

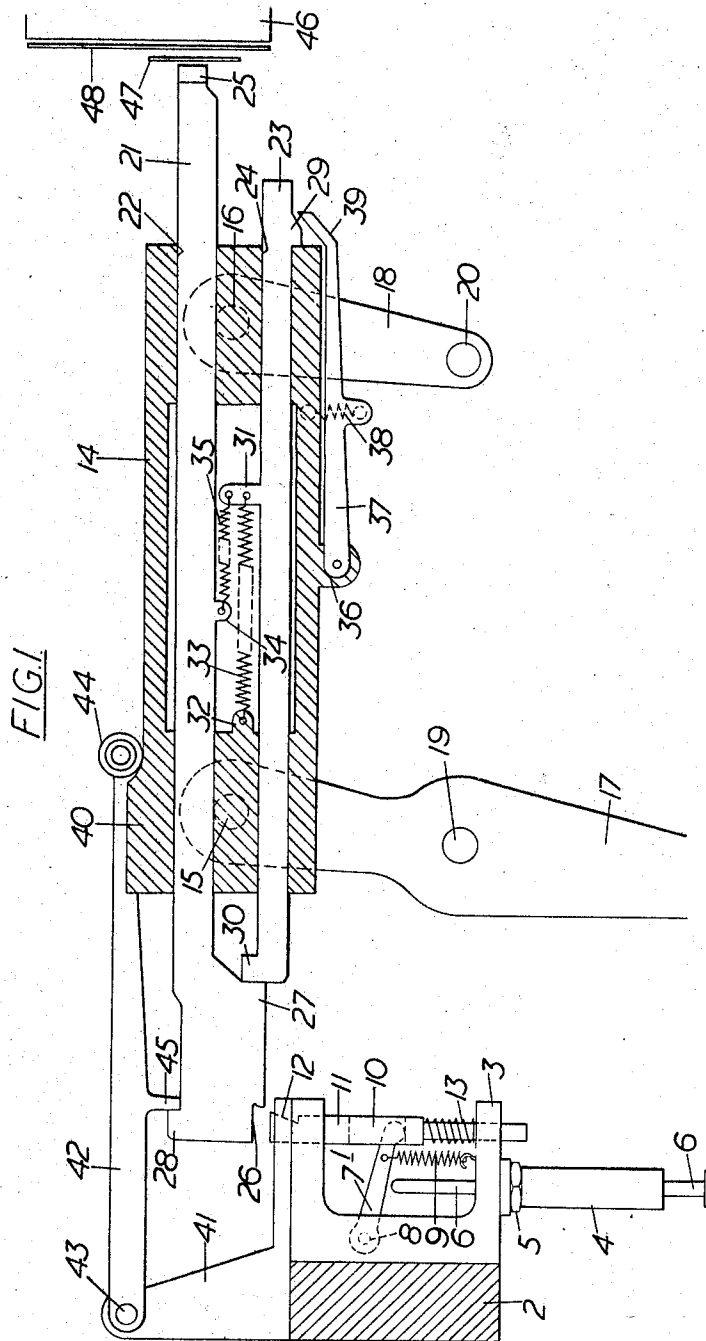
April 4, 1967

L. H. MUYSHONDT
CODE SETTING DEVICE FOR PRINT ELEMENTS
ON RECIPROCATING CARRIAGE

3,312,163

Filed Nov. 20, 1964

6 Sheets-Sheet 1



Inventor

LUCIEN H. MUYSHONDT

By Percy P. Lutz
Attorney

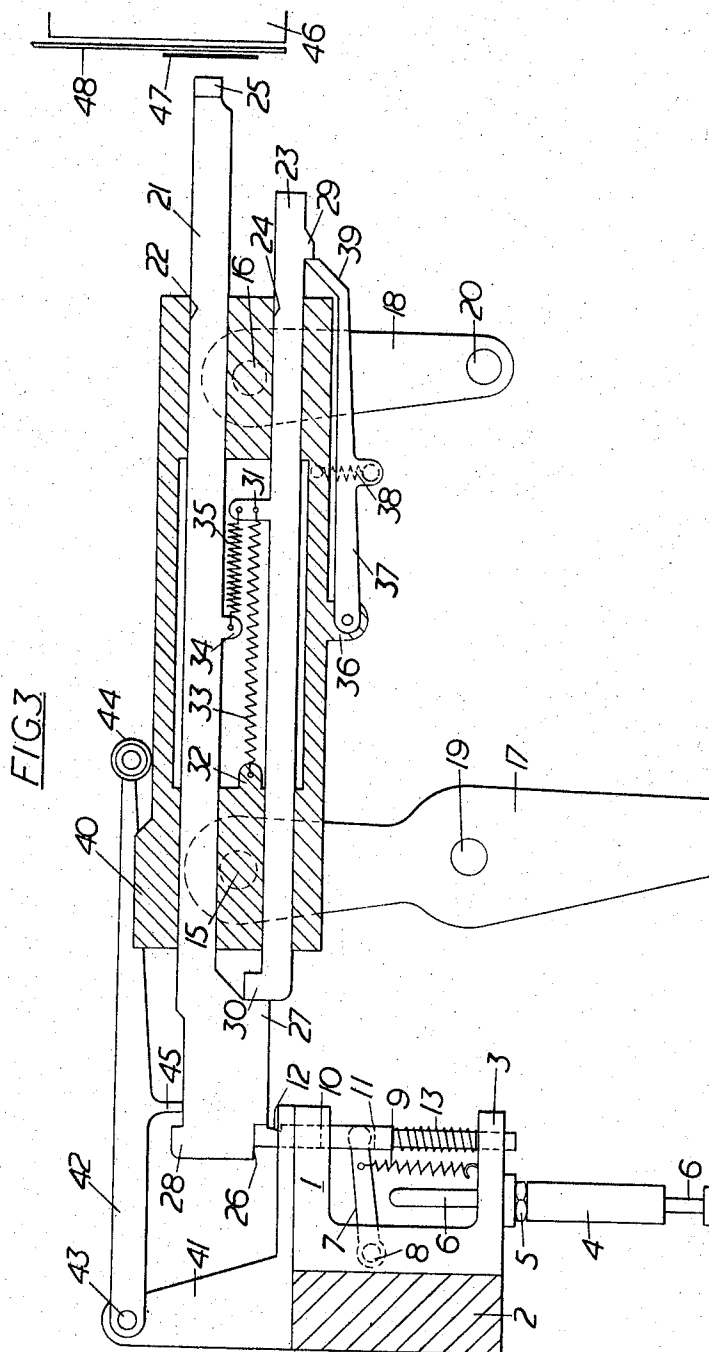
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Inventor

