

SWIPE MOUSE

FIELD OF INVENTION

- 5 The following invention relates to computer pointing device technology and printing. More particularly, though not exclusively, the invention relates to a mouse having a built-in printer.

BACKGROUND OF THE INVENTION

- 10 Modern desktop computers and their associated peripheral devices take up a lot of desk space. Desktop scanners, printers, monitors, keyboards and mouse pointing devices all demand desk space. Particularly monopolizing of desk space are desktop printers and mouse pointers. Mouse pointers themselves are quite small, but they require a large area of desk space in use.

- 15 The mere incorporation into a mouse body of a known printer device would not result in a compact, easily manoeuvrable mouse. This is because prior art printers incorporate a supply of print media and employ a print media feed mechanism to transport the print media past the printhead to effect printing onto the print media. Moreover, known printers, having a supply of print media, are large and heavier than would be desirable in a mouse pointing device.

20 SUMMARY OF THE INVENTION

In accordance with the invention, there is provided a mouse pointing device comprising:

- a housing;
 - a motion sensor mounted to the housing and serving to relay positional data from the device to a computer so as to effect motion of a graphic pointer on a monitor associated with the computer; and
 - 25 a printer located within the housing and configured to receive print data from the computer, the printer being configured to print an image, based on the print data, onto print media external to said housing as the housing traverses said media, said motion sensor providing positional data of the housing relative to said print media to the printer during printing.
- 30 Preferably, the housing further includes an ink supply for storing ink and supplying it to the printer. More preferably, the ink supply comprises a removable ink cartridge.

In a preferred form, the printer includes a drop-on-demand inkjet printhead including a plurality of ink ejection nozzles.

- 35 Preferably, the housing also includes a print controller including a computer processor into which the print data can be input and converted into a sequence of drop ejection control signals. In this case, the print controller operates the ink ejection nozzles in accordance with the drop ejection control signals to cause

printing on the print media at a rate determined using a measured relative speed between the printhead and the print media.

Preferably, the motion sensor includes a light source to emit light onto a surface on which the device is used.

5 Light reflected from the surface passes through a lens to a CCD chip.

It is particularly preferred that the printer includes a printhead fabricated at least partially using microelectromechanical processes.

CO-PENDING APPLICATIONS

10 Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention simultaneously with the present application:

15	AP39	AP43	AP44	AP46	AP47	AP48
	AP49	AP50	AP51	AP52	AP53	AP55
	AP58	AP60	AP61	AP62	AP63	AP64
	AP65	AP66	AP67	AP68	AP69	AP70
	AP71	AP77	AP78	AP79		

20 The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its file reference. This will be replaced by the corresponding PCT Application Number when available.

RELATED PATENT APPLICATIONS AND PATENTS

25	US6,227,652	US6,213,588	US6,213,589	US6,231,163
	US6,247,795	US6,394,581	US6,244,691	US6,257,704
	US6,416,168	US6,220,694	US6,257,705	US6,247,794
	US6,234,610	US6,247,793	US6,264,306	US6,241,342
	US6,247,792	US6,264,307	US6,254,220	US6,234,611
30	US6,302,528	US6,283,582	US6,239,821	US6,338,547
	US6,247,796	US09/113,122	US6,390,603	US6,362,843
	US6,293,653	US6,312,107	US6,227,653	US6,234,609
	US6,238,040	US6,188,415	US6,227,654	US6,209,989
	US6,247,791	US6,336,710	US6,217,153	US6,416,167
35	US6,243,113	US6,283,581	US6,247,790	US6,260,953
	US6,267,469	US6,273,544	US6,309,048	US6,420,196
	US6,443,558	US09/422,892	US6,378,989	US09/425,420
	US09/422,893	US09/609,140	US6,409,323	US6,281,912
	US09/575,113	US6,318,920	US6,488,422	US09/693,644
40	US6,457,810	US6,485,135	US09/112,763	US6,331,946
	US6,246,970	US6,442,525	US09/505,951	US09/505,147
	US09/505,952	US09/575,108	US09/575,109	US09/575,110

