Sept. 1, 1942. W. F. HELMOND 2,294,662

TYPEWRITING MACHINE

Filed June 26, 1940 2 Sheets-Sheet 1

Fig. 1

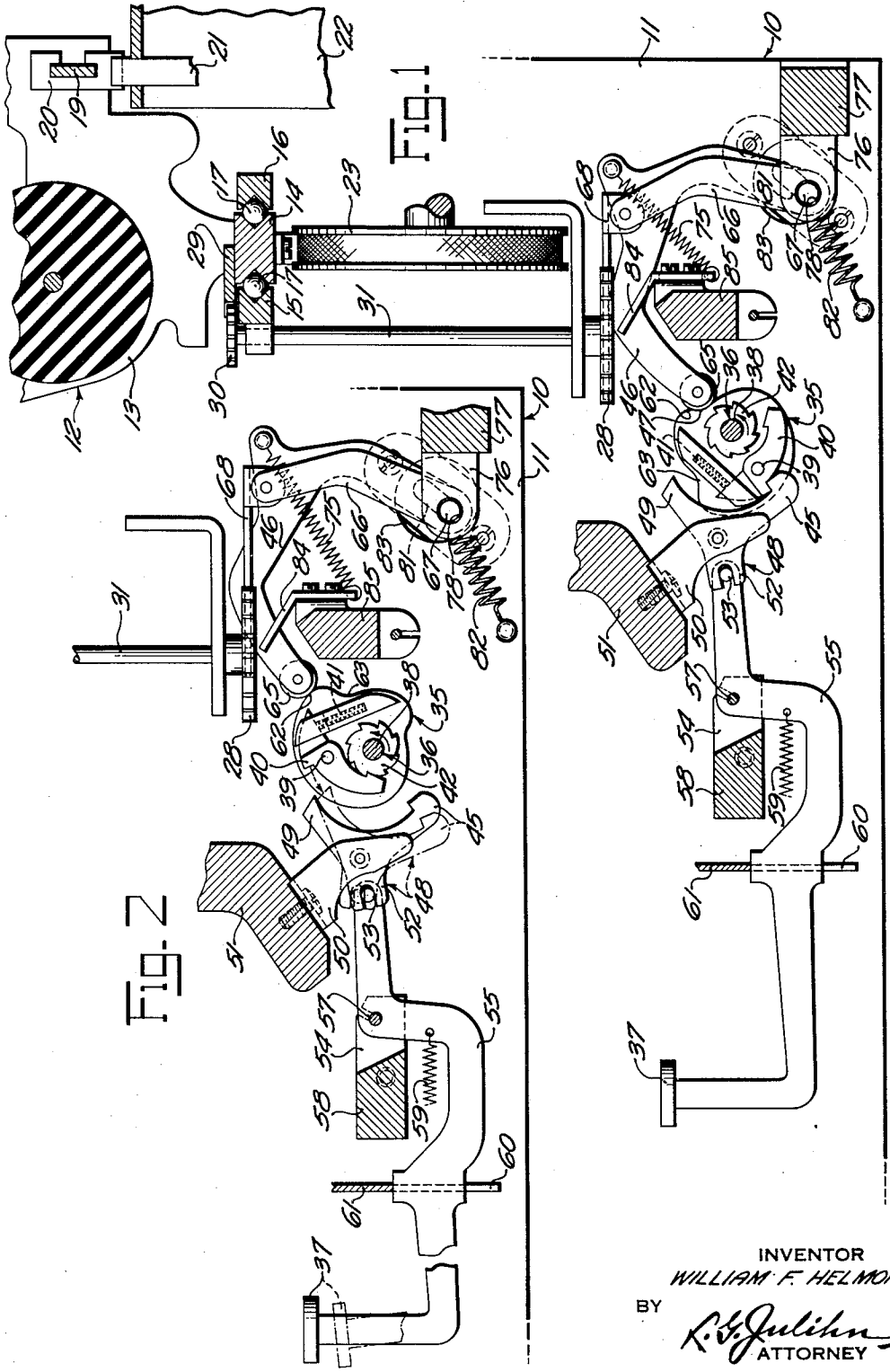


