

Aug. 9, 1955

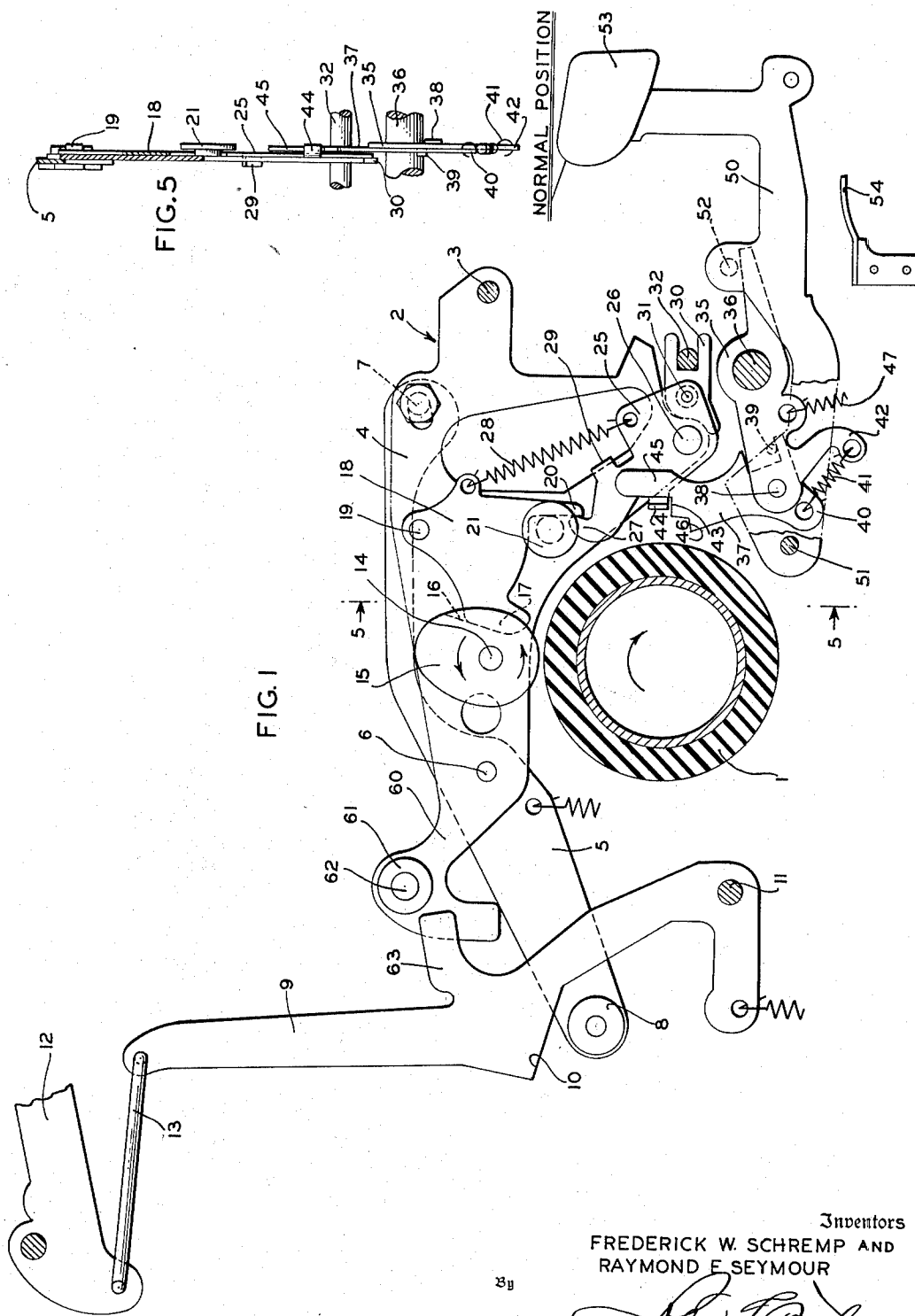
F. W. SCHREMP ET AL

2,714,948

REPEAT KEY ACTION FOR POWER OPERATED TYPEWRITERS

Filed July 25, 1951

4 Sheets-Sheet 1



Inventors
FREDERICK W. SCHREMP AND
RAYMOND E. SEYMOUR

Spencer T. Smith
Attorney

Aug. 9, 1955

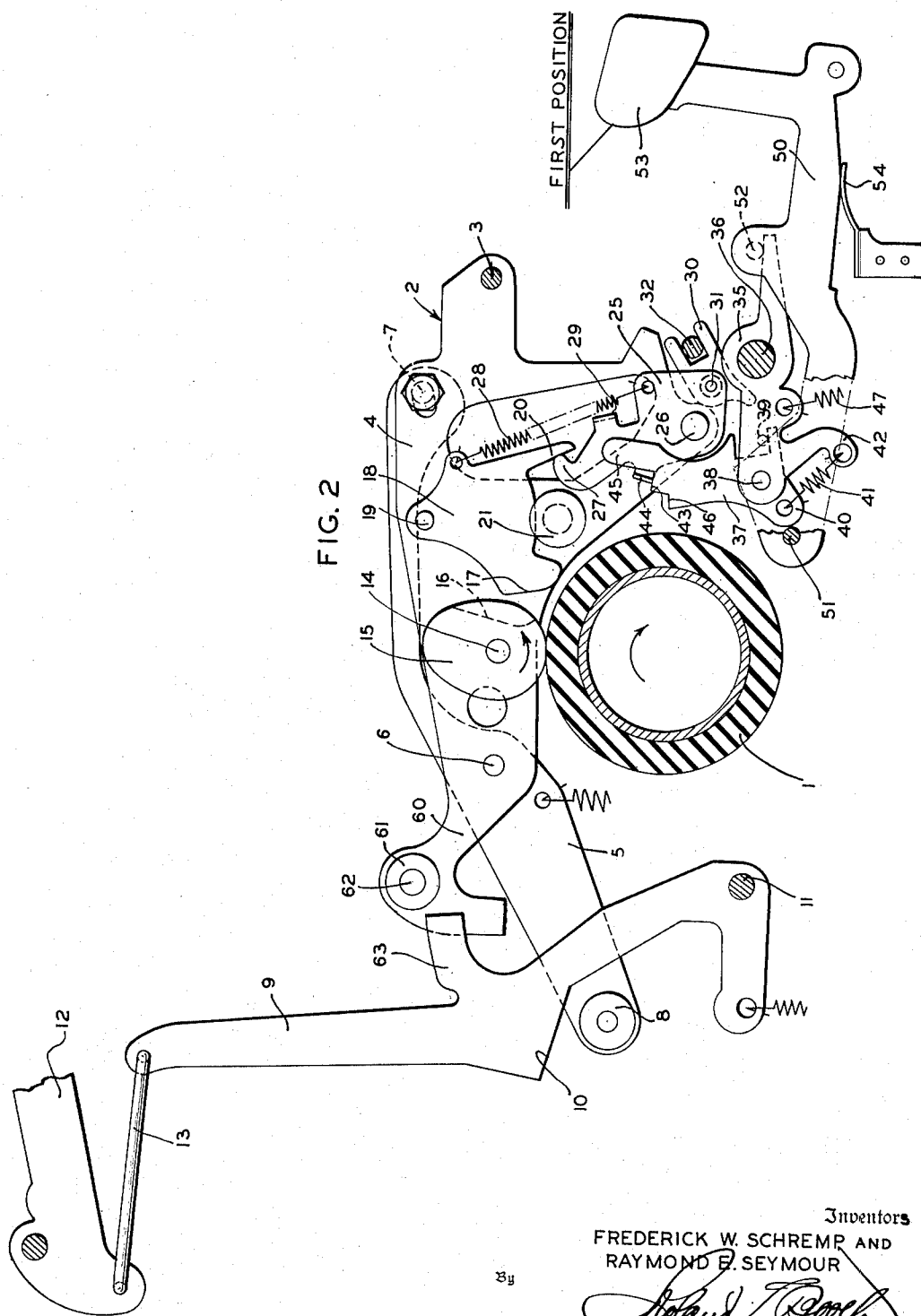
F. W. SCHREMP ET AL

2,714,948

REPEAT KEY ACTION FOR POWER OPERATED TYPEWRITERS

Filed July 25, 1951

4 Sheets-Sheet 2



Inventors
FREDERICK W. SCHREMP AND
RAYMOND E. SEYMOUR

