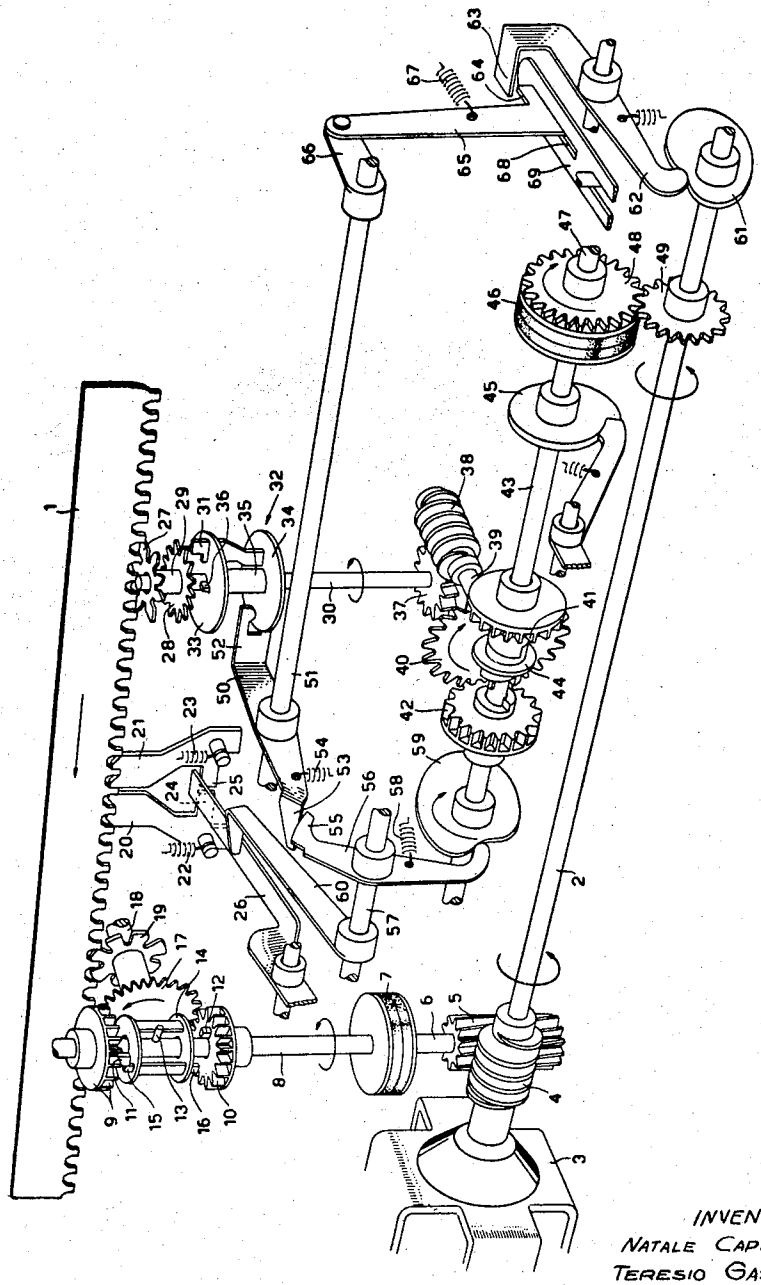
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CARRIAGE FEED MECHANISM FOR COMBINED TYPEWRITING AND COMPUTING MACHINES

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INVENTORS
NATALE CAPELLARO
TERESIO GASSINO
BY Kenyon & Kenyon
ATTORNEYS

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CARRIAGE FEED MECHANISM FOR COMBINED TYPEWRITING AND COMPUTING MACHINES

Natale Capellaro and Teresio Gassino, Ivrea, Italy, assignors to Ing. C. Olivetti & C., S. p. A., Ivrea, Italy, a corporation of Italy

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This invention relates to paper carriage feed mechanisms for combined typewriting and computing machines, wherein the carriage is adapted to be moved through a continuous run from one columnar position to another, as in tabulating strokes or carriage return strokes, and is also adapted to be moved step by step for letter spacing.

The primary object of the invention is to provide a power operated traveling carriage which is moved with great speed in spite of its generally highest inertia.

Another object of the invention is to provide in such a machine a power operated letter spacing mechanism adapted to prevail over a power operated continuous feed mechanism continuously engaging the carriage.

