United States Patent [19]

Menzi

[11] **3,788,443**

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[54] **CHARACTER SELECTION AND IMPRESSION CONTROL MECHANISM FOR TYPEWRITER**

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[73] Assignee: **Paillard S.A.,** Sainte-Croix, Vaud, Switzerland

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[30] **Foreign Application Priority Data**

Feb. 12, 1971 Sweden 2119/71

[52] **U.S. Cl.** **197/16,** 197/55

[51] **Int. Cl.** **B41j 1/32**

[58] **Field of Search** 197/16, 55

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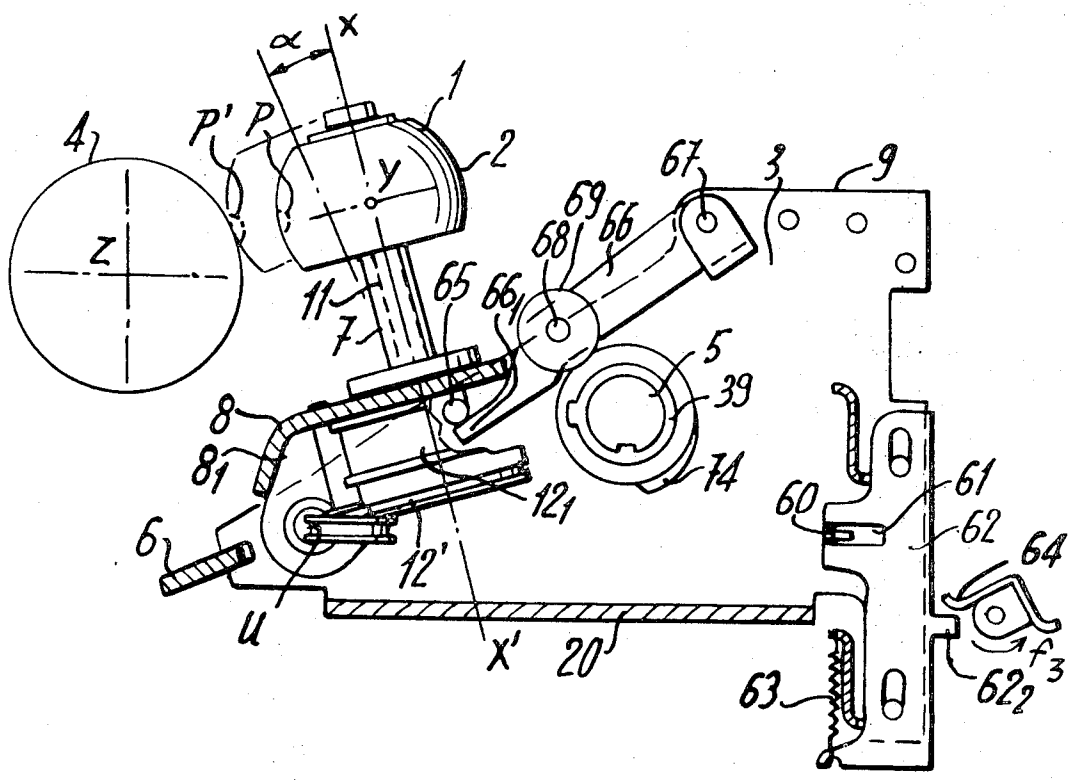
Primary Examiner—Edgar S. Burr

Attorney, Agent, or Firm—Emory L. Groff et al.

[57] **ABSTRACT**

A character selection and impression control mechanism is provided with an integrated coded mechanical system of transmission for the orders controlling the character selection, the shift, the printing velocity and the "No-print" functions, between the frame of a typewriter and converter or decoding means supported on the carriage and controlling the devices performing these functions on said carriage. This system of transmission comprises a definite number of bails mounted on said frame for relative movements thereon and each adapted to cooperate with control means supported by the carriage for all the positions of said carriage along a line of writing. A number of said bails control the decoding device for the character selection and an additional bail controls the device for the "No-print" function. Still another bail controls the high and low printing velocity. One or the other of these two last mentioned bails, or both simultaneously, control equally the shift device for selecting one of two surface portions on the printing element.

9 Claims, 19 Drawing Figures



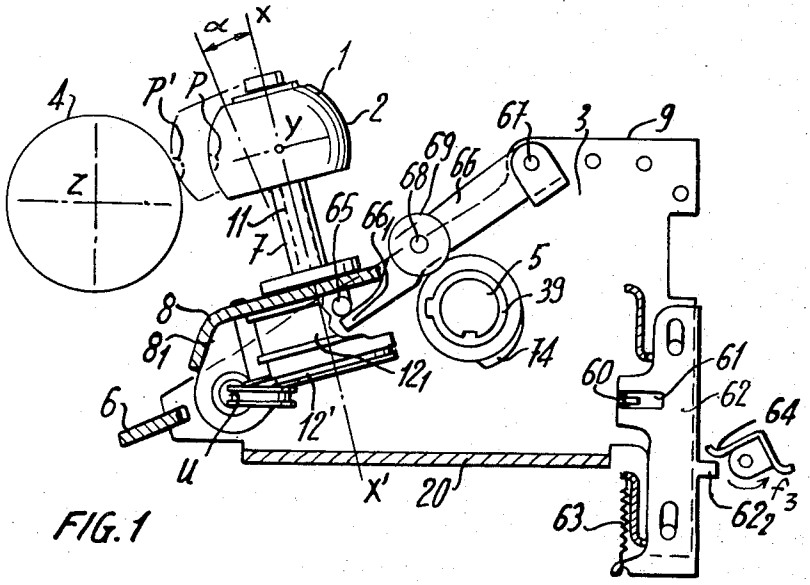


FIG. 1

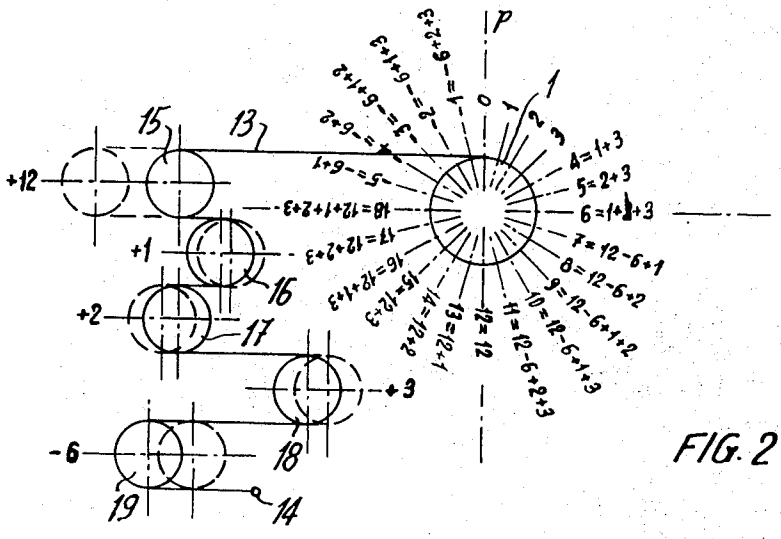
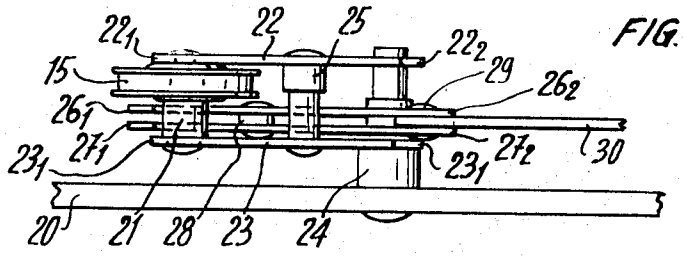