Paul R. Smith
Attorney

Aug. 9, 1955

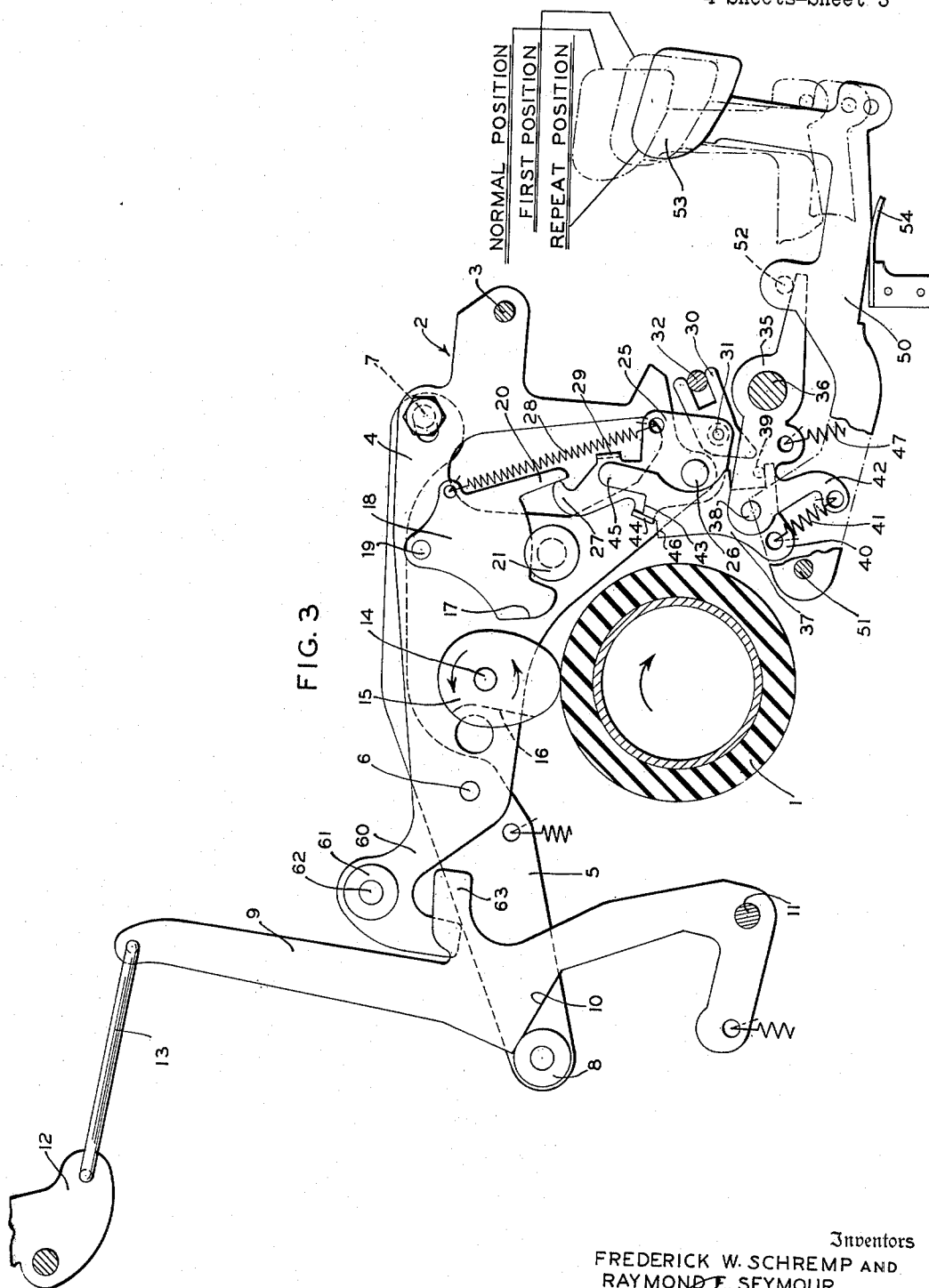
F. W. SCHREMP ET AL

2,714,948

REPEAT KEY ACTION FOR POWER OPERATED TYPEWRITERS

Filed July 25, 1951

4 Sheets-Sheet 3



Inventors
FREDERICK W. SCHREMP AND
RAYMOND E. SEYMOUR

Robert T. Smith
Attorney

Aug. 9, 1955

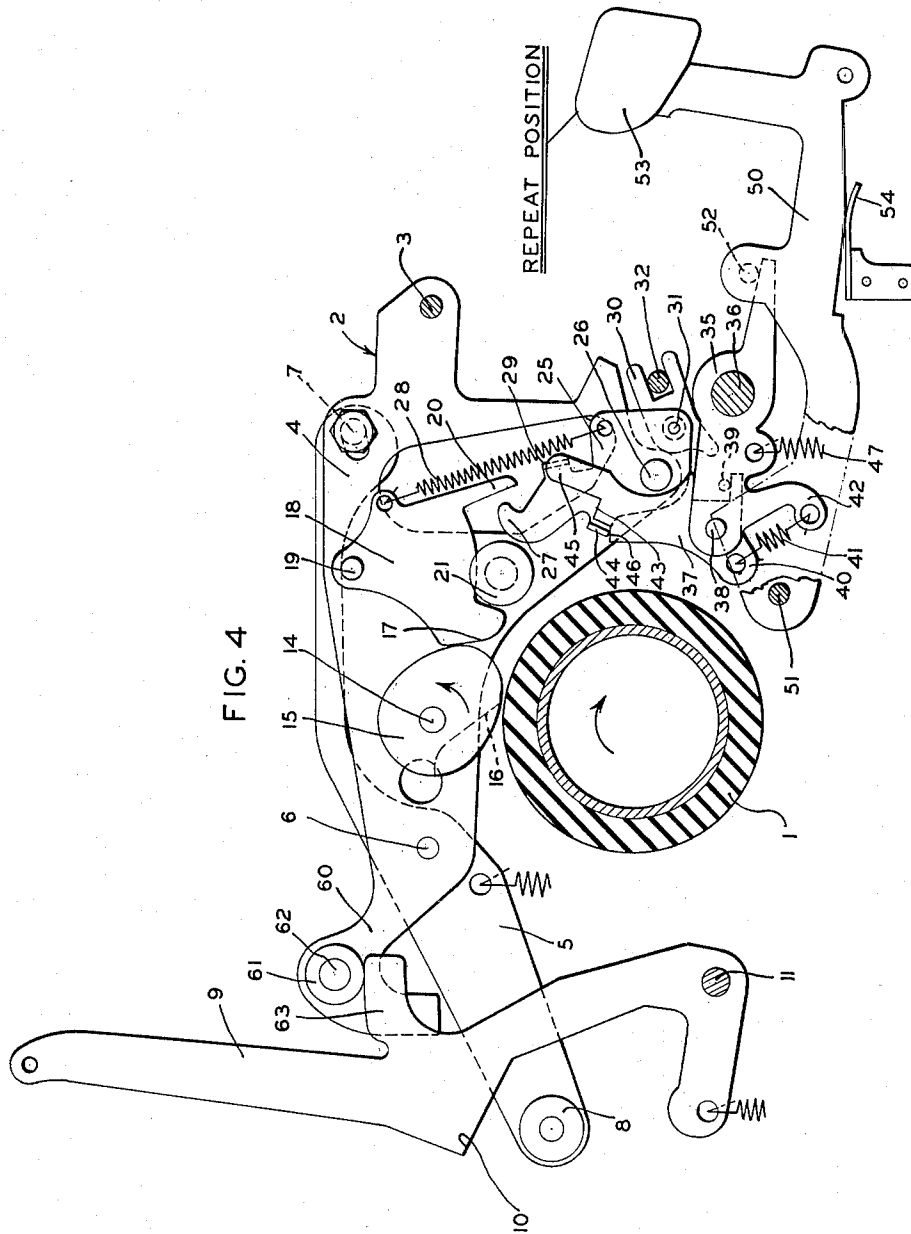
F. W. SCHREMP ET AL

2,714,948

REPEAT KEY ACTION FOR POWER OPERATED TYPEWRITERS

Filed July 25, 1951

4 Sheets-Sheet 4



Inventors
FREDERICK W. SCHREMP AND
RAYMOND E. SEYMOUR

Arthur T. Booth
Attorney

1

2,714,948

REPEAT KEY ACTION FOR POWER OPERATED TYPEWRITERS

Frederick W. Schremp, Stamford, and Raymond E. Seymour, Norwalk, Conn., assignors to Sperry Rand Corporation, a corporation of Delaware

Application July 25, 1951, Serial No. 238,412

9 Claims. (Cl. 197—17)

This invention relates to power operated typewriters, and particularly to a repeat key action actuated by a continuously rotating power driven roll.