LUCIEN H. MUYSHONDT

By *Lucy P. Lantier*
Attorney

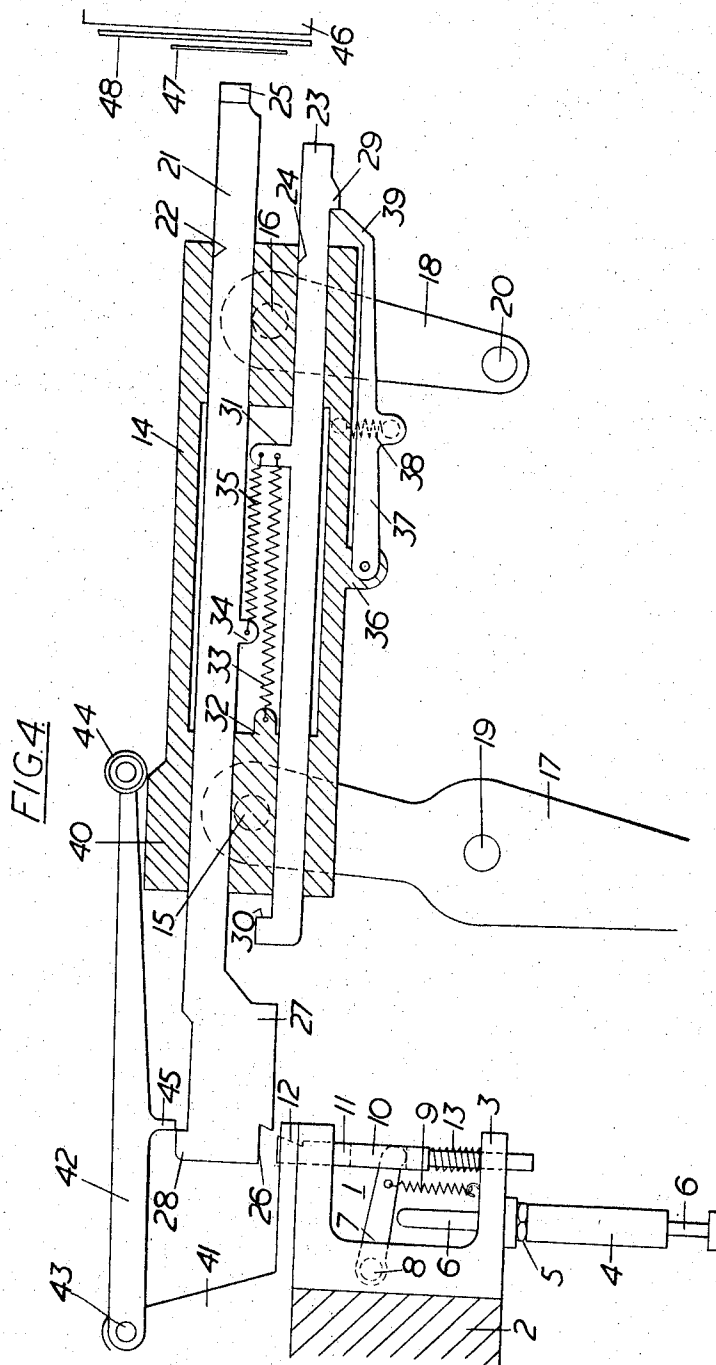
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Inventor
LUCIEN H. MUYSHONDT