A further object of the invention is to provide in such a machine a letter spacing mechanism positively operable by a main operating shaft substantially during the extent of a full machine cycle.

In accordance with the invention we provide in a combined typewriting and computing machine having a traveling paper carriage and power means, a power operated continuous feed mechanism including driving means constantly engaging said carriage and a yieldable coupling between said power means and said driving means. We further provide in said machine a power operated letter spacing mechanism including an advancing device engageable with said carriage and a substantially positive coupling between said power means and said advancing device, said positive coupling being adapted to prevail over said yieldable coupling to enable the carriage to be letter spaced notwithstanding the constant engagement of said continuous feed mechanism.

Other objects and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof, taken in connection with the accompanying drawing which is a perspective view of the carriage feed mechanism according to the invention embodied in a combined typewriting and computing machine.

Referring to the drawing, the numeral 1 indicates the conventional rack bar secured to the paper carriage of the machine, not shown in the drawing. The numeral 2 indicates a power means such as a shaft 2 of a continuously running electric motor 3. A worm gear 4 secured to the shaft 2 drives a continuous feed mechanism which will now be described.

More specifically, the worm gear 4 meshes with a companion worm wheel 5 secured to a vertical shaft 6. A yieldable coupling such as a friction joint 7 yieldably connects the shaft 6 with a similar shaft 8 carrying a pair of pinions 9 and 10 rotatably mounted on the shaft 8, but prevented from axially sliding thereon. The shaft 8 is provided with a radial pin 13 cooperating with a peripheral slot of a drum 14 axially slidable on the shaft 8. The drum 14 is provided with a pair of projections 15 and 16 alternately engageable with either one of a pair of similar projections 11 and 12 secured to the pinions 9 and 10, respectively. The pinions 9 and 10 are meshing with a gear 17 rotatably mounted on a fixed shaft 18 and

secured to a suitable driving means, such as a pinion 19 constantly meshing with the rack bar 1.

In the drawing the drum 14 is in its uppermost position wherein the projection 15 engages the adjacent projection 11 of the pinion 9. Rotation of the shaft 2 will thus be transmitted by means of the fritcion coupling 7 to shaft 8, drum 14, pinion 9, gear wheel 17 and pinion 19, which forces the rack bar 1 leftwards.

The machine comprises manual means, not shown in the drawing, adapted to move the drum 14 from its uppermost to a lowermost position wherein the projection 16 will engage the projection 12 of the pinion 10, and the rack bar 1 will be forced rightwards.

However, the rack bar 1 is normally locked in a columnar position of the carriage against the continuous action of the pinion 19 by a normally effective locking member comprising a pair of pawls 20 and 21 urged upwards by a pair of springs 22 and 23, respectively. The pawls 20 and 21 are provided with opposed teeth in order to positively lock the movement of the rack bar 1 in both directions. The pawls 20 and 21 are further provided with projections 24 and 25, respectively, which are simultaneously engageable by the rear end of a lever 26.

The machine is provided with manipulative means, not shown in the drawing, operable to initiate a continuous run of the carriage from one columnar position to another, such as a tabluating stroke or a carriage return stroke. When said manipulative means are operated the lever 26 will be rocked clockwise and latched in the rocked position. The lever 26 thus disengages the pawls 20 and 21 from the rack bar 1 releasing the carriage which will now be continuously moved by the shaft 2 in the direction according to the position of the drum 14. The run of the carirage will be stopped in a predetermined columnar position by conventional stop means adapted to release the lever 26 to reengage the pawls 20 and 21 with the rack bar 1.

The alphabetical typewriting device of the machine may be of the type described in the copending application Serial No. 480,941, filed January 10, 1955, and is actuated by a main shaft 43 rotatable through a single cycle for each character to be written. More specifically, upon depression of a key of the keyboard of the typewriting device a conventional one-revolution clutch 45 is released to condition the main shaft 43 to be cyclically rotated by the shaft 2 through a gear wheel 49, a gear wheel 48 secured to a shaft 47 and a friction joint 46. The action of this joint is very strong, whereby the shaft 43 may be considered as being substantially positively driven by the power shaft 2.

The main shaft 43 operates a letter spacing mechanism for the carriage which will now be described.