Fig. 2

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Fig. 3

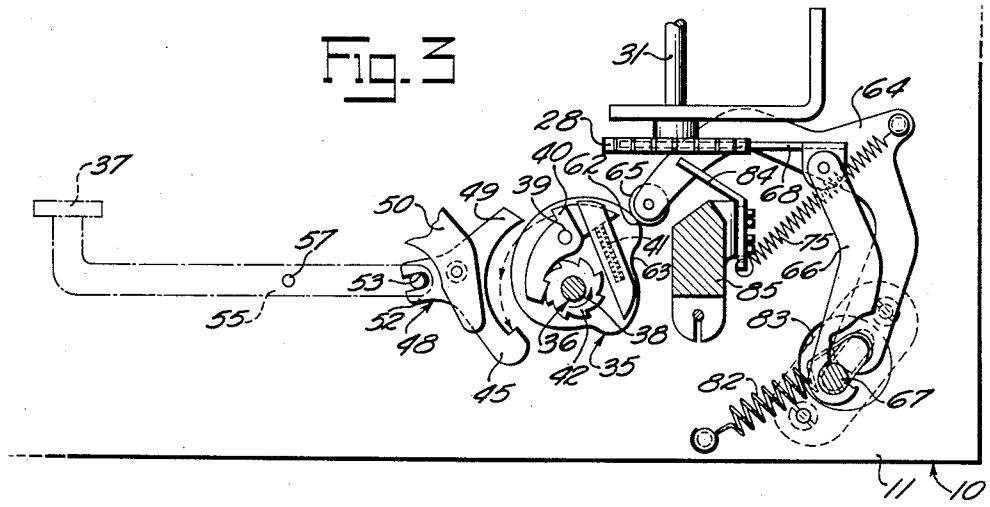
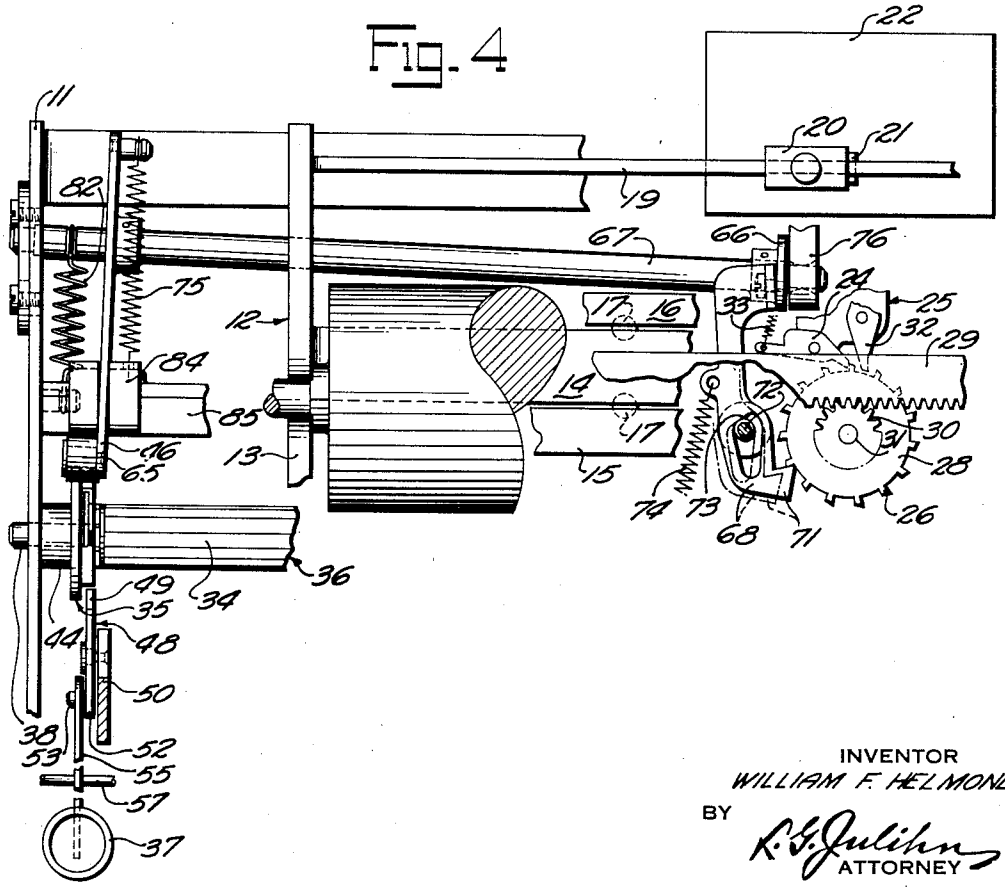


