Oct. 24, 1967 K. R. FRECHETTE 3,348,648

KEYBOARD PROVIDING SERIAL GENERATION OF TWO DIFFERENT CODES RESPONSIVE TO ONE KEY DEPRESSION

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Fig_1

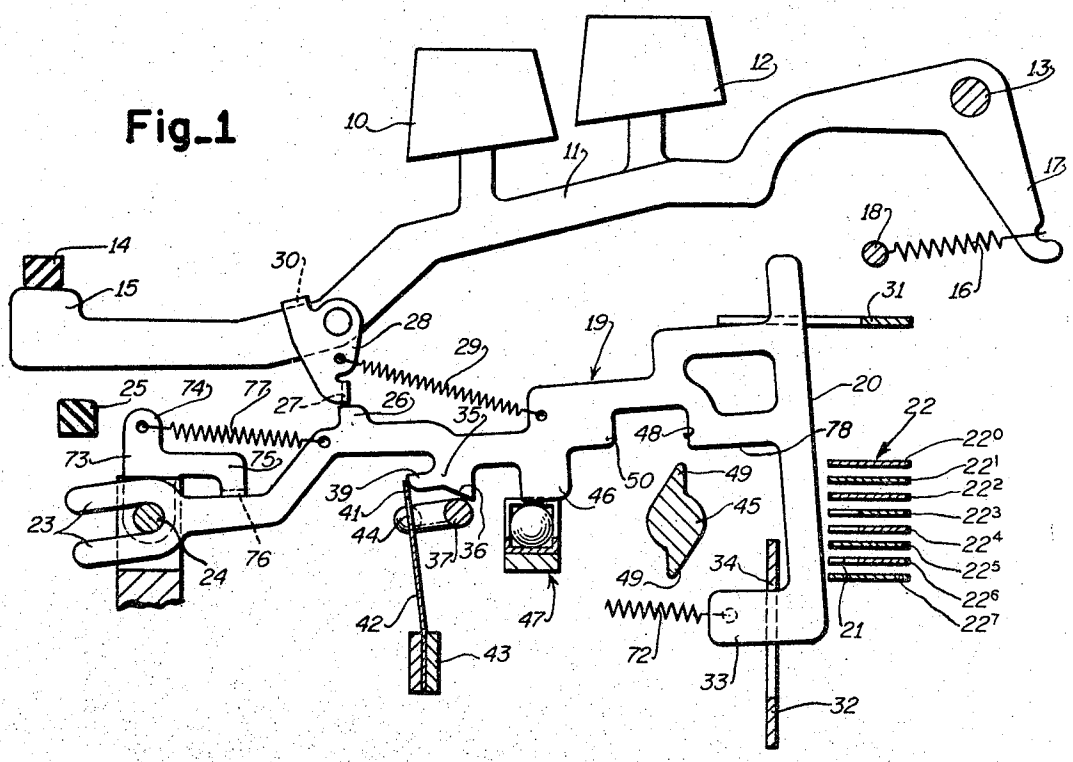
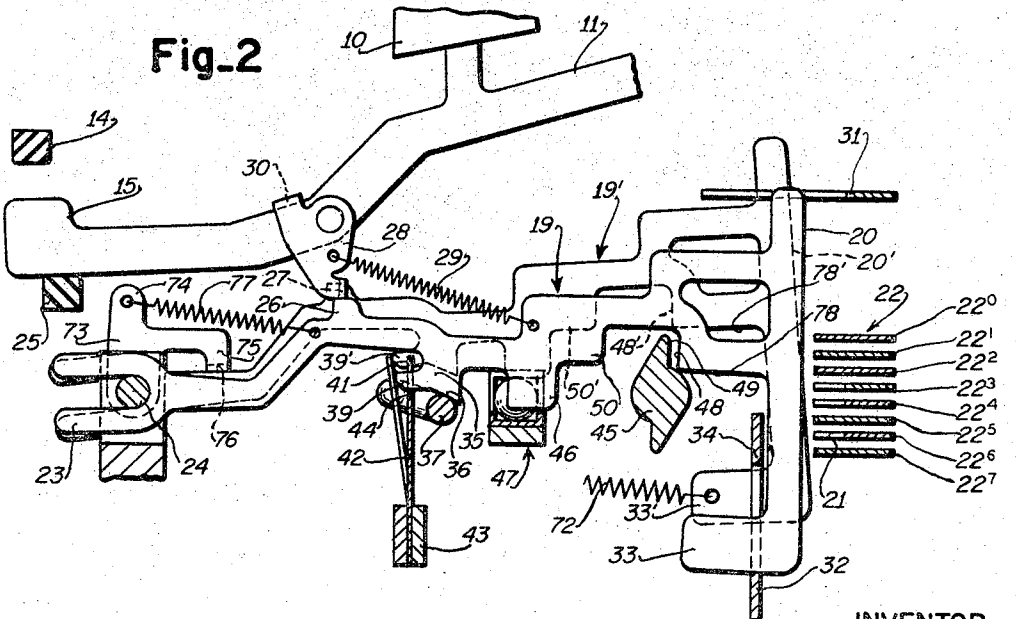