FIG. 2



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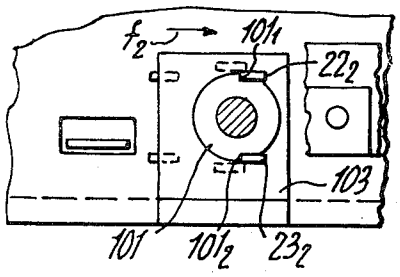


FIG. 7

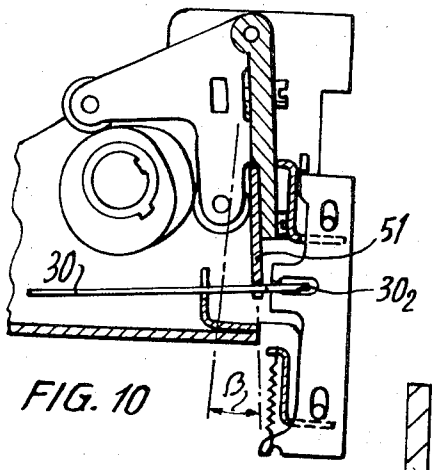


FIG. 10

FIG. 3

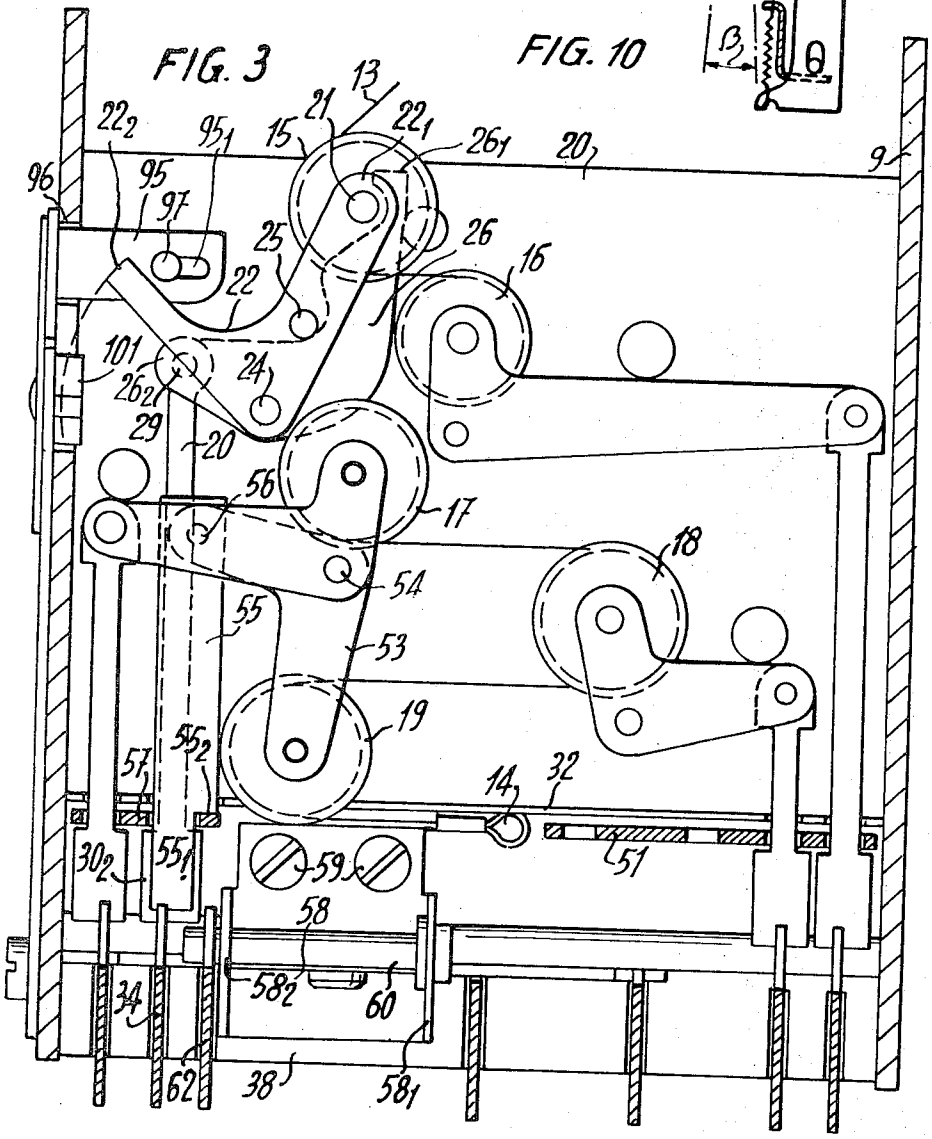
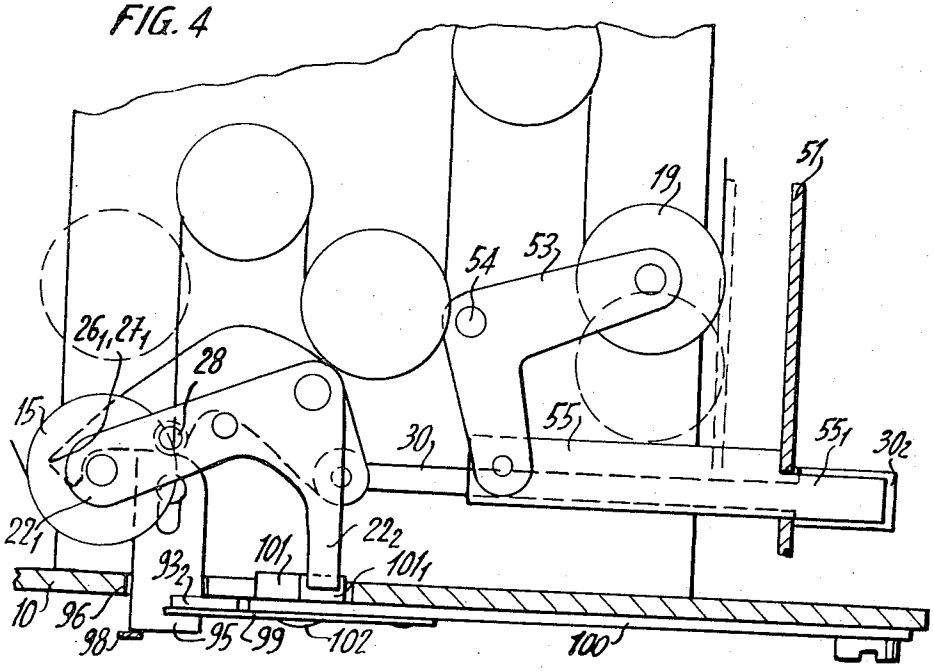


FIG. 4



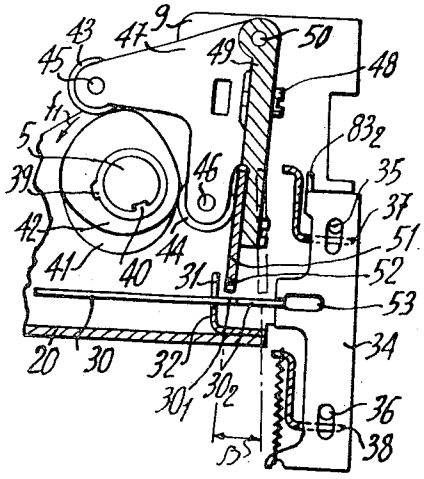


FIG. 8

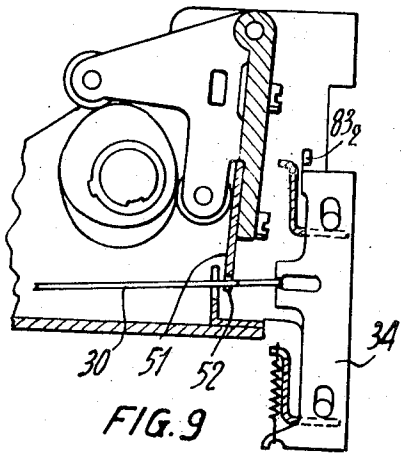
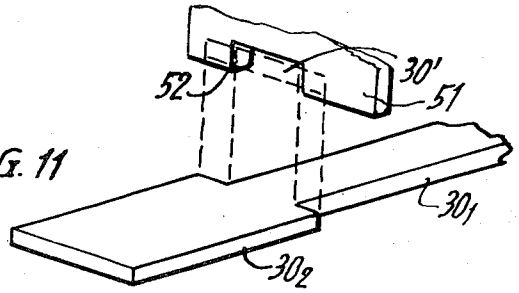


