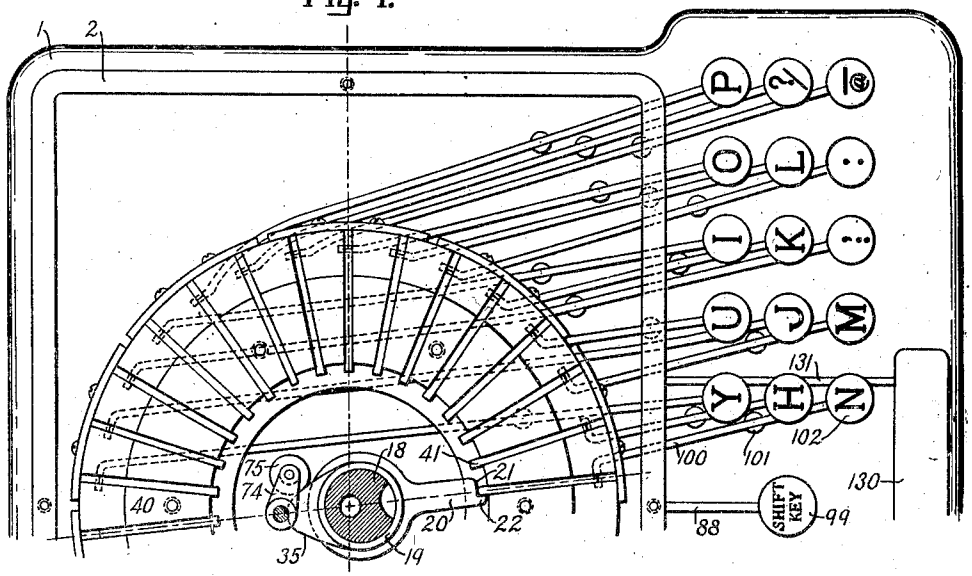
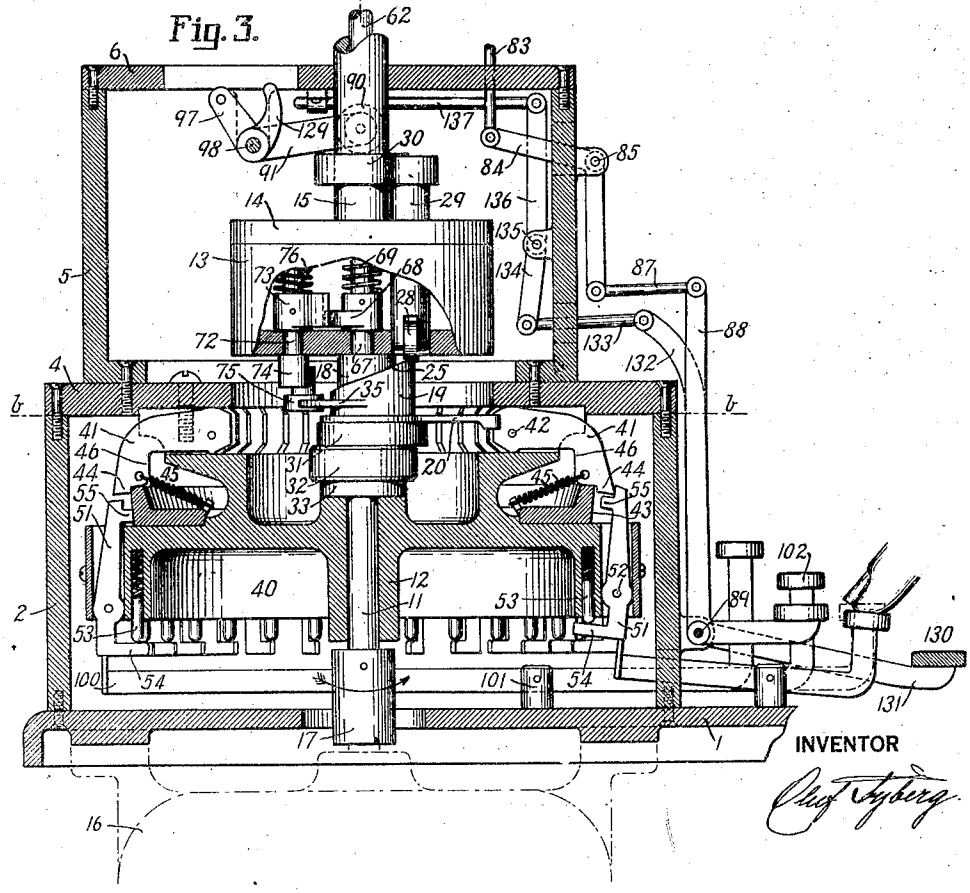


Fig. 3.



