March 6, 1956 F. W. SCHREMP 2,737,279

POWER OPERATED KEY ACTION FOR TYPEWRITERS AND LIKE BUSINESS MACHINES

Filed Dec. 13, 1952 2 Sheets-Sheet 1

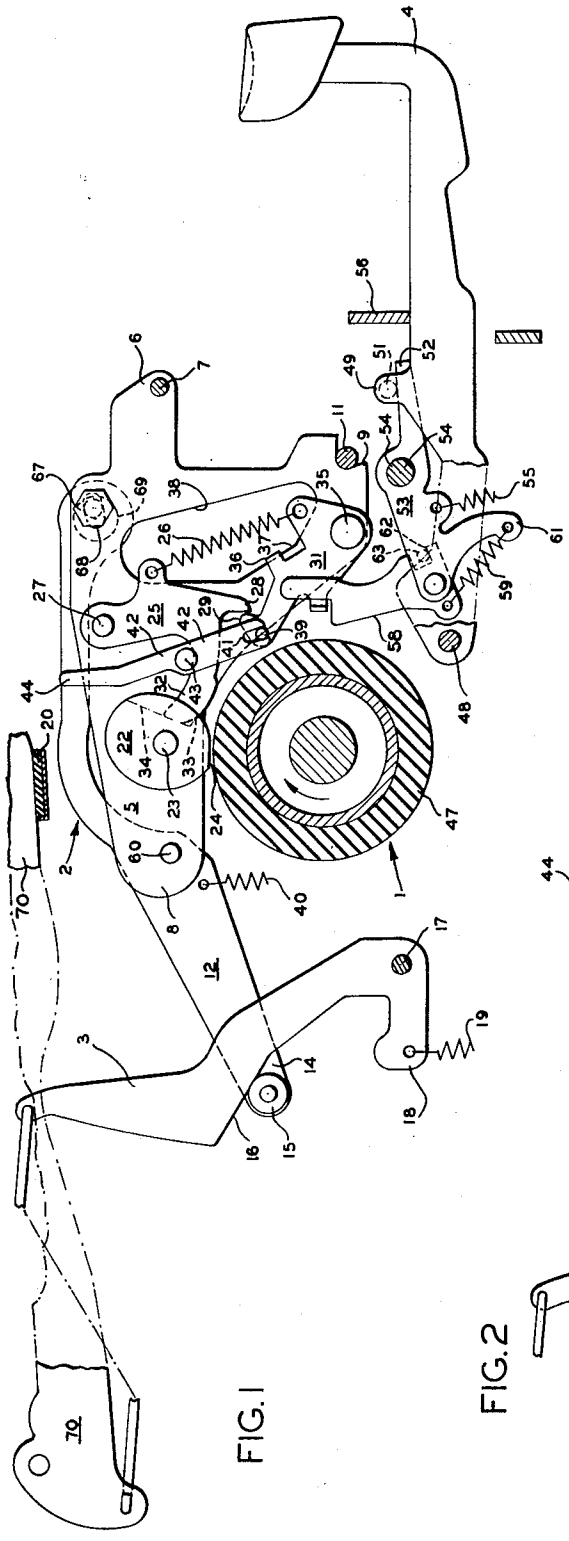

