

[54] SINGLE ELEMENT TYPE ACTION  
ARRANGEMENT

[75] Inventor: Manfred Link, Nurnberg, Germany  
[73] Assignee: Triumph Werke Nuernberg A.G.,  
Nurnberg, Germany  
[22] Filed: Feb. 25, 1974  
[21] Appl. No.: 445,561

[30] Foreign Application Priority Data

Mar. 2, 1973 Germany..... 2310593

[52] U.S. Cl..... 197/16; 197/17  
[51] Int. Cl..... B41j 5/22  
[58] Field of Search ..... 197/16, 17, 98, 18

[56] References Cited

UNITED STATES PATENTS

2,938,615	5/1960	Donnan et al.	197/17
3,195,707	7/1965	Reynard	197/16
3,327,828	6/1967	Dannatt	197/16 X
3,349,885	10/1967	Stuiber et al.	197/17
3,715,022	2/1973	Rix et al.	197/17 X
3,814,228	6/1974	Blum	197/16
3,817,366	6/1974	Blum	197/16

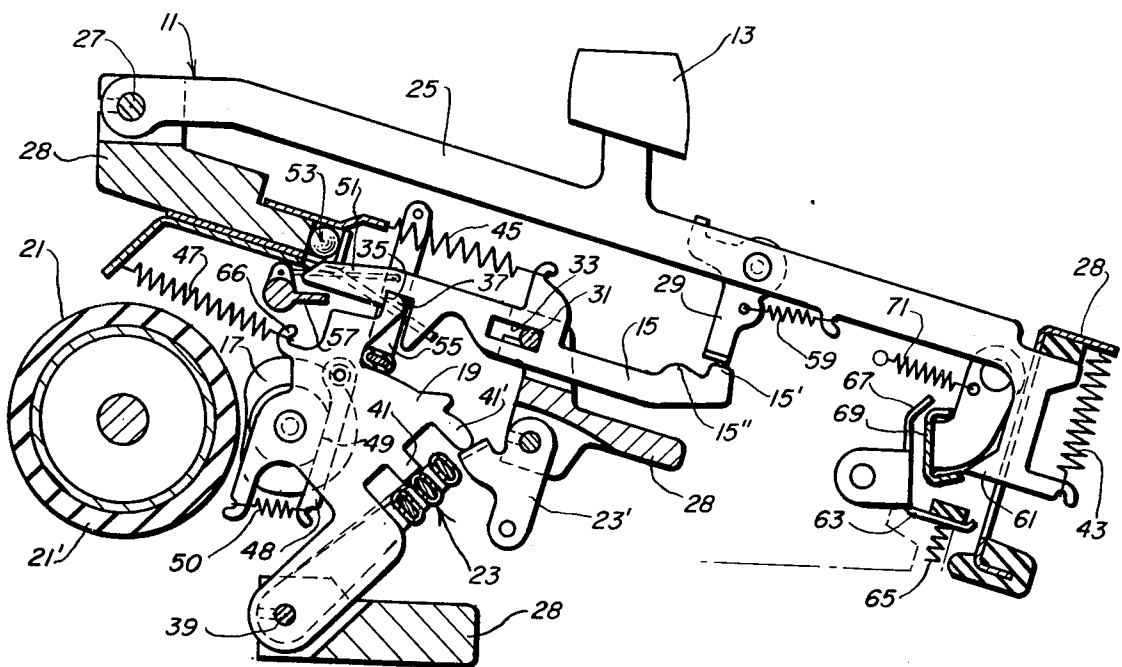
Primary Examiner—Edgar S. Burr  
Assistant Examiner—R. T. Rader  
Attorney, Agent, or Firm—Joseph R. Spalla