	US09/607,985	US6,398,332	US6,394,573	US09/606,999
	US6,238,044	US6,425,661	US6,390,605	US6,322,195
	US09/504,221	US6,480,089	US6,460,778	US6,305,788
	US6,426,014	US6,364,453	US6,457,795	US09/556,219
5	US09/556,218	US6,315,399	US6,338,548	US09/575,190
	US6,328,431	US6,328,425	US09/575,127	US6,383,833
	US6,464,332	US6,390,591	US09/575,152	US6,328,417
	US6,322,194	US09/575,177	US09/575,175	US6,417,757
	US09/608,780	US6,428,139	US09/607,498	US09/693,079
10	US09/693,135	US6,428,142	US09/692,813	US09/693,319
	US09/693,311	US6,439,908	US09/693,735	PCT/AU98/00550
	PCT/AU00/00516	PCT/AU00/00517	PCT/AU00/00511	PCT/AU00/00754
	PCT/AU00/00755	PCT/AU00/00756	PCT/AU00/00757	PCT/AU00/00095
	PCT/AU00/00172	PCT/AU00/00338	PCT/AU00/00339	PCT/AU00/00340
15	PCT/AU00/00341	PCT/AU00/00581	PCT/AU00/00580	PCT/AU00/00582
	PCT/AU00/00587	PCT/AU00/00588	PCT/AU00/00589	PCT/AU00/00583
	PCT/AU00/00593	PCT/AU00/00590	PCT/AU00/00591	PCT/AU00/00592
	PCT/AU00/00584	PCT/AU00/00585	PCT/AU00/00586	PCT/AU00/00749
	PCT/AU00/00750	PCT/AU00/00751	PCT/AU00/00752	PCT/AU01/01332
20	PCT/AU01/01318	PCT/AU00/01513	PCT/AU00/01514	PCT/AU00/01515
	PCT/AU00/01516	PCT/AU00/01517	PCT/AU00/01512	PCT/AU01/00502
	PCT/AU02/01120	PCT/AU00/00333	PCT/AU01/00141	PCT/AU01/00139
	PCT/AU01/00140	PCT/AU00/00753	PCT/AU01/01321	PCT/AU01/01322
	PCT/AU01/01323	PCT/AU00/00594	PCT/AU00/00595	PCT/AU00/00596
25	PCT/AU00/00597	PCT/AU00/00598	PCT/AU00/00741	PCT/AU00/00742

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred form of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

- 30 Fig. 1 is a schematic perspective illustration of a mouse having almost completed the printing of an image onto a page, the mouse being in accordance with the invention;
- Fig. 2 is a schematic perspective illustration of the mouse;
- Fig. 3 is a schematic inverted perspective illustration of the mouse;
- Fig. 4 is a schematic inverted exploded perspective illustration of the mouse;
- 35 Fig. 5 is a plan view of the mouse;
- Fig. 6 is a front elevational view of the mouse;
- Fig. 7 is a side elevational view of the mouse;
- Fig. 8 is an end elevational view of the mouse;
- Fig. 9 is a schematic inverted plan view of the mouse;
- 40 Fig. 10 is a schematic cross-sectional elevational view of the mouse taken at X-X in Fig. 9;

Fig. 11 is a schematic cross-sectional end elevational view of the mouse taken at XI-XI in Fig. 9; and Fig. 12 is a schematic perspective view of internal components of the mouse.

DESCRIPTION OF THE PREFERRED EMBODIMENT

5 In Fig. 1 of the accompanying drawings there is schematically depicted a mouse 10 having almost completely traversed a page of print media 11 so as to print an image 12 thereon. Mouse 10 is connected to a computer via a universal serial bus (USB) cable 12, although any suitable data connection, including a wireless infrared or radio based connection, can be used instead.

10 As shown in Fig. 2, the mouse 10 looks similar to a known mouse from above and includes a top molding 15, a pair of button moldings 13 and a scroll wheel/button 14 situated therebetween.

The underside of the mouse is shown in Fig. 3, including a base molding 16 to which the top molding 15 is attached. A number of slider pads 17 are attached to the base molding 16, thereby enabling the mouse to slide
15 smoothly over a mouse pad or a sheet of print media.

A light pipe 20 emits light through an opening 48 so as to be reflected from a surface of a mouse pad or the print media and received by lens 21.