By *Lucy P. Lantz*
Attorney

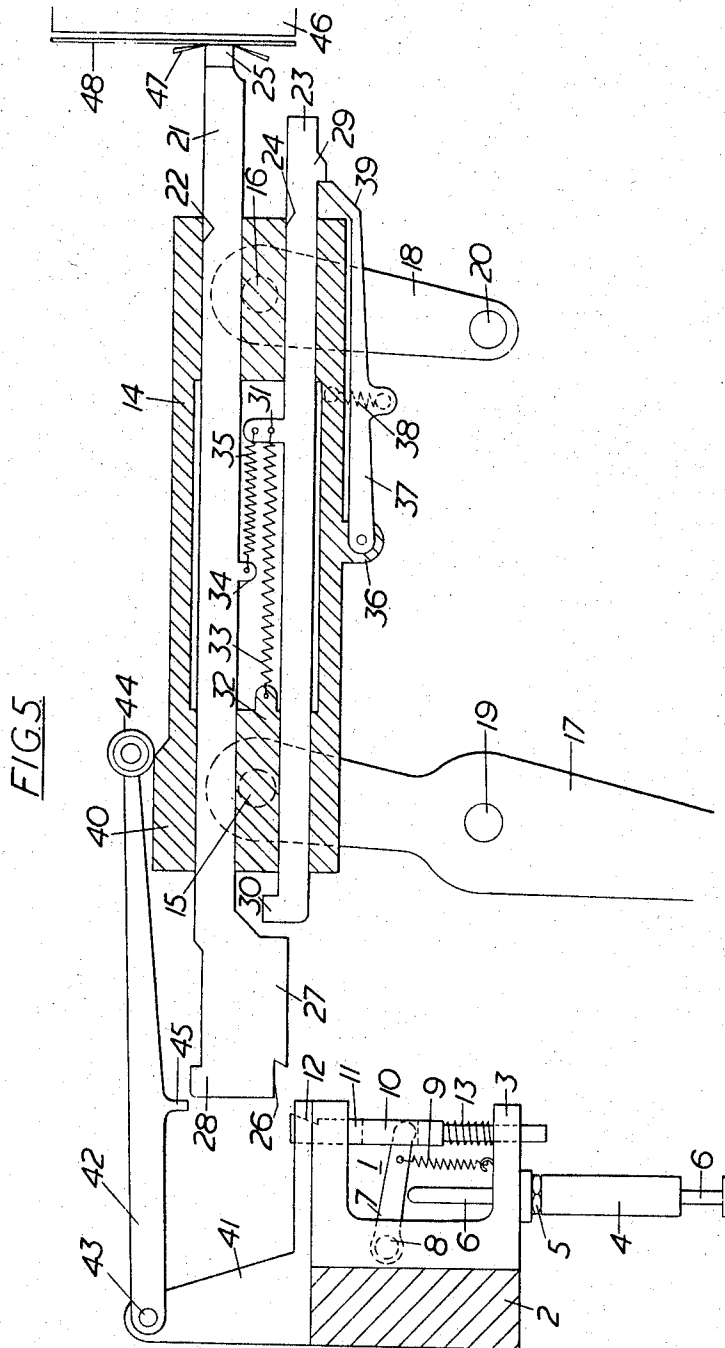
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Inventor
LUCIEN H. MUYSHONDT

By *Ray P. Lantry*
Attorney

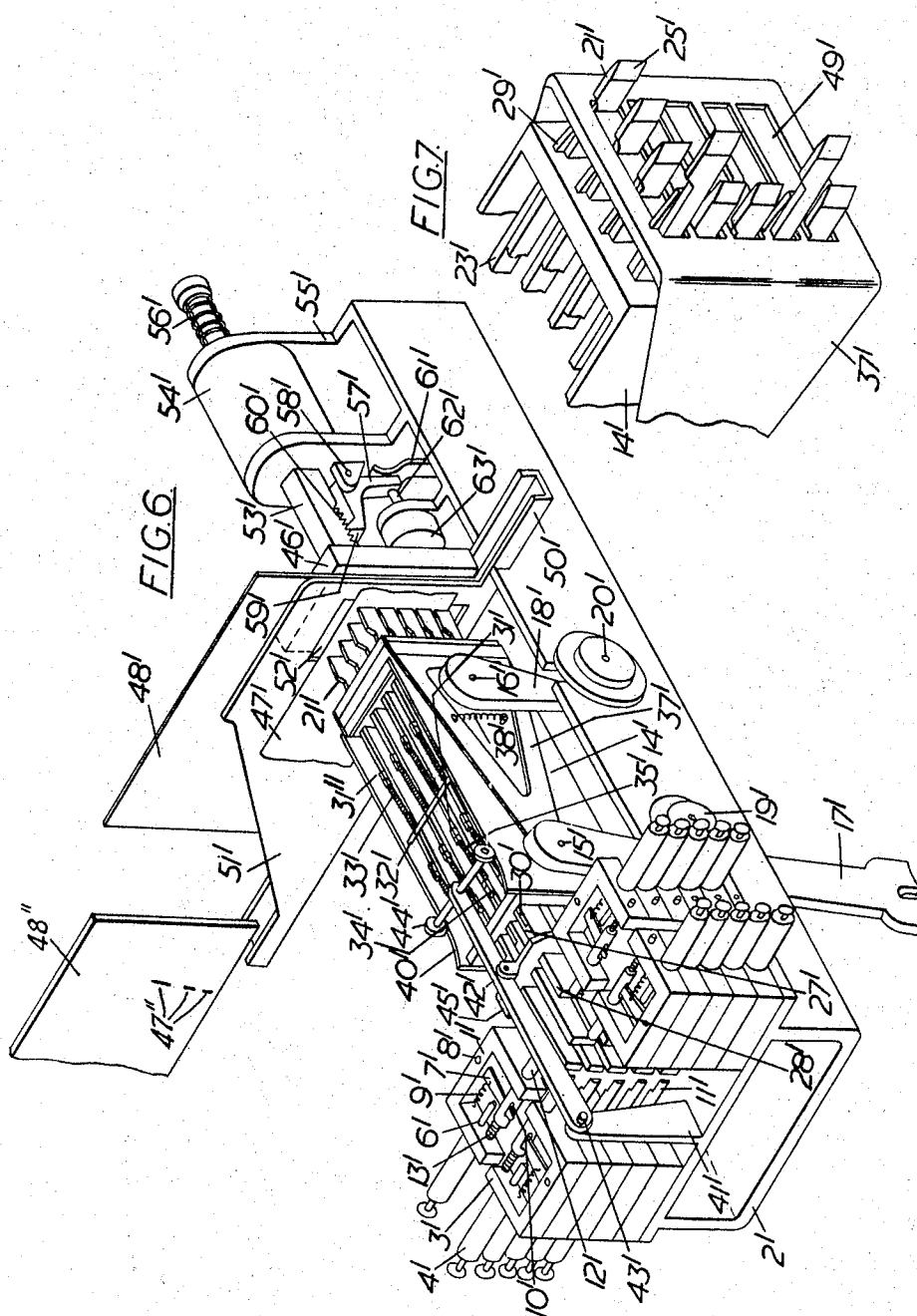
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6 Sheets-Sheet 6