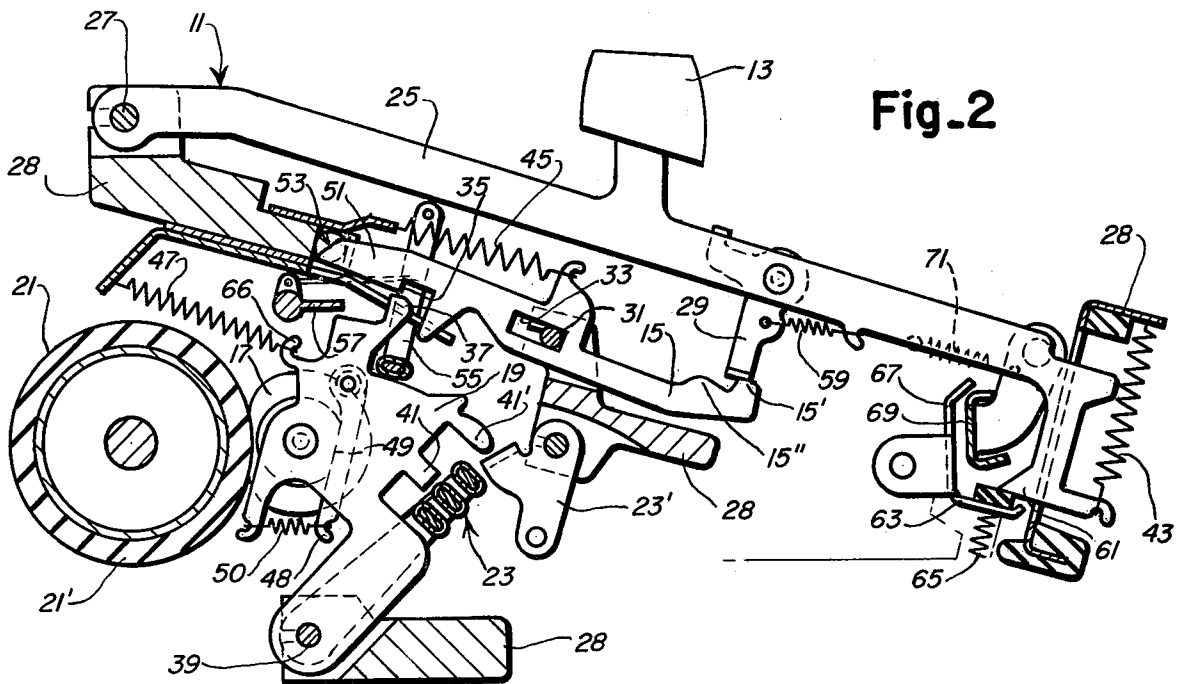
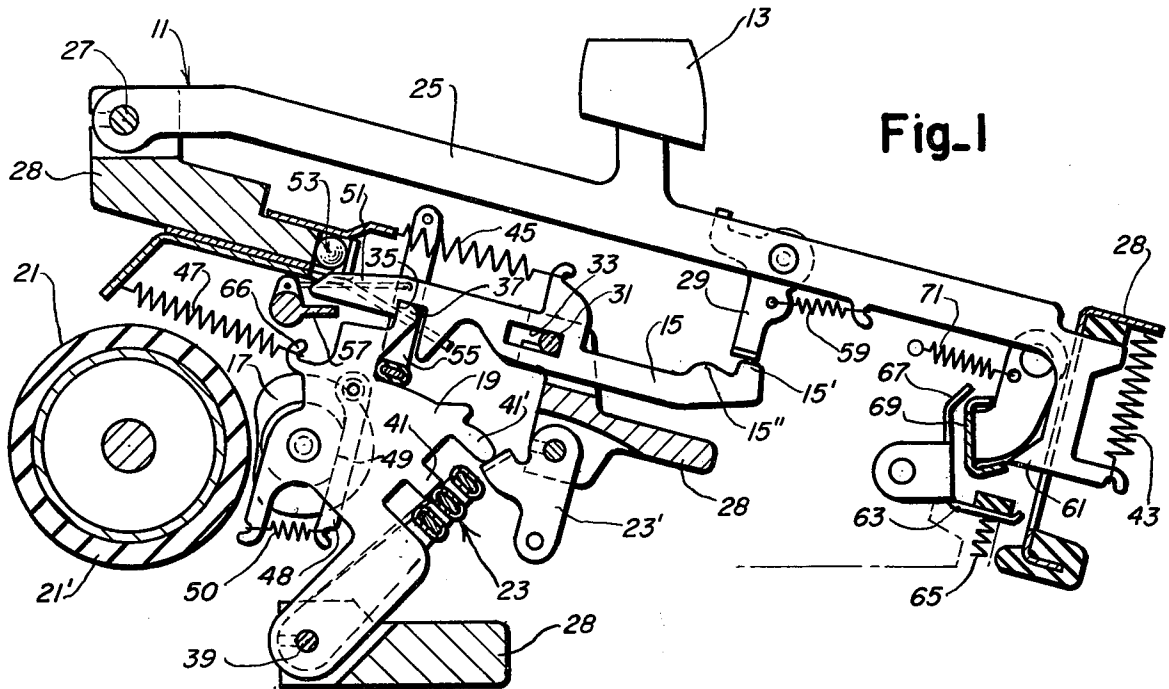
[57] ABSTRACT

