

"PRINTER"

The present invention relates to a printer.

A known printer is provided with a number of operating switches which include a switch for specifying an ON-line/OFF-line condition, a selection switch
5 for selecting either draft quality printing or NLQ (Near Letter Quality) printing, a form-feed switch and a line-feed switch.

Another known printer may be set in additional modes in which to achieve a desired character pitch,
10 desired types of characters (desired degree of stress, double printing and so on) and desired length of printing paper. Such a printer, however, has to be provided with switches related to the setting of the said modes and with lamps for displaying the nature of the
15 mode selected. For instance, a printer having a character pitch setting mode may include display units for displaying modes such as 10CPI (Character Per Inch) 12CPI, 17CPI and so forth. Such a printer requires to be provided with lamps which respectively indicate operation of the individual display units with the aid of appropriate
20 switches. For this reason, a large number of switches and lamps are required which is expensive.

According, therefore, to the present invention,
there is provided a printer comprising a printing head;
moving means for moving the printing head to a plurality
of different positions; and mode setting means for setting
5 the printer in a specified mode of operation in accordance
with the particular position to which the printing head
has been moved.

Preferably, there are first manually operable switch
means for effecting operation of the shift means so as to
10 move the printing head to the said particular position,
and second manually operable switch means for controlling
the setting of the mode setting means.

The mode setting means preferably comprise mode specifying
means whose mode is selected by the second manually operable
15 switch means, and printer operating means for operating
the printer in accordance with the mode set up in the mode
specifying means.

There are preferably control means for selectively
setting each of the first and second manually operable
20 switch means in a plurality of different modes.

Thus the mode setting means may be operable by the
second manually operable switch means only when the latter
has been set by the control means in a predetermined
mode or modes.

The first manually operable switch means may comprise two switches which are settable in a first mode in which the printer is respectively set up for a predetermined form feed and line feed, and a second mode in which the printing head is respectively moved in opposite directions.

The second manually operable switch means may be settable in first modes in which the printer is set up for either near letter quality printing or draft printing, and in second modes in which the printer is set up for particular character pitches.

There is preferably a third manually operable switch means which is settable in a first mode in which it has an ON/OFF function and a second mode in which it controls the control means so as to change the mode of the first and second manually operable switch means.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 is a functional block diagram showing an embodiment of a printer according to the present invention;

Figure 2 is a front view of a part of the printer of Figure 1 showing one example of an operating panel thereof;

Figure 3 is a diagrammatic view showing positions

to which a printing head of the printer of Figure 1 may be moved, and

Figure 4 is a flowchart showing the operation of the printer of Figure 1.

5 In Figure 1 there is shown a block diagram of a printer according to the present invention which is provided with manually operable operating switches 1-4 which comprise, when operated in a first mode, an ON-line/OFF line selecting switch 1, an NLQ/draft selecting
10 switch 2, a form-feed executing switch 3 and a line-feed executing switch 4. The switches 1-4, when operated in a second mode, respectively function as a mode change-over switch, a character pitch setting switch, a printing head left moving switch for moving a printing head 15 (Figure 3)
15 towards the left, and a printing head right moving switch for moving the printing head 15 towards the right. These switches are disposed in the way shown in Figure 2.

 The numeral 5 represents a mode control circuit which, when suitably operated by the switch 1, changes over
20 the modes of the switches 2, 3, 4. An output control circuit 6 is adapted to produce outputs related to the functions of the switches 1-4 when the latter are set in their said first modes. Another output control circuit 7 is adapted to produce outputs related to the functions of the switches 1-4 when

the latter are set in their said second modes, so that the output control circuit 7 is operable to set the character pitch. The numeral 8 represents a head movement control circuit for controlling the movement of the printing head 15. The reference numeral 9 indicates a specifying circuit for specifying the character pitch; and the reference numeral 14 designates a character pitch setting circuit.

Referring to Figure 2, there is shown a lamp marked with the numeral 11 which lights up when the ON-line mode of the switch 1 is selected.

The operation of the printer will hereinafter be described with reference to Figures 3, 4.

The output control circuit 6 is selected when the switch 1 is in its first mode as a result of the respective output of the mode control circuit 5, whereby the switches 2, 3, 4 perform their original or first mode functions. At this time, change-over outputs for the ON-line and OFF-line are outputted from a terminal a, whereby the change-over is effected. The lamp 11 lights up at ON-line time.

On the other hand, selection outputs for the NLQ printing and the draft quality printing are generated from a terminal b by operating the switch 2, and the change-over thereof may be carried out.

Furthermore, outputs are generated from a terminal c by operating the switch 3, thereby effecting form-feed of recording paper. Upon operation of the switch 4, moreover, outputs are produced from a terminal d, whereby line-feed is performed.

The operation for setting up the character pitch will now be explained.