The rack bar 1 is engageable by an advancing device comprising an advancing member such as a pinion 27 meshing therewith and adapted to be driven by a normally ineffective clutch formed of a tooth 31 engageable with a toothed wheel 28 secured by means of a hub 29 to the pinion 27. The toothed wheel 28 is rotatably mounted on a vertical shaft 30, while the tooth 31 projects from a drum 32 formed of a pair of disks 33, 34 secured to a hub 35. The drum 32 is axially slidable on the shaft 30 and is rotated thereby by means of a projection 36 secured to the shaft. Also secured to the shaft 30 is a worm wheel 37 meshing with a worm gear 38 secured to a gear wheel 40 by means of a short shaft 39. The gear wheel 40 is constantly meshing with a pair of pinions 41, 42 rotatably mounted on the main shaft 43 but prevented from axially sliding thereon. Slidably mounted on the shaft 43 but not rotatable thereon is a hub 44 adapted to engage for rotation either one of the pinions 41 and 42.

A lever 50 secured to a shaft 51 is provided with a

forked ear 52 engaging the disk 34 of the drum 32. Another bent ear 53 of the lever 50 is urged by a spring 54 to abut against a heel 55 of a lever 56. This lever is secured to a shaft 57 and is urged by a spring 58 to cooperate with a cam 59 secured to the main shaft 43. An arm 60 is also secured to the shaft 57 and is adapted to engage the lever 26.

Upon releasing the clutch 45 the main shaft 43 starts rotating, whereby first the cam 59 rocks the lever 56 clockwise and the heel 55 releases the ear 53. The lever 50 is thus rocked counterclockwise by the spring 54 whereby on one side the ear 53 latches the lever 56 in the rocked position and on the other side the forked end 52 moves the drum 32 upwards thus engaging the tooth 31 with the wheel 28. Therefore, the pinion 27 is now coupled to the worm wheel 37, the lever 56 so operated by the main shaft 43 having rendered the clutch 28, 31 effective to enable the advancing pinion 27 to be driven by the main shaft 43. At the same time the arm 60 rocking bodily with the lever 56 engages the lever 26 and pulls down the pawls 20 and 21, thus releasing the rack bar 1. It will thus be apparent that the lever 56 and the arm 60 are operable for alternately engaging the locking member and the advancing device with the rack bar 1.

Normally, as when the main shaft 43 is operated for a typewriting cycle or a spacing cycle the hub 44 engages the pinion 41, which by means of the wheel 40, worm gears 38 and 37 and pinion 27 will advance the carriage leftwards. The worm gears 37 and 38 are adapted to so reduce the motion of the shaft 43 that a complete revolution of the latter will advance the rack bar 1 through a single letter feed step, whereby during the typewriting cycles the carriage is advanced step by step. Furthermore, it will be apparent that the letter spacing mechanism is operable by the shaft 43 during the extent of a full machine cycle.

The shaft 43 is also cycled upon depression of the conventional back space key, not shown in the drawing. However, this key is adapted to move the hub 44 leftwards. The hub 44 will now engage the pinion 42, whereby the rack bar 1 will be moved step by step rightwards.

During the step by step movement of the carriage the shaft 2 rotates the main shaft 43 as well as the vertical shaft 6, whereby the rack bar 1 is urged both by the pinions 19 and 27. However, it is to be noted that the friction joint 46 is so strong as to prevail over the friction joint 7 which will slip, whereby the continuous feed mechanism driven by the friction joint 7 will not prevent the carriage from being moved step by step irrespective of the engagement of the pinion 19 with the rack bar 1.

Upon completion of the cycle of the shaft 43 the lever 56 remains latched by the ear 53 in its rocked position. Consequently, the pawls 20 and 21 remain disengaged from the rack bar 1 and the tooth 31 continues engaging the pinion 28. Now the tooth 31 instead of the pawls 20 and 21 locks the carriage.

In order to reset the various parts in their normal position shown in the drawing, a cam 61 is secured to the shaft 2 and is adapted to cooperate with a lever 62.

This lever is provided with a bent ear 63 adapted to engage a projection 64 of a lever 65 linked to an arm 66 secured to the shaft 51. A spring 67 urges the projection 64 to abut the rear edge of a slot 68 formed in a slide 69 adapted to be moved horizontally. Normally the slide 69 holds the projection 64 out of the vertical path of the ear 63 and the lever 62 is oscillated idly by the cam 61.