The present invention provides an improvement in the present Remington electric typewriter where the type bars are power actuated from a continuously rotating power driven roll by a selective operation of suitable release means for the desired typing or other operated device. The improvement forming the present invention is in the power arm mechanism of the character shown in the application of Frederick W. Schremp, S. N. 101,450, filed June 25, 1949, now issued as Patent No. 2,638,199, May 12, 1953.

The present invention provides a power operating mechanism operable selectively to produce either one complete cycle of operation of a type action or other device for each complete revolution of the eccentric on the power arm or repeated operation of the typing or other device by repeated power arm operation secured automatically according to the position of a key lever or other control device. The repeat operation of the power driven mechanism is controlled to secure repeat cycles of operation automatically through cooperation of parts of the power operating mechanism with parts of the typing or other device actuated thereby so that each complete cycle will be substantially uniform. In obtaining uniform repeat cycles, the invention provides means controlled by the operation of the typing or other device that will retain the power arm against repeat operation until the typing or other device has completed its own cycle of operation without regard to the repeat operation set up by the control mechanism.

According to the present invention, the trigger mechanism operated by the key lever or control mechanism is movable into either of two operated positions, one for the purpose of securing single complete cycles of operation of the power arm and typing or other device, while the second position causes the trigger means to operate the trip mechanism to secure continued repeat operations of the power arm mechanism automatically. The trigger of the present invention is provided with two shoulders for engagement with the trip arm on the trip lever. One shoulder operates the trip lever into disengaged position relative the eccentric to secure a single operation of the power arm and one rotation of the eccentric in which the trip arm moves off the end of the shoulder of the trigger before the eccentric completes one revolution after its initial release thereby releasing the trip lever to engage and arrest the operation of the eccentric to secure a single operation of the power arm. This is obtained when the trigger is held in one of its two operative positions. In the other operative position the trigger is moved to operate the trip lever so that as the eccentric nears the end of its first rotation the trip arm will become disengaged from the first shoulder and will then be engaged by the second shoulder and held in position to prevent engagement of the trip lever with the eccentric when the power arm reaches the normal

2

or starting position. This provides for the continued rotation of the eccentric on the power arm for engagement with the power driven roll and continued repeat operation of the power arm so long as the trigger is held in the repeat position.

Due to the speed of operation of a type action or other device on the typewriter not being as rapid or the same as that of the eccentric and power arm mechanism, it has been found desirable to control repeat operation of the power arm in such a way that each type action and other power actuated device on the typewriter may complete its cycle of operation by the power arm before beginning automatic and successive repeat operations. This control is obtained according to the present invention by providing the bell-cranks operated by the power arms, or such other device as may be operated by the power arms, with a projection movable into position with the operation of the bell-crank to engage and support a complementary part on the power arm such as a roller, in a position where the power arm will be supported against completing its return movement to the normal or starting position until the bell-crank for the type bar or other device has returned to its normal or starting position. When the cycle of operation of the bell-crank is completed, the roller will drop off the end of the projection and allow movement of the power arm into its starting position. As this movement is completed, a repeat operation will be started if the trigger is supported in the repeat position through the operation of a key lever or other control means.

In the drawings:

Fig. 1 is an enlarged vertical cross section through a typewriter with portions omitted and other portions shown in cross section and broken away, illustrating a type action and a key lever actuated trigger and trip mechanism on one power arm in side elevation in the position of rest.

Fig. 2 is a view similar to Fig. 1 showing the key depressed into the first operative position in which the trigger has operated the trip lever to release the eccentric and power arm so that the eccentric has moved into engagement with the power driven roll to start a cycle of operation.

Fig. 3 is a view similar to Fig. 2 in which the power driven roll has moved the eccentric 180° from the Fig. 2 position to the maximum operated position of the power arm. The key lever has also been depressed to the second position for holding the trigger in the repeat position for securing repeat operation of the power arm and mechanism operated thereby.

Fig. 4 is a view similar to the preceding figures, showing a key lever held in the second or repeat position with the eccentric near the end of one revolution or cycle of operation in returning to the starting position. This figure illustrates how a typing or other actuated device on the typewriter controls the repeat operation of the power arm until the stroke of the actuated device has been completed.

Fig. 5 is a cross section taken on line 5—5 of Fig. 1.

The invention is described and shown in the drawings as applied to a Remington electric typewriter, as particularly described and shown in U. S. application Serial No. 101,450 filed June 25, 1949, now issued as Patent No. 2,638,199, May 12, 1953. The typewriter mechanism with the exception of those parts illustrated in this and the aforementioned application is similar to the structure shown in Patents Numbers 2,289,531, July 14, 1942; 2,304,216, December 8, 1942; 2,326,312, August 10, 1943; and U. S. application S. N. 66,672, filed December 22, 1948, now issued as Patent No. 2,579,763, December 25, 1951, in view of which only those portions of a typewriter are illustrated as are necessary to show the present invention in association with related typewriter parts.

The drawings show only a single key lever, power arm assembly and typing or other device actuated thereby in view of the fact that all of the plurality of power operated typing or other devices use the same duplicate mechanism for their operation.

A power driven roll 1 is rotatably mounted in the typewriter frame and driven by an electric motor drive means of conventional form so that the roll will be continuously rotated in one direction as indicated by the arrow. A fulcrum bar as shown in aforementioned Patent No. 2,638,199 is employed in connection with the present invention and is formed with a plurality of spaced parallel transverse slots for receiving and pivotally mounting a plurality of power arms 2, one in each slot, on pivot rod 3 carried thereby. Each power arm comprises a pair of sections having a pivot section 4 and an operating arm section 5.