FIG. 9



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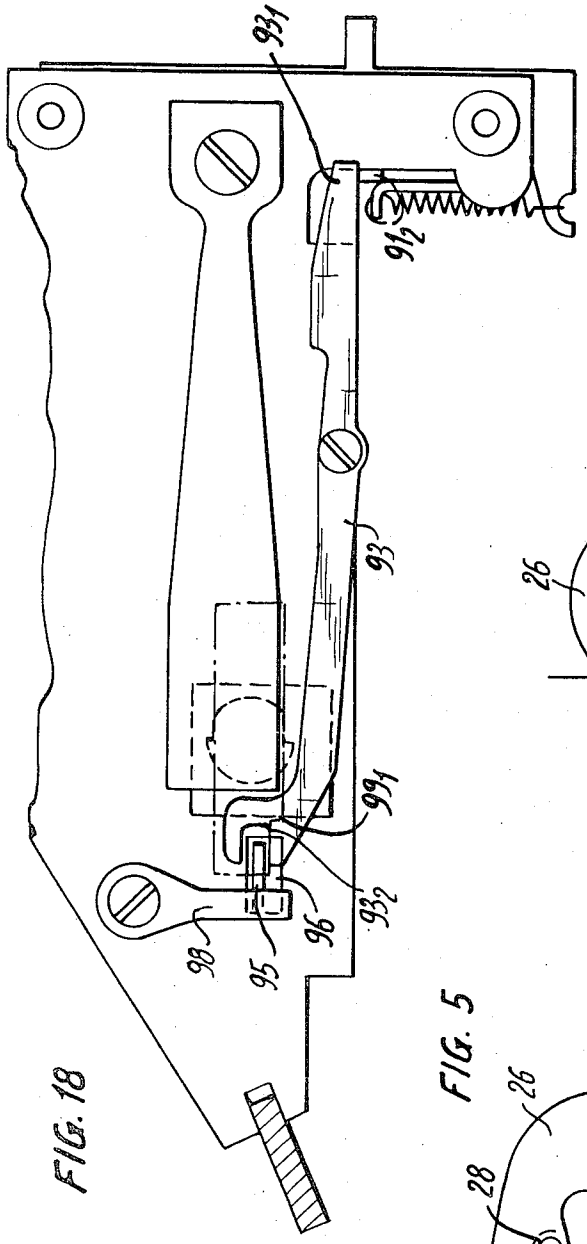

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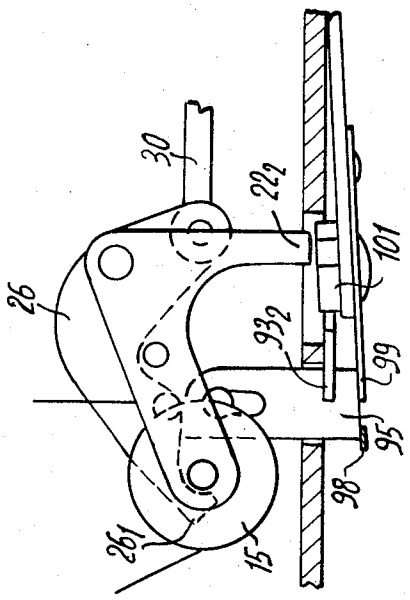

FIG. 19

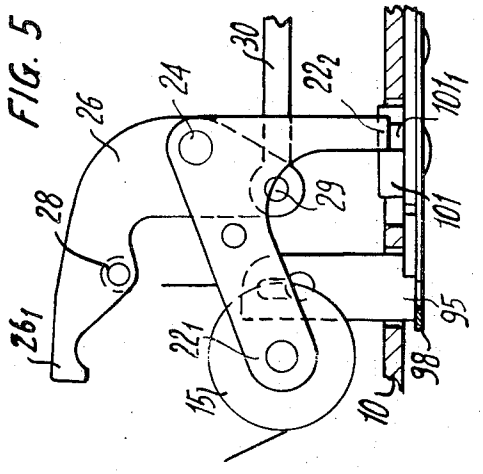

FIG. 5

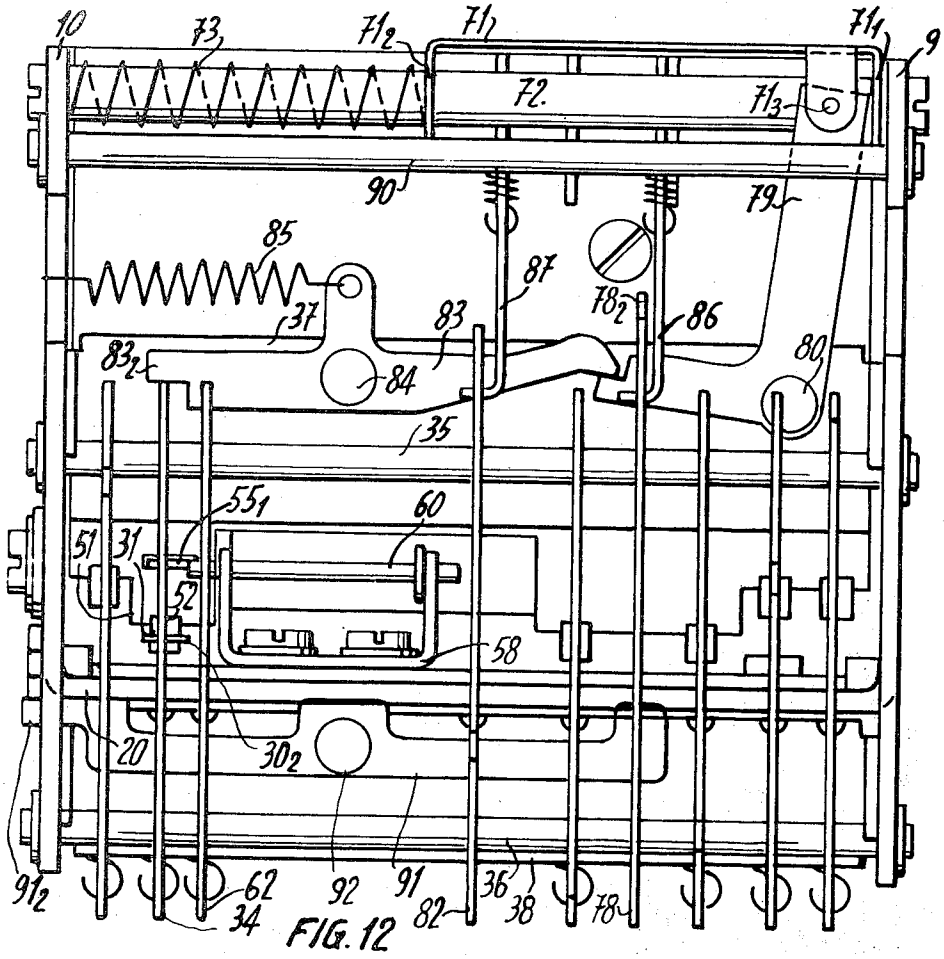
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FIG. 12