Upon operation of the manipulative means initiating a continuous run of the carriage, the lever 26 will be rocked clockwise and latched in its rocked position irrespective of the arm 60 by the means described in the cited application Serial No. 480,941 with reference to the lever 70 of Fig. 1. Furthermore, said manipulative means when so operated are adapted by known means to move the slide 69 rearwards. The slide 69 enables now the projection 64 to be placed by the spring 67 into the vertical path of the ear 63.

Upon the first ensuing rotation of the motor shaft 2 the cam 61 rocks the lever 62 whose ear 63 now engages the projection 64 and pulls the lever 65, whereby arm 66, shaft 51 and lever 50 are rocked clockwise. The bent ear 53 of the lever 50 thus releases the lever 56 which is returned to rest by the spring 58, thus relatching the lever 50 by means of the heel 55. The lever 50 in turn moves downwards the drum 32, disengaging the tooth 31 from the wheel 28. The carriage is now free from any engagement both by the letter spacing mechanism and by the locking member and the pinion 19 may resume the continuous feed described above.

While the form of the mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended that the invention shall be confined to the particular embodiment disclosed herein but rather that it shall extend to all structures employing the principles taught herein.

What we claim is:

1. In a machine of the class described having a traveling paper carriage adapted to move through a continuous run from one columnar position to another and also movable step by step to be letter-spaced, and power means, the combination of a power operated continuous feed mechanism including driving means constantly engaging said carriage and a yieldable coupling between said power means and said driving means, and a power operated letter spacing mechanism including an advancing device engageable with said carriage and a substantially positive coupling between said power means and said advancing device, said positive coupling being adapted to prevail over said yieldable coupling to enable the carriage to be letter spaced notwithstanding the constant engagement of said continuous feed mechanism.

2. In a machine of the class described having a traveling paper carriage adapted to move through a continuous run from one columnar position to another and also movable step by step to be letter-spaced, the combination of a rack bar on said carriage, a normally effective locking member engageable with said rack bar for locking said carriage in one of said columnar positions, power means, a yieldable coupling continuously operated by said power means, driving means driven by said coupling and engaging said rack bar to move said carriage through said continuous run when said locking member is ineffective, an advancing device substantially positively operated by said power means and engageable with said rack bar to move said carriage step by step irrespective of the engagement of said driving means, and means for alternately engaging said locking member and said advancing device with said rack bar.

3. In a machine of the class described having a traveling paper carriage adapted to move through a continuous run from one columnar position to another and also movable step by step to be letter-spaced, the combination of a rack bar on said carriage, a locking member normally engaging said rack bar for locking said carriage in one of said columnar positions, power means, a yieldable coupling continuously operated by said power means, driving means driven by said coupling and engaging said rack bar to move said carriage through said continuous run when said locking member is disengaged from said rack bar, said power means including a main shaft cyclically driven in alphabetic typewriting, a normally ineffective clutch operable by said main shaft, an advancing member driven by said clutch and engaging said rack bar to move said carriage step by step irrespective of the engagement of said driving means, and means operable by said main shaft to render said clutch effective and to disengage said locking member from said rack bar.

4. A machine as claimed in claim 3, characterized in that said advancing member is formed of a pinion adapted to advance said rack bar one step during one cycle of said main shaft.

5. In a machine of the class described having a traveling paper carriage adapted to move through a continuous run from one columnar position to another and also movable step by step to be letter-spaced, the combination of a rack bar on said carriage, a locking member normally engaging said rack for locking said carriage in one of said columnar positions, power means, a yieldable coupling continuously operated by said power means, driving means driven by said coupling and engaging said rack bar to move said carriage through said continuous run when said locking member is disengaged from said rack bar, said power means including a main shaft cyclically driven in alphabetic typewriting, a clutch operable by said main shaft, said clutch being normally latched in an effective position, an advancing member driven by said clutch and engaging said rack bar to move said carriage step by step irrespective of the engagement of said driving means, and means movable by said main shaft to an operating position for disengaging said locking member from said rack bar and for releasing said clutch, said clutch when so released being adapted to latch said movable means in said operating position after said cycle.

6. In a machine as claimed in claim 5, a manually controlled element operable by said power means to release said movable means upon initiating a continuous run after a letter spacing movement of said carriage.

No references cited.