Fig_2



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Fig_3

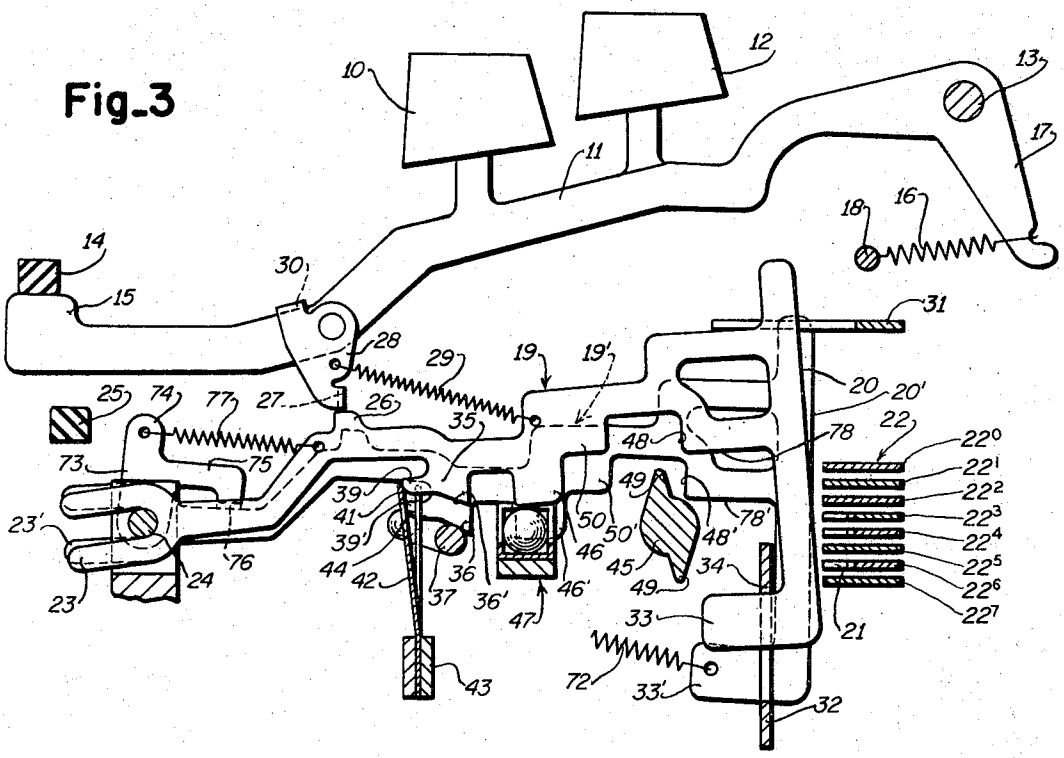


Fig_5

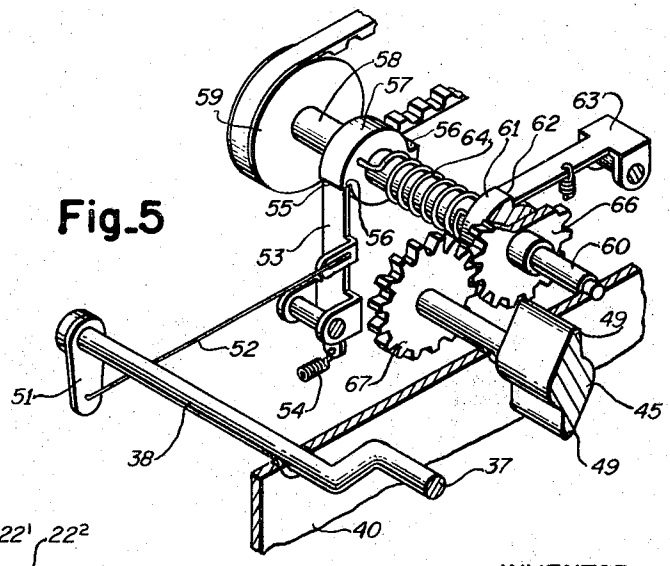
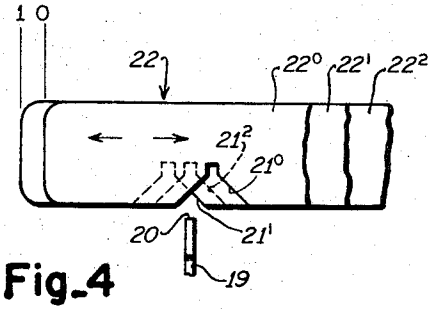


Fig_4



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KEYBOARD PROVIDING SERIAL GENERATION OF TWO DIFFERENT CODES RESPONSIVE TO ONE KEY DEPRESSION

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2 Claims. (Cl. 197—16)

ABSTRACT OF THE DISCLOSURE

A code generating keyboard having key controlled mechanism for effecting a serial generation of two distinct codes in response to depression of a single key. The movement of a first code generating element, initiated by key depression, is operative after generation of its representative code to rock a lever which initiates the movement of a second code generating element.

This invention relates to code generating keyboards; more particularly it relates to a code generating keyboard having key actuated mechanisms for effecting the serial generation of two distinct codes in response to a single key depression; and specifically it relates to a code generating keyboard having a carriage return code generating element operably positioned by a carriage return key to initiate a cycle of and to be driven by a power element, and mechanism responsive to movement of a carriage return code generating element for operably positioning a line feed code generating element which will thereby recycle and be driven by the power element to generate a line feed code following the generation of a carriage return code.

In conventional office typewriting machines a line feed function is a by-product of the initiation of a carriage return function; thus these machines are not provided with a separate line feed key lever. That is, when a carriage return function is initiated, a motor is clutched to the carriage via a drawband thereby to pull the carriage. The drawband is operative on the line fed mechanism before carriage movement starts; the line feed mechanism completing its return stroke after the carriage is arrested and the clutch disengaged.

Some data processing machines, as distinguished from office typewriting machines, include means to generate by-product codes representative of the keys on a keyboard. Such codes are usually recorded on tapes for later utilization to automatically operate other machines. These machines follow the scheme employed in office machines in that the line feed function is a by-product of carriage return key depression. In these machines there is no necessity for and they therefore do not produce a line feed code but only a carriage return code. If a line feed code is specified as a desired output, these machines must be provided with a separate line feed key and the line feed function must be divorced from the carriage return function.