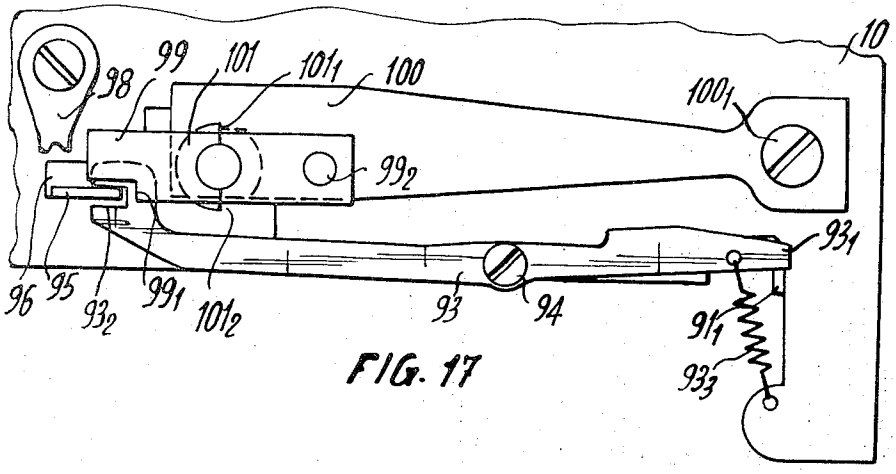
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FIG. 17

