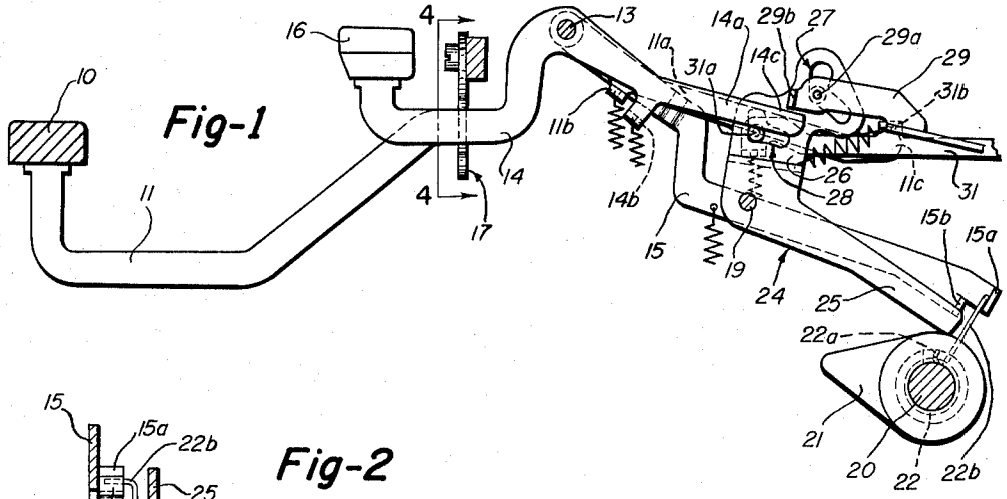
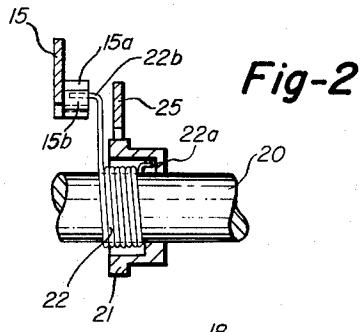
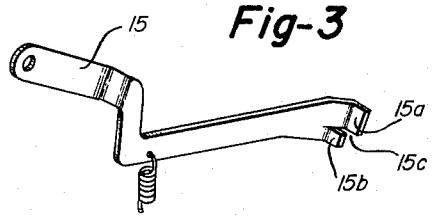
Nov. 16, 1965 L. P. FRECHETTE ETAL 3,217,850