A single element printer is provided with a type action

arrangement wherein character selection members are moved pivotally to determine the orientation of a single print element to print a selected type character by lugs on a pivotal drive lever carrying a drive cam which is rotatably driven by frictional engagement with a rotating power roll for imparting a cyclical driving movement to the drive lever. The engagement of the drive cam with the power roll is controlled by a control lever which is pivoted out of blocking relation to the drive lever in response to the depression of a corresponding type keylever. The control lever is momentarily moved into a ball ratchet to prevent the simultaneous depression of another type keylever and then slidably driven by the drive lever to an actuated position where it is pivoted under the urging of a spring for returning to blocking relation with the drive lever upon completion of the printing operation. To prevent malfunctions resulting from the simultaneous operation of other type actions, the movement of the cyclically driven drive lever causes a lock bar to be moved into blocking relation with the other drive levers to prevent another drive cam from engaging the power roll. Repeated printing of the selected type character is effected by further depressing the type keylever to further pivot the control lever and prevent it from returning to blocking relation with the drive lever upon completion of the printing cycle. In addition, other type keylevers are prevented from being depressed by a key lock bar which is moved into blocking relation with a stop projection of other type keylevers in response to the further depression of the selected type keylever.

7 Claims, 4 Drawing Figures





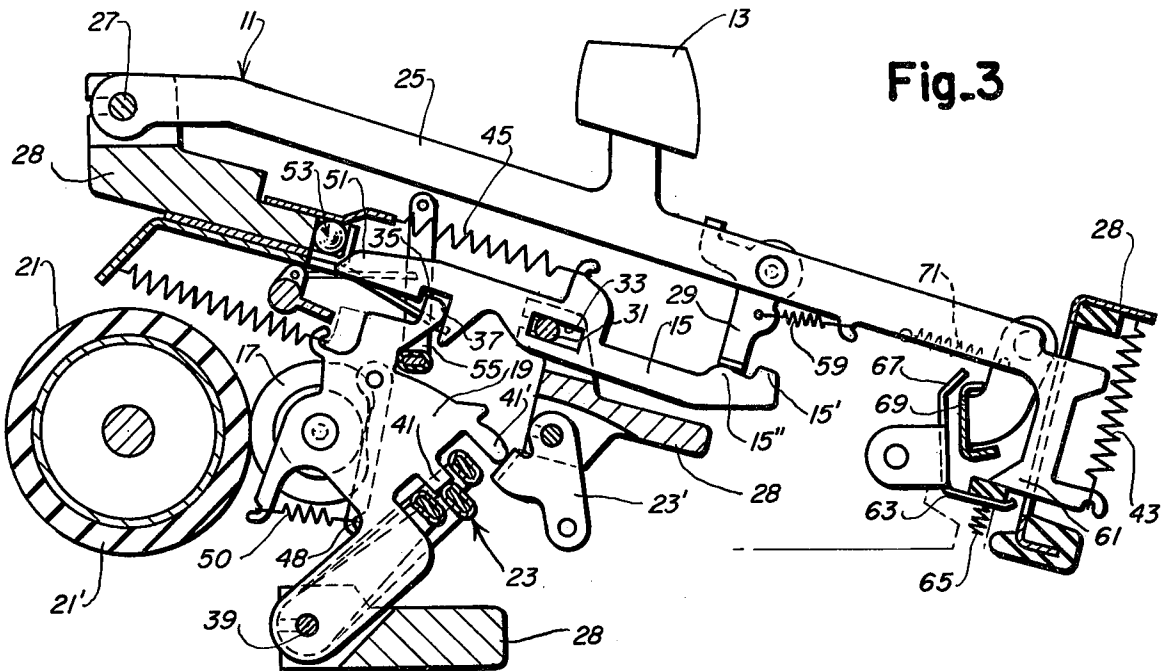


Fig. 3

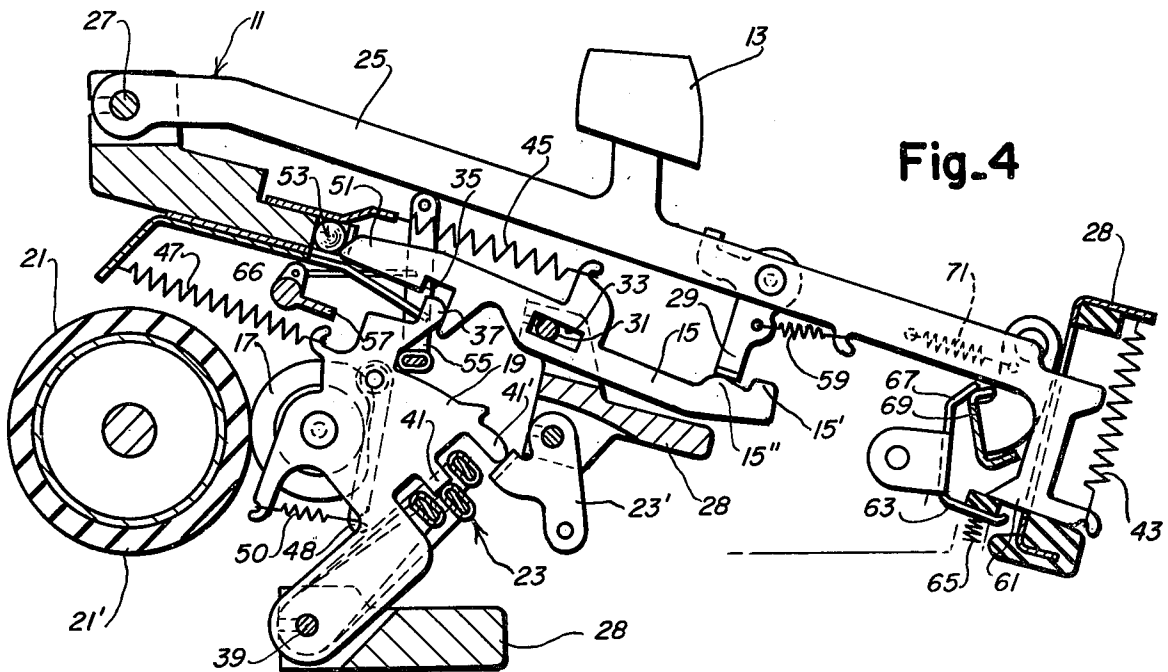


