Typewriter keyboard with a keylever pawl tube spring.

Priority: 31.03.80 US 136001

Date of publication of application: 07.10.81 Bulletin 81/40

Publication of the grant of the patent: 23.01.85 Bulletin 85/04

Designated Contracting States: BE CH DE FR GB IT LI NL SE

References cited:
CH-A-211 345
FR-A-1 360 162
US-A-3 032 168
US-A-3 915 277


Proprietor: International Business Machines Corporation
Old Orchard Road
Armonk, N.Y. 10504 (US)

Inventor: Mayborg, Charles Clarence
684 Longwood Road,
Lexington Kentucky 40503 (US)
Inventor: Teel, Il Delbert Lewis
3473 Lansdowne Drive
Lexington Kentucky 40503 (US)

Representative: Siccardi, Louis
Compagnie IBM France Département de Propriété Industrielle
F-08610 La Gaude (FR)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention.)
a transversal softness is necessarily accompanied with a high longitudinal softness. The latter would then require tedious and time-consuming work for inserting the restore member across the keyboard, beneath all of the key-levers and into a small space defined between the pawls and the key-levers, especially as no support or guiding means exist for such a restore member in the said keyboard arrangement.

Brief Description of the Invention

The object of the invention is to eliminate the multiple springs required for restoring the key-lever pawls with respect to the key-levers, in a typewriter keyboard of the type described for example in FR—A—1,360,162 and to simplify assembly of the typewriter keyboard.

The object of the invention is achieved and the disadvantages of the prior art are overcome, according to the present invention, by a typewriter keyboard of the type described in FR—A—1,360,162 characterized in that each of the key-levers comprises a depending support member and in that a resilient deformable, open-ended, hollow tubular restore member deformable in cross section is supported by said depending support members, with its axis transverse to said key-levers, in a position where it is engageable and deformable by each of said pawls moving out of its motion-transferring relation with its associated interposer.

The restore member of the present invention being a hollow body, the material of which it is constituted can readily be chosen so as to confer to the said body both the required transversal softness for easily collapsing under the action of the pawls and the required longitudinal stiffness for an easy insertion of the body in the zone defined by the said depending support members. In addition, as the said depending support members are integral with the key-levers, no separate assembly and adjustment operations of the support members are required and the support members further act as guiding means for the restore member during insertion thereof across the keyboard.

As the hollow restore member of the invention is provided with end openings to the atmosphere, the only forces encountered by the key-lever pawls are the forces of local deformation of the member as it seeks to return to its original undeformed condition.

Brief Description of the Drawings

Figure 1 is a perspective view of a portion of a keyboard according to the present invention. Figure 2 is an end view of the keyboard portion showing the key-lever pawl restore member relationship with the key-lever and interposer in a rest position. Figure 3 illustrates the positions of elements of the keyboard when the key-lever and interposer are depressed to effect selection of a desired character.
Figure 4 illustrates the keyboard with the interposer causing local deformation of the tube spring by its action upon the keylever pawl, upon restoration of the interposer before the release of the keylever.

Detailed Description of the Invention

The keyboard of an office machine, such as the IBM SELECTRIC typewriter, has key buttons 10 and keylevers 12 for entering the information desired. The keylever 12 is typically pivotally mounted on pivot 14. Pivot 14 extends across the entire keyboard and is a common pivot for all keylevers 12 which are arranged in parallel spaced relation. Carried on keylever 12 is keylever pawl 16. Keylever pawl 16 is mounted for pivotal movement on pivot 18. Keylever pawl 16 is also provided with a stop lug 20 which prevents keylever pawl 16 from moving past a predesignated desired position with respect to keylever 12. Stop lug 20 is effective to stop the movement of keylever pawl 16 in a clockwise direction, as illustrated in the drawings, to align keylever pawl 16 with interposer stem 36.

Extending from the underside of keylever 12 is a support appendage 22 formed into a generally hooked shape. This support appendage 22, in conjunction with similar support appendages 22 on other keylevers, constrains the movement of a tube spring 24 which extends transverse to all keylevers. Tube spring 24 rests on the upper surface of the support appendage 22 and is effectively trapped between keylever pawl 16 and appendage 22. Appendage 22 is provided with sufficient length to insure a clearance, above tube spring 24 and beneath the underside of keylever 12, sufficient for keylever 12 to be rotated about pivot 14 to its activated position without engaging the top of tube spring 24. The up position or normally restored position of keylever 12 is defined by the keylever upstop 26. Lateral stability for keylever 12 is provided by the front comb 28 which restricts the extent of movement of the keylever 12 laterally and downward. Restoration of keylever 12 upon release is accomplished by the keylever return spring 30 which is a leaf spring engaging the underside of keylever 12 with one of its ends and grounded at the other end by return a spring bracket 32 to a portion of the frame of the typewriter keyboard.