Fig. 4



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TYPEWRITING MACHINE

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Application June 26, 1940, Serial No. 342,473

8 Claims. (Cl. 197—91)

This invention relates to typewriting machines, and, with respect to certain more specific features thereof, to power-driven back-spacing devices.

The invention has for one of its objects to provide a power-driven back-spacing mechanism which is simple in construction, reliable in operation and inexpensive to manufacture.

It is another object of the invention to provide in combination with a power-operable back-spacing mechanism, a reliably operating and simple controlling device assuring for every actuation of the latter a single back-spacing operation.

A further object of the invention is to provide a revoluble cam capable of being driven a partial revolution in response to each down and each up stroke of a spacing key, and capable of imparting to a follower a single back-spacing stroke for every down and up stroke of said key.

It is also an object of the invention to provide an actuating cam which in cooperation with a follower, constituting part of a back-spacing train, checks backward rotation of the cam after partial revolutions.

A further object of the invention is to provide a power-operable back-spacing train which includes a member that is spring urged to normally pivot about a certain pivot axis, but the axis of which may shift to prevent damage to the machine in case the typewriter carriage is blocked against back-spacing movements.

Other features and objects of the invention will be pointed out while others will be readily apparent as the following description of a preferred embodiment of the invention proceeds.

The invention, accordingly, consists in the various features of construction, combination of elements, and arrangement of parts which will be exemplified by the following description read in connection with the accompanying drawings, and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Figure 1 is a view in right side elevation of a typewriter embodying applicant's power-operable mechanism for back-spacing the carriage, all parts being shown in their normal positions.

Figure 2 is a view in right side elevation of the back-spacing mechanism being effectively power-operated in consequence of an operation and release of the back-space key.

Figure 3 is a side elevation showing the driving cam for the back-spacing mechanism being power-operated, a certain portion of the back-spacing train being displaced in an abnormal manner in consequence of the carriage being blocked in its movement.

Figure 4 is a plan view illustrating the various parts of the back-spacing mechanism in substantially the position seen in Figure 3 and further showing the back-spacing pawl blocked against operation by a tooth of an escapement wheel.

Referring now more in detail to the drawings, a typewriter frame is indicated generally at 10, and includes opposite side walls 11. A carriage 12 includes opposite end plates 13 which are connected by a longitudinally grooved carriage bar 14. Upon the frame 10 are mounted two grooved trackways 15, 16 between which the carriage bar 14 is confined to travel in letter-feeding and return direction by the employment of antifriction elements 17. The carriage has extending longitudinally thereof, in the rear, a bar 19 supporting a carriage return margin stop 20, which may be adjusted to different positions along the bar. A counterstop 21, carried by a frame member 22 in the rear of the machine, cooperates with the margin stop 20 to limit the return movement of the carriage. The carriage is urged to move in letter-feed direction from left to right in a conventional manner by a carriage feeding spring 23. A holding dog 24, pivotally mounted on an escapement rocker 25, normally holds the carriage against movement in letter-feeding direction by engaging the teeth 26 of a carriage-driven escapement wheel 28. The drive from the carriage 12 to the escapement wheel 28 includes a rack 29 carried by the carriage and in mesh with a pinion 30 that is mounted upon the upper end of a vertical shaft 31, upon the lower end of which the escapement wheel 28 is mounted. The escapement rocker 25 also includes a stepping dog 32 and is operable in the usual manner by type keys, not shown, to allow the carriage spring 23 to letter-feed the carriage. The holding dog 24 is constantly yieldably urged to engage with the escapement wheel 28 by a spring 33 so that it readily permits carriage motion in return direction, and is also operative to hold the carriage in whatever letter-feed position it has assumed.