FIG. 1

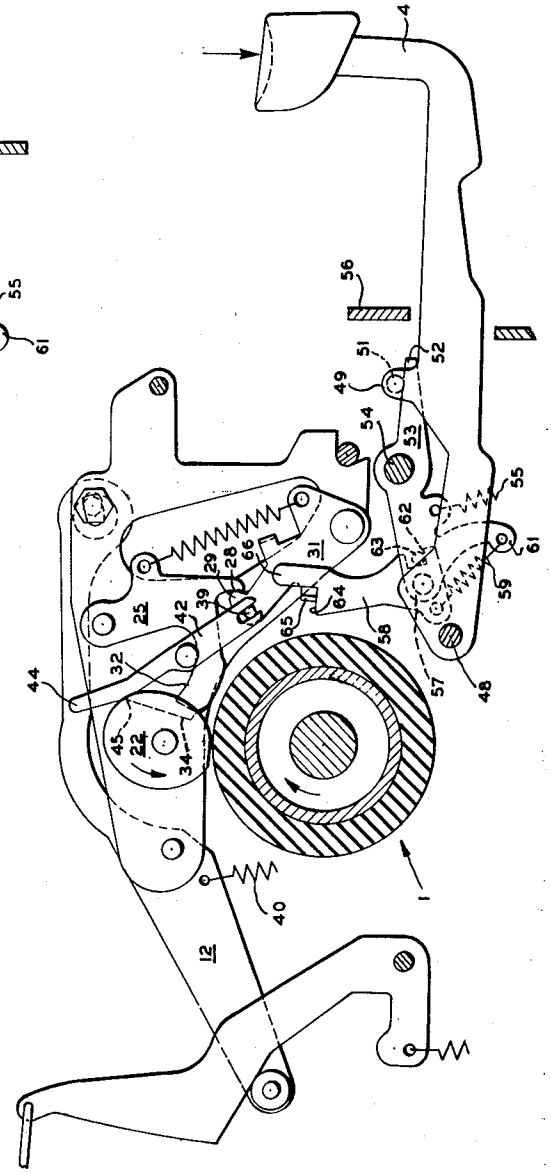

FIG. 2

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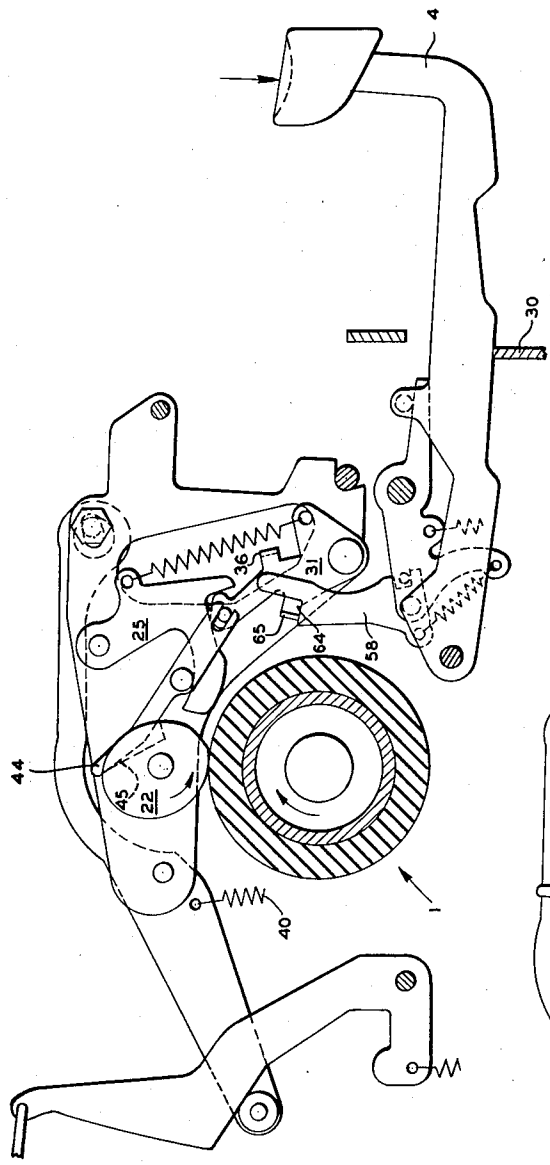