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Patented Aug. 31, 1926. 1,598,028

UNITED STATES PATENT OFFICE.

OLUF TYBERG, OF POINT LOMA, SAN DIEGO, CALIFORNIA.

TYPEWRITER MOVEMENT.

Application filed May 29, 1922. Serial No. 564,644.

The object of this invention is to produce a series of new mechanical movements by means of which it shall be possible efficiently to control the printing action of a type-carrier, which by the aid of some auxiliary power is normally in a continuous state of motion, and thus to construct a typewriter or similar device capable of being operated with certainty, ease and speed.

With this and other objects in view the invention consists in certain constructions, improvements and combinations as will hereafter be fully described and then specifically pointed out in the claims hereunto appended.

As this invention is capable of a great variety of modifications, the typewriter here shown is one selected for the particular purpose of clearly illustrating the concrete embodiment of the invention, from which many features, otherwise essential to a complete machine of this nature but unrelated to the subject matter of this invention, have been eliminated.

In the accompanying drawings, consisting of three sheets, Fig. 1 is a front elevation of a typewriter embodying my invention. Fig. 2 is a sectional side elevation of the same on the lines *a*—*a* of Fig. 1 showing the working parts in their normal position. Fig. 3 is a part of a similar section as Fig. 2 showing working parts in active operation. Fig. 4 is a sectional top view of Fig. 3 on the lines *b*—*b*. Fig. 5 is a part of a top view, similar to Fig. 4, showing the working parts in position corresponding to those in Fig. 2. Figs. 6 and 7 are end and side views of the armed sleeve, and Fig. 8 is a sectional top view of the rotating carrier on the lines *c*—*c* of Fig. 2.

The frame may be built in any suitable manner and form; as shown in the drawings it consists of a base plate 1, with a rectangular casing 2, mounted on top of it. Over the rectangular casing 2 is a plate 4. Upon the top of plate 4 is mounted another casing 5, covered by another plate 6. All of said parts are properly fitted and screwed together.

The rotary carrier (Figs. 2 and 3) may be constructed in any suitable manner; and is shown in the shape of a hollow cylinder 13, supported on a shaft 11 and mounted in the bearing 12. The bearing 12 is a hub formed in the center of the pawl case 40, to be described hereafter. The upper portion of the hollow cylinder 13 has a cover 14, provided with a tubular projection 15, fitted to turn in the upper plate 6, and acts as the upper support for the rotary carrier. The manner of revolving the rotary carrier may be done in any suitable manner; and the means here provided is an electric motor 16 (indicated by broken lines) and fastened to the bottom of the base plate 1, directly in line with the rotary carrier and connected thereto by means of a common shaft clutch 17. As indicated by arrow in Fig. 3 the motion of the rotary carrier is anti-clockwise. On the upper part of shaft 11 and directly beneath the hollow cylinder 13 is an enlarged cylindrical portion, which has been turned eccentrically to its own rotating axis. Upon this eccentric 18 is mounted an armed sleeve 19, resting upon a washer 31, and held in position by a nut 32. The nut 32 rests against a washer 33, and supports the rotary carrier on the bearing 12. The armed sleeve 19 is mounted to turn freely on the eccentric 18. Its arm 20 is provided with an abutment 21, and a hook 22. (Figs. 4 and 5). Upon the upper face of the sleeve proper of the armed sleeve 19 is a face cam 25, and upon the side of this same sleeve is a side cam 35, (this latter cam will be referred to hereinafter). Resting against the face cam 25 is a roller 28, pivoted in an upwardly extending plunger 29, that is fitted to slide up and down through the hollow cylinder 13 and the cover 14. The upper end of the plunger 29 is provided with a cap 30, made to embrace and slide up and down over the tubular projection 15. A roller 90, mounted on an arm 91, which will be referred to hereafter, keeps the plunger 29 continually bearing against the cam face 25, and, because of the particular shape of this cam face, (Fig. 6) compels the plunger to come to a normal state of rest in its lowest position, and at the same time compels the armed sleeve to always assume a state of normal rest in a definite position on the rotary carrier. This position is indicated in Figs. 2, 5 and 6. If