The latter scheme, i.e. the provision of a separate index and carriage return keys to produce associated codes and functions is followed in teletype machines adapted for by-product code generation and transmission. These separate keys must be depressed serially to accomplish the related functions and codes. Usually the operators of these machines are trained to depress the carriage and line feed keys in sequence.

The machines discussed above are generally characterized by keyboards married to printers, i.e. the keys are mechanically linked to and trigger associated print actions and machine functions. The codes are by-products, i.e. the codes are not employed to select the character printed.

In recent years data processing machines comprising mechanically divorced code producing keyboards and printers have been proposed; the keyboards in these modular machines are separate units whose function is to generate codes which may be coupled either mechanically or electrically to a translator within one or more remote printers to select and print a character, or one or more remote tape recording devices to record a code.

In that such data processing machines with code producing keyboards have now moved into the office and their operation is falling to operators trained to use office machines, it is desirable that an operator be able to shift from a data processing machine keyboard to an office machine keyboard without having to remember different rules, particularly in systems whose specifications require a line feed code.

In accordance with the invention a code producing keyboard is provided which is manipulatable in the same fashion as a conventional office machine keyboard, and produces a carriage return and a line feed code in sequence upon manipulation of the carriage return key only.

Accordingly, an object of the invention is to provide a code generating keyboard having the ability to generate a line feed code in response to depression of a line feed key or in response to depression of a carriage return key following the generation thereby of a carriage return code.

A further object of the invention is to provide a simple inexpensive coupling between a carriage return code generating element and a line feed code generating element so arranged that a line feed code will be automatically generated after the generation of the carriage return code.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIGURE 1 is an elevational view of a carriage return key lever and associated code producing element associated with a lever for effecting rocking of an adjacent line feed code producing element;

FIGURE 2 is an elevational view similar to FIGURE 1 showing the carriage return code producing element rocked and latched in position for power driven translatory movement;

FIGURE 3 is an elevational view similar to FIGURE 1 showing the carriage return code producing element in forward returned position and the line feed code producing element rocked to latched position during the translatory movement of the carriage return code producing element;

FIGURE 4 is a cut away plan view of several code slides and an interposer; and

FIGURE 5 is a perspective view of a cycle clutch mechanism.

Referring now to the drawings wherein like reference numerals designate like or corresponding parts throughout the several views there is shown in FIGURE 1 a carriage return key **10** which is mounted on a key lever **11**. Other keys **12** are mounted on other key levers comprising the keyboard complement of a code producing keyboard in accordance with the invention. The rear ends of the key levers are pivoted on a common transverse fulcrum **13** and biased counterclockwise to a normal position against an upstop **14** lying above the forward ends **15** of the key levers by springs **16** connected to the downwardly depending tails **17** of the key levers and to a common transverse anchor rod **18**.

Directly below each key lever and substantially coextensive therewith is an interposer or code producing element generally designated by reference numeral **19** adapted to be rocked clockwise and thereafter power translated to the right or rearwardly as viewed in FIGURES 1–3. The rearward translating movement drives the rear edge **20** of the interposers into triangular permutably located cam notches **21** (FIGURE 4) of a set of bistable code slides **22** which are mounted for transverse movement. The movement of the interposers will cam selected ones of the code slides to the right (binary 0) or the left (binary 1) or not at all, depending on the previous condition of the code slides as illustrated in FIGURE 4, thus making or breaking switches (not shown) positioned at one end of the code slides.

Referring again to FIGURE 1 the interposer **19** is formed with a forked forward end **23** which embraces a common frame supported transverse fulcrum rod **24** located below the forward end of the keylevers and below and rearwardly of a keylever downstop **25**.

The upper edge of the interposer rearwardly or to the right of the forked end as viewed in the FIGURES 1–3, is formed with an upstanding post **26** which underlies a bent off lug **27** of a by-pass arm **28** pivotally secured to the key lever. A spring **29** secured at one end to and below the pivot of the by-pass arm and to the upper edge of the interposer rearwardly of the post serves to bias the by-pass arm counterclockwise the counterclockwise movement being limited by a bent off lug **30** of the by-pass arm which overlies the upper edge of the key lever.