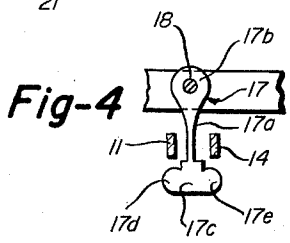
FORWARD AND BACK SPACING MECHANISM

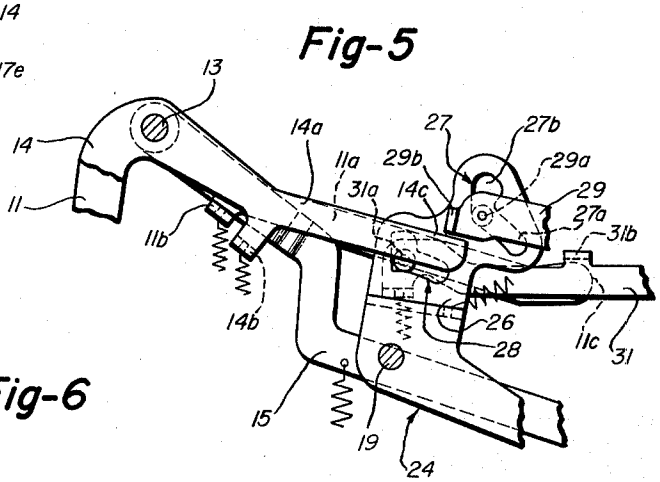
Filed Nov. 21, 1963 2 Sheets-Sheet 1

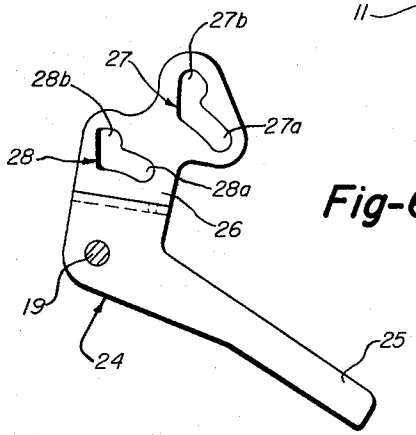












INVENTORS
LEO P. FRECHETTE
HAROLD D. GAUDET

BY Thomas S. Ross
James R. Haelt

ATTORNEYS

Nov. 16, 1965 L. P. FRECHETTE ETAL 3,217,850

FORWARD AND BACK SPACING MECHANISM

Filed Nov. 21, 1963 2 Sheets-Sheet 2

Fig-7

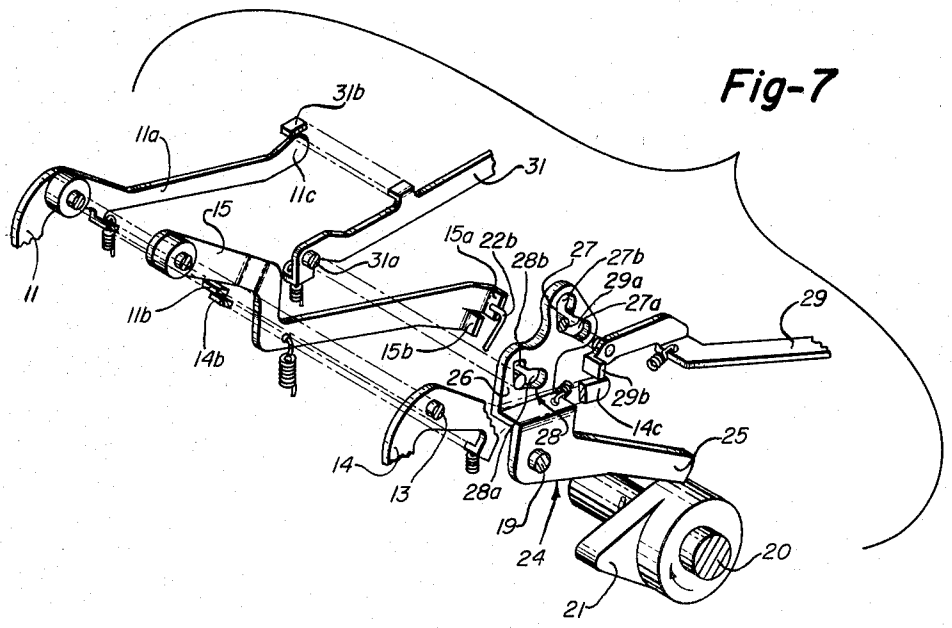
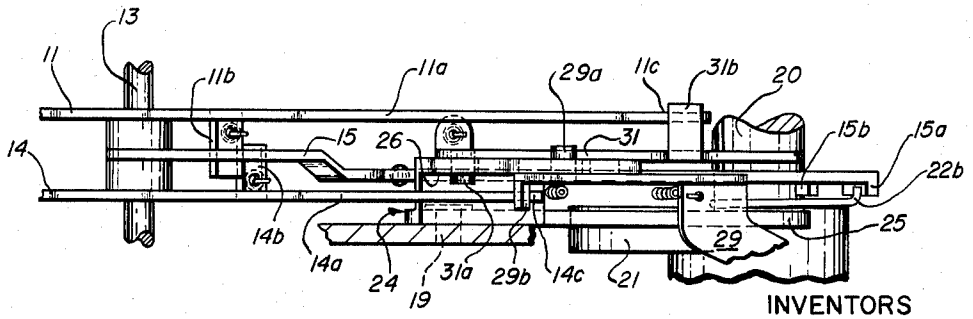


Fig-8



INVENTORS
LEO P. FRECHETTE
HAROLD D. GAUDET

BY Thomas S. Ross
James C. Black

ATTORNEYS

United States Patent Office 3,217,850 Patented Nov. 16, 1965

3,217,850

FORWARD AND BACK SPACING MECHANISM

Leo P. Frechette, West Hartford, and Harold D. Gaudet, Enfield, Conn., assignors, by mesne assignments, to Royal Typewriter Company, Inc., New York, N.Y., a corporation of Delaware

Filed Nov. 21, 1963, Ser. No. 325,308
3 Claims. (Cl. 197—82)

This invention relates to an action characterized by a single power arm for powering a selected one of a plurality of function mechanisms, as for example the forward space and backspace mechanisms of an electric typewriter or the like; more particularly it relates to a single power arm action operable in response to depression of any of a plurality of function key levers to power function mechanism operating links associated with and selected by the operated function key lever.