however the armed sleeve should be arrested by some extraneous force, the continuous motion of the rotary carrier would compel the roller 28 to travel over the face cam 25, and cause an up and down motion of the plunger 29. The means employed for controlling this action of the armed sleeve, and which may be widely varied in construction, will now be explained.

The pawl case may be constructed in any suitable manner; as shown in my preferred construction I employ a circular casing 40, (Figs. 2 and 3) fastened to the underside of the plate 4. The center portion of casing 40, as has already been explained, acts as the lower bearing for the rotary carrier. In the upper part of the casing 40 are a series of radial slots, in which are mounted a corresponding number of stop pawls 41, while on the outer circumference of the pawl case, directly below and in line with the radial slots, are a similar number of longitudinal slots, in which are mounted the impulse pawls 51. A series of key levers 100, pivoted upon studs 101—mounted on top of base plate 1—have their front end provided with keys 102, while the rear end of each rests against the underside of a respective impulse pawl.

The stop pawls 41 have a sliding motion crosswise to the axis of the orbital motion of the hook 22 of the armed sleeve 19, for the purpose of arresting the same in a manner to be explained hereafter; normally these pawls are maintained at rest outside the orbit of hook 22. In addition to the sliding motion just referred to, these stop pawls 41 have also a rocking motion about the center 42, so as to permit their rear end, which projects downward and is provided with a nose 44, to rest against an angular shaped ring 43, which has been cut in sections so as to be fastened on a shoulder formed upon the pawl case 40, directly above the impulse pawls 51. A spring 45 is provided for each stop pawl, and performs two functions, as it not only tends to draw the pawl inward towards the main axis, but also to keep the nose 44 down against the ring 43, so as to be gripped by the outer edge of ring 43, thereby keeping the pawls in their outward normal position of rest.

The impulse pawls 51 are made to slide up and down in their respective slots and have also a rocking motion about the center 52. A spring actuated plunger 53, bearing against the lower projection 54, keeps the pawls in their normal downward position resting upon their respective keylevers 100, and at the same time, because of their freedom to rock, keeps the upper portion 55 resting against the outer surface of the ring 43. The normal position of both the stop pawls and the impulse pawls are shown on the rear (or left) side of the pawl case in Fig. 2, while on the front side of this view is shown a depressed key which, in pushing the impulse pawl up, has released the nose 44 of the corresponding stop pawl, and permitted the spring 45 to pull this stop pawl inward until it is stopped by the shoulder 46, but sufficient to permit the stop pawl to enter the orbit of the hook 22 of the armed sleeve 19.

The pawl action. In order to fully explain the manner in which these parts act and are automatically restored to their normal positions, I refer to Fig. 5, which is the plan view corresponding to the position of the parts in Fig. 2, and shows the armed sleeve 19 in its normal position, but just ready to be arrested by the released stop pawl just referred to. In this view it will be seen that the center of the rotary carrier or the center of the continuous rotation is shown by the crossing of the diagonals x—x and z—z, while the center of the eccentric 18 is shown by the crossing of the diagonals x—x and y—y, so that relative to the center of rotation the center of eccentricity is directly opposite (on the diagonal x—x) to that of the position of the hook 22 of the armed sleeve mounted on this eccentric. It follows that the diameter of the orbit described by hook 22 must always be smallest when the armed sleeve is maintained in its normal position on the rotary carrier. But as soon as the hook 22 is gripped by the released stop pawl, and the rotation of the armed sleeve arrested, a radial motion is given to the armed sleeve, produced by the revolving eccentric, which now causes the abutment 21 on the arm 20 to push against the stop pawl that is arresting the arm, so that by the time the eccentric has made half a revolution, as shown in Figs. 3 and 4, this stop pawl has been pushed back far enough to permit its rear nose 44 to be gripped again by the edge of the ring 43, and cause it to be restored to its inactive position. In Fig. 3 it will further be seen, that even if the finger should still be pushing the key-lever down and thereby holding the impulse pawl up,—because of the rocking motion of the impulse pawl, already referred to—the stop pawl is able to push the impulse pawl back so as to enable the spring 45 to pull the nose 44 down over the edge of the ring 43, and restore the stop pawl to its normal inactive position. It will also be understood that by the time the eccentric has completed one whole revolution from the time the armed sleeve was arrested, the hook 22 has been completely released from the reset and now inactive stop pawl, and is therefore free to resume its normal position on the rotary carrier, and revolve along with it. Not until the impulse pawl has been once more permitted to resume its normal position under the reset stop pawl, by the complete