The spring **29** also serves to bias the interposer **19** forwardly and counterclockwise or upwardly about its fulcrum **24**. The rear end of the interposer is supported for planar movement in frame supported upper and lower guide combs **31** and **32** and the rear edge **20** of the interposer which is adapted to be driven into cam notches **21** of and to cam code slides **22**, is provided on its lower end with a forward projection **33** which extends into the lower guide comb **32**; the upper edge **34** of the comb serving to limit the counterclockwise movement of the interposer. Thus depression of the key lever **11** will bring the by-pass arm **28** into engagement with the interposer post **26** and rock the interposer **19** clockwise about fulcrum rod **24**; the geometry of the parts being such that spring **29** offers negligible resistance to rocking movement of the interposer.

The lower edge of the interposer rearwardly of the post **26** is provided with a depending part **35** having a forwardly and upwardly sloping edge **36** adapted when the interposer is rocked clockwise to cammingly depress and rock a common clutch trigger bail **37** to effect cycle clutch engagement, the forwardly offset ends **38** of which, as shown in FIGURE 5, are pivotally mounted in the side frames **40** of the machine. The depending part **35** is also formed with a projection **39** extending forwardly of the sloping edge which normally abuts a cross piece **41** of and forwardly flexes an associated flexible latching element **42** extending upwardly from a fixed support **43**. An opening **44** in the flexible latching element **42** below the cross piece serves to trap the interposer and latch it in its fully rocked position as shown in FIGURE 2 after the clutch trigger bail **37** has rocked sufficiently to trip a cycle clutch and initiate a 180° cycle of an interposer drive shaft **45** rotatably mounted in side frames **40** and located to drive interposers as will hereinafter appear.

The lower edge of the interposer rearwardly of the clutch trigger actuator and interposer latch part is formed with a depending spade-like projection **46** adapted to cooperate with a conventional ball interlock assembly generally designated by reference **47** thus to prevent the simultaneous or near simultaneous depression of more than one key lever to an extent sufficient to initiate a cycle.

Further, the lower edge of the interposer rearwardly of the locking blade is formed with a cut out to define a forwardly facing shoulder or drive surface **48** facing and adapted to be engaged and to be driven rearwardly by 180° spaced interposer drive lobes **49** on the interposer drive shaft **45** which is rotated through a half revolution when a cycle clutch is triggered. The cut out further defines a depending abutment **50** rearwardly of the locking blade which is adapted to be engaged by the lobes **49** toward the end of a 180° cycle, thereby to drive the interposer upwardly so that the locking blade will clear the ball lock as spring **29** returns the associated interposers to normal position.

With reference to FIGURE 5, one end **38** of the clutch trigger bail **37** carries a lever **51** which is connected as by a link **52** to rock a pivotally mounted clutch interposer **53** counterclockwise against the bias of a spring **54** whereby the end **55** of the clutch interposer will move out of the path of 180° spaced peripheral shoulders **56** on a clutch control disc **57**. The clutch control disc **57** is rotatably mounted on a sleeve **58** extending from a continuously belt driven pulley **59**. The pulley and sleeve are rotatably supported by a stub shaft **60** extending from the machine frame **40**. Another clutch control disc **61** formed with oppositely facing peripheral 180° spaced shoulders **62** is also rotatably mounted on sleeve **58**, and a pivotally mounted no-back interposer **63** is biased in the path of the shoulders thereof. The control discs **57** and **61** secure opposite ends of a wrap spring **64** which is coiled about the driven sleeve **58**. With the clutch interposer end **55** in the path of a shoulder **56** on the clutch control disc **57**, the counterclockwise rotation of the sleeve will cause the spring **64** to expand and disengage from the sleeve. When the control disc **57** is free to rotate by rocking interposer **53** counterclockwise, the coil spring **64** will engagingly wrap about sleeve **58** thereby driving both clutch control discs over a 180° cycle. As is evident, should a second key be depressed and latched during one cycle, the clutch will remain engaged to drive the second interposer. The clutch control disc **61** is integrally formed with or secured to a gear **66** which is in mesh with and drives a gear **67** secured to one end of the interposer drive shaft **45**.