Electric typewriters commonly have separate and distinct power operated systems or actions for actuating conventional function mechanisms such as the function mechanism for forward spacing shown in Patent 2,567,722 the function mechanism that backspaces the carriage such as shown in Patent 2,577,467. Thus, in many instances, there is a multiplicity of parts that lends to complexities in assembly and maintenance and increases the cost of the machine. Also adjustment difficulties are often encountered, particularly in the field where down time of the typewriter is vexatious and costly.

It is accordingly among the objects of the invention to provide an action having a single power arm for powering a selected one of a plurality of function mechanisms that obviates such difficulties in a simple and practical manner. Other objects will be in part apparent and in part pointed out hereinafter.

In the drawing wherein we have shown a preferred embodiment of the invention and wherein similar reference characters refer to similar parts throughout the several views:

FIGURE 1 is a fragmentary side elevation of the action;

FIGURE 2 is an enlarged fragmentary elevation showing the wrapped spring clutch comprising an element of the action;

FIGURE 3 is an isometric view of the clutch control arm;

FIGURE 4 is an enlarged section taken along the line 4—4 of FIGURE 1 showing a lock-out device;

FIGURE 5 is an enlarged fragmentary side elevation of the space bar and back space levers and their relation to the clutch controlling arm;

FIGURE 6 is an enlarged side view of a bell crank comprising part of the action;

FIGURE 7 is a fragmentary isometric view of the action; and

FIGURE 8 is a fragmentary top plan view of the action.

As noted hereinbefore the single power arm is operable to power a selected one of a plurality of function mechanisms. These function mechanisms as described herein are those that effect forward spacing and backspacing movements of a carriage in response to depression of an associated space bar function key lever and a backspace function key lever respectively which are operable to selectively couple associated function mechanism drive links to the single power arm and to initiate the operation of the power arm. More particularly there is provided a space bar function key lever and a backspace function key lever pivotally carried by a cross shaft secured to the machine frame. These levers independently operate a clutch control arm that effects engagement and disengagement of a wrapped spring clutch mounted on a constantly rotating shaft. One end of the clutch is connected to a

cam freely mounted on the shaft so that when the clutch is engaged the cam is driven through one revolution. A single power arm which takes the form of a bell crank is operative when driven to power function mechanism drive links. The bell crank is pivotally mounted on the frame adjacent the cam and has a follower arm positioned to engage and be rocked by the cam. The other arm of the bell crank has a pair of slots formed therein, each comprising a lost motion arcuate portion and a straight drive portion. A pair of function mechanism drive links extend through the slots respectively and are respectively connected to drive the function mechanism to effect carriage escapement and to drive the function mechanism to effect backspacing, each of which, as noted in said aforementioned patents, may be of conventional nature. The link ends that extend through the slots normally lie at rest in the arcuate portions thereof. When the space bar, for example, is depressed its lever does two things, namely, it operates the clutch control arm to cause engagement of the clutch and at the same time lifts the appropriate link so that its end lies in the straight driving portion of the slot. Thus as the bell crank is rocked by the cam the space bar link is driven to actuate the escapement. During this operation the end of the back space link merely rides up and down in the lost motion arcuate portion of its slot so that the back spacing mechanism is not affected. The back space portion of the action operates in exactly the same manner. Preferably a lock-out device is provided to preclude depression of the back space lever when the space bar lever is operated and vice versa.

More particularly and with reference to FIGURE 1, a space bar **10** is secured to the outer ends of a pair of levers **11** (only one being shown) rockably mounted on a cross shaft **13** carried by the typewriter frame (not shown). A back space lever **14** having a key **16** is also rockably mounted on cross shaft **13**. Lever **11** includes a tail **11***a* between the ends of which a lug **11***b* is bent over to underlie a clutch control arm **15** pivotally mounted on cross shaft **13** (see also FIGURE 5). Lever **14** also includes a tail **14***a* between the ends of which a lug **14***b* is bent over to underlie clutch control arm **15** at a point spaced from lug **11***b*. It will now be evident that when space bar **10**, for example, is depressed its lever tail lug **11***b* pivots clutch control arm **15** counterclockwise to effect engagement of a clutch as will be described below. Thus the space lever **11** and the back space lever **14** are independently operable to rock a single clutch control arm.