FIG.3

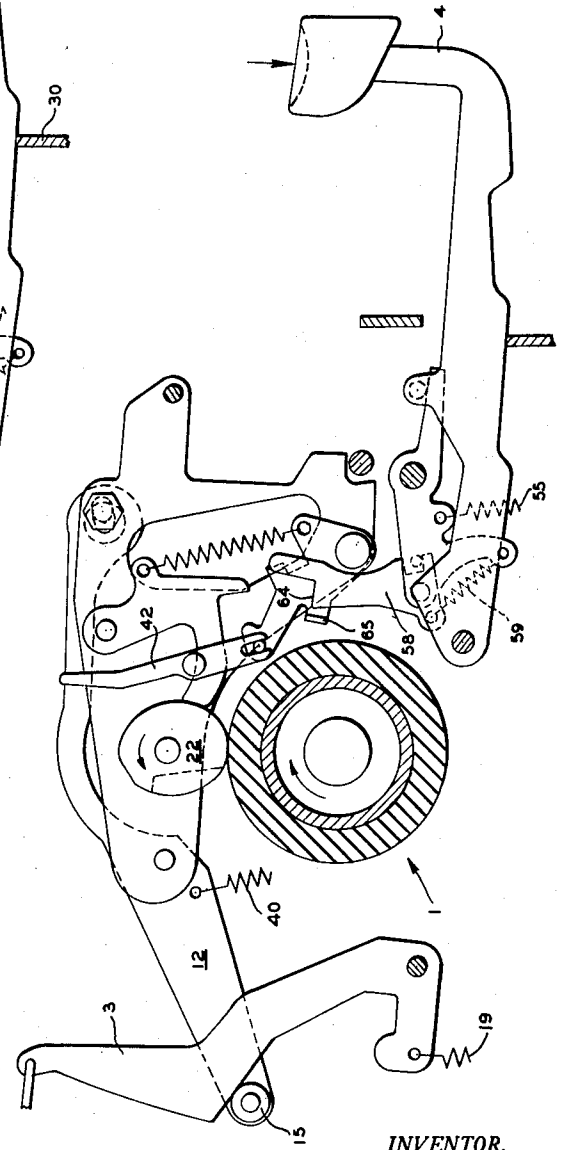

FIG.4

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POWER OPERATED KEY ACTION FOR TYPEWRITERS AND LIKE BUSINESS MACHINES

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13 Claims. (Cl. 197—17)

This invention relates to new and useful improvements in the key actions of power driven business machines such as typewriters and the like, wherein a type bar movement is effected by a power arm mechanism in association with a continuously motor driven power roll. It is particularly concerned with improved power arm mechanism in such machines and has for its general object an improved and highly efficient power arm mechanism.

In machines of the type employing a power arm mechanism in association with a continuously rotating power roll, the mechanism includes means which, when a related key is actuated, causes a power arm to drop and bring an eccentric cam disc into contact with the power roll. The power roll then rotates the cam to effect an oscillation of the power arm and a consequent print operation of a corresponding type bar. The present invention, however, proposes a power arm mechanism which includes means for positively engaging the eccentric cam disc with the power roll upon actuation of the related key without requiring the power arm to first drop to engage the cam with the roll. By this arrangement the delay and drag of the mechanism that would otherwise be required initially to drop the power arm to engage the eccentric cam with the power roll is eliminated and, consequently, this novel arrangement results in higher speed power arm and print operations, less wear and tear on the related mechanisms, as well as highly efficient machine.

For further comprehension of the invention, its objects and advantages, reference is directed to the accompanying drawings and to the more detailed description below.

In the drawings:

Fig. 1 is a side elevation view of a power arm mechanism embodying the invention;

Fig. 2 is a similar view but illustrating the position of the parts when a related type bar key is partially actuated;

Fig. 3 shows the positions of the parts when the related key is fully actuated; and

Fig. 4 shows the eccentric cam disc rotated to a position with its highest cam point engaged with the power roll.

The invention by way of illustration only, inasmuch as it finds application in other types of machines, is shown as embodied in a power driven typewriter of a type such as is disclosed in my earlier U. S. patent application, S. N. 101,450, filed June 25, 1949, now Patent No. 2,638,199, patented May 12, 1953, over which the present invention represents an improvement, and the machine in which the present invention is embodied is, except for the power arm mechanism, otherwise the same.

The machine incorporating the invention includes a power roll 1 arranged transversely of the machine for continuous rotation by a suitable motor drive. The power roll is common to a plurality of power arm mechanisms, generally designated 2, of which it suffices for purposes of this application to describe, and illustrate as in the drawings, but one of the power arm mechanisms. Each power arm mechanism is associated with a separate type bar actuating bell crank 3 and a corresponding type bar key 4.