Pivot section 4 is formed with an aperture to receive pivot rod 3 to pivotally mount the right hand end of the power arm on the fulcrum bar. The center portion of arm section 5 is pivotally mounted on stud 6 on the end of pivot section 4 opposite that mounted on pivot rod 3. The right hand end of operating arm section 5, as shown in Fig. 1, is secured to the end portion of pivot section 4 near the part mounted on pivot rod 3 by means of eccentric stud 7. This eccentric stud is mounted in the arm sections for adjustment to vary the position of operating arm section 5 relative to pivot section 4 by moving arm section 5 on stud 6 as a pivot to change the relation of section 5 to pivot section 4. This provides an adjustment for varying the operating stroke of one operating arm relative to another in a manner disclosed in said aforementioned Patent No. 2,638,199.

The opposite end of operating arm section 5 carries a roller 8 positioned for engaging and operating a bell-crank 9 which may be a type bar bell-crank or may operate any other device on the typewriter. The position of roller 8 on each power arm of a series for operating the typing and other devices may be adjusted relative to each other by adjusting the position of roller 8 relative to the plane through stud 6 and the center pivot rod 3 by the rotation of eccentric stud 7. In operation, roller 8 is engaged with cam face 10 on bell-crank 9 in upward movement of roller 8 during power operation of the power arm to move bell-crank 9 about pivot rod 11 on which it is mounted with the corresponding pivoted members for all of the other power operated actions, so as to produce power operation of a type bar 12 through a connecting link 13. The operation of other mechanism on the typewriter is also produced through clockwise rotation of a bell-crank 9, or the like, as shown in Fig. 1.

A stub shaft 14 is mounted on pivot section 4 with its axis in spaced parallel relation above power driven roll 1. An eccentric 15 having a cam shaped periphery is rotatably mounted beside section 4 on stub shaft 14 in a position to have its periphery extend below section 4 to engage the periphery of power driven roll 1. The inner marginal portion of eccentric 15 next to section 4 is recessed to provide angular shoulder portions 16 formed to receive and engage retaining finger 17 on one end portion of trip member 18 pivoted at the opposite end at 19 on pivot section 4 of the power arm. The trip member 18 has another portion of the first mentioned end extending in angular relation to retaining finger 17 and formed with trip finger 20 positioned to engage stop pin 21 mounted on pivot section 4 at the lower end of trip member 18 for limiting the clockwise movement of trip member 18 about its pivot 19, as shown in Figs. 1 to 4. This limit position determines the position of retaining finger 17 where it engages in the recessed portion of eccentric 15 having the shoulder portions 16.

A trip lever 25 has its lower end pivotally secured on stud 26 mounted on the lower depending portion of pivot section 4 while the upper end portion is formed with a trip projection 27 positioned to engage trip finger 20 below

stop pin 21 for moving trip member 18 in a counter-clockwise direction, as shown in Fig. 1, in the clockwise movement of trip lever 25. A tension spring 28 has one end secured to a laterally projecting portion of trip lever 25, as shown in Fig. 1, while the opposite end is secured to an ear extending laterally from trip member 18. This spring normally rotates trip lever 25 in a counter-clockwise direction and trip member 18 in a clockwise direction, as illustrated in Fig. 1, to engage trip finger 20 with stop pin 21 for limiting movement of trip member 18 by the spring. The movement of trip lever 25 is also limited by stop projection 29 extending through an aperture in pivot section 4 and engaging a portion of pivot section 4 forming the edge of the aperture.

A portion of trip lever 25 on the opposite side of pivot stud 26 from that part formed with trip projection 27, pivotally mounts toggle link 30 thereon by means of pivot stud 31. Toggle link 30 has a free end bifurcated and embracing supporting rod 32 carried by the fulcrum bar which supports pivot rod 3. This structure is the same as that shown in the aforementioned Patent No. 2,638,199.

The trigger mechanism has a trip rocker 35 provided for each power arm assembly. Each trip rocker has a central portion formed to pivotally engage on rocker pivot rod 36. Rocker pivot rod 36 is suitably mounted in the typewriter frame in a manner well known in the art, as shown in the aforementioned application. A trigger 37 is pivotally mounted at its lower end at 38 on the rear end of trip rocker 35 and has a recessed portion providing a pair of shoulders arranged in opposite relation on opposite sides of pin 39. Pin 39 is mounted on the rear central portion of trip rocker 35 and projects from one side of the trip rocker, as clearly shown by the drawings, for engagement with one or the other of the shoulders formed on trigger 37 to limit pivotal movement on pivot 38. Ear 40 formed on trigger 37 provides an anchor for one end of tension spring 41 having its opposite end anchored to extension 42 depending from the rear end of trip rocker 35. Tension spring 41 normally operates trigger 37 in a counter-clockwise direction, as shown in Fig. 1, for engagement of the lower shoulder of the trigger with pin 39, as shown in Fig. 1. This spring 41 normally retains trigger 37 in a position so that release shoulder 43 on the upper end will be normally positioned just below trip arm 44 projecting laterally from trip lever 25. Trigger 37 will thus be in a position for moving trip lever 25 upon depression of a key lever.

A finger 45 adjacent shoulder 43 forms the upper portion of trigger 37 and extends in front of trip arm 44 for cooperation with the shoulder to retain trip arm 44 engaged thereon during the entire upward operative movement of the trigger. Trigger 44 has a second release shoulder 46 on the side opposite finger 45 positioned slightly below release shoulder 43 and offset therefrom. This second release shoulder secures repeat operation of the power arm while shoulder 43 secures only a single non-repeat operation. A tension spring 47 has one end anchored to the lower rear end portion of trip rocker 35 and the opposite end secured to a fixed portion of the typewriter, not shown, for normally moving trip rocker 35 in a counter-clockwise direction as shown in Fig. 1.

It will be understood that a trip rocker and trigger assembly as above described, and of the type referred to in Patent No. 2,638,199, is provided for each power arm, a plurality being arranged in spaced parallel relation below each power arm in the position illustrated in the drawing. Each trigger assembly is associated with a power arm and trip mechanism so that a trigger mechanism is provided for controlling and operating each power arm.