Preferably a lock-out device generally indicated at **17** in FIGURE 4 is provided. This device comprises a leg **17***a* having a hip **17***b* by which the leg pivotally depends from a stud shaft **18** secured to the machine frame. The bottom end **17***c* of leg **17***a* has a pair of spaced feet **17***d* and **17***e* formed thereon which respectively underlie levers **11** and **14** with leg **17***a* lying between the levers. It may now be seen that when lever **11**, for example, is depressed it will engage foot **17***d* and rock cam leg **17***a* counterclockwise causing foot **17***e* to move to the right to a position to lock lever **14** against depression. Similarly depression of lever **14** locks out lever **11** and accordingly it is impossible to depress one lever while the other is depressed. Also the parts are so proportioned and positioned as to preclude simultaneous depression of both levers which would jam the carriage control mechanisms.

A power driven constantly rotating shaft **20** is journaled in the machine frame and has a cam **21** freely mounted thereon. Shaft **20** also carries a wrapped spring clutch **22** (FIGURE 2) having a finger **22***a* connected to cam **21** and having a tail **22***b* by which engagement and disengagement of the clutch is accomplished. Clutch control arm **15** (FIGURES 1, 2 and 3) has a pair of

lugs 15*a* and 15*b* formed on its end, these lugs lying in spaced parallel planes to provide a horizontal gap 15*c* therebetween. When control arm 15 is in rest position (see FIGURE 2) its upper lug 15*a* is engaged by clutch tail 22*b* which prevents the wrapped spring clutch 22 from gripping shaft 20. When control arm is rocked counterclockwise in the manner described above, lug 15*a* is lifted upwardly away from the clutch tail 22*b* allowing the clutch tail to slip down through gap 15*c* and behind lower lug 15*b*. This permits the wrapped spring clutch to contract in well known manner and grip shaft 20 so that cam 21 is rotated. If the lever 11 or 14 which was depressed to lift control arm 15 is held depressed, clutch tail 22*b* will engage lower control lug 15*b* causing the clutch to disengage and thus avoid repeat operation of the cam. If the depressed lever is released in time, the clutch tail will engage upper lug 15*a* after one revolution. Thus in either case but one revolution of cam 21 is effected.

As shown in FIGURE 1 the power arm comprises a bell crank 24 which is pivotally mounted on a shaft 19 carried by the machine frame. This bell crank includes a cam follower arm 25 adapted to be engaged by cam 21 to be rocked counterclockwise thereby on rotation thereof. The bell crank also includes a drive arm 26 (FIGURE 6) in which a pair of slots 27 and 28 are cut. Slot 27 comprises an arcuate portion 27*a* and a straight vertical portion 27*b*. Slot 28 similarly comprises an arcuate portion 28*a* and a straight vertical portion 28*b*. Slot 27 receives a pin 29*a* carried by a link 29 which is connected to a back spacing mechanism (not shown). Slot 28 receives a pin 31*a* carried by a link 31 which is connected to an escapement mechanism (not shown). When the action is at rest these link pins lie in their respective slots each at a point about where the arcuate slot portion joins the vertical slot portion. The end 14*c* of lever tail 14*a*, when at rest, lies on the right hand side of bell crank drive arm 26 immediately below a bent over ear 29*b* of link 29 while the end 11*c* of lever tail 11*a* lies on the left hand side of the drive arm immediately below a bent over ear 31*b* of link 31, the lever tail ends thus being in position to engage the bent over link ears when either of levers 11 or 14 is actuated.