Inventor
LUCIEN H. MUYSHONDT
By *Lucy P. Lamb*
Attorney

1

3,312,163

CODE SETTING DEVICE FOR PRINT ELEMENTS ON RECIPROCATING CARRIAGE

Lucien Hendrik Muyshondt, Kapellen, Belgium, assignor to International Standard Electric Corporation, New York, N.Y., a corporation of Delaware

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13 Claims. (Cl. 101—93)

The present invention relates to a printer including a plurality of printing elements which are normally in a rest position, a code setting device and means for bringing one or more of said printing elements, in accordance with a code established by said code setting device, first in a set position and then in a printing condition for printing on a printing medium arranged in a printing position.

Such a printer is already known from the British Patent No. 866,284 and it is an object of the present invention to provide an improved printer of this type.

The present printer is characterized in that said plurality of printing elements is mounted on a reciprocating carriage which constitutes a guide for said printing elements and which is arranged between said code setting device and said printing position, that the code registered in said code setting device is transferred to said plurality of printing elements, some of which are set in said set condition in accordance with said code when said reciprocating carriage is brought into cooperation with said code setting device, the thus set printing elements being held in said set condition under the control of first holding means which are operated during the subsequent travel of said reciprocating carriage towards said printing position thereby transferring said set printing elements into their printing condition.

The above mentioned and other objects and features of the invention will become more apparent and the invention itself will be best understood by referring to the following description of embodiments taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a cross-sectional view of a one-line printer according to the present invention shown in a rest position;

FIGURE 2 is a cross-sectional view of the one-line printer shown in FIGURE 1 illustrating the first movement to a set position;

FIGURE 3 is a cross-sectional view of the one-line printer shown in FIGURE 2 illustrating the second movement from a set position to a set condition;

FIGURE 4 is a cross-sectional view of the one-line printer shown in FIGURE 3 illustrating the printing condition wherein the movement is toward the printing position;

FIGURE 5 is a cross-sectional view of the one-line printer shown in FIGURE 4 wherein the printer is shown in the printing position;

FIGURE 6 is a perspective view of a five-line printer according to the invention;

FIGURE 7 is an enlarged perspective view of a part of the printer of FIGURE 6.

Principally referring to the FIGURES 1 to 5, the one-line printer shown therein includes a code setting device and a reciprocating carriage arranged between this code setting device and a printing position. This printer permits to print on a letter a code of fluorescent marks, arranged in a single line, in order to permit this letter to be automatically sorted.

The code setting device is constituted by a plurality of code setting mechanisms 1 which are arranged in parallel relationship to each other and which are fixed by not shown means on a frame 2. Each such code set-

2

ting mechanism comprises a U-shaped bracket 3 to which a plunger electromagnet 4 is secured by means of the nut 5, the plunger of this electromagnet being indicated by 6. A lever arm 7 is secured with the help of the screw 8 to the U-shaped bracket 3 and a spring 9 is arranged between this bracket and the lever arm 7, the free end of which is located in the slot 10 in the code setting bar 11. The latter bar 11 is slidably mounted in holes in the parallel legs of the U-shaped bracket 3 and has an oblique indentation at its upper end as indicated at 12. A spring 13 is arranged around the code setting bar 11 and between the broader part thereof and the U-shaped bracket 3. This spring 13 maintains the lower edge of the slot 10 in the code setting bar in contact with the lower part of the lever arm 7.