Fig. 4

## SINGLE ELEMENT TYPE ACTION ARRANGEMENT

This invention relates to a printer having a single print element with a plurality of different type characters at different positions, and more particularly, to a key operated type action arrangement for determining the orientation of the single print element to print a selected type character.

In a single element typewriter, selected type characters are printed by depressing a corresponding type keylever to operate a type key action which determines the orientation of the print element for printing the selected type character by impacting it against a recording medium suitably supported on a platen. In the past, single element typewriters have been provided with type action arrangements in which the depression of a type key moves an interposer into engagement with a tooth on a rotating shaft which drives the interposer in a translatory motion to move corresponding character selection members which determine the orientation of the print element to print the selected type character. Such arrangements are shown, for example, in German Disclosure No. 1,965,031 and corresponding to U.S. Pat. No. 3,817,366 granted to R. Blum German Pat. No. 1,207,942 corresponding to U.S. Pat. No. 3,086,635 granted to L. E. Palmer. However, the impact accompanying the engagement and disengagement of the interposer with the rotating tooth is undesirably noisy and imparts vibrations to the typewriter. Moreover, with some type actions it is necessary to hold the character selection members in an operated position for a period of time and this often necessitates locking and subsequently unlocking the character selection members at the operated position which necessarily reduces the operational speed of the type action arrangement and increases the attendant noise.