Operation—Figures 1 and 7

It will now appear that when space bar 10, for example, is depressed, its lever 11 is rocked counterclockwise (FIGURE 1) so that lug 11*b* on lever tail 11*a* lifts clutch control arm 15 causing the clutch to engage and drive cam 21 as described above. At the same time that lug 11*b* lifts arm 15, end 11*c* of lever tail 11*a* lifts bent over ear 31*b* of link 31 into the vertical drive portion 28*b* of bell crank arm slot 28. As cam 21 rocks bell crank 24 counterclockwise its drive arm by way of vertical slot portion 28*b* draws link 31 to the left to actuate the escapement mechanism. At the same time link pin 29*a* merely rides in arcuate lost motion portion 27*a* of crank arm slot 27 leaving the back spacing mechanism undistributed. Similarly, depression of backspace lever 14 actuates the backspace mechanism by way of lever tail end 14*c*, slot 27 and link 29 without disturbing the escapement mechanism.

If desired, repeat operation of either the escapement or backspacing mechanism or both can be attained by provision of a so-called "double dip" mechanism such as shown, for example, in the copending application of Frechette and Slabinski, Serial No. 286,372, filed June 7, 1963.

It will now appear that we have provided an action for controlling forward and backspacing of a typewriter carriage that attains the several objects set forth above in a thoroughly practical and efficient manner.

As other embodiments of the invention are possible and as modifications of the one disclosed may be made, all without departing from the scope of the invention it is to be understood that the foregoing should be interpreted as illustrative and not in a limiting sense.

We claim:

1. An action for controlling the forward spacing and backspacing mechanism of an electric typewriter, in combination,
- forward spacing and backspacing mechanism actuating links,
- a cross shaft,
- space bar and backspace levers pivotally mounted on said shaft,
- a second cross shaft,
- a single power arm pivotally mounted on said second shaft operable to drive an actuating link selectively operatively connected thereto,
- a power shaft,
- a drive cam freely mounted on said power shaft,
- clutch means engageable to connect said cam to said power shaft whereby said cam is driven, said power arm being positioned to be engaged and driven by said cam when the latter is driven,
- a member operable to effect engagement of said clutch,
- and means associated with said space bar and back space levers to selectively connect associated actuating links to said power arm and to operate said member when either the space bar or backspace lever is manipulated.

2. An action for controlling a pair of function mechanisms in an electric typewriter comprising in combination,
- a pair of actuating links adapted when individually driven to actuate the corresponding one of said function mechanisms,
- a continuously driven power shaft,
- a single power arm operable when coupled to said power shaft to drive an actuating link selectively operatively connected thereto,
- a pair of manipulatable function key levers adapted when manipulated to operatively connect a corresponding one of said pair of actuating links to said power arm,
- control means operable to couple said power arm with said power shaft,
- and means responsive to manipulation of either one of said function key levers for effecting operation of said control means.

3. An action for controlling a pair of function mechanisms in an electric typewriter comprising in combination,
- a pair of actuating links adapted when individually driven to actuate a corresponding one of said function mechanisms,
- a continuously driven power shaft,
- a cam freely mounted on said power shaft,
- a wrap spring wound about said shaft and connected to said cam, said spring having a normal interference fit with said shaft,
- control means for maintaining said spring disengaged from said shaft and operative to effect engagement of said spring and shaft thereby coupling said shaft and cam,
- a single power arm operatively engaging and adapted to be driven by said cam,
- a pair of drive slots formed in said power arm one associated with each of said links,
- a pair of function key levers adapted when depressed to move a corresponding link into its corresponding power arm drive slot whereby when said arm is powered by said cam said link is actuated,
- and means associated with each of said key levers to render said control means operative.

References Cited by the Examiner

UNITED STATES PATENTS

1,913,892	6/1933	Mez	197—84 X
1,984,410	12/1934	Hart	197—91
2,105,520	1/1938	Carlstrom et al.	197—91 X
2,565,985	8/1951	Norton et al.	197—84 X
2,714,948	8/1955	Schremp et al.	197—17
2,723,740	11/1955	Toeppen	197—17
2,728,436	12/1955	Kupper	197—82
2,798,584	7/1957	Kennedy	197—17
2,879,876	3/1959	Palmer et al.	197—16
2,902,131	9/1959	Ascoli et al.	197—17
2,973,078	2/1961	Templeton et al.	197—17
3,086,635	4/1963	Palmer	197—16
3,126,998	3/1964	Palmer	197—82

ROBERT E. PULFREY, *Primary Examiner.*