The reciprocating carriage comprises a frame 14 which is hingedly connected by the pivot axles 15 and 16 to the one ends of the lever arms 17 and 18 respectively. The lever arm 17 is able to pivot about the axle 19 and its other end is coupled to a not shown but classical reciprocating mechanism. The other end of the lever arm 18 is able to pivot about the axle 20.

A plurality of printing elements are arranged in parallel relationship with each other in the frame 14, each of these printing elements being associated to a code setting mechanism 1. Each such printing element comprises a printing bar 21, which is slidably mounted in a slot 22 in the frame 14, and a memory bar 23 which is slidably mounted in a slot 24 in this frame, the slots 22 and 24 being parallel to each other. The printing bar 21 and the memory bar 23 of each printing element are mounted in front of and perpendicularly to the code setting bar 11 of the associated code setting mechanism 1.

The printing bar 21 is provided at its printing end with a sharp printing part 25 and at its other end with an incision 26 corresponding to the oblique indentation 12 at the end of the code setting bar 11 of the associated code setting mechanism 1. At its other end the printing bar 21 is also provided with a downwardly extending abutment 27 and with an upwardly extending abutment 28. The memory bar 23 is provided at its one end with a downwardly extending abutment 29 and at its other end with an upwardly extending abutment 30. The upper surface of the abutment 29 has a first inclined part, a part parallel to the slot 24 and a part perpendicular to its longitudinal axis. The memory bar 23 is further provided, substantially in its middle part, with an upwardly extending finger 31 which is connected to the finger 32 forming part of the frame 14 by means of the spring 33. The finger 31 of the memory bar 23 is also connected by means of the spring 35 to the downwardly extending finger 34 of the printing bar 21.

The frame 14 is integral at its lower part with an extension 36 about which is pivoted the plate 37 which is attached to the frame 14 by means of the spring 38 and which is provided at its free end with an inclined part 39. This plate 37 has a width equal to that of the frame 13. At its end nearest to the code setting device the frame 14 is provided at its upper part with a raised part 40 presenting an inclined surface and a horizontal surface.

The support 41 is fixedly secured to the frame 2, its flat part being fixed on the upper surfaces of the aligned code setting mechanisms 1 in such a manner that the code setting bar 11 of each these mechanisms slightly extends beyond this flat part and is substantially located below the oblique indentation 26 in the associated printing bar 21. The plate 42 has the same width as the frame 14 and is pivoted to the pivot axle 43 secured on the triangular part of the support 41. The plate 42 further carries a cylindrical roller 44 and is integral with a downwardly extending plate 45.

3

The parallel aligned printing bars 21 are perpendicular to the print block 46 in front of which is arranged a fluorescent printing tape 47. An element to be printed on, e.g. a letter 48, is inserted between the print block 46 and the printing tape 47. This print block 46 is shown as being fixed, but it may also be of the type shown in the FIGURES 6 and 7 which will be described later.

In the rest position of the printer, the various parts thereof are located as shown in FIG. 1. The springs 33 and 35 have been so calculated that the abutments 27 and 28 of each printing bar 21 make contact with the abutment 30 of the corresponding memory bar 23 and with the downwardly extending plate 45 respectively. Hereby the roller 44 of this plate 42 is situated at the foot of the inclined part 40 of the frame 14, whereas the inclined end part 39 of the plate 37 makes contact with each of the memory bars 23 at the right hand of the abutment 29. The various plunger electromagnets 4 are not operated and each of the lever arms 7 is held into contact with the plunger 6 by means of the spring 9 and against the action of the spring 13. Hereby the one end of each of the setting bars 11 is located substantially below the oblique indentation 26 of the associated printing bar 21.

The operation of the printer is as follows. When a plunger electromagnet 4 is energized, its plunger 6 is displaced upwardly. Due to this the lever arm 7 is pivoted upwardly about the axle 8 against the action of the spring 9. The setting bar 11 is hereby also displaced upwardly under the action of the spring 13 which maintains the lower edge of the slot 10 in the setting bar 11 into contact with the lower part of the lever arm 7. When a number of setting bars 11 have thus been set to their operative condition, the reciprocating mechanism is operated due to which the frame 14 is first moved from its rest position towards the code setting device, then towards the print block 46 and finally back to its rest position. Due to the first movement all the print bars 21 are displaced towards the left (FIG. 2) so that the abutments 28 no longer make contact with the plate 45. Each of the print bars 21 which is associated to a non operated code setting mechanism does not come into contact with the setting bar 11 thereof. Each print bar 21 which is associated to an operated code setting mechanism comes into contact with the operated setting bar 11 thereof. Only this printing bar is now considered further. The indentation 26 of this printing bar 21 meshes with the incision 12 of the associated setting bar 11 as shown in FIG. 2. The associated plunger electromagnet 4 may be released since the setting bar 11 cannot be moved downwardly, i.e. reset to its rest position, as long as the associated printing bar 21 exerts a push thereon due to the particular oblique shape of the incisions 12 and 26. When the frame 14 is then further moved towards the left the spring 33 is tensioned (FIG. 3) due to the fact that the memory bar 23 has been arrested together with the associated printing bar 21. During this movement the free end 39 of the pivoted plate 37 slides on the inclined and horizontal parts of the abutment 29 of the memory bar 23 and is then suddenly moved upwardly, under the action of the spring 38, behind the vertical part of this abutment 29. Thus the further movement to the left of the memory bar 23 is prevented. At this moment the reciprocating mechanism starts moving the frame 14 towards the printing position (FIG. 4). Hereby the memory bar 23 is also moved towards this position due to the fact that the free end 39 of the plate 37 has snapped behind the vertical part of the abutment 29 of this memory bar 23. Meanwhile the abutment 28 of the printing bar 21 is first moved into contact with the plate 45. During the further movement of the frame 14 the spring 35 is tensioned and meanwhile the roller 44 is moved on the upper part of the frame 14, then on the inclined surface and finally on the horizontal surface of the raised part 40 of this frame 14 (FIG. 5). A short time interval after this roller 44 has started its movement on the latter horizontal surface, the plate 45 is

