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(54) Printing apparatus.

(57) A hand-held printing apparatus, including a control device (16) having a clock mechanism, a printing device (26) for printing, and an indicator (6) for indicating what is being printed.

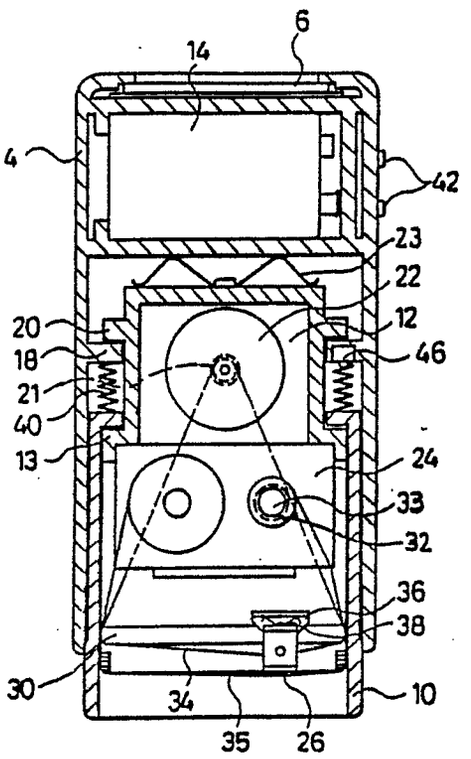

FIG.2

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Printing apparatus

BACKGROUND OF THE INVENTION

This invention relates to a printing apparatus which can print the time of day or the like.

Fig. 5 shows a prior art printing apparatus 100. The printing apparatus 100 is provided with printing types for printing the time on an admission ticket or the like, and a control device for operating the printing types. To print on a ticket using the printing apparatus 100, the ticket is inserted into a slot 102 which is situated at the lower part of the printing apparatus 100. When the ticket is inserted, the printing apparatus strikes the ticket with the printing types to print the current time on the surface of the ticket.

The printing apparatus 100 has many limitations. One limitation is that the procedure for printing on a ticket is time-consuming. The operator must receive a ticket from a user, insert it into the printing apparatus 100 to print with the printing device, and return the printed ticket to the user, which results in an inefficient use of time and labor when dealing with a large volume of items to be stamped. Another limitation is that the printing apparatus 100 cannot be used to print on an article which cannot be inserted into the slot 102, such as a package, parcel, or other thick item. Moreover, a ticket or similar mass-produced item of a predetermined standard form for the printing apparatus 100 to print at the same position on every ticket. Finally, it is difficult to print with the printing apparatus 100 on a flexible surface or a fragile article.

In order that the invention would be more clearly understood, it will now be disclosed in greater detail with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an oblique view of a preferred embodiment of the printing apparatus according to the present invention.

Fig. 2 is a front vertical sectional view of the printing apparatus shown in Fig. 1.

Fig. 3 is a wide vertical sectional view of the printing apparatus shown in Fig. 1.

Fig. 4 is an oblique view of a second embodiment of the printing apparatus according to the present invention, and

Fig. 5 is an oblique view of a prior art printing apparatus.

DESCRIPTION OF THE INVENTION

Fig. 1 shows a printing apparatus 2 according to the present invention. The printing apparatus 2 comprises a rectangular outer frame 4 and a printing mechanism and others provided within the outer frame 4. The outer frame 4 is provided at its upper part with an indicator 6, which can be checked while the printing apparatus 2 is in use.

As shown in Fig. 2 and Fig. 3, a sleeve-shaped pressure plate 10 is provided inside the outer frame 4, and a base 12 is provided inside the pressure plate 10. The pressure plate 10 is constructed so it can slide in and out of the outer frame 4, and two springs 40 are disposed between the pressure plate 10 and a projection 18 provided on the outer frame 4. The springs 40 normally push the pressure plate 10 downward. The projection 18 is mounted with a switch 46 which senses contact with the pressure plate 10.

The base 12 slides relative to the pressure plate 10 and the outer frame 4. An engaging piece 20 is situated on the side of the upper part of the base 12, and a shoulder portion 13 is located in the middle of the side part of the base 12. A spring 23 is mounted on the top of the base 12, which pushes the base 12 downward, and the engaging piece 20 normally touches against the projection 18 of the outer frame 4. The shoulder portion 13 touches against the top of the pressure plate 10.