With reference to FIGURES 2 and 3 there is shown a line feed interposer identical to and adjacent the carriage return interposer. As they are identical, corresponding parts of the line feed interposer are designated by primed reference numerals. The line feed interposer **19′**, in order to provide a keyboard similar to that of a conventional office typewriter, will normally not be associated with a key lever, though if a separate line feed key to produce line feed codes is desired, a key lever therefor may be provided. Where no key lever is provided with the line feed interposer **19′**, the latter will be biased to normal position by a spring **72** secured to the projection **33′** extending forwardly of the rear end of the line feed interposer as shown.

In accordance with the invention there is provided a lever **73** pivotally mounted on the interposer fulcrum shaft **24** having an upwardly extending projection **74** and a forwardly and downwardly extending projection **75**, the latter having an offset end **76** overlying the upper edge of the line feed interposer **19′** rearwardly of the fulcrum shaft. The upwardly extending projection is connected by a spring **77** to the upper edge of the carriage return interposer **19** forward of its post **26**.

As viewed in FIGURE 2 the initial rocking of the carriage return interposer rotates the spring **77** through an arc and negligible pressure is applied by lever **73** to rock the line feed interposer **19′**. As the carriage return interposer **19** moves rearwardly the spring connection tends to rock the lever **73** clockwise but substantial rocking of the line feed interposer is prevented by the ball lock **47**, and by the engagement of the horizontal edge **78′** defining the interposer drive shoulder with the periphery of the interposer drive shaft **45** until the carriage return

interposer **19** completes its rearwardly powered translatory movement. At this time the line feed interposer **19'** will be permitted to move to its fully rocked and latched position thus redepressing the clutch trigger bail **37** to maintain the clutch engaged for another 180° cycle during which time the line feed interposer **19'** will be translated rearwardly; its associated latch element maintaining the line feed interposer **19'** rocked during the return movement of the carriage return interposer **19** and the line feed interposer actuating lever **73**.

As will be understood the returning carriage return interposer **19** will rock the by-pass arm **28** clockwise if the carriage return key lever is still held depressed thus preventing a repeat action.

It should be understood that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. A code generating keyboard comprising,

a frame,

a keylever and an interposer fulcrum rod supported by said frame,

a plurality of keylevers pivotally supported by said keylever fulcrum rod,

an interposer beneath each of said keylevers rockably supported by said interposer fulcrum rod and power translatable relative thereto, said interposers being rockable from a restored to an active position in response to depression of its associated keylever through a normal distance,

a spring for restoring each of said interposers after translatory movement thereof,

a cyclically operable shaft for power translating a rocked interposer to generate a respresentative code,

means for preventing the rocking of a second interposer until a first rocked interposer has been translated by said shaft,

means for latching a rocked interposer and for releasing a said rocked interposer as it is translated thereby permitting another interposer to be rocked,

means responsive to the rocking movement of an interposer for cycling said shaft,

a lever pivoted on said interposer fulcrum rod having an offset overlying one of said interposers located adjacent a predetermined interposer,

and a spring connected between said predetermined interposer and said lever operative toward the end of powered translatory movement of said predetermined interposer to rock said lever to thereby rock the said one interposer adjacent the predetermined interposer.

2. A keyboard as recited in claim **1** wherein said predetermined interposer is rockable by a carriage return key and said one interposer adjacent said predetermined interposer is operative to generate a line feed code.

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