A normally quiescent cam actuator 35 is rotatably carried upon a continuously driven power-shaft 36 and is adapted to rotate therewith a full revolution for every down and upstroke of a back-space key 37. The power shaft 36 extends transversely of the machine and is pivoted in the opposite side walls 11. An electric motor, not shown, continuously drives the shaft in the direc-

tion indicated by the arrow in each of the Figures 1, 2 and 3. A major portion 34 of the shaft 36 (see Figure 4) is fluted and type-action actuators, not shown, are engageable with this fluted portion to drive type-bars. The cam 35 has a hub 44 and is rotatable upon a reduced portion 38 of the shaft 36, at a location just rightward of the left side wall 11 of the machine and carries upon a pivot pin 39 a clutch element or pawl 40, urged by a spring 41 to engage a toothed clutch-element 42 on and secured to the reduced shaft portion 38 at the right of the cam 35. Referring to Figure 1, it is seen that a dog 45 is normally in engagement with the clutch pawl 40 and maintains the latter out of engagement with the toothed clutch element 42 on the shaft. A follower 46, by resiliently bearing on a declining portion 47 of the cam 35, counteracts the tendency of the pawl-spring 41 to rotate the cam in reverse direction and thereby engage the pawl 40 with the clutch element 42. With the dog 45 in control of said clutch pawl 40, the follower 46 bears upon the lowest point of the cam. The dog 45 is a part of a rockable member 48, which also includes a dog 49 normally clear of the orbit of the clutch pawl 40. The member 48 is pivoted upon a bracket 50 that is secured to and extends downwardly from a cross frame piece 51 of the machine frame, and has a forwardly extending arm 52 articulated by a pin-and-slot connection 53 to the rear end of the lever 55 bearing at its front a back-space key 37. The lever 55 is pivoted intermediate its ends upon a pivoted rod 57 that is embedded in a cross bar 58 of the machine. The cross bar has a slot 54 wherein the key lever 55 is guided for movement in a vertical plane. A spring 59 constantly urges the lever 55 to the normal position against the upper end of a vertical guide slot 60 in a plate 61. See Figures 1 and 2. Upon operation of the key 37, the control member 48 will occupy the position indicated by dot-and-dash lines in Figure 2, and the dog 45 is then clear of the clutch pawl 40 while the dog 49 is directly in the latter's orbit. Consequently the clutch pawl 40, being urged by the spring 41, moves into engagement with the companion clutch element 42 and the power-shaft 36 rotates the cam until the clutch pawl 40 is severed from the clutch element 42 by being intercepted by the dog 49, the cam having rotated substantially three-fourths of a revolution. During this partial revolution, the follower 46 is operated by a cam-incline 62 to actuate a back-spacing train later to be described. At the time the pawl is being intercepted, the follower 46 moves down along a decline 63 and thereby checks reverse rotation of the cam and also maintains the pawl 40 in declutched position against the dog 49 in opposition to the pawl spring 41. At the release of the back-space key 37, the dog 49 is withdrawn and the other dog 45 projected resulting in a reengagement of the clutch elements 40, 42 and further drive of the cam 35. As the cam completes the revolution, the dog 45 intercepts the pawl 40 and thereby disengages the latter again from the clutch elements 42. The alternative substitution of the dogs 45 and 49 into the orbit of the pawl 44 assures a single revolution of the cam for each actuation of the back-space key 37 and consequently also a single back-spacing operation. If the key 37 is given a staccato depression, the dog 49 vibrates into and out of the orbit of the pawl 40 before the latter approaches it, however, the dog 45 consequently vibrates into position early enough to intercept the pawl 40 at the completion of the revolution of the cam. The cam under these conditions is driven uninterruptedly a whole revolution.