4

brought out of engagement from the abutment 28. Thus the printing bar 21 is suddenly displaced, under the action of the releasing spring 35, towards the printing position where a fluorescent mark is then printed on the letter 48 through the fluorescent printing tape 47.

During the further movement of the frame 14 from the printing position of FIG. 5 towards the rest position of FIG. 1 the memory bar 23 which has been set in its operative condition remains in that condition. The resetting of this memory bar 23 is realized when during a following operation another memory bar is brought from the rest position shown to the set position. Indeed, during the transfer to the set position the plate 37 is pivoted in the clockwise direction so as to free each previously set memory bar which is thus reset to its rest position under influence of the restoring spring 33.

Principally referring to FIGS. 6 and 7, the compact five-line printer shown therein includes a code setting device and a reciprocating carriage arranged between this code setting device and a printing position. This printer permits to print on a letter a code of fluorescent marks, arranged in five lines, in order to permit this letter to be automatically sorted. This five-line printer includes a plurality of elements which have the same function as in the one-line printer described above with reference to FIGS. 1 to 5 and these elements are therefore indicated in the FIGS. 6 and 7 by the same reference numerals as in the FIGS. 1 to 5, however provided with a prime.

The code setting device is constituted by twenty code setting mechanisms 1' which are flatwise arranged in four stacks on a frame 2', each stack comprising five code setting mechanisms. Each such code setting mechanism 1' comprises a U-shaped bracket 3' to which a plunger electromagnet 4' is fixed, the plunger of this electromagnet being indicated by 6'. A lever arm 7' is secured with the help of the screw 8' to the U-shaped bracket 3' and a spring 9' is arranged between this bracket and the lever arm 7'. The free end of this lever arm is located in a slot 10' in the code setting bar 11' which is slidably mounted in holes in the parallel legs of the U-shaped bracket 3' and which has an indentation at its upper end as indicated at 12'. A spring 13' is arranged around the setting bar 11' and between the broader part thereof and the U-shaped bracket 3'. This spring 13' maintains the edge of the slot 10' in the setting bar into contact with the lever arm 7'.

The reciprocating carriage comprises a frame 14' which is hingedly connected by the pivot axles 15' and 16' to the one ends of the lever arms 17' and 18' respectively. The lever arm 17' is able to pivot about the axle 19' and its other end is coupled to a not shown but classical reciprocating mechanism. The other end of the lever arm 18' is able to pivot about the axle 20'.

In the frame are arranged in parallel relationship with each other twenty printing elements, each of which is associated to a code setting mechanism 1'. Each such printing element comprises a printing bar 21' and a memory bar 23' which are slidably mounted next to each other in slots of the frame. The printing bar 21' of each printing element is mounted perpendicularly to the setting bar 11' of the associated code setting mechanism 1'.

The printing bar 21' is provided at its printing end with a sharp printing part 25' and at its other end with a laterally extending abutment 27' and with an upwardly extending abutment 28'. The memory bar 23' is provided at its one end with an upwardly extending abutment 29' and its other end is indicated by 30'. The abutment 29' has an inclined part and a part perpendicular to its longitudinal axis. The printing bar 21' is also provided with a finger 34' which is connected to a finger 31' of the associated memory bar 23' by means of a spring 35'. The memory bar 23' is also provided with a finger 31' connected to the transverse rod 32' forming part of the frame 14' by means of a spring 33'.

5

A U-shaped bracket 37' is freely pivoted about the axle 15' of the frame 14' to which it is attached by means of the spring 38'. The transverse part of the bracket 37' is provided with five rectangular windows 49' through which extend the front parts of the printing bars 21'.

At the end nearest to the code setting device the frame 14' is provided at its upper part with the inclined parts 40'. A lever arm 42' carrying a plate 45' which has the same width as the frame 14' is able to pivot about the pivot axle 43' secured on the support 41'. At its free end the lever arm 42' is connected to an axle carrying the rollers 44' each rolling on an inclined part 40'.