Accordingly, an object of the present invention is to provide a single element printer with a type action arrangement in which the character selection members are moved without the noise and vibrations accompanying the impact of an interposer driven in a translatory movement by engagement with rotating toothed drive shaft.

Another object of the invention is to provide a single element printer with a type action arrangement in which the character selection members are driven to an operated position and held there, for a predetermined period of time without being locked at the operated position.

Still other objects, features and advantages of the present invention will become apparent to those skilled in the art from a reading of the following detailed description of a preferred embodiment taken in conjunction with the accompanying drawing, wherein:

FIG. 1 is a sectional view of a type action arrangement constructed in accordance with the present invention and illustrating the condition of the type action arrangement in the normal rest position;

FIG. 2 is a view similar to FIG. 1 and illustrating the condition of the type action arrangement upon initiation of the printing operation;

FIG. 3 is a view similar to FIG. 1 and illustrating the condition of the type action arrangement upon movement of a character selection member to an operated position; and

FIG. 4 is a view similar to FIG. 1 and illustrating the condition of the type action arrangement to effect repeated printing of a type character.

Referring now in detail to the figures in the drawing, there is shown a type action arrangement, generally indicated 11, for controlling the printing operation of a typewriter having a single print element and for effecting repeated printing of a type character. As is conventional, the single print element has a plurality of type characters formed thereon at different positions, and the printing of a selected type character is effected by orienting the print element to bring the selected type character into position for printing while driving the print element in a printing movement to impact the selected type character against a recording medium. The type characters formed on the print element have a corresponding type key 13 which is typically located on a keyboard area of the typewriter and the printing of a selected type character is initiated by depressing the corresponding type key 13. Although only a single type action arrangement 11 is illustrated in the drawing, it is to be understood that the typewriter has a plurality of such type action arrangements 11 each associated with a different type character on the single print element and operated by a corresponding type key 13.

As explained below in further detail, the depression of a selected type key 13 moves a control lever 15 and causes a drive cam 17 carried on a drive lever 19 to be brought into engagement with a rotatable drive means in the form of a power roll 21 rotatably driven by a suitable motor, not shown. The rotation of the drive cam 17 imparts a cyclical driving movement to the drive lever 19 which actuates character selection members, generally indicated 23, to determine the proper orientation of the print element for printing the selected type character. The print element, the recording medium, the motor and other portions of the typewriter are not shown since they form no part of the present invention and may be desirably conventional.

As shown, the type key 13 is mounted on a keylever 25 which is pivotally supported by a rod 27 in a portion of a typewriter frame 28 and carries a release pawl 29 for engaging a raised portion 15' at the rearward end of the control lever 15. The control lever 15 is slidably and pivotally supported about a rod 31 which is received in a slot 33 formed in the control lever 15 which also has an abutment 35 engaging a projection 37 of the drive lever 19 to block movement thereof toward the power roll 21. The drive lever 19 is pivotally supported about an axis 39 for movement in one direction toward the power roll 21 and in another direction toward the character selection members 23. The power roll 21 has an elastic surface in the form of a rubber sleeve 21' for frictional engagement with the drive cam 17, and the drive lever 19 has means in the form of lugs 41 for engaging the character selection members 23 which are pivotally supported about the same axis 39 as the drive levers 19. In addition, another character selection member 23' may be pivotally supported on another portion of the typewriter frame 28 for engagement by another lug 41' of the drive lever 19. As is conventional, the character selector members 23 are common to a plurality of type actions and correspond to the positions of the type characters on the single print element and serve to operate further mechanisms, not hereinafter described, for controlling the orienting movement of the single print element. Although not

shown, the plurality of other type actions operated by the other type keys, referred to hereinabove, each include corresponding keylevers 25, control levers 15 and drive levers 19, which are mounted in side-by-side relation, while the rotating power roll 21 and the character selection members 23 are common to the plurality of type actions and extend transversely thereto.