The printing apparatus 2 is provided at its upper part with a rechargeable battery 14, and as shown in Fig. 3, with a control device 16. A drive motor 22 is mounted on the base 12, and a pulley 21 is mounted on a drive shaft of the drive motor 22. A belt 34 is wound down around the pulley 21. The drive motor 22 is connected to the control device 16. A print head 26 is located beneath the base 12. The print head 26, which is a thermal print head, is mounted so it moves in a vertical direction on a head mount 36. A spring 38 is located between the print head 26 and the head mount 36, and the spring 38 pushes the print head 26 downward. The head mount 36 is mounted so it moves along a guide 30 located at the side of the printing apparatus 2. The belt 34 is guided around the pulley 21, bending in the vicinity of both ends of the guide 30, and returning to the pulley 21. The print head 26 is integrally fixed to the belt 34 and reciprocally moved along the guide 30 according to the movement of the belt 34. An ink ribbon cassette 24 is provided between the drive motor 22 and the print head 26. The ink ribbon cassette 24 is detachably mounted and contains reels 32 of an ink ribbon 35. The ink ribbon 35 is reeled out from

the ink ribbon cassette 24 and runs in front of the print head 26 horizontally. Shafts engage with the individual centers of the reels of the ink ribbon 35, and one shaft 33 of these shafts is provided with a pulley 32. The pulley 32 and the shaft 33 have a ratchet mechanism. The ratchet mechanism may be any structure that allows movement in only one direction.

The control device 16 has a clock function to transmit time and date and a drive control function to control the drive motor. Further, the control device 16 is connected to the indicator 6 to indicate time and the like on the indicator 6. When the pressure plate 10 moves to activate the switch 46 to transmit a signal to the control device 16, the control device 16 causes the drive motor 22 to rotate a predetermined distance, moving the print head 26 along the guide 30, and transmitting the time or the like to the print head 26 so it will print it. When the print head 26 reaches one end, the drive motor 22 is rotated in reverse to bring the print head 26 back to its original position. At this time, the ratchet mechanism is fixed to rotate the shaft 33 and wind the ink ribbon 35. The return operation of the print head 26 may be alternatively initiated by sensing the release of the pressure plate 10 from the switch 46.

Since the current time is printed simply by pressing the printing apparatus 2 against the surface of an admission ticket or the like, the printing apparatus 2 eliminates the need for receiving tickets by the operator to print them. Further a stamp 50 can be mounted on the pressure plate 10, as shown in Fig. 1. The stamp 50 has the inked raised lettering of a business's name or other words or characters which will be printed when the printing apparatus 2 prints the time. The stamp 50 is attached by sliding it into a groove made in the pressure plate 10.

A printing apparatus 60 shown in Fig. 4 has a positioning plate 64 mounted on a pressure plate 62. The positioning plate 64 has an opening 66 at the printing position. The positioning plate 64 is pressed against the ticket surface to be printed, thereby setting the printing apparatus 60 at a predetermined position for printing.

The control device 16 can be set to print letters, characters or numerals, such as an amount of money, instead of the time. In such a case, the contents to be printed can be selected using a switch 42 which is provided externally. This allows a desired message or number to be printed at a desired position.

While the invention has been herein described with reference to a particular embodiment and example, one skilled in the art will readily recognize various modifications and changes without deviating from the present invention. It is therefore intended that each such variation and modification as falls within the true spirit and scope of the invention be covered in the following claims.

Claims

1. A printing apparatus comprising
a frame (4) of substantially rectangular form adapted to be hand held,
a print head (26) for printing located at the lower end of said frame (4),
a drive mechanism (22) for driving said print head (26),
a control device (16) for transmitting contents to be printed by said print head (26) and for controlling said drive mechanism (22), and
an indicator (6) located on the surface of said frame (4) for indicating said contents to be printed.

2. The apparatus of claim 1, wherein said frame (4) is provided at its lower part with a stamp (5) to print simultaneously with the printing by said print head (26).

3. The apparatus of claim 1 or 2, wherein said frame (4) has at its lower part an opening for positioning said frame.

4. The apparatus of any of claims 1 to 3, wherein said print head (26) is a thermal print head.

5. The apparatus of any of claims 1 to 4, wherein said control device (16) has a clock function.

6. The apparatus of any of claims 1 to 5, wherein said control device (16) transmits letters, characters or numerals.

7. The apparatus of any of claims 1 to 6, further having a switch (42) to input contents to be printed into said control device (16).