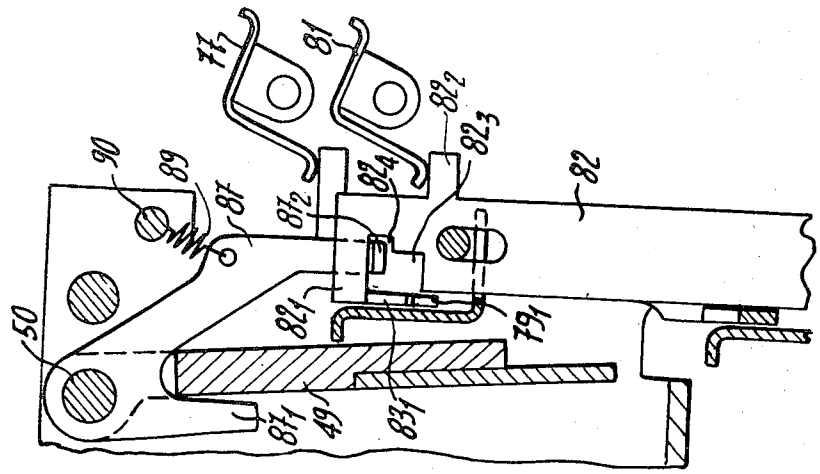

FIG. 16

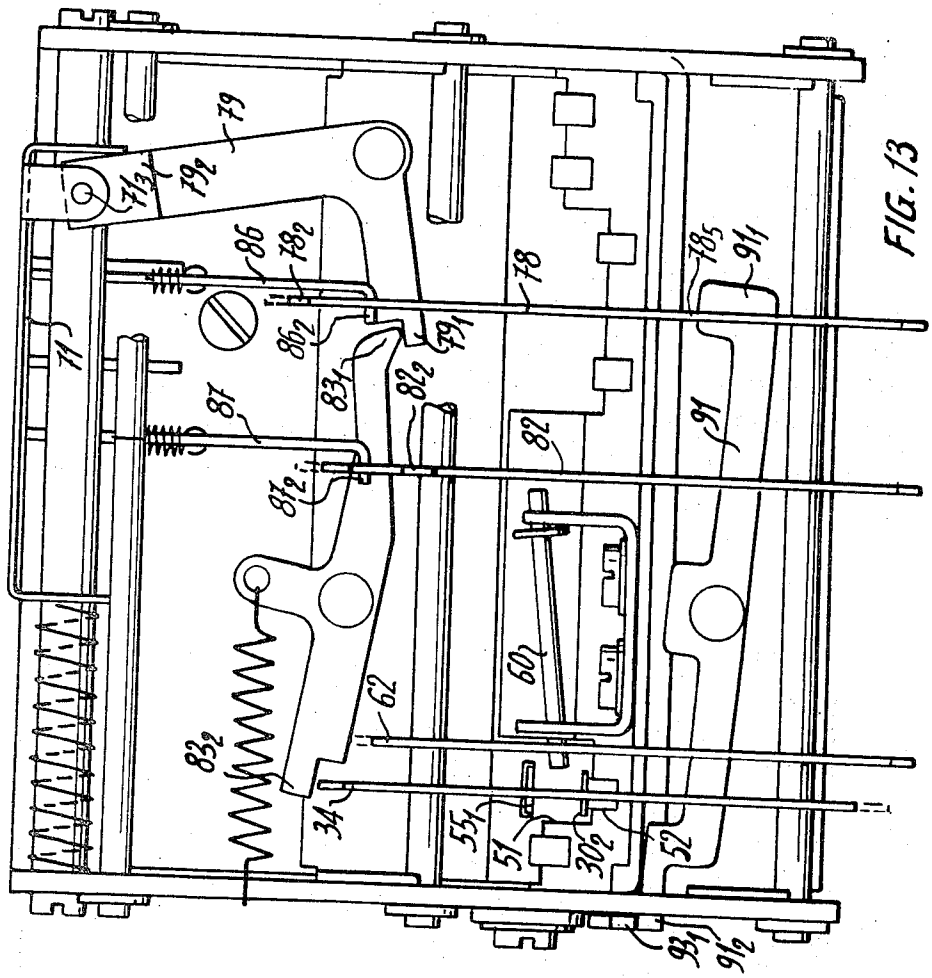

FIG. 13

FIG. 14

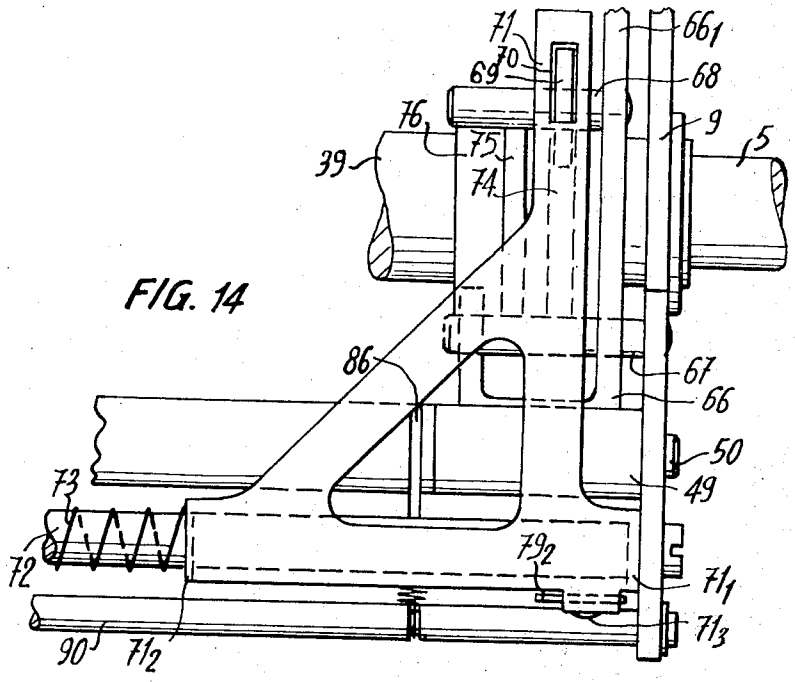
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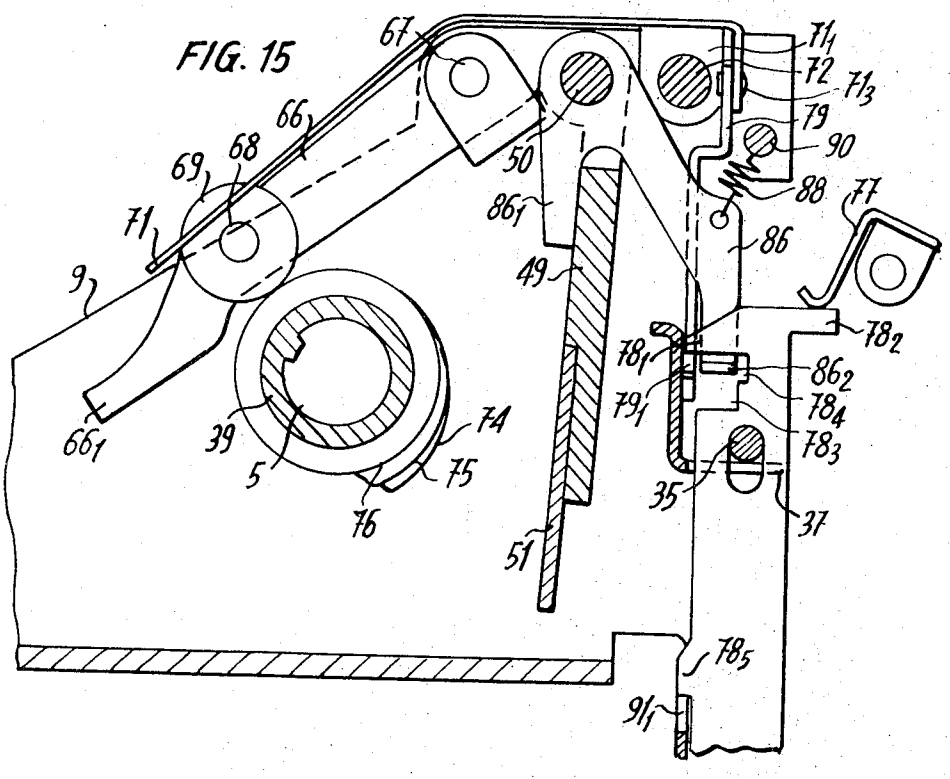
FIG. 15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CHARACTER SELECTION AND IMPRESSION CONTROL MECHANISM FOR TYPEWRITER

FIELD OF THE INVENTION

This invention relates to typewriters and more particularly to a character selection and impression control mechanism for a typewriter of the kind comprising at least one printing element on the surface of which a plurality of the characters of a type front are positioned. This kind of machine comprises a typewriter having a single element printing head wherein all the characters of the type font are positioned on the surface of said printing head.

Whether all of the characters are positioned on a single printing device or distributed on a few printing elements rotatebly and shiftably mounted on the same shaft, the characters may be considered as being distributed along a certain number of columns and lines. A character selection mechanism is provided to present one character at a time to a single printing position, an impression control mechanism being provided to bring the selected character in printing engagement with a paper carrier.

According to the standard keyboard of typewriters, two different characters or signs are associated with each key button, particularly upper and lower case characters. These characters and signs are distributed into two distinct groups corresponding to different portions of the surface of the printing element or elements. A selection operation requires first moving the printing element or elements to present one of said surface portions for the selection of characters, an operation that is generally called a shift operation, then moving the printing element or elements within the area of the portion presented for the selection of one particular character.

The impression control mechanism is effective to establish the proper printing velocity in accordance with the area of each character, so that a desirable impression on the paper is achieved. Generally, two different printing velocities are considered adequate. The impression control mechanism is further effective to establish a "No-print" mode under certain circumstances.

In typewriters of the kind described, the character selection mechanism is generally controlled from the keyboard through a coding mechanism associating with the actuation of any character key a unique combination of impulses on a determined number of bails. A converter or decoding mechanism is then provided for transforming the coded impulses on these bails into analog coordinate displacement for positioning the printing element or elements. A further common feature of typewriters of this kind is that the paper feed unit remains stationary while the printing element, or elements, is supported on a carriage which is movable across the page. All the information concerning the selection and the impression control mechanism are thus to be transmitted from the frame of the machine to this carriage. The general design of the typewriter is very much determined by the conception of the means associated with this transmission.

DESCRIPTION OF THE PRIOR ART

Numerous systems and mechanisms associated with the control of the character selection, shift, printing velocity and "No-print" functions are already known in the art.

When considering the design of all the known machines of the kind described, it is apparent that, although an integration of all the mechanisms performing different functions of the various machines appeared highly desirable to the designers, the means provided for the transmission of the orders controlling these various functions are still of a widely different conception on a same typewriter model.

An homogenous system of coding and decoding has been practically realised for the selection of a character in one of the surface portions of a single printing element only. In the best known machines, the coding and decoding devices are located on the frame in such a way that high precision transmission elements requiring a relatively high level of energy are necessary to link the printing element on its carriage to the decoding device. These transmission elements of substantial length and inertia are submitted to high accelerations on fast printing machines and they require complicated wear compensation devices.

The shift, the printing velocity and the "No-print" functions are still controlled by different mechanisms whose coding and or decoding devices, when present, and or transmission elements between the frame and the carriage, are different in design and in location on the machine.

It will be realised that typewriters of this design do not allow a complete adjustment and checking of all the functions installed on the carriage before a practically complete assembling of the machine.

OBJECT

Accordingly, one of the objects of this invention to provide an integrated system of transmission between the frame and the carriage of a typewriter of the kind described for the transmission of the orders controlling the character selection, the shift, the printing velocity and the "No-print" functions.

It is a more specific object of this invention to provide an integrated coded system of transmission for these different functions that lends itself to simple mechanical or electrical control.

Another object of the invention is to provide an integrated system of transmission allowing the design of a carriage incorporating the devices for performing these different functions as a largely independant module allowing the complete adjustment and checking of said functions before the final assembling of this carriage on the typewriter.

It is a still further object of the invention to provide an integrated coded mechanical system of transmission for these different functions requiring means of minimum precision and low energy between the typewriter frame and its carriage.

A still further object of the invention is to provide a character selection mechanism with simple means adapted for cyclically moving the printing element or elements in two opposite directions for the selection of a surface portion as well as for the selection of a character.

SUMMARY

In order to accomplish these and other objects of the invention, a character selection and impression control mechanism is provided with an integrated coded mechanical system of transmission for the orders controlling the character selection, the shift, the printing velocity and the "No-print" functions, between the frame of a typewriter and converter or decoding means supported on the carriage and controlling the devices performing these functions on said carriage. This system of transmission comprises a definite number of bails mounted on said frame for relative movements thereon and each adapted to cooperate with control means supported by the carriage for all the positions of said carriage along a line of writing. A number of said bails control the decoding device for the character selection and a additional controls the device for the "No-print" function. Still another bail controls the high and low printing velocity. One or the other of these two last mentioned bails, or both simultaneously controls equally the shift device for selecting one of two surface portions on the printing element.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention, as illustrated in the accompanying drawings.

FIG. 1 is a side elevation of a portion of the carriage of the typewriter showing the single head printing mechanism.

FIG. 2 is a schematic view of the column selection on the single element print head.

FIG. 3 is a top plan view of a portion of the carriage, showing the column selection mechanism.

FIGS. 4 and 5 represent parts of FIG. 3 for different phases of the cyclical operation.