An ON-line state (Figure 4a) is first created by means of the switch 1, and the switch 1 is then further pushed (Figure 4b) for a given period, for instance one second or more. As a result, the change-over outputs are generated from the mode control circuit 5, and the output control circuits 6, 7 are respectively rendered inoperative and operative, so that the function of the switches 1 to 4 are changed over. Simultaneously, the lamp 11 illustrated in Figure 2 begins to go on and off by virtue of the aforementioned change-over outputs. Immediately the switch 3 is operated (Figure 4c) the printing head 15 moves to the left-hand side of Figure 3 (Figure 4d). When the switch 4 is operated (Figure 4e), the printing head 15 moves to the right-hand side of the Figure 3 (Figure 4f).

As shown in Figure 3, a paper holding bar 13, which is opposite the printing head 15, is marked with the numerals 1a, 10, 12, 17 in the corresponding positions to which the printing head 15 may be moved. The numeral 1a indicates

that the printing is effected at a character pitch which responds to a command given from a host computer (not shown). The numerals 10, 12, 17 indicate that the printing is effected at fixed pitches such as 10CPI, 12CPI, 17CPI regardless of the command issued from the host computer.

Originally, the numerals with which the holding bar 13 is marked serve to indicate the number of printing digits and the printing positions; and the marking may be such that only 1a, 10, 20,....are actually marked, other numerals therebetween being indicated by graduations (not shown).

When effecting printing at 10CPI, for example, driving signals for the printing head 15 are generated from the head movement control circuit 8 illustrated in Figure 1 by operating the switches 3, 4, thereby moving the printing head 15 to the position indicated by the numeral 10 of Figure 3. At this time, the character pitch specifying circuit 9 transmits data for specifying a character pitch, i.e. 10 CPI in this case, which corresponds to the position of the printing head 15. Then the said data are set in the character pitch setting circuit 14 (Figure 4h) by operating the switch 2 (Figure 4g). The outputs for changing over the mode are concurrently generated from the mode control circuit 5,

and the first or ordinary mode is restored, whereby the individual switches 1-4 revert to their original functions. The character pitch is thus set to 10CPI, and the printing continues to be performed at 10CPI regardless of the command.

In the case of setting the character pitch to 12CPI or 17CPI, however, the printing head 15 is made to move to the position indicated by the numeral 12 or 17 of Figure 3, and then the switch 2 may be operated.

When performing printing at pitches in accordance with the commands sent from the computer, the printing head 15 is moved to the position indicated by the numeral 1a, and the switch 2 may be operated.

In the above-described embodiment, reference has been made to the character pitches being set by the specified modes. The present invention is not, however, confined to this particular case, but may extend to the setting of various types of characters such as stress and double printing and further to the setting of the length of the printing paper.

As will be appreciated in the printer described above, the contents of a given mode are specified in accordance with the position to which the printing head 15 has been moved by operating the switches 3, 4, and such contents are set by operating another switch, i.e. the

switch 22. Hence, it is feasible to display the contents of the specified mode without the use of display units for displaying such contents. This arrangement simplifies the structure and reduces costs.

- 5 The switches 1-4 for setting the printer thus serve as the switches for moving the printing head and for the setting of the mode contents, which brings about a reduction in costs.

C L A I M S

1. A printer comprising a printing head; moving means for moving the printing head to a plurality of different positions, and mode setting means for setting the printer in a specified mode of operation in accordance with the particular position to which the printing head has been moved.
2. A printer as claimed in claim 1 in which there are first manually operable switch means for effecting operation of the moving means so as to move the printing head to the said particular position, and second manually operable switch means for controlling the setting of the mode setting means.
3. A printer as claimed in claim 2 in which the mode setting means comprise mode specifying means whose mode is selected by the second manually operable switch means, and printer operating means for operating the printer in accordance with the mode set up in the mode specifying means.
4. A printer as claimed in claim 2 or 3 comprising control means for selectively setting each of the first and second manually operable switch means in a plurality of different modes.



5. A printer as claimed in claim 4 in which the mode setting means are operable by the second manually operable switch means only when the latter has been set by the control means in a predetermined mode or modes.

5 6. A printer as claimed in claim 4 or 5 in which the first manually operable switch means comprise two switches which are settable in a first mode in which the printer is respectively set up for a predetermined form feed and line feed, and a second mode in which the printing
10 head is respectively moved in opposite directions.

7. A printer as claimed in any of claims 4-6 in which the second manually operable switch means is settable in first modes in which the printer is set up for either near letter quality printing or draft printing, and in
15 second modes in which the printer is set up for particular character pitches.

8. A printer as claimed in any of claims 4-7 in which there is a third manually operable switch means which is :
settable in a first mode in which it has an ON/OFF function
20 and a second mode in which it controls the control means so as to change the mode of the first and second manually operable switch means.



9. A printer substantially as hereinbefore described
with reference to and as shown in the accompanying
drawings.