Positioned beneath each of the keylevers 12 on the keyboard is an interposer 34. Interposer 34 is provided with a plurality of code lugs 33 which may be removed or left intact depending on the character coding desired for each specific keylever. Extending upwardly from interposer 34 is a stem 36. Stem 36 has a flat area 37 on the end thereof for the engagement of the underside of keylever pawl 16. In addition, stem 36 has a rear surface 38 which is engageable with the front surface 40 of keylever pawl 16.

Interposer 34 is constrained against lateral movement while, at the same time, being allowed longitudinal movement by a guide comb 42. Guide comb 42 and bracket 44 together form a race within which balls 46 may be placed to interlock against more than one interposer 34 being displaced into the ball interlock formed by guide comb 42, bracket 44 and balls 46. The filter shaft 50 may be cyclically driven through a conventional single cycle clutch 52 or oscillated as a ball by appropriate linkage. The rib or flute 54 of filter shaft 50 will impact interposer 34, which has been depressed, to provide the drive force necessary to translate interposer 34 longitudinally for character selection coding. Interposer 34 is provided with an aperture 56 through which interposer fulcrum shaft 58 extends.

Inteurope fulcrum shaft 58 provides a sliding and pivotal support for interposer 34. The front interposer guide comb 60 provides lateral and rotational support to keep the character interposer 34 in its appropriate relationship with the other interposers on the keyboard.

Return spring 48 acts to pull interposer 34 into its restored position upon being freed of external forces from filter shaft 50 and keylever pawl 16.

The general operation of the keyboard incorporating tube spring 24 is quite similar to other previously marketed keyboards. As key button 10 and keylever 12 are depressed by the operator, keylever 12 pivots around pivot 14, thus causing keylever pawl 16 to move downward. As keylever pawl 16 moves downward, it engages the top 37 of interposer stem 36. This, in turn, causes interposer 34 to rotate in a clockwise direction about interposer fulcrum shaft 58 lowering the rear end of the interposer such that the nose 61 of the interposer 62 will be forced between balls 46 contained in the ball tube formed by guide comb 42 and bracket 44, thus interlocking the keyboard against the depression of a subsequent carrier interposer. With the interposer 34 depressed, the rear end 35 of the interposer 34 is then engageable by flute 54 of filter shaft 50 upon its next cyclic rotation. Interposer 34, upon engagement by flute 54, will translate longitudinally and generally leftward in the drawings to effect the selection coding of the character selected.

Upon disengagement of the flute 54 from the end 35 of the interposer 34, the restore spring 48 will urge the interposer 34 upward and toward the right to its rest position. As the interposer 34 restores to its rest position and assuming that keylever 12 remains depressed by the operator's force on key button 10, the rear surface 38 of stem 36 will engage the front surface interposer 34 completely to its home or rest position, the spring force is transmitted through stem 36 to keylever pawl 16 causing the keylever pawl 16 to be displaced counterclockwise about pivot stud 18.

The rear surface of keylever pawl 16 will then
engage the external periphery of tube spring 24 causing tube spring 24, made of a resilient rubber or similar material to locally collapse under the keylever pawl 16 are the forces of local information of the tube as the latter seeks to return to its original undeformed position. The keylever pawl will continue to deform tube spring 24 until such time as the operator removes the force on key button 10 allowing keylever 12 to rise about its pivot 14 and engage the keylever upstop 26. As keylever 12 is restored by keylever return spring 30, the force of keylever return spring 30 having been stored during the depression of keylever 12, the front edge 40 keylever pawl 16 will disengage the rear surface 38 of interposer stem 36. As this disengagement occurs, the resilient nature of tube spring 24 and the forces generated in the wall of the tube spring 24 by keylever pawl 16 will act to restore the resilient tube spring 24 to its normal cross sectional shape, thus forcing keylever pawl 16 in a clockwise direction to restore it to its normal at rest position defined by the engagement of stop lug 20 with the underside of keylever 12.

The single tube spring, made of rubber or other easily deformable but resilient material, will provide a restore force to the keylever pawl 16 while, at the same time, providing restore forces to other keylever pawls on other keylevens 12 which may as yet not have been returned to their rest position. The tube spring is a simple reliable improvement over the multiple keylever pawl springs heretofore commonly found in typewriter keyboards.

Claims

1. A typewriter keyboard of the type comprising:
   a plurality of keylevens (12), each of said keylevens being mounted for movement between a rest position and a depressed position,
   restoring means (30) for restoring the keylevens (12) to their rest position,
   an interposer (34) associated with each of said keylevens (12) and having an activated position and a rest position,
   interposer restoring means (48) for restoring said interposers (34) to their rest position,
   a keylever pawl (16) pivotally mounted on each of said keylevens (12), said keylever pawl (16) engaging said interposer (34), when the keylever (12) is moved to its depressed position, to transfer the motion of the keylever (12) to the interposer (34) and to move the latter to its activated position and to, under the influence of the interposer (34) pivot out of motion-transferring relation to allow said interposer (34) to restore to its rest position under the action of said interposer restoring means (48),

said typewriter keyboard being characterized in that each of said keylevens comprises a depending support member (22) and in that a resilient deformable, open-ended, hollow tubular restore member (24) deformable in cross-section, is supported by said depending support members (22), with its axis transverse to the keylevens (12), in a position where it is engageable and deformable by said pawl (16) during the pivoting movement thereof, to provide restoring forces to said pawl (16).