removal of the finger from its corresponding key, can this same stop pawl be made active again, so that irrespective of the manner in which the keys are touched, each depression of a key arrests the armed sleeve 19 for only one complete revolution of the rotary carrier at a time.

The typewheel 60 is provided with a number of characters on its circumference corresponding to the number of stop pawls in the pawl case. It may be provided with any suitable number of rows of characters as well, in the drawings are shown only two such rows. The typewheel is fastened to a flange 61, which forms part of the typewheel shaft 62, concentrically mounted on the rotary carrier. The manner of mounting this typewheel shaft may be widely varied; as shown its upper end is supported in a bearing 64, which forms part of a bracket 66, fastened to the top plate 6. The typewheel shaft 62 extends down through the tubular projection 15, and its lowest end 67 is pivoted in the bottom of the hollow cylinder 13, Directly above the pivot 67 a segmental gear 68 is fastened to the typewheel shaft and above this gear is spiral spring 69. This spring bears against the bottom of the cover 14, and keeps the typewheel shaft in its downward position but free to move endwise as well as to swing on its bearings.

The typewheel control may be widely varied in construction; as shown it consists of a control shaft 72, mounted in the rotary carrier parallel with the typewheel shaft 62. To the control shaft is secured a segmental gear 73, which meshes with the teeth of the segmental gear 68. (Figs. 2, 3 and 8). The teeth of gear 73 are made wider, so as to permit the segmental gear 68 to remain in mesh with gear 73 whenever the typewheel shaft moves endwise. The shaft 72 extends down through a bearing in the hollow cylinder 13, and is there provided with an arm 74, upon the free end of which is a roller 75. The upper end of shaft 72 is supported in the cover 14, and on the shaft between the gear and the cover is a spiral tortional spring 76, which keeps the segmental gear 73 normally resting against a pin 77, (Fig. 8) situated so as to permit the roller 75 to rest close to the circular portion of the armed sleeve 19. It will thus be seen that the spring 76 through the segmental gears keeps the typewheel shaft and the typewheel normally at rest in a definite position on the rotary carrier; but permits the typewheel to be moved or rather oscillated on the rotary carrier by any intermittent motion applied to the arm 74. As soon as the armed sleeve is arrested by one of the stop pawls, (as already explained) the continuous motion of the rotary carrier will move the control-shaft 72 with its arm 74 and roller 75 around the sleeve, until the roller reaches the side cam 35, (previously referred to and shown in Fig. 4) when the roller and arm will be forced to swing outward, and through its connections with the typewheel shaft force the typewheel to revolve on the rotary carrier. (Figs. 3 and 4 show the control motion in action.) When the roller reaches the apex of the cam 35, the sping 76 will compel the roller to follow the descending incline of the cam, and permit the entire control mechanism to return to its normal position of rest until a new impulse is given. As may be seen the motion given to the typewheel by the rising portion of the cam 35 is one opposite to the motion of the rotary carrier, it follows that if the shape of this cam-rise is proportioned accordingly, a motion may be given to the typewheel, the speed of which will be equal to that of the rotary carrier itself, and being both opposite and equal to the speed of the rotary carrier must cause the typewheel to stand still in relation to any fixed point on the machine itself. Furthermore in view of what has already been shown, namely that each type on the typewheel has a corresponding set of stop pawls, impulse pawls and keys, it is possible by selection to make any particular type on the typewheel stand momentarily still opposite a given fixed point.