FIGS. 6 and 7 are side elevations of parts of FIGS. 3, 4 and 5.

FIGS. 8, 9 and 10 are side elevations of a portion of the carriage for different phases of the cyclical operation.

FIG. 11 is a perspective view, on a larger scale, of a part of FIG. 8.

FIG. 12 is a rear elevation of the carriage.

FIG. 13 is also a rear elevation of the carriage during another phase of the shift cycle.

FIG. 14 is a top plan view of a portion of the carriage with the printing velocity control mechanism.

FIG. 15 and 16 are side elevations of portions of the carriage with control bails.

FIG. 17 and 18 are elevations of the left side of the carriage showing different positions of the shift control mechanism.

FIG. 19 is a similar to FIGS. 4 and 5 showing a shift operation. The kind of typewriter with a single element print head chosen as an application is well known in the art, thus a complete and detailed description of all the associated mechanism is not considered necessary for the full understanding of the invention.

With reference to FIG. 1, the single element print head illustrated has the form of a truncated sphere whose upper and lower end planes are perpendicular to the polar axis XX'. All the characters and signs to be printed, here a total number of 96, are arranged on the face 2 of the print element in four rows, parallel to the end planes of the head, and 24 columns.

Any character may be moved to the print position P by moving the head from a test position : a rotation about axis XX' for the selection of one column and a tilting movement about a second axis Y going through the center of the sphere, perpendicular to XX' and parallel to the axis Z of the platen 4, for the selection of one row.

The aspects of the present invention relating to the column selection only and the mechanism for the selection of the rows are well known in the art and need not to be described here.

The print head 1 is mounted upon a carriage 3 which is slidably supported on a cycle shaft 5 journaled on the frame of the typewriter, not shown, and by a stationary bar 6, both extending parallel to the platen 4.

The print head is rotatably mounted on a hollow post 7 fastened to a rocker platform 8 that is pivotably mounted between the two side walls 9 and 10 of the carriage 3 to oscillate about an axis U, parallel to the axis Z of the platen. With this arrangement, printing is effected when the rocker platform 8 is rocked at an angle α, bringing the character situated in the print position P in contact with the platen at P'.

COLUMN SELECTION MECHANISM

The print head 1 is in driving connection with a shaft 11 journaled into the hollow post 7 and with a pulley 12 fastened to the lower end of said shaft. A tape 13 is connected at one end to the pulley 12 and extends around that pulley and over a number of other pulleys 15, 16, 17, 18 and 19 to an anchor point 14 on the carriage 3. A spiral spring in a barrel 12^1 maintains tension on the tape.

As diagrammaticaly illustrated in FIG. 2, any one of the 24 columns numbered -5 to $+18$ on the print head may be presented in the printing position P by moving one or several pulleys 15, 16, 17, 18 and 19 radially between a normal rest position and an active position illustrated in dotted lines, extending or contracting the effective length of tape 13.

It is apparent from FIG. 2 that columns $+7$ to $+18$ may be presented in the printing position by adding 12 units of rotation, corresponding to 180° on the print head, to the values corresponding to columns -5 to $+6$. As the two characters or signs associated with a single key button are positioned on a same row and in a same meridian plane on the print head, a shift operation is performed by moving pulley 15 a distance of $+12$ units to the left.

The mechanism controlling the positions of pulleys 15 to 19 is illustrated on FIG. 3. Each pulley is associated with a lever adapted to transform a unitary control stroke into a radial displacement of given length and direction of the corresponding pulley.

The mechanisms controlling the $+15$ shift displacement of pulley 15 and the displacement of -6 units of pulley 19 will now be described in detail. The control mechanism for pulleys 16, 18 and 19 being very similar, such mechanisms need not be further explained.

The two side walls 9 and 10 of carriage 3 are assembled to a base plate 20 on which all the levers associated to the pulleys are pivoted. As illustrated on FIG. 6, pulley 15 is pivotally mounted on a stud 21 fastened between the arms 22^1 and 23^1 of a double lever 22, 23 pivoted on a stud 24 of base plate 20. Stud 25 is fastened to each of arms 22^1 and 23^1.

A second double lever 26, 27 is pivoted on stud 24 between the arms of lever 22,23. This second lever, comprising an assembling stud 28, is adapted to cooperate with stud 21 on the first lever. A selector latch 30 is hinged on a stud 29 fastened between the arms 26^2 and 27^2 of the second lever.

Referring particularly to FIG. 8, the selector latch 30 has an elongated portion 30^1 of reduced width guided in a notch 31 on a guide plate 32 fastened to base plate 20. Its free end 30^2, which is broader, is engaged between the lips 33^1 of a notch 33 cut in a coupling slide 34.

Each pulley 15 to 19 has a coupling slide which is guided in a vertical plane by two slotted cross-pieces 37 and 38 and by two horizontal rods 35 and 36 extending between the side walls 9 and 10 of the carriage.

The sliding engagement of the carriage 3 on cycle shaft 5 is realised by means of a sleeve 39 journaled in the side walls 9 and 10. This sleeve, which may be rotated by shaft 5 through a key 40, drives two complementary cams 41 and 42. A selector latch control lever 49 is pivotally mounted on a shaft 50 between the side walls 9 and 10, as illustrated in FIG. 8, and bears a selector latch control plate 51 whose lower edge is provided with a series of notches 52 aligned with the corresponding notches 31 of guide plate 34. A double arm 47, fastened by screw 48 to the selector latch control lever 49, supports two cam rollers 43 and 44 rotatably mounted on studs 45 and 46 and cooperating respectively with cams 41 and 42 in such a way that for each cyclical 360° rotation of shaft 5, in the direction of arrow f_1 the selector latch control lever 49 performs a complete oscillation β

At the beginning of a selection cycle, the coupling slide 34 may assume two different positions, as hereinafter described. In its lower position illustrated in FIG. 8, it maintains the selector latch 30 out of the notch 52 (see also FIG. 11). This selector latch is then not engaged and not carried away by the selector latch control plate 51 during its cyclical oscillation and the pulley 15 remains in its rest position.

In the upper position of the coupling slide 34 illustrated on FIG. 9, the selector latch 30 is moved into the notch 52 (see 30' on FIG. 11) and as soon as the selector latch control plate initiates its oscillation to the right, it carries away the coupling slide by the shoulder formed by its broader end 30^2 to the position illustrated on FIG. 10.

The corresponding counter-clockwise rotation of lever 22, 23, under the action of lever 26,27, brings pulley 15 in its active position against the tension of the tape and a rotation of + 12 units on the print head will result. The control mechanism for moving pulley 19 in its − 6 units active position is different, since it is acting in the same direction as the tension on the tape.

The lever 53, rotatably supporting pulley 19, is pivoted on a stud 54 of the base plate 20. The corresponding selector latch 55, hinged at 56 on lever 53, has a free end 55^1 of reduced width forming a notch 55^2. This free end extends through a hole 57 in the selector latch control plate 51 with notch 55^2 bearing on this plate under the tension of the tape acting on pulley 19.

A U-shaped bracket 58 is fastened by screws 59 on the base plate 20 in front of the guide-plate 32. A latch member 60 is mounted for pivotal movement on the arm 58^1 and extends first through an elongated slot of the other arm 58^2 of the bracket and then through the notch 61 of a coupling slide 62.

When this coupling slide 62 is in its upper rest position under the action of spring 63, as illustrated on FIG. 1, the notch 61 maintains the latch member 60 in a horizontal position. In this position, the free end of this latch member is situated at the level of the free end 55^1 of the selector latch 55. Thus, when at the beginning of a selection cycle, the selector latch control plate 51 initiates its oscillation to the right, the selector latch 55 will be stopped by the latch member 60 and the pulley 19 will remain in its rest position.