In the rest position, the keylever 25 is normally urged upwardly to a raised position by resilient biasing means in the form of a spring 43 stretched between the rearward end of the keylever 25 and a suitable portion of the typewriter frame 28, such as a guide comb, while the control lever 15 is urged forwardly and counter-clockwise against the projection 37 of the drive lever 17 by another spring 45 stretched between another portion typewriter frame 28 and a portion of the control lever 15 which is moved forwardly until one end of the slot 33 abuts the rod 31. The drive lever 19 is urged forwardly toward the power roll 21 by resilient biasing means in the form of a spring 47 stretched between a suitable portion of the typewriter frame 28 and a suitable projection 66 formed on the drive lever 19, and the drive lever 19 is blocked from movement toward the power roll 21 by the downward portion 35 of the control lever 15. Moreover, the drive cam 17 is maintained at a starting position by a stop lever 48 pivotally carried on the drive lever 19 and urged against a beveled portion 49 of the drive cam 17 by a spring 50 which is suitably stretched between the stop lever 48 and the drive lever 19.

When the type key 13 is depressed to initiate the printing of a selected type character, as more particularly shown in FIG. 2, the pawl 29 on the pivoting keylever 25 pivots the control lever 15 clockwise about pivot 31 to a release position in which a forward portion 51 moves into a conventional ball lock, generally indicated 53, which serves as an interlock preventing simultaneous depression of more than one type keylever 25. The pivoting of the control lever 15 releases and thus enables the drive lever 19 to move forwardly under the urging of the spring 47 to bring the concave peripheral section of the drive cam 17 into frictional engagement with the rotating power roll 21 for being rotatably driven. The rotatably driven drive cam 17 imparts a cyclical driving movement to the drive lever 19 and brings the lugs 41 into engagement with the character selection members 23, as shown in FIG. 3, for pivoting the character selection members 23 from a rest position to an operated position to operate additional mechanisms determining the orientation of the single print element for printing the selected type character.

While the single print element undergoes orienting and printing movements in response to the movement of the character selection members 23 to the operated position, the character selection members 23 are held at the operated position for a period of time as determined by the configuration of the drive cam 17. In addition, the rearward movement of the drive lever 19 slidably drives the control lever 15 rearwardly to a retracted position, as shown in FIG. 3, thus clearing the ball lock 53 to enable a type key 13 of another type action 11 to be depressed, and at the same time the first control lever 15 is pivoted by the urging of the spring 45 to reestablish blocking relation with the drive lever 19 to prevent reengagement of the drive cam 17 with the power roll 21 upon completion of the cyclical movement. Moreover, the rearward movement of the

drive lever 19 pivots a bail 55 linked to a lock bar 57 for movement from a rest position to a blocking position to prevent a drive lever of another type action from moving toward the power roll 21.

The operational cycle of the type action arrangement 11 is determined by the configuration of the drive cam 17, and as the drive cam 17 returns to the starting position, as shown in FIG. 1, the drive lever 19 is returned to the rest position under the urging of the spring 47 and enables the lock bar 57 to be returned to the rest position. At the same time, the control lever 15 is returned to the rest position under the urging of the spring 45. As shown, the pawl 29 is pivotally supported on the type keylever 25 and resiliently biased to a normal position by a spring 59 stretched between the type keylever 25 and the pawl 29, and if the type keylever 25 remains depressed during the returning movement of the control lever 15, the pawl 29 is pivoted out of the way by the raised portion 15' of the control lever 15. Upon completion of the cycle, the drive cam 17 is brought to rest at the starting position by the stop lever 48 pressing against the beveled portion 49 of the drive cam 17.