According to the embodiment of the invention shown, the follower 46 is in the form of a pivotally displaceable arm having a roller 65 engaging the cam, and forms part of a pivotally displaceable bail structure that includes another arm 66 which is laterally spaced from the arm 46 and rigidly connected thereto by a shaft 67. The arm 66 is located at the central region of the machine in the proximity of the escapement wheel 28 and has articulated thereto a back-spacing pawl 68. The bail is normally constrained to move about the axis of the shaft 67 to thereby transmit back-spacing motion from the cam 35 to the pawl 68 and a spring 75 keeps the follower in contact with the cam. The back-spacing pawl has a tooth 71 normally held clear of the escapement wheel 28 by a pin 72 engaging a short cam face 73 formed by a slot in the pawl. See the normal position of the pawl outlined in dot-and-dish lines in Figure 4. The pin 72 has a large head cooperating with the portion of the frame, not shown, whereon the pin 72 is supported to guide the pawl tooth 71 in the plane of the escapement wheel. A spring 74 connected to the back-space pawl urges the tooth thereon rightwardly into engagement with the escapement wheel teeth 26. At the beginning of the revolution of the cam 35 to back space the carriage, the cam-face 73 on the back-space pawl permits the tooth 71 thereon to move into engagement with one of the escapement-wheel-teeth 26 and upon further rotation the escapement wheel 28 is rotated and back spaces the carriage, through the drive 31, 30 and 29, a single letter space. The holding dog 24 during this operation ratchets over one of the teeth 26 to hold the carriage in the back-spaced position. The right end of the shaft 67 pivots loosely in an ear 76 extending forwardly from a cross bar 77 of the machine framework. The left end of the shaft pivots normally upon a seat 78, formed by the lower end of an upwardly and rearwardly inclined slot 81, provided in a case-hardened plate attached by screws to the outside of the side wall 11. The side wall 11 has a clearance hole 83 for passage of the shaft 67 into the slot 81. A heavy spring 82, attached at one end to the left side-wall of the machine and at the other end in a circumferential groove of the shaft, resiliently constrains the shaft 67 to pivot at its left end upon said seat 78. With the carriage unobstructed against back spacing, the bail is operable by the cam 35 to pivot about the axis of the shaft 67, the tension of the spring 82 being sufficient to prevent displacement of the left shaft end upwardly in the slot 81. However, if the carriage is obstructed in its movement, as, for example, when the margin stop 20 is against the counterstop 21, the tension of said spring 82 is insufficient to enforce pivotal movement of the shaft 67 about the seat 78 after the tooth 71 of the back-space pawl engages the escapement wheel 28. The bail being a rigid structure and the arm 66 being blocked against rotation, the bail is then displaced by the cam 35, in an idle manner, so that the left end of the bail shaft 67 glides upwardly and rearwardly in the slot 81 about the location of the right-hand shaft pivot in the ear 76, as is clearly illustrated in Figures 3 and 4. The springs 82 and 75 restore the bail to normal position as the cam rotates to the position seen in Figure 1. A slotted plate 84 secured to the part 85 of the frame guides the

follower arm 46 so that the roller 65 thereon always remains in operative alignment with the cam.