One of a plurality of key levers is shown at 50 which correspond in number to the number of type bars and other mechanism for key lever operation in the typewriter. The key levers are provided at the front of the machine to form a keyboard having the usual key caps on each key lever arranged in one of a plurality of rows in a manner

5

well known in the art. The rear ends of all of the key levers are pivotally mounted on a key lever pivot bar 51 mounted in the typewriter frame in a manner well known in the art and shown in the aforementioned patents. Each key lever 50 extends forwardly on pivot bar 51 in spaced parallel relation to carry the key caps at the forward ends in a conventional manner, while an upwardly extending ear in an intermediate portion of each key lever carries a laterally extending pin 52 engaged over the forward end of a trip rocker 35 so that each key will operate one trip rocker and trigger mechanism. The key cap for manual engagement by an operator as usually applied to each key lever is indicated at 53.

Each key lever 50 is movable from normal or inoperative position and indicated by the legend "normal position" in the drawings. Each key lever may be moved from this "normal position" to a first position as shown in Fig. 2 in full lines and dot and dash lines in Fig. 4 and indicated by the legend "first position." In this "first position" the trigger mechanism will be operated to move the trip lever for disengaging the eccentric and securing a single operation of a power arm and a mechanism operated thereby in a manner to be hereinafter described.

Each key lever 50 is also movable into a repeat position shown in full lines in Figs. 3 and 4 and indicated by the legend "repeat position" in Figs. 3 and 4. When the key lever is in this repeat position, as hereinafter described, the trigger mechanism is moved into a position where it will secure repeat operation of the power arm by moving the trip lever into eccentric disengaging position each time the power arm completes a cycle of operation.

Means is provided for indicating to the operator when key lever 50 is manually moved into the "first position" and for normally arresting the movement of the key lever in this "first position." In the form illustrated in the drawings, this consists of a leaf spring 54, one for each key lever 50, mounted below the respective key lever to engage the bottom edge thereof when it is depressed into the "first position." Then, when it is desired to secure a repeat operation of the power arm and the typing or other devices operated thereby, the operator may manually depress key lever 50 through downward pressure on key cap 53 by applying greater force in the downward movement of key lever 50 sufficient to overcome the stiffness of leaf spring 54 and flex it downwardly into the "repeat position" shown in Figs. 3 and 4. The operator holds key lever 50 in the repeat position against the tension of spring 54 as long as repeat operation of the type action or other device is desired. Key lever 50 will be restored to its normal position upon manual release by the operator from either the "first position" or "repeat position" by spring 54 and spring 46 normally tending to rotate key lever 50 and trip rocker 35 in a counter-clockwise direction, as shown in Fig. 1.

It has been found that the cycle of operation of a type action and some of the other operated devices on a typewriter varies in the time required to complete a movement into the fully operated position and return to the starting position, that is different from the time required for a complete cycle of operation of the power arm through one revolution of eccentric 15. Where repeat operations of a type action or other operated device on the typewriter are desired, this difference in the timing cycle of the typing or other device with respect to the power arm timing cycle will cause the power arm to begin a repeat operation before the device operated thereby has completed its first cycle of operation. This results in a repeat power operation of the device through only a portion of its normal power operation stroke. The second and subsequent cycles of operation will not be uniform with the first cycle of operation or each other. Therefore, it is desirable to provide means for preventing a repeat cycle of operation of a type action or other operative device by its power

6

arm until the cycle of the type action or other operative device has been completed.

For this purpose, the type action or other device is provided with means for automatically controlling the operation of its power arm to prevent a repeat operation of the power arm until the typing or other device has completed its cycle of operation. In accomplishing this result pivot section 4 of the power arm is provided with an angular extension 60 on its free end projecting toward the central portion of bell-crank 9 and carrying roller 61 rotatably mounted on the laterally extending stud 62. Roller 61 is adapted to engage projection 63 extending outwardly toward the power arm from the central portion of bell-crank 9. Projection 63 is positioned on bell-crank 9 so that it will engage under roller 61 when the power arm is slightly above the normal or starting position as shown in Fig. 1. When bell-crank 9 is in the position of rest, or starting position, projection 63 will terminate in a position adjacent to roller 61 but out of contact with the roller so that the power arm may move from the starting position shown in Fig. 1 downwardly to begin a power operation stroke by bringing eccentric 15 in contact with power driven roll 1, as shown in Fig. 2. As the power arm moves downwardly from its upper limit of movement during power operation by eccentric 15 being rotated in contact with power driven roll 1 and before the completion of a cycle of movement by bell-crank 9, projection 63 will lie in a position that is within the path of movement of roller 61 for engaging roller 61 and support power arm 2 in a position slightly above normal or starting position of the power arm.

In operation the mechanism as shown and described herein will begin a cycle of movement from the position of the parts as shown in Fig. 1. For a single non-repeat operation of a type action or other device on the typewriter the operator manually engages key cap 53 in the usual way and by a finger depression on key cap 53 moves key lever 50 downwardly until the bottom edge engages the spring 54. This moves trip rocker 35 in a clockwise direction as shown in Fig. 1 moving trigger 37 upwardly to engage release shoulder 43 with trip arm 44. Trip arm 44 is moved about its pivotal mounting on stud 26 in a clockwise direction as shown in Fig. 1 so the upper end forming projection 27 engages trip finger 20 of trip member 18 and moves trip member 18 in a counterclockwise direction to disengage retaining finger 17 from angular shoulder portions 16 of eccentric 15. The eccentric is thereby released for free rotation on stub shaft 14.