If, at the beginning of a selection cycle, the coupling slide 62 is brought to its lower position, the latch member 60 will be tilted downwardly and its free end will clear the way to the extremity 55^1 of the selector latch 55 allowing it, under the tension of tape 13, to follow the selector latch control plate 51 in its cyclical oscillation.

CODING AND TRANSMISSION OF ORDERS TO THE CARRIAGE

A certain number of the coupling slides, such as 62, are each directly controlled by a bail, such as 64 in FIG. 1. These bails belong to a group of bails extending parallel to the axis Z of the platen along the whole travel of the carriage. They are pivoted on the frame of the typewriter at their two ends.

Coding mechanisms associated with a keyboard to transform the actuation of a key button, be it for a print function operation or for an other function operation, such as a shift operation for example, into a definite pattern of impulses on a suitable number of bails are well known in the art. For this reason, this coding mechanism will not be described here.

Each bail, such as 64, is adapted to cooperate with a definite coupling slide, such as 62, on the carriage 3. For transmitting an impulse to the corresponding coupling slide, a bail is rotated in the direction of arrow f_3. Its leading edge will then contact a finger, such as 62^2, which is an integral part of the slide and push said slide down, against the action of a spring, such as 63, to its lower position.

Four bails, not illustrated, are necessary to control the position of pulleys 16, 17, 18 and 19 through corresponding coupling slides. They allow the selection of twelve columns on the print head numbered from − 5 to + 6. Two more bails are necessary for controlling the selection of the four rows on the head.

PRINTING MECHANISM

This mechanism controls the oscillation of the rocker platform 8. As illustrated on FIG. 1, 14 and 15, the side wall 8^1 of the rocker platform suports a stud 65 cooperating with the free end 66^1 of a control arm 66 pivoted on a stud 67 fastened to the side wall 9 of carriage 3. A roller 69, rotatably and slidably mounted on a stud 68 fastened to the arm 66, is partially engaged in a rectangular opening 70 of a sliding arm 71 guided by its two ears 71^1 and 71^2 for free axial and angular movement on a shaft 72 fastened between the side walls of the carriage.

In its normal position illustrated in FIGS. 12 and 14, the sliding arm 71 rests against the side wall 9, under the action of a helical spring 73, and the roller 69 is positioned opposite a high velocity print cam 74 driven by sleeve 39 and cycle shaft 5.

By sliding the arm 71 against the action of spring 73, the roller 69 may be positioned opposite a low velocity print cam 75. A further displacement of arm 71 will position arm 71 opposite a No Print cam 76 with no rise or a negligible rise.

Two additional bails 77 and 81 (see FIGS. 15 and 16) and two coupling slides 78 and 82 are provided for the control of the printing mechanism. For implementing a low velocity print, an impulse is transmitted from bail 77 to the coupling slide 78 to bring it into its lower position illustrated in FIGS. 13 and 15. Under the action of a nose 78^1 of slide 78 cooperating with the arm 79^1 of a lever 79 pivotally supported at 80 on the cross-piece 37, this lever 79 is rotated counter-clockwise and, through a second arm 79^2 hinged at 71^3 on the sliding arm 71, this latter is shifted to the left to position the roller 69 opposite low velocity cam 75.

For implementing a "No-print" function, an impulse is transmitted from bail 81 to the coupling slide 82 to bring it into its lower position illustrated on FIG. 16. Under the action of the nose 82^1 of slide 82 cooperating with the arm 83^1 of a lever 83 pivotally supported at 84 on the cross-piece 37, this lever 83 is rotated clockwise against the action of a spring 85 to the position illustrated on FIG. 13. In this position, the free end of arm 83^1 cooperating with the arm 79^1 of lever 79 rotates said lever counter-clockwise, further than when a direct actuation through coupling slide 78 takes place, in order to position the roller 69 opposite the No Print cam 76.

The impulses on the bails, controlled by a cycle mechanism, are generally of a short duration as compared to the duration of a complete cycle. For this reason, a latching mechanism has been provided to maintain the roller 69 opposite the desired cam, 75 or 76, during the major part of a cycle.

Two latch levers 86 and 87 are provided cooperating respectively with coupling slides 78 and 82. They are pivotally mounted on shaft 50 in two slots of the slector latch control lever 49 for rotation in counter-clockwise direction under the action of springs 88 and 89 tied up to the rod 90.

When the selector latch control lever 49 is in its rest position, at the beginning of a cycle as illustrated in FIG. 15 for coupling slide 78, the arms 86^1 and 87^1 of latch levers 86 and 87 rest against lever 49 and the bent ends of their other arms 86^2 and 87^2 remain in an inactive position inside of elongated openings 78^3 and 82^3 of the coupling slides. In this position, they allow these slides to move freely downwardly under the action of their respective bails.

As soon as the selector latch control lever 49 initiates its oscillation to the right, the two latch levers 86 and 87 follow its movement until their bent ends either are stopped by the edge of openings 78^3 and 82^3, if the coupling slides have not been actuated, or penetrate in notches 78^4 and 82^4 if they have been actuated. As illustrated in FIG. 16, for coupling slide 82, they are then maintaining the slides in their lower active position until lever 49 returns to its rest position at the end of a cycle.

SHIFT CONTROL MECHANISM

The coupling slide 78 cooperates further through a nose 78^5 with the arm 91^1 of a second lever 91 pivotally supported at 92 on the cross-piece 38. As apparent from FIGS. 12, 13 and 15, a downward movement of the slide causes a clockwise rotation of lever 91. With its other arm 91^2 protruding on the outside of the side wall 10, it cooperates with the arm 93^1 of an other lever 93 pivotally mounted at 94 on this side wall, to rotate this lever 93 in a counter-clockwise direction against the action of spring 93^3, as illustrated in FIGS. 17 and 18.

The end 93^2 of the other arm of lever 93 is fork-shaped and embraces the free end of a trigger 95 that extends through a rectangular opening 96 of side wall 10.

As illustrated on FIG. 3, the trigger 95 is slidably mounted on a stud 97 of base plate 20 and guided by the opening 96. When the pulley 15 is brought to its active + 12 units position by the lever 26,27 (see FIG. 4), the trigger 95 will be pushed forward by the stud 28 on said lever against the action of a leaf spring 98 fastened to side wall 10.

According to the position of lever 93, the trigger 95 is able to slide freely through a notch 99^1 of a second leaf spring 99 fastened at 99^2 on a third leaf spring 100 fastened at 100^1 on side wall 10, as illustrated in FIGS. 4 and 17, or, according to FIGS. 18 and 19, it will strike against leaf spring 99 and bend it with leaf spring 100 away from side wall 10.

A shift latch cam 101 of a generally circular shape is fastened at 102 to the third leaf spring 100 and extends through an opening 103 of side wall 10 to the inside of the carriage. At the end of a + 12 units displacement of pulley 15, as illustrated in FIGS. 4 and 7, the two arms 22^2 and 23^2 of the lever 22,23 supporting the pulley are moving in the direction of arrow f_2. They are first elastically drawn aside by the cam 101 befor snapping into two notches 101^1 and 101^2 of said cam.

A shift operation will now be described step by step. When the shift key button is depressed on the keyboard, a selection-printing cycle is initiated and the coding mechanism transmits an impulse to a certain number of bails;

on the three bails (not illustrated) controlling the pulley 16, 17 and 18 for + 1, + 2 and + 3 units to maintain these pulleys in their inactive position;

on bail 64 to tilt down latch member 60 through coupling slide 62;

on bail 77 to slide down coupling slide 78 and rotate lever 91;

on bail 81 to slide down coupling slide 82 and rotate lever 83.