The power arm mechanism includes a substantially triangular plate 5 having at its upper right corner portion an extension 6 pivoted upon a cross rod 7. An extended left end 8 of plate 5 extends rearwardly over the power roll 1. Counter-clockwise pivoting of plate 5 is limited by a shoulder 9 at the lower right hand corner thereof abutting against a cross rod 11, whereby the lower edge of the plate is held in a position spaced over the power roll. An elongated arm plate 12 fastened across the upper margin of the back face of plate 5 carries a roller 15 at the end of a rearwardly extended finger portion 14. Roller 15 is arranged to abut against a cam surface 16 on the underside of the central portion of a type bar bell crank 3. Bell crank 3 is pivoted at its lower end upon a cross rod 17 and has an anchored spring 19 connected to an ear 18 which normally tensions the bellcrank in a counter-clockwise direction to a substantially upright position limited by the conventional basket rest 20. The opposite or front face of plate 5 carries mechanism actuable by key 4 in conjunction with the continuously rotating power roll whereby the power arm as a unit is oscillated up and down and its end roller 15 is caused to actuate the bellcrank 3 to effect a type bar print action. This mechanism includes an eccentric cam disc 22 pivoted for rotation on a stud 23 carried on the face of plate 5, the axis of the eccentric being directly above and in parallel spaced relation to the axis of the power roll. The low portion or shortest radii of the eccentric terminate in a small flat peripheral surface 24 which projects slightly below the lower edge of plate 5 and is spaced slightly above the peripheral surface of the power roll as in Fig. 1. Eccentric 22 is normally held in this latter position by a latch plate 25 pivoted at its upper end on a stud 27 of plate 5. Latch 25 is tensioned clockwise by a spring 26. In the normal position of the latch the free end of a curved rearwardly extending arm 32 thereof abuts upon a step 33 at the base of an angular recess 34 formed on the inner marginal face of the eccentric to latch the latter against counter-clockwise rotation. Trigger link 31 is pivoted at its lower end on a stud 35 of plate 5. It is tensioned counter-clockwise by spring 26 which is anchored to an upper extension of link 31 and connected at the other end to an ear of latch 25. Link 31 is limited in its counter-clockwise direction by an ear 36 thereon abutting against an edge 37 of an enlarged cutout 38 in plate 5. At its upper nose end link 31 carries on its face a stud 39 about which is carried the forked lower end 41 of a finger 42. The latter pivots centrally upon a stud 43 of plate 5 and is held by the forked end in an upright position inclined slightly counter-clockwise. The finger terminates at its upper free end in a tip 44 the rearward side of which is substantially vertical and is held at a slight distance before the eccentric and overhangs the upper edge of the angular recess 34. The arrangement of the finger with respect to the eccentric is such that, when the finger is pivoted counter-clockwise, the finger tip serves to abut against a shoulder 45 of the recess which shoulder is inclined in the direction of the finger tip and upon doing so rotates the eccentric progressively counter-clockwise to bring a higher cam portion thereof into frictional contact with the power roll 1. The latter is formed of a tubular metal sleeve with a covering of resilient rubber 47 or other material suitable to provide a cylindrical outer surface having good frictional drive characteristics

and, when the higher cam portions of the eccentric are progressively brought into contact with the power roll, the latter continuously rotating clockwise carries the eccentric around in a counter-clockwise direction. Release of latch 25 to enable counter-clockwise rotation of the eccentric and counter-clockwise movement of finger 42 to rotate the eccentric into engagement with the power roll, are effected by clockwise actuation of trigger link 31 upon depression of the key 4 as below.

Key lever 4 is pivoted at its rear end on a cross rod 48 and carries an upward extension 49 having an inwardly extending pin 51 which rests upon a forwardly extending arm 52 of a rocker plate member 53 centrally pivoted on a cross rod 54. A spring 55 anchored at its lower end and connected at its upper end to an ear of the rocker tensions the latter counter-clockwise whereby the arm portion 52 abuts against pin 51 to tension the key lever 4 in a counter-clockwise direction to a normal position limited by an overhanging crossbar 56. Pivoted on a stud 57 carried on the inner face of the rear of rocker 53 is a trigger actuating link plate 58 normally tensioned in a counter-clockwise direction by a spring 59 connected at one end to link 58 and anchored at the other to a depending ear arm 61 of the rocker. Link 58 is limited in its counter-clockwise direction to an upright normal position by a shoulder 62 at its rear limiting against an inwardly extending pin 63 on the rocker arm. The upper end of link 58 includes a step 64 positioned immediately below a projecting ear 65 of the trigger link. An upwardly extending finger 66 of link 58 rests against the flat surface of the trigger link.