2. A typewriter keyboard according to claim 1, characterized in that the restore member (24) is supported by the support members (22) in a position allowing a keylever (12) to be depressed without deforming the restore member (24).

Revendications

1. Clavier de machine à écrire du type comportant:
   une pluralité de leviers de touche (12), chacun étant monté de façon à pouvoir être transféré d’une position de repos à une position enfoncée et inversement,
   des moyens de restauration (30) pour restaurer les leviers de touche (12) dans leur position de repos,
   une barre de commande (34) associée à chaque levier de touche (12) pouvant être placée en position de travail ou en position de repos,
   des moyens de restauration des barres de commande (48) pour restaurer lesdites barres de commande (34) en position de repos,
   un cliquet de levier de touche (16) monté à pivot sur chacun des leviers de touche (12), ledit cliquet de levier de touche (16) sollicitant ladite barre de commande (34) lorsque le levier de touche (12) est transféré dans sa position enfoncée, pour communiquer le mouvement du levier de touche (12) à la barre de commande (34) et pour passer cette dernière en position de travail et, sous l’effet de la sollicitation de la barre de commande (34), pour provoquer par pivotement la suppression de la communication du mouvement afin de permettre à ladite barre de commande (34) de revenir dans sa position de repos sous l’action dudit moyen de restauration de barre de commande (48),

ledit clavier de machine à écrire étant caractérisé en ce que chacun desdits leviers de touche comprend un élément de support inférieur (22) et en ce qu’un élément de restaura- 

tion tubulaire, creux, à extrémités ouvertes, déformable et flexible (24) de section déformable, est porté par ledit élément de support inférieur (22) avec son axe orienté transversalement aux leviers de touche (12), dans une position où il peut être sollicité et déformé par ledit cliquet (16) pendant le mouvement de pivotement de celui-ci, afin d’appliquer des forces de restauration audit cliquet (16).

2. Clavier de machine à écrire selon la re-
vendications 1 caractérisé en ce que l’élément de restauration (24) est porté par les éléments de support (22) dans une position permettant l’enfoncement d’un levier de touche (12) sans déformation de l’élément de restauration (24).

Patentansprüche

1. Eine Schreibmaschinentastatur von der Art, die umfasst:
   eine Vielzahl von Tastenhebeln (12), wobei jeder dieser genannten Tastenhebel im Hinblick auf einen Lauf zwischen einer Ruhestellung und einer niedergedrückten Stellung eingebaut ist:
   ein Rückführmittel (30), um die Tastenhebel (12) in ihre Ruhestellung zurückzubringen;
   einen mit jedem der genannten Tastenhebel (12) zusammenwirkenden Zwischenhebel (34) mit einer aktivierten und einer Ruhestellung;
   ein Zwischenhebel-Rückführmittel (48), um die genannten Zwischenhebel (34) in ihre Ruhestellung zurückzuführen;
   einen Tastenhebelfinger (16), der schwenkbar an jedem der genannten Tastenhebel (12) angeordnet ist, wobei der genannte Tastenhebelfinger (16) den Zwischenhebel (34) betätigt, wenn der Tastenhebel (12) in seine nieder gedrückte Stellung gebracht wird, um den Lauf des Tastenhebels (12) auf den Zwischenhebel (34) zu übertragen und derart diesen Zwischenhebel in seine aktivierte Stellung zu bringen und um unter der Einwirkung des Zwischenhebels (34) aus der Bewegungsübertragenden Stellung zu schwenken, damit der genannte Zwischenhebel (34) unter der Wirkung des genannten Zwischenhebel-Rückführmittels (48) in seine Ruhestellung zurückgeführt werden kann;
   wobei die genannte Schreibmaschinentastatur dadurch gekennzeichnet ist, dass jeder der genannten Zwischenhebel ein hängendes Halteglied (22) umfasst, und dass eine elasstisches, nachgiebiges, offendiges, hohles, rohrförmiges Glied (24), das in seinem Querschnitt verformt werden kann, von dem genannten Halteglied (22) getragen wird, während seine Längsachse quer zu den Tastenhebeln (12) in einer Stellung steht, die ein Einwirken darauf ermöglicht; und
   die einer Verformung durch den genannten Finger (16) während dessen Schwenkbewegung erlaubt, um eine Rückführkraft für den genannten Finger (16) zu liefern.
2. Eine Schreibmaschinentastatur nach Anspruch 1, dadurch gekennzeichnet, dass das Rückführglied (24) von den Haltegliedern (22) in einer Stellung gehalten wird, die es erlaubt, einen Tastenhebel (12) niederzudrücken, ohne dass das Rückführglied (24) verformt wird.