It should therefore be understood that the mechanical movement disclosed by this invention is one based upon the fact that it is possible to subject a body to two independent motions of similar nature and acting in opposite directions at the same time, and further that when these two opposite motions are exactly equal, and as here shown applied to a rotated typewheel, this wheel will be made to stand still upon its own axis while actually in a state of rotation.

It should also be explained that in case it is found desirable to make the typewheel contact a movable platen,—as might be necessary, if for instance the paper is actually being fed forward during the printing action—the typewheel would merely have to be momentarily retarded in its motion, and hence subjected to two unequal motions in opposite directions at the same time, so related to each other as to make the motion of the wheel coincide properly with the moving platen at the time of printing.

The platen may be constructed in any suitable manner; as shown it is made in the form of a hammer 92, pivoted to the plate 6 at 93, and held in its normal position of rest away from the typewheel by the spring 94. The upper end 95 of the hammer is adapted to press the paper against the typewheel. Its lower end 96 bears against a pin on the arm 97 of a rockshaft 98. On

this rockshaft is another arm 91 with a roller 90, already described as resting against the cap 30 of plunger 29. Whenever the armed sleeve 19 is stopped by one of the stop pawls 41, the plunger 29, which is mounted in the continuously rotating carrier, will be made to travel over the face cam 25. This cam is so shaped as to time correctly with the typewheel control motion, so as to make the plunger 29 push the hammer 92 against the typewheel while it is momentarily standing still in relation to the platen. As shown in Figs. 3 and 4 the plunger reaches its highest point exactly at the time when the rising portion of cam 35 is in the act moving the arm 74 and roller 75 of the control shaft 72, which as already described causes the typewheel to stand still in relation to the platen.

The typewheel shift may be constructed in any suitable manner; as shown in Figs. 1 and 2 it consists of a roller 80, mounted on the end of a lever 81. This lever is pivoted at 82 on a lug cast on the bracket 66. Attached to the other end of lever 81 is a rod 83, connecting this lever with the arm 84 of a rockshaft pivoted at 85, between lugs cast on the casing 5. The other arm 86 of this rockshaft is connected by rod 87 to the bell crank 88, pivoted at 89. The lower end of this bell crank 88 constitutes the keylever upon which the shift key 99 is fastened. By the depression of this key the typewheel shaft may be raised while rotating, so as to bring the lower row of types in line with the platen.

The carriage may be constructed in any suitable manner. As shown it consists of two feed rollers 105 and 106. The roller 105 is mounted in bearings 107, which are connected at the rear by a bar 108 and at the front by a rod 109. The roller 106 is carried in a rocking frame 110, pivoted at its lower end to the end pieces 107. A spring 111 holds the roller 106 against the roller 105. The paper is coiled up in the paper holders 112, and is fed up through the rollers and then passed between the hammer and the typewheel. The carriage is supported at the rear by grooved rollers 113, mounted upon brackets 114, fastened to the top of plate 6. In front of the carriage a forked arm 115, forming part of the bearing 64, straddles and guides the rod 109.

The carriage action may be of any suitable construction. On a bearing 120, forming part of the bracket 66 is mounted a gear 121, meshing with a rack 122, fastened to the end pieces 107. The gear 121 is provided with a spring case 123, in which is mounted a spring 124, normally tending to force the carriage in one direction. Upon a rockshaft 125, mounted in the bracket 66, is attached the solid pawl 126 and the yielding pawl 127, constituting a common escapement. A downward extending arm 128 of rockshaft 125 contacts an arm 129 on the rockshaft 98, so that with each motion of this rockshaft 98, as already described, the carriage is permitted to advance one step.

Whenever it is desired to feed the carriage without printing, a space bar 130 is provided. This space bar is mounted on arms 131, pivoted in lugs 139 on the front part of casing 2, (Fig. 1) and through its upward extending lever arm 132 and connecting rod 133, is connected with the lower lever arm 134, pivoted at 135. The upper lever arm 136 carries a pushrod 137, which is made to act upon the arm 138 of the rockshaft 125. Through these connections the carriage may be fed step by step with each depression of the space bar.