At the same time, the clockwise rotation of trip lever 25 moves pivot stud 31 carrying toggle link 30 downwardly from the position shown in Fig. 1 causing toggle link 30 to pivot thereon for breaking the toggle connection so that power arm 2 may rotate on pivot rod 3 in a counterclockwise direction. This results in the movement of the parts into the position shown in Fig. 2 where eccentric 15 has the portion of shortest radius engage the periphery of constantly rotating power driven roller 1 for starting the power operation of eccentric 15 so that it will rotate on stub 14.

As eccentric 15 is rotated by power driven roll 1 on stub 14 in a counter-clockwise direction as shown in Figs. 1 and 2 the power arm will be moved from the position shown in Fig. 2 upwardly about pivot rod 3. This causes roller 8 to move upwardly into engagement with cam face 10 of bell-crank 9. Further operation of power arm 2 by rotation of eccentric 15 in engagement with power roll 1 will move the power arm upwardly and operate bell-crank 9 in a clockwise direction to move type bar 12 or other operated device from its normal position of rest into the fully operated position. In the case of a type bar, it will be moved upwardly about its pivot to produce the desired impact with the platen of the typewriter in a well known manner. This operation of type

bar 12 or other devices is obtained through the connecting link 13 which transmits the motion of bell-crank 9.

Power arm 2 will be moved upwardly in this power operation through rotation of the eccentric by the power driven roll into the position shown in Fig. 3 where the eccentric reaches a position in which the portion of longest radius is directed toward and is engaged with the periphery of power driven roll 1. From the position shown in Fig. 3 the eccentric 15 continues its movement in a counter-clockwise direction by the driving action of power driven roll 1 back to the starting position shown in Fig. 1. As the eccentric continues its rotation from the position shown in Fig. 3 power arm 2 will move downwardly from the position shown in Fig. 3 toward the position shown in Fig. 1.

Fig. 3 also shows the position of bell-crank 9 at the end of the power stroke applied thereto with projection 63 moved into a position under roller 61. Bell-crank 9 will start a counter-clockwise rotation from the position shown in Fig. 3 toward the position shown in Fig. 1 as the eccentric completes its rotation from the position shown in Fig. 3 back to the starting position of Fig. 1. When the power arm moves downwardly from the position in Fig. 3 roller 61 will engage projection 63 and retain power arm 2 against further downward movement into the starting position until such time as the type action or other operated device actuated by the movement of bell-crank 9 has substantially returned to starting position. When bell-crank 9 with its operated device has substantially returned to the starting position, projection 63 will move to the left of roller 61, as shown in Fig. 3, so that the projection will disengage from under the roller.

Fig. 4 shows the position where the power arm has moved from the position shown in Fig. 3 by rotation of the eccentric toward the starting position to the position where roller 61 engages projection 63. From the position of the parts shown in Fig. 4 in which the power arm is moving downwardly and bell-crank 9 is moving counter-clockwise with eccentric 15 moving counter-clockwise toward the starting position, the eccentric will continue its counter-clockwise movement into the starting position through the inertia given to it by the power roll. Eccentric 15 will move into the starting position where shoulders 16 will engage projection 17 on trip member 18. Trip member 18 in the position of the parts shown in Fig. 4 is moving into position to engage shoulders 16 on the eccentric and hold eccentric 15 in the starting position while bell-crank 9 completes its movement to the starting position. As bell-crank 9 completes its cycle of movement from the position shown in Fig. 4 to that shown in Figs. 1 and 2, roller 61 will ride off the end of projection 63 so that power arm 2 can be operated by gravity and the spring attached thereto, downwardly about pivot rod 3 into the starting position.

With the key lever operated to the "first position" and held there after operation into the first position, the power mechanism including eccentric 15 will not produce a repeat operation of the power arm. The eccentric will move into the starting position from the position shown in Fig. 4 and be held in the starting position until roller 61 drops off of the end of projection 63 on bell-crank 9. As this movement takes place trip arm 44 will have moved off of shoulder 43 and second release shoulder 46 will be in a position that will provide for the movement of trip lever 25 into its counter-clockwise limit of movement determined by stop projection 29 so that the center of pivot stud 31 for toggle 30 will be in the plane intersecting the center of supporting rod 32 and stud 26. With the toggle having its center in the straight position, toggle link 30 will engage stop rod 32 and arrest downward return movement of the power arm in completing the first cycle of operation in the position shown in Fig. 1 where the power arm will be supported until the key lever is again depressed.

When a repeat operation of the power mechanism is

desired, the operator presses downwardly on key cap 53 so that the key lever 50 is moved into the repeat position by pressing the key lever down sufficiently to overcome the tension of spring 54 with the key moved into a position below the first position as shown in Figs. 2 and 4 to the repeat position, shown in Figs. 3 and 4. In the repeat position of key lever 50 where the key lever will be held by the operator for obtaining the desired number of repeat operations of the power arm and the devices operated thereby, trigger 37 will be moved into a position higher than that shown in Fig. 2, as illustrated in Figs. 3 and 4, where shoulder 46 will be elevated to the same height as shoulder 43 in Fig. 2. The first cycle of operation will be initiated and completed in the manner described hereinabove in connection with the depression of the key lever into the first position. Then, as the power arm mechanism has the parts moved from the position shown in Fig. 3 to the position shown in Fig. 4, the retention of trigger 37 in the "repeat position" by the depression of the key lever into the lower "repeat position" as shown in Figs. 3 and 4 will position second release shoulder 46 in a position to engage trip arm 44 as the parts reach the Fig. 4 position. Eccentric 15 will be further operated by power roll 1 to move in a counterclockwise direction from the position shown in Fig. 4 to its starting position as shown in Fig. 1 where trip member 18 will arrest its motion as above described. Then, as roller 61 drops off the end of projection 63 on bell-crank 9 through counterclockwise movement of bell-crank 9 from the position shown in Fig. 4 toward the position shown in Fig. 1, second release shoulder 46 by engaging trip arm 44 in further downward movement of power arm 2 will cause trip lever 25 to move on stud 26 in a clockwise direction and break the toggle to allow continued downward movement of the power arm with counter-clockwise movement of trip member 18 to disengage from the eccentric until the position shown in Fig. 2 is reached where the eccentric engages the power roll and starts a repeat cycle of operation through the positions shown in Figs. 2, 3 and 4. Further repeat operations are obtained by holding the key lever in the "repeat position." Whenever the repeat operation is to be stopped, the operator releases key lever 50 by disengaging the finger from the key cap 53 so that the key lever will return to the normal position. The power arm mechanism will complete the cycle of rotation as hereinabove described in which the parts will return to the position shown in Fig. 1 where they are ready to start a second operation through depression of the key lever.