In the unrepeatable printing of a selected type character as described above, the type keylever 25 is depressed until a stop projection 61 at the rearward end of the type keylever 25 engages stop means in the form of a pivotally supported stop abutment 63 which is resiliently biased to a rest position by a spring 65. To effect repeated printing of the selected type character, the type keylever 25 is further depressed to the position shown in FIG. 4 so as to further pivot the control lever 15 out of blocking relation with the drive lever 19, thereby enabling the rotational movement of the drive cam 17 to be continued at the end of the printing cycle described above. As shown, the control lever 15 has another raised portion 15'' which is engaged by a pawl 29 when the type keylever 25 is further depressed so as to maintain the control lever 15 out of blocking relation with the drive lever 19 which moves the control lever 15 back and forth in accordance with the cyclical driving movement. Moreover, to prevent an unintentional repeated actuation of a different keylever, the depression of the pivotally supported stop abutment 63 presses an associated arm 67 against a pivotally supported key lock bar 69 and pivots it against the urging of a spring 71 from a rest position, as shown in FIG. 3, to a blocking position above the stop projection 61 of the depressed type keylever 25, thereby blocking the depression of another type keylever.

What is claimed is:

1. In a printer having a single print element with a plurality of different type characters at different positions, the combination comprising:
  - a plurality of character selection members supported for movement to determine the orientation of the single print element,
  - a drive lever associated with one of the different type characters on the single print element and having means for engaging and moving selected character selection members,
  - said drive lever being pivotally supported about an axis for movement from a rest position toward and for effecting movement of said character selection members,
  - a first resilient biasing means for urging said drive lever toward said rest position and beyond,

5

a control lever supported for movement about a pivot point and having a portion for normally engaging said drive lever and establishing said rest position thereof,

a second resilient biasing means for urging said control lever toward engagement with said drive lever, a continuously rotatable power roll,

a drive cam rotatably supported on said drive lever for being cyclically rotatably frictionally driven when engaged with said power roll to move said drive lever toward and to effect movement of said character selection members to a single print element orienting position, to maintain said orienting position for a time to permit printing of a selected character, and to permit return movement of said drive lever toward said rest position, and

keylever means depressible to a first limit position for pivoting said control lever to a release position against the urging of said second resilient biasing means to release and enable movement of said drive lever beyond said rest position under the urging of said first resilient biasing means thereby to bring said drive cam into frictional engagement with said power roll.

2. In a printer as recited in claim 1,

said drive cam having a first peripheral section complementary to said power roll periphery, and a second peripheral section concentric with the axis thereof, said first peripheral section being normally facing said power roll and spaced therefrom when said drive lever is in rest position and being engageable with said power roll when said drive lever is released for movement beyond said rest position, and

means for normally resiliently holding said drive cam with said first peripheral section facing said power roll.

3. In a printer according to claim 1,

said control lever being slidably supported about said pivot point for movement from said released position in response to movement of said drive lever toward said character selection members and for being restored by

6

said second resilient biasing means incident to said movement to reestablish engagement with said drive lever during its return movement to said rest position upon completion of the cyclic movement of said drive cam.

4. In a printer according to claim 1, said keylever means being further depressible to a second limit,

said control lever being further pivoted in response to the depression of said keylever means to said second limit to preclude reengagement of said control lever with said drive lever,

resiliently supported stop means defining said first limit position,

a key lock bar operably associated with said stop means and supported for movement between a rest position and a blocking position,

said resiliently supported stop means giving way to depression of said keylever means to a second limit position,

said key lock bar being movable to the blocking position in response to the movement of said stop means to a second limit position to block the depression of another keylever means while the first remains depressed to said second limit position.

5. In a printer according to claim 1,

a lock bar located adjacent said drive lever and movable between a rest position and a blocking position preventing movement of a second released drive lever beyond said rest position,

said lock bar being movable to the blocking position in response to the movement imparted to a first released drive lever until said first released drive lever completes its cycle.

6. In a printer as recited in claim 1, including a ball lock arranged to preclude movement of more than one control lever to released position.

7. In a printer according to claim 1,

said plurality of character selection members being in the form of bails supported for pivotal movement about the same axis as said drive levers.

\* \* \* \* \*

45

50

55

60

65