8. The apparatus of any of claims 1 to 7, wherein a printing ribbon cassette (24) is detachably provided inside said frame (4).

9. The apparatus of any of claims 1 to 8, wherein a primary battery or a rechargeable battery (14) as a power source is detachably provided inside said frame (4).

10. The apparatus of any of claims 1 to 9, wherein said indicator (16) is a liquid crystal display device.

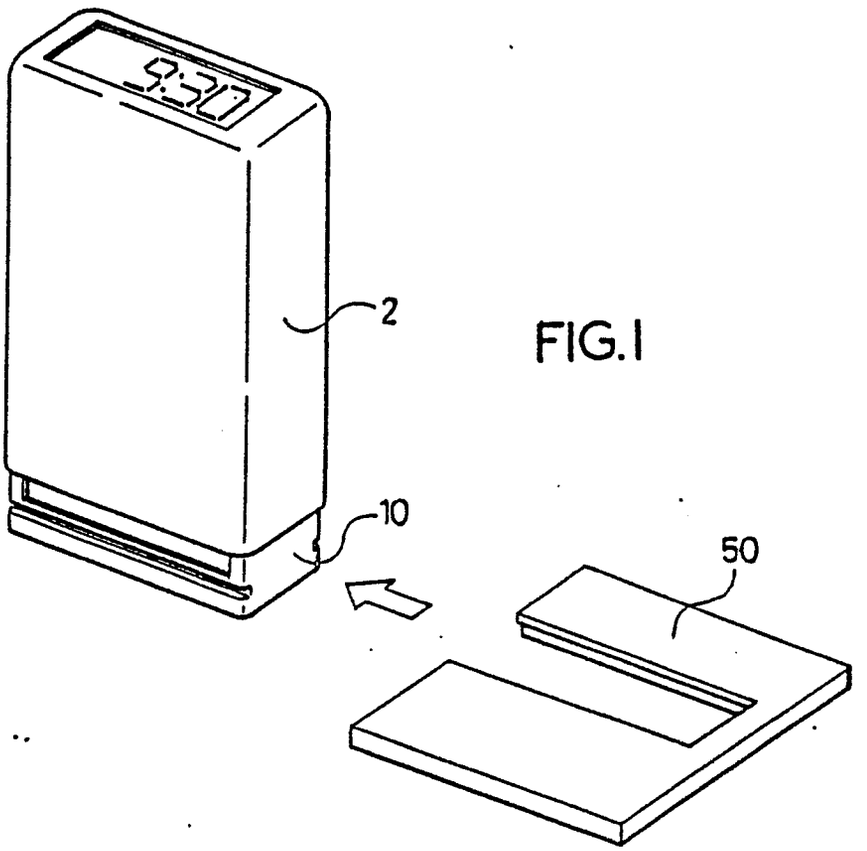

FIG.1

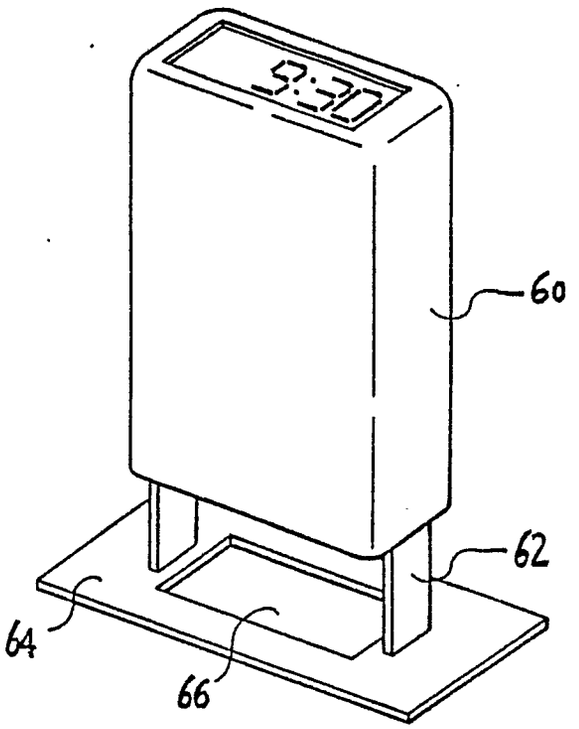

FIG. 4

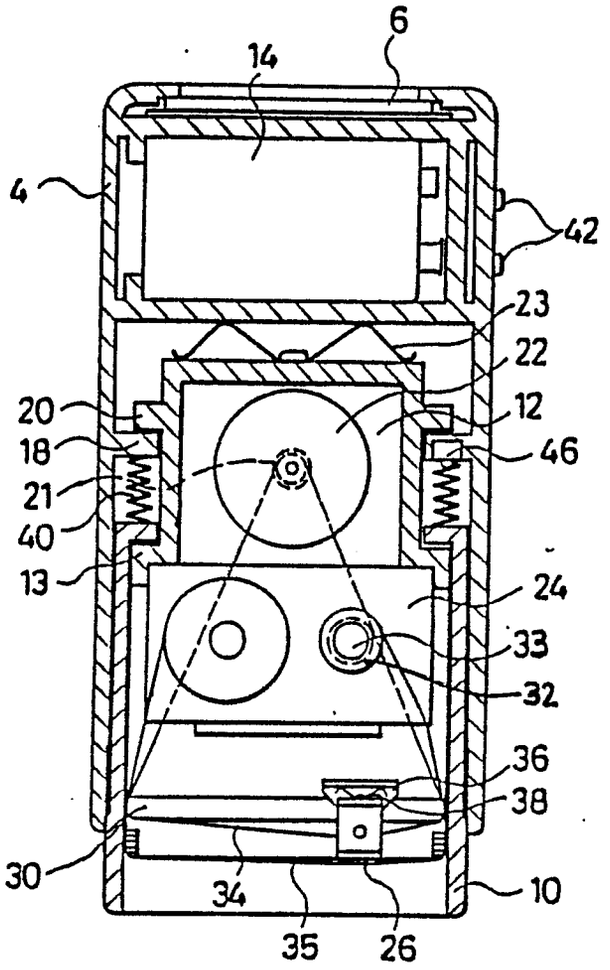

FIG.2

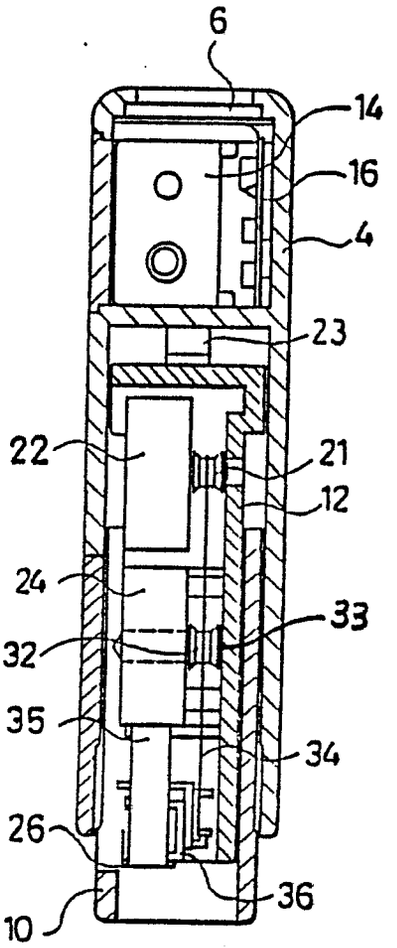

FIG.3

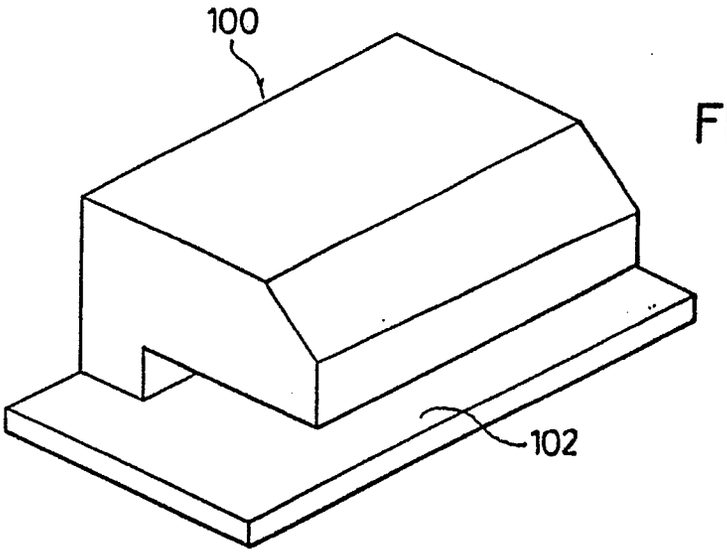

FIG. 5