The invention claimed is:

1. In a power operated typewriter having a power driven roll, a plurality of typing and other operated devices, and a plurality of key levers, one for each typing and other operated device, the combination of a plurality of power arms pivoted at one end and each arranged to have the opposite end engage and operate one of said typing and other operated devices in pivotal movement thereof in one direction, a plurality of eccentrics, one eccentric rotatably mounted on each power arm for peripheral engagement with said power driven roll to move said power arm on its pivot in operating one of said devices, trip means having portions latching the eccentrics against rotation and including a plurality of trip levers, each pivotally mounted on one of said power arms, said key levers being operable into either of two positions for operating said trip levers, trigger means operable by each key lever and having a pair of trip lever engaging portions independently engageable with a trip lever of the corresponding power arm, one of said trip lever engaging portions being operable to engage and move said trip lever for releasing said eccentric in one of the positions of said key lever for producing a single cycle of operation of a power arm and the other of said trip lever engaging portions being engageable with a trip lever for moving and maintaining said trip

lever disengaged from said eccentric when the key lever is moved into the other of said two positions for producing repeat operations of said power arm.

2. In a power operated typewriter having a power driven roll, a plurality of typing and other operated devices and a plurality of key levers, one for each typing and other operated device, the combination of a plurality of power arms pivoted at one end and each arranged to have the opposite end engage and operate one of said typing and other operated devices in pivotal movement thereof in one direction, a plurality of eccentrics, one eccentric rotatably mounted on each power arm for peripheral engagement with said power driven roll to move said power arm on its pivot in operating one of said devices, trip means having portions latching the eccentrics against rotation and including a plurality of trip levers, each pivotally mounted on one of said power arms, key lever actuated means for operating each of said trip levers to release the corresponding eccentric for engagement with and operation by said power driven roll for moving said power arm to operate one of said devices, whereby each typing or other operated device is power operated upon manual operation of the corresponding key lever, and means operated by any of said typing or other operated devices having a part cooperating with a portion of the corresponding power arm to hold said power arm from completing a cycle of operation until said typing or other device has substantially completed its cycle of operation.

3. The combination claimed in claim 2, wherein the key lever actuated means is movable into either of two operative positions and has trigger means operable in one of said positions to actuate a trip lever to release said eccentric to obtain a single cycle of operation and in the other of said two positions has means to operate and retain said trip lever in disengaged position with respect to said eccentric to produce repeat operation of said power arm.

4. In a power operated typewriter as claimed in claim 1, the combination of means controlled by the typing or other operated device retaining the power arm against the completion of its cycle of operation until the typing or other device has substantially completed its cycle of operation.

5. A power operated typewriter as claimed in claim 1, wherein each of said typing and other operated devices includes a bell-crank and said bell-crank is operated by the power arm and has a projection for engaging a complementary part on the power arm for supporting the power arm against return to the starting position until said bell-crank has substantially completed its cycle of operation.

6. In a power operated typewriter as claimed in claim 1, wherein each of said plurality of key levers is movable into either of two operative positions to produce a single cycle of operation of an associated power arm in one of said positions and repeating cycles of operation of said associated power arm in the second of said posi-

tions, arresting means associated with each of said key levers having a semi-positive stopping action at said single cycle of operation position of said key lever and depressible further to said second position of said key lever for producing said repeating cycles of operation of said power arm.

7. In a power operated typewriter having a power driven roll, a plurality of typing and other operated devices, actuating means for each of said typing and other operated devices engageable with said power driven roll for transmitting power from said power driven roll in operating said typing and other operated devices, and key lever means for each of said actuating means controlling engagement of said actuating means with said power driven roll; each of said key lever means being unidirectionally depressible in the normal direction of key lever travel into two successive positions, depression into the first of said positions controlling the engagement of said actuating means with said power driven roll in producing a single cycle of operation only of such aforesaid typing or other operated device and further depression of said key lever means into the second of said positions controlling the engagement of said actuating means with said power driven roll whereby repeating cycles of operation of said typing or other device are continued throughout the retention of said key lever means in said second operating position.

8. In a power operated typewriter as claimed in claim 7, wherein each of said plurality of key lever means is unidirectionally depressible into two successive positions, arresting means associated with each of said key lever means having a semi-positive stopping action at the first of said two positions of said key lever means, and depressible further to the second of said positions of said key lever means.

9. A power operated typewriter having a type bar, a key bar arranged to be depressed normally a certain distance but being capable of being depressed further than normal, power driving means having connections conditioned by a normal depression of said key bar to cause said driving means to drive said type bar to printing position for a single impression only, said connections further being conditioned by depressing said key bar further down than normal and in the direction of its normal movement for causing said driving means to repeatedly drive said type bar to printing position, and resilient means positioned to limit the depression of said key bar to its normal position while permitting further depression in opposition to said resilient means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,227,846	Smathers	May 29, 1917
1,789,661	Schulze	Jan. 20, 1931
1,963,285	Woodward	June 19, 1934
2,043,393	Pasinski	June 9, 1936