As already stated, a variety of changes may be made in the instrumentalities here shown for carrying into effect my invention, and I do not wish to be limited to the particular design, since the gist of my invention rests in the broad idea of providing certain original mechanical movements for controlling the printing action in a power driven typewriter or similar device, as herein set forth.

In regard to the soundness and practical utility of this invention, it may be proper to state here that this application has been written on an experimental machine embodying these identical mechanical principles, and that it was written while the rotary carrier herein described was being revolved at the rate of 1200 revolutions per minute.

Having thus fully described my invention, what I claim as new and useful is:

1. The combination of a continuously rotating carrier, an armed sleeve movably mounted on the axis of said carrier and normally revolving with said carrier in a definite position thereon, a stop-pawl, and means including a key for throwing said stop-pawl into the path of the arm of said armed sleeve and intermittently arresting the motion of said armed sleeve for only a single rotation at a time independent of the release of the key action.

2. The combination of a continuously rotating carrier, an armed sleeve movably mounted on the axis of and normally revolving with said carrier in a definite position thereon, a stop-pawl normally out of engagement with the arm of said armed sleeve, means for pushing said stop-pawl into the path of said arm, and for pushing said stop-pawl back into normal position before said carrier has completed one rotation from the moment of engagement between said arm and said stop-pawl.

3. The combination of a continuously rotating carrier, an armed sleeve movably mounted on a cylindric part of said car-

rier eccentrically situated with reference to the axis of said carrier and normally revolving with said carrier in a definite position thereon, a stop-pawl normally out of engagement with the arm of said armed sleeve, means for pushing said stop-pawl into the path of said arm, and for pushing said stop-pawl back into normal position before said carrier has completed one rotation from the moment of engagement between said arm and said stop-pawl.

4. The combination of a continuously rotating carrier, a movable armed sleeve eccentrically mounted on the axis of said carrier and normally revolving with said carrier in a definite position thereon, a series of stop-pawls grouped around said carrier and normally out of engagement with the arm of said armed sleeve, means for throwing any selected stop-pawl into the path of said arm, and means for pushing said stop-pawl back into normal position before said carrier has completed one rotation from the moment of engagement between said arm and said stop-pawl.

5. The combination of a printing mechanism, a continuously rotating carrier, a movable armed sleeve eccentrically mounted on the axis of said carrier and normally revolving with said carrier in a definite position thereon, a selecting device for intermittently arresting the motion of said armed sleeve at different points of the rotation, and mechanism controlled by said armed sleeve while arrested for operating said printing mechanism.

6. The combination of a printing mechanism, a paper feed, a continuously rotating carrier, an armed sleeve movably mounted on the axis of said carrier and normally revolving with said carrier in a definite position thereon, a selecting device for intermittently arresting the rotary motion of said armed sleeve at different points of the rotation and for only a single rotation at a time, and mechanism controlled by said armed sleeve while arrested for operating said printing mechanism and said paper feed.

7. The combination of a continuously rotating carrier, a typewheel pivoted and normally resting in a definite position on said carrier, mechanism for giving said typewheel a cylindrical reciprocating motion on said carrier at different points of the rotation, and a selecting device for actuating said mechanism at will.

8. The combination of a continuously rotating carrier, a typewheel concentrically pivoted and normally revolving with said carrier in a definite position thereon, positive movable connections between said typewheel and said carrier, and means for giving the typewheel an intermittent rotary movement in the direction opposite to that of the carrier at different points of the rotation, and a selecting device for actuating said mechanism at will.

9. The combination of a platen, a continuously rotating carrier, a typewheel normally resting in a definite position on said carrier, mechanism mounted on said carrier for intermittently moving said typewheel on said carrier so as to momentarily cause any type on said typewheel to stand still opposite the platen, and a selecting device for actuating said mechanism at will.

10. The combination of a platen, a typewheel concentrically pivoted and normally resting in a definite position on a continuously revolving carrier, mechanism for giving said typewheel a cylindrical reciprocating motion on said carrier at different points of the rotation, mechanism for simultaneously producing contact between said typewheel and said platen, and a selecting device for actuating said mechanisms at will.