It is clear now in the operation of the power arm mechanism, Figs. 1–4, that upon a partial depression of key lever 4 as shown in Fig. 2 pin 51 will move down to pivot the rocker arm 53 clockwise against the tension of spring 55 causing the rear thereof to lift clockwise and to bring the step 64 of link 58 against the trigger ear 65 so as to pivot the trigger link clockwise. In this latter movement a nose 29 of the trigger presses against a tail 28 of the latch and forces the latch 25 counter-clockwise to withdraw its curved end 32 partially out of the angular recess 34, and at the same time the trigger pin 39 pivots the finger 42 counter-clockwise to bring the tip 44 thereof immediately above the end of the recess shoulder 45. Pressing the key lever 4 further down to its limit on the cross bar 30 as in Fig. 3 raises link 58 further upward and in a clockwise direction, which action increases the clockwise movement of the trigger 31 bringing its ear 65 to the edge of step 64. With this further movement of link 58 latch 25 is drawn clear of the eccentric 22 and the finger tip 44 is pivoted farther counter-clockwise to push against the recess shoulder 45 so as to rotate the eccentric and bring a higher peripheral cam surface thereof into frictional contact with the power roll. The latter frictionally engages with the eccentric and continues to rotate the latter.

A spring 40 connected to the power arm at one end and anchored at the other exerts a slight downward tension on the power arm during the clockwise movement of the latter and thereby serves to further insure good frictional contact of the eccentric cam disc with the power roll.

The immediate further rotation of the eccentric progressively brings the cam surface of its greater radii into contact with the power roll. Such action lifts the power arm to carry its roller end upward against the type bar bellcrank 3. Upward movement of the power arm also carries the trigger ear 65 off the step 64, whereupon finger 42 and the trigger link 31 are simultaneously restored to normal position by the contracting of spring 26 as in Fig. 4. With the latter action the end of the latch curved arm 32 is carried rearwardly to ride against the periphery of the eccentric 22. As the latter progressively rotates, the power arm roller 15 is lifted and moves the type bar bellcrank 3 bringing it to a clockwise position to effectively fire a related type bar 70, of which a fragment is shown. Upon the eccentric being rotated past its highest point it progressively rotates back to its normal position allowing the power arm to restore and the type bar bellcrank to be restored by its spring 19. As the eccentric rotates to normal position the latch end 32 is tensioned back into the angular recess to again restrain rotation of the eccentric.

It is to be noted from Fig. 4 that when the finger 42 and trigger link 31 have restored, the key lever 4 is disabled against a repeat action in the event it is continuously held depressed, inasmuch as the position of the link 58 will be forwardly of the trigger ear. Upon manual release of the depressed key, the latter is tensioned by the rocker arm spring 55 back to normal and with this action link 58 is drawn counter-clockwise by spring 59 to bring its step 64 to normal position under the trigger ear 65.

It is also to be noted that the power arm includes an adjusting feature whereby the normal position of the roller 15 at the end of arm 12 may be adjusted, slightly up or down with respect to the type bar bellcrank 3. To enable this, plate 5 is pivoted at its rear 60 to arm 12 and at its forward upper corner includes a lock nut 67 engaged through a slot 68 with an eccentric nut 69 rotatable in an opening of arm 12, whereby upon loosening the lock nut the eccentric 69 may be turned to raise or lower the position of the roller arm, and when so adjusted the lock nut may be tightened to secure the adjusted position.

It is to be understood that the arm 12 and plate 5, if desired, might also be formed as an integral unit.

While I have described and illustrated a specific embodiment of the invention, it is my intent, however, to claim the invention in all such forms thereof as may reasonably be construed to be within the spirit of the invention and within the scope of the appended claims.