What I claim is:

1. In a power-actuable back-spacing mechanism for a typewriter carriage, continuously operating power means, a rotatable cam, clutch elements companion to each other on said cam and on said power means, means influencing said companion clutch elements to engage, an operable member comprising two dogs each of which is adapted, when active, to cause the disengagement of said companion clutch elements and the arrest of the said cam as the latter rotates to a different position, said dogs being alternatively rendered active by the operation and restoration of said member, a follower resiliently bearing on said cam, said cam having a rise for displacing said follower, and means to effect back-spacing operations of said carriage by the displacement of said follower, said cam being declining where engaged by the follower in the said different positions to prevent reverse rotation of the cam.

2. In a power-operable back-spacing device for a typewriter carriage, a power-operable cam, means operative to transmit back-spacing motion from said cam to the said carriage including a cam-follower normally pivotally displaceable about a certain axis, and means having provision to resiliently constrain said follower to pivot about the said axis to thereby enable said follower to transmit back-spacing motion to said carriage, the resiliency of said means allowing said follower to be displaced relative to its axis of rotation whereby said follower may move in an idle manner whenever the carriage is obstructed against movement.

3. In a power-operable back-spacing device for a typewriter carriage, a power actuator, means adapted to transmit back-spacing motion from said actuator to said carriage, including a rigidly constructed bail, a device having provision to resiliently constrain said bail to rotate about a certain axis to thereby enable said bail to transmit back-spacing motion to said carriage, the resiliency of said device allowing the bail to be displaced relative to its axis of rotation whereby said bail may move in an idle manner whenever the carriage is obstructed against movement.

4. In a power-operable back-spacing device for a typewriter carriage, an actuator, means to transmit a back-spacing motion from said actuator to said carriage including a pivotally displaceable member, an open pivot seat for said member and spring means urging said member to pivot normally upon said seat, said seat and said spring being arranged to permit idle displacement of said member from said seat if the carriage is blocked against movement.

5. In a power-operable back-spacing device for a typewriter carriage, a power-operable cam, means adapted to transmit back-spacing motion from said cam to said carriage including a bail and a back-spacing pawl, said bail comprising a follower arm bearing on said cam, an arm connected to said pawl and a rigid shaft connection between said arms; a stationary pivot at one end of said shaft, and means having provision to resiliently constrain the other end of the shaft to move pivotally, the constraint effected by said last means being such as to enforce effective operation of the bail if the movement of the carriage is unobstructed, but providing for idle displacement of the bail if the movement of the carriage is obstructed.

6. In a power-actuable back-spacing mechanism for a typewriter carriage, continuously operating power means, a rotatable cam, clutch elements companion to each other on said cam and on said power means, means influencing said companion clutch elements to engage, an operable member comprising two dogs each of which is adapted, when active, to cause the disengagement of said companion clutch elements and the arrest of the said cam as the latter rotates to a different position, said dogs being alternatively rendered active by the operation and restoration of said member, a follower bearing on said cam, and means having provision to resiliently constrain said follower to rotate about a certain axis to thereby enable said follower to transmit back spacing motion to said carriage, the resiliency of said means allowing said follower to be displaced relative to its axis of rotation whereby said follower may move in an idle manner whenever the carriage is obstructed against movement, said cam having a rise for displacing said follower and thereby back-spacing said carriage and being declining where engaged by the follower in the said different positions to prevent thereby reverse rotation of the cam.

7. In a power-actuatable back-spacing device for a typewriter carriage, an actuator, means to transmit a back-spacing motion from said actuator to said carriage including a member normally displaceable in a pivotal manner about a certain axis, and pivot means for said member normally constraining the latter to move about the said axis but having a yielding provision to allow it to move independently of said axis, in an idle manner, whenever said actuator is actuated while the carriage is blocked against movement.

8. In a power-operable back-spacing device for a typewriter carriage, a power actuator, means operable by said actuator to back-space said carriage, including a member normally movable through a prescribed path to transmit back-spacing motion, said member being also idly movable through another path, and means including a resilient device, adapted to constrain said member to move through said prescribed path only if the carriage is free to back-space, the resiliency of said means allowing said member to move idly through said other path whenever the carriage is obstructed against back-spacing movement.

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