The parallel aligned printing bars 21' and memory bars 23' are perpendicular to the print block 46' which is arranged above U-shaped channel 50' of a guide plate 51' and in front of an opening 52' in this guide plate 51'. A letter 48' is positioned in the U-shaped channel 50' and in front of the opening 52', and a fluorescent printing tape 47' is arranged between the printing and memory bars and the guide plate 51'. The print block 46' is integral with the plunger 53' of a plunger electromagnet 54' the frame 55' of which is mounted on the frame 2'. A spring 56' is arranged around the plunger 53' and between this plunger 53' and the rear part of the electromagnet frame 55'. An L-shaped lever 57' is pivoted about an axle 58' secured to the front part of the electromagnet frame 55'. The one arm of the lever 57' is provided with a beak 59' engaged in a tooth rack 60' at the lower side of the plunger 53'. The other arm of the lever 57' is on the one hand in contact with the blade spring 61' and is on the other hand located in front of the plunger 62' of a plunger electromagnet 63'.

In the rest position of the printer, the various parts thereof are located as shown in FIG. 6. The springs 33' and 35' have been so calculated that the abutments 27' and 28' of each printing bar 21' make contact with the end 30' of the corresponding memory bar 23' and with the plate 45' respectively. Hereby the rollers 40' are each situated at the foot of the inclined part 40' of the frame 14', whereas the transverse plate of the U-shaped bracket 37' makes contact with each of the memory bars 23' at the right hand of the abutment 29' of each of the memory bars 23'. The various plunger electromagnets 4' are not operated and each of the lever arms 7' is held into contact with the plunger 6' by means of the spring 9' against the action of the spring 13'.

The operation of the printer is as follows. When a fluorescent code 47'' must be printed on the letter 48'' the corresponding plunger electromagnets 4' and the plunger electromagnet 54' are operated. Due to this a number of setting bars 11' are set to their operative position and a part of the letter 48' is pressed between the print block 45' and the guide plate 51'. It is maintained in that position due to the beak 59' of the lever 57' being urged between two teeth of the rack 60' by the blade spring 61'. The reciprocating mechanism is then operated due to which the frame 14' is first moved from its rest position towards the code setting device, then towards the print block 46' and finally back to its rest position. Due to the first movement all the print bars 21' are displaced towards the left so that the abutments 28 no longer make contact with the plate 45'. Each of the print bars 21' which is associated to a non operated code setting mechanism does not come into contact with the setting bar thereof. Each print bar 21' which is associated to an operated code setting mechanism comes into contact with the operated setting bar 11' thereof. Only this print bar is considered further. When the frame 14' is then further moved towards the left the spring 33' is tensioned due to the fact that the memory bar 23' has been arrested together with the associated printing bar 21'. During this movement the inclined part of the abutment 29' of the memory bar 23' slides under the upper part of a window 49 in the U-shaped bracket 37' which is thus lifted. At a certain moment this bracket 37' is then suddenly moved downwardly be-

6

hind the vertical part of this abutment 29' under the action of the spring 38'. Thus the further movement to the left of the memory bar 23' is prevented (see some printing bars on FIG. 7). At this moment the reciprocating mechanism starts moving the frame 14' towards the printing position. Hereby the memory bar 23' is also moved to this position due to the fact that the U-shaped bracket 37' has snapped behind the vertical part of the abutment 29' of this memory bar 23'. During this movement the abutment 28' of the printing bar 21' is first moved into contact with the plate 45' and during the further movement of the frame 14' the spring 35' is tensioned. Meanwhile the rollers 44' are moved on the inclined parts 40' of this frame 14'. A short time interval after these rollers 44' have started their movement on the latter inclined surface, the plate 45' is brought out of engagement from the abutment 28'. Thus the printing bar 21' is suddenly displaced, under the action of releasing spring 35', towards the printing position where a fluorescent mark is then printed on the letter 48' through the fluorescent printing tape 47' (see some printing bars in FIG. 7).

During the further movement of the frame 14' from the printing position towards the rest position, the memory bar 23' which has been set in its operative condition remains in that condition. The resetting of this memory bar 23' is realized when during a following operation another memory bar is brought from its rest position into a set position. Indeed, during the transfer to the set position the U-shaped bracket 37' is pivoted in the anti-clockwise direction so as to free each previously set memory bar which is thus reset to its rest position under influence of the restoring spring 33'.

When the printing operation is finished the plunger electromagnet 63' is operated so that the lever 57' is pivoted in the anti-clockwise direction so as to free the plunger 53'.

While the principles of the invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

I claim:

1. Printer apparatus comprising:

a plurality of printing elements which are normally in a rest position;

a printing medium arranged in a printing position;

a code setting device having means for registering and transferring a code to said printing elements;

means for bringing said printing elements into a set position, said means including a reciprocating carriage for mounting and guiding said plurality of printing elements, and said carriage being positioned such that when said printing elements are in a set position at least one of said printing elements is set, according to said code, by said setting device in a set condition; and

a first holding means for holding the set printing elements in said set condition, whereby during the following movement of said carriage toward said printing position, said first holding means is operated to transfer said set printing elements into a printing condition to print on said printing medium.

2. Apparatus according to claim 1, wherein each of said printing elements includes:

a printing bar slidably mounted in said reciprocating carriage; and

an associated memory bar slidably mounted in said carriage in parallel relation to said printing bar, such that the setting of said printing element is accomplished by displacing the associated memory bar first into said set position and then into said set condition, and when said set printing element is transferred from said set condition to said printing condition said printing bar is in an operative condition.