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

1. In a mechanical device including a continuously rotating roll, a power arm pivoted for first an up and then a down movement and arranged to engage and operate another mechanical device on its upward movement, an eccentric disc rotatably mounted on the power arm for peripheral engagement with the roll to move said power arm on its pivot to operate the other device, latch means pivoted on said power arm for holding the eccentric disc in a position where a low peripheral cam surface thereof is slightly spaced above the roll, finger means pivoted on said power arm for engaging and partially rotating said eccentric disc from the low cam surface until a higher peripheral cam surface thereof engages the rotating roll, means mounted on said power arm connected to the latch means and to the finger means, and key operated means for engaging and operating said last-mentioned means for simultaneously disengaging said latch means from said eccentric disc and engaging said finger means with said eccentric disc for pushing said disc into engagement with said continuously rotating roll.

2. A device as in claim 1, wherein the eccentric disc includes a shoulder and the finger means is pivotable to move against the shoulder to rotate the eccentric disc.

3. A device as in claim 1, wherein the means mounted on said power arm includes a pivotable trigger lever having a pin engaging one end of the finger means and having a portion pressed against the latch means, and the key operated means pivots the trigger lever clockwise to simultaneously move the latch means clockwise and the finger means counter-clockwise.

4. In a mechanical device including a continuously rotating roll, a power arm pivoted for first an up and next a down movement and arranged to engage and operate another mechanical device on its upward movement, an eccentric disc rotatably mounted on the power arm for peripheral engagement with the roll to move said

power arm on its pivot to operate the other device, latch means for holding the eccentric disc in a position where its low peripheral cam surface is spaced slightly above the roll, a finger lever pivotable to push the eccentric disc progressively around until a higher cam surface thereof engages the rotating roll, means connected to the latch means and to the finger lever operable to simultaneously disable the latch means and to pivot the finger lever to push against the eccentric disc, and spring means operable upon pivoting of the power arm to its first position to restore the finger lever to normal position.

5. A device as in claim 4 wherein key actuated means is provided to pivot the finger lever.

6. A device as in claim 4 wherein the eccentric disc includes a marginal shoulder and the finger lever is pivotable against the shoulder to rotate a high portion of the disc into engagement with the rotating roll.

7. A device as in claim 4 wherein the eccentric disc includes a low flat cam portion positioned over and in spaced relation to the rotating roll and the latch means includes a spring drawn pivoted latch normally holding the eccentric disc against rotation.

8. A device as in claim 4, wherein the power arm is provided with means continuously and slightly tensioning the arm downward during its upward movement.

9. In a power operated typewriter including a power driven roll, a plurality of type bar actuating devices and a plurality of key levers each corresponding to one of the type bar actuating devices, the combination of a plurality of power arms pivoted at one end to a cross bar and each arranged to have the opposite end engage and operate one of the type bar actuating devices in pivotal movement thereof in one direction, a plurality of eccentric discs, one rotatably mounted on each power arm for peripheral engagement with the power roll to move said power arm on its pivot in operating one of said devices, latch means including a plurality of levers each pivotably mounted on one of the power arms and having a portion thereof normally latching the associated eccentric disc against rotation, a finger lever associated with each eccentric disc pivotable to rotate the latter into peripheral engagement with the power roll, and key actuated means associated with each power arm and common to the finger lever and latch means arranged for simultaneously releasing the latch means from the eccentric disc and pivoting the finger lever to rotate the latter.

10. A device as in claim 9 wherein the key actuated means includes a trigger lever common to the latch means and to the finger lever and arranged to pivot the latter and to release the former upon actuation of the key.

11. A device as in claim 10 wherein the trigger lever includes an ear and the key actuating means includes a pivotable trip lever having a shoulder engageable with the ear to pivot the trigger lever upon actuation of the key.

12. A device as in claim 10 wherein the latch means lever includes a curved end and the eccentric includes an angular recess having a base step upon which the curved end of the latch lever is arranged to normally limit and from which it is released upon actuation of the trigger lever, and the angular recess further includes an upwardly extending shoulder against which the finger lever is adapted to push upon being pivoted by the trigger lever.

13. A device as in claim 10 wherein each finger lever includes a center pivot and a forked lower end and the latch lever includes a tail, and the trigger lever is associated with the finger lever by a pin engaged in the forked end and is associated with the latch lever by a common spring connecting one to the other and by a nose adapted to abut against the latch tail upon expansion of the spring.

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