11. The combination of a platen, a typewheel having a multiple series of characters and resting in a definite position on a continuously rotating carrier, means for bringing any desired series of characters in line with said platen, self-restoring mechanism mounted on said carrier for oscillating said typewheel on said driver at different points of the rotation, mechanism for simultaneously producing contact between said typewheel and said platen, and a selecting device for actuating said mechanism at will.

12. The combination of a typewheel and an armed sleeve both independently pivoted and both normally resting in definite positions on a continuously rotating carrier, means for intermittently arresting said armed sleeve at different points of the rotation, and means mounted on the carrier and controlled by said armed sleeve while arrested for oscillating said typewheel on said driver.

13. The combination of a continuously rotating carrier, a concentrically mounted typewheel and an eccentrically mounted armed sleeve both normally resting in definite positions on said carrier, means for intermittently arresting said armed sleeve for only a single rotation at a time, and means controlled by said armed sleeve while arrested for oscillating said typewheel on said driver.

14. The combination of a platen, a continuously rotating carrier, a concentrically mounted typewheel and an eccentrically mounted armed sleeve both normally resting on said carrier, means for intermittently arresting said armed sleeve, and means mounted on said carrier and controlled by said armed sleeve while arrested for moving said typewheel on said carrier and simultaneously producing contact between said typewheel and said platen.

15. The combination of a platen a typewheel and an armed sleeve both independently pivoted and both normally resting on a continuously rotating carrier, means for intermittently arresting said armed sleeve at different points of the rotation and for only one single rotation at a time, and means controlled by said armed sleeve while arrested for moving said typewheel on said driver and simultaneously producing contact between said typewheel and said platen.

16. The combination of a continuously rotated wheel, and means for intermittently subjecting said wheel to an additional, independent motion of similar nature to that of the continuous rotation but acting in opposite direction for the purpose of changing the motion of said wheel around its own axis.

17. The combination of a continuously rotated wheel, and means for intermittently subjecting said wheel to an additional and identical motion in opposite direction to that of the continuous rotation for the purpose of arresting said wheel on its own axis at any desired point of its rotation.

18. The combination of a rotating driver, a movable arm normally rotating with said carrier, and a series of pawls for intermittently arresting the motion of said arm at different points of the rotation each of said pawls being so shaped and mounted as to be capable of a combined sliding and rocking action controlled by a single spring for each pawl.

19. The combination of a continuously rotating carrier, an armed sleeve eccentrically mounted thereon, resilient means mounted in said carrier for normally holding said armed sleeve in a definite position thereon, and means for intermittently arresting the motion of said armed sleeve.

20. The combination of a continuously rotating carrier, an armed sleeve eccentrically mounted thereon, a spring actuated plunger mounted parallel to the axis in said carrier for normally holding said armed sleeve in a definite position thereon, and means for intermittently arresting the motion of said armed sleeve.

21. The combination of a platen, a continuously rotated typewheel, a key-controlled selecting device fo rintermittently subjecting said typewheel to an additional independent motion around its own axis at different points of the rotation, and means for simultaneously producing contact between said platen and said typewheel.

22. The combination of a platen, a continuously rotated typewheel, a key-controlled selecting device for intermittently subjecting said typewheel to an additional motion in opposite direction to that of the continuous rotation, and means for simultaneously producing contact between said typewheel and said platen.

23. The combination of a continuously rotated carrier, a typewheel concentrically mounted on said carrier, a cam-controlled shaft independently mounted on said carrier and operatively connected to said typewheel, and a key-controlled selecting device for operating said shaft at different points of the rotation.

24. The combination of a platen, a continuously rotated carrier, a typewheel concentrically mounted on said carrier, a cam-controlled shaft independently mounted on said carrier and operatively connected to said typewheel, a key-controlled selecting device including a cam for intermittently operating said shaft at different points of the rotation, and means for simultaneously producing contact between said typewheel and said platen.

Signed by me at Point Loma, city and county of San Diego, State of California, this 1st day of May, nineteen hundred twenty two.

OLUF TYBERG.