3. Apparatus according to claim 2, in which:

said first holding means includes a retaining plate (45) which prevents displacement of a set printing bar in the direction of said printing position until operated; said printing bar being provided at its end nearest to said code setting device with a first abutment (27) and a second abutment (28); said memory bar being provided at its end nearest to said code setting device with a third abutment (30); and said memory bar being connected to said reciprocating carriage by a first spring element (33) which urges said first and third abutments into contact with each other and towards said code setting device, and said printing bar is connected to said associated memory bar by means of a second spring element (35) which urges said second abutment into contact with said retaining plate.

4. Apparatus according to claim 3, wherein said code setting device includes a plurality of code setting mechanisms (1), each of said mechanisms being associated with one of said printing elements, and each of said mechanisms including a code setting bar (11) which when operated is situated in the path of travel of the printing bar of the associated printing element during the travel of said printing element towards said code setting device.

5. Apparatus according to claim 4, in which said code setting mechanism includes:

- a U-shaped bracket (3), said code setting bar (11) slidably mounted in said bracket and parallel to the transverse arm of said bracket, and said bar (11) having a cutout portion defining a slot (10);
- a lever arm (7), one end of which is pivotally mounted to said transverse arm, and the other end of which is engaged in said slot;
- a first spring (13) urging said bar (11) towards a position, located in the path of travel of said printing bar;
- a second spring (9) urging said lever arm and said code setting bar towards their rest position; and
- an electromagnet (4) having a plunger (6) which is in contact with said lever arm, such that when said electromagnet is operated said lever arm is pivoted against the action of said second spring, and said first spring then displaces said code setting bar in the path of travel of said printing bar.

6. Apparatus according to claim 5, including a second holding means connected to said reciprocating carriage and being adapted to engage said memory bar in a form locking manner, such that when said second holding means is holding said memory bar in the form locking manner, the further displacement of said memory bar in the direction of said code setting device is prevented.

7. Apparatus according to claim 6, wherein when said reciprocating carriage is moved toward said code setting device, the printing bar of the printing element associated with an operated code setting bar is stopped and the first spring element (33) is tensioned, said second holding means engages said memory bar to prevent further displacement of said memory bar in the direction of said code setting device, and on the following movement of said carriage toward said printing position, said second spring element (35) is tensioned and said first holding means is operated to free the tensioned second spring element (35) which urges said printing bar into said printing condition.

8. Apparatus according to claim 7, wherein when said second holding means is operated to engage said memory bars in the form locking manner, the previously engaged memory bars are disengaged and returned to their rest position.

9. Apparatus according to claim 8, wherein said first holding means comprises:

- a first pivoted plate (42) which is pivotally mounted on one end to the side of said code setting device by means of a pivot axle (43);
- a roller (44) resting on said carriage and supporting the other end of said first pivot plate;
- said first pivoted plate including said retaining plate (45) which is positioned between said roller and said pivot axle, said retaining plate being normally in contact with said second abutment (28); and
- said reciprocating carriage including a raised part (40) which is located between said roller and said retaining plate, such that when said carriage moves toward said printing position, said roller mounts on said raised part and pivots said retaining plate out of engagement from said second abutment.

10. Apparatus according to claim 9, in which:

- said memory bar includes a fourth abutment (29) which is located at its end nearest said printing position, and said abutment (29) has a rising slope in the direction of said code setting device which terminates abruptly; and
- said second holding means includes a second pivot plate (37) pivotally mounted to said carriage, and having a free end (39) which is normally held into contact with said fourth abutment at a point nearest to the printing position by means of a third spring element (38), such that when said carriage is displaced toward said code setting device and said memory bar has been arrested by means of said code setting device, said free end (39) snaps behind said fourth abutment in a form locking manner.

11. Apparatus according to claim 1, including:

- a guide plate (51') in said printing position having an aperture (52') defining the area of said printing medium on which said printing elements are to print; and
- means being positioned opposite said printing elements and adjacent said printing medium to press said printing medium against said guide plate, whereby the position of said printing medium during printing is fixed.

12. Apparatus according to claim 11, wherein said pressing means includes:

- a print block (46');
 - a first plunger (53') forming part of said print block and having a tooth rack (60'); and
 - a first plunger electromagnet (54'); and
- a restoring first spring (56') positioned on said first plunger, such that when said first plunger electromagnet is energized, said printing medium is pressed between said printing block and said guide plate, and when said first plunger electromagnet is de-energized said print block is returned to its unenergized position by means of said restoring first spring.

13. Apparatus according to claim 12, including:

- an L-shaped lever (57') having on one arm a beak (59') for engaging said tooth rack;
- a second spring (61') on one side of the other arm of said L-shaped lever, said second spring urging said beak into contact with said tooth rack; and
- a second plunger (62') and second plunger electromagnet (63'), said second plunger being mounted in front of the other side of said other arm, such that when said second plunger electromagnet is energized, said beak is disengaged from said tooth rack.

No references cited.

WILLIAM B. PENN, *Primary Examiner.*