The clockwise rotation of lever 83 positions, through lever 79 and sliding arm 71, roller 69 opposite the No Print cam 76. Simultaneously, the raised arm 83^2 of lever 83 allow the coupling slide 34 to reach its upper position under the action of its spring as illustrated on FIG. 3 and 13.

During a first part of the cycle corresponding to a rotation of about one-fourth of a turn of the cycle shaft 5 in the direction of arrow f_1, the selector latch control plate 51 advances to its forward position over an angle β as illustrated on FIG. 10.

Driven by their respective selector latches 30 and 55 and by the corresponding levers 26, 27 and 53, the pulleys 15 and 19 proceed to their active position as illustrated in FIG. 4. The combined action of the − 6 units and + 12 units pulleys rotates the print head of + 6 units.

The lever 93, which has been rotated counter-clockwise under the action of lever 91 to the position

illustrated in FIG. 17, has guided through its fork-shaped extremity 93^2 the trigger 95 towards notch 99^1 of leaf spring 99 through which it is freely sliding. At the end of the counter-clockwise rotation of lever 22,23, its two arms 22^2 and 23^2 are then latched on the non-displaced shift latch cam 101.

During the last quarter of this "No-print" cycle, the selector latch control plate 51 oscillates back to its initial rest position, as well as selector latches 30 and 55 and their associated levers 26,27 and 53. The + 12 units pulley 15 remains in its latched position as illustrated in FIG. 5, when the − 6 units pulley 19 returns to its rest position, rotating the print head of a further amount of + 6 units.

The coupling slides 78 and 82, which had been latched during the major part of the cycle in their lower position, resume their rest position as well as levers 79, 83, 91 and 93. The typewriter is thus ready to perform a normal selection-printing cycle for the characters associated to columns + 7 to + 18 of the print head.

To suppress the shift action, that is to again print the characters associated with columns − 5 to 30 6, one has to release the shift key button on the keyboard. This will initiate a new cycle at the beginning of which the coding mechanism transmits the same impulses to the bails as for implementing a shift operation, with the following exception :

the bail 77 linked to coupling slide 78 does not receive an impulse and, as a consequence, levers 91 and 93 remain in their rest position illustrated in FIG. 18.

During the first quarter of the cycle, the lever 26, 27 rotates counter-clockwise driving the trigger 95 to the outside. As the fork-shaped end 93^2 of lever 93 is now maintaining the free end of the trigger 95 at a higher level, it will hit the leaf spring 99 and push it back together with leaf spring 100 and cam 101 as illustrated in FIG. 19, unlatching the arms 22^2 and 23^2 of lever 22,23. During the last quarter of this "No-Print" cycle, the lever 22,23 will thus be free to follow the clockwise rotation of lever 26,27 to its rest position.

In the same way as for a positive shift operation, the coordinated action of the − 6 units pulley 19 allows a two step return operation, each time of six units, instead of a one step twelve unit operation in half the time, thus decreasing substantially the accelerations.

As will be apparent from the foregoing, the system described realises a high degree of integration in the transmission between the frame and the carriage of the typewriter of the orders controlling the character selection, the shift, the printing velocity and the "No-print" functions. Two additional bails only, identical to the character selection bails, are needed to control these three last mentioned functions. While the invention has been particularly shown and described with reference to a particular embodiment thereof, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A typewriter comprising a platen (4), a driving shaft (5) extending parallel to said platen and adapted to rotatable for a definite angular value during each print cycle, a carriage (3) movable along said shaft (5) along a line of writing and carrying at least one printing element (1) having a plurality of characters on its surface (2) distributed into two groups, a shift device which permits selection at will of one of said two groups of characters, a selection device for bringing one of the characters of the group selected into printing position, an impression control device comprising means to impart at least two different printing velocities to said printing element (1), and means to establish a "print" or "no-print" mode during an operating cycle, a coding device supplying orders coded in the form of impulses through the actuation of the keys of the typewriter keyboard, a decoding device comprising a set of pulleys (15–19) movable with respect to each other and controlling a pulley (12) selectively rotatably driving the printing element (1) by means of a flexible tape (13), and means for actuating and moving said pulleys, said decoding device also including a device for transmission of the coded orders from the fixed portion of the typewriter to the carriage (3), said set of pulleys being carried entirely by said carriage (3), and said decoding device controlling said shift device, the character selection device as well as the impression control device.

2. A typewriter according to claim 1, wherein said coded order transmission device comprises two universal bars (81, 77) controlling said shift device, the first universal bar (81) controlling the shift function, the second universal bar (77) controlling the locking of said shift device as well as said impression control device.

3. A typewriter according to claim 1, wherein the means for moving the pulleys (15–19) of said set of pulleys comprises linking elements (30) for each pulley, wherein said pulleys (15–19) are driven by a single actuating member (49) also mounted on said carriage (3), said actuating member (49) controlled by said driving shaft (5) and having a cyclical reciprocating movement imparted thereto, movement transforming means for each linking element (30) provided on said carriage (3) so as to transform movements of approximately equal amplitudes of said linking elements (30) into movements of different amplitudes of said pulleys (15–19), coupling elements (34) also mounted on the carriage (3), each said coupling element acting upon a linking element (30) and capable of assuming two positions, a first position in which the corresponding linking element (30) is susceptible of being driven by the actuating member (49) and controls a movement of specific amplitude of the corresponding pulley (15), a second position in which the corresponding linking element (30) is not susceptible of being driven by said actuating member (49).

4. A typewriter according to claim 3, wherein means are provided to impart to the corresponding pulley at the beginning of the printing cycle, a movement acting on the length of the free portion of the flexible tape (13), comprising a movable stop (60), movable by a coupling element (62) and susceptible of assuming two positions under the action of the corresponding universal bar (64), a first position in which the stop (60) is in the way of the linking element (55) preventing the latter from following the movement of the single actuating member (49), a second position in which said stop (60) is out of the way of said linking element (55), the latter then being capable of following the movement of the actuating member (49) under the action of the tension of the flexible tape (13).

5. A typewriter according to claim 3, wherein the movement transforming elements each comprise a lever (26) pivotally mounted on a base plate (20) inte-

gral with the carriage (3) of the typewriter, some of said levers supporting, on the one hand, one of the pulleys (15) of the set of pulleys and hinged, on the other hand, to one of the linking elements (30), at least one of the pulleys (15) of the set of pulleys being supported by an element (22, 23) hinged on base plate (20), one arm of the corresponding movement transforming lever (26) being susceptible of acting on said element under action of the corresponding linking element (30) hinged on said lever to control the movement of specific amplitude of said pulley.

6. A typewriter according to claim 3, wherein the movement transforming levers (26) each comprise two arms forming an angle of approximately 90° and having different lengths, one of said arms hinged to a linking element (30), the other arm controlling the movement of the corresponding pulley of the set of pulleys.

7. A typewriter according to claim 1, wherein the impression control means are associated with the control means of the shift device, said shift device being controlled by two intermediary coupling slides (78, 82), one of said coupling slides (78) also used to select the light impression control device.

8. A typewriter according to claim 7, wherein said typewriter includes means to maintain said intermediate coupling slides (78, 82) in their lower position during the greatest part of the print-selection cycle, said means comprising two locking levers (86, 87) which move simultaneously with the pivoting of said single actuating member (49).

9. A typewriter according to claim 7, wherein the intermediate coupling slide (78) controls a locking device (91, 93, 95, 99, 101) for the arms of the movement transforming lever (22, 23), so as to retain beyond the duration of a printing cycle at least one of the pulleys (15) of said set of pulleys in a position corresponding at least approximately to the maximum amplitude of its movement under the action of the cyclical reciprocating movement of said actuating member (49).

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