20 Also shown is a "MEMJET" printer chip 18 flanked by the slider pads 17. A mechanical capper device 19 caps the "MEMJET" chip 18 when printing is not in operation.

An ink cartridge 22 (Fig. 3) is received within an ink cartridge bay 23 (Fig. 4). A number of flexible collars 24 extend into the ink cartridge bay 23. A corresponding number of ink pins 25 projecting from an ink connector
25 block 26 extend into the flexible collars 24 of the ink cartridge bay 23.

The ink connector block 26 conveys ink to the printhead 18. A flexible printed circuit board (PCB) 27 is connected to the printhead 18. A print chip 28 forms part of the printhead 18. A printed circuit board (PCB) 34 is housed within the mouse and has attached to it the USB cable 12. Also attached to the PCB 34 are QA
30 chip contacts 29 adapted to contact a QA chip 45 (Fig. 12) on the ink cartridge 22.

An optical lens molding 30 is attached to the PCB 34 as shown.

35 As shown in Fig. 10, there is located within the mouse 10 a high power/intensity light emitting diode (LED) 32. This emits light into the light pipe 20 for reflection from the surface and collection by the lens 30 to be focused on a CCD chip 33. The arrangement of LED 32, light pipe 20, lens 30 and the CCD chip 33 is known, and is used, for example, in the Microsoft "IntelliMouse® Explorer".

40 As can be seen in the cross-sectional view in Fig. 10, the ink cartridge 22 comprises individual compartments for cyan ink 35, black ink 36, yellow ink 37 and magenta ink 38.

The construction and operation of scroll wheel and button 14 is also well known, and is used in, for example, Microsoft "IntelliMouse[®]" models.

5 As shown in Fig. 11, the flexible PCB 27 is connected via flex connector 39 to the PCB 34. The flex PCB transmits power and data to the printhead 18 for operational control of the "MEMJET" print chip 28 and capper device 29.

10 Electronic components attached to the PCB 34 are shown in Fig. 12. These include the CCD chip 33, the print engine controller chip (PEC) 43, a dynamic random access memory (DRAM) chip 41 and a flash memory chip 42.

15 In use, the mouse can be manipulated by a user to control software in a conventional manner. That is, motion of the mouse upon a mouse pad or other surface results in corresponding movement of the pointer on a monitor. Clicking of the mouse buttons 13 results in conventional software effects.

In order to print an image 12 on a page, software can be activated by use of the mouse and/or a keyboard.

20 The mouse can then be manipulated by a user to traverse page 11 in a straight line indicated by arrow A in Fig. 1. Motion of the mouse 10 is detected via lens 21 by the CCD chip 33. Positional information can be transmitted via cable 12 to the computer, which in turn sends print control signals back down cable 12 to the mouse and printhead 18. More preferably however, the positional information read by CCD chip 33 is relayed directly via PCB 34 to the PEC chip 43 which takes graphic information from DRAM memory 41 and controls the printhead 18 so as to deposit ink onto media 11 depending on the speed at which the mouse is
25 manipulated by the user to traverse the page.

30 In order to ensure a straight or "parallel" movement of the mouse across the page in the printing operation, its back edge 47 might be provided as a straight edge to bear against a straight ruler, for example, held in place by a user upon the print media 11. That is, the mouse can be drawn against an edge of a ruler for example to ensure correct, parallel printing in a direction normal to the longitudinal extent of the print chip 18. Smearing of ink directly after its deposit onto the print media 11 by slider pads 17 does not occur as the pads are located longitudinally outward of the print chip 18.

35 In an alternative embodiment (not shown), the printhead is configured to print coded data onto the media, preferably in an infrared ink that is substantially invisible to humans. It is particularly preferred that the coded data be printed in addition to other, visible data, such that a coded data reader can be used by a user to sense the coded data on the media even where there is visible printed information. Further information about the applicant's Netpage system incorporating such coded data reading and printing is disclosed in the patent applications and patents listed in the paragraph headed "Related Patent Applications and Patents", at page 2,
40 the contents of which are incorporated herein by way of reference.

5 It will be appreciated that various aspects of the printhead such as size, resolution, orientation relative to the mouse, number and type of printable inks and the like can be varied without departing from the spirit and scope of the invention. Although various aspects of the invention have been described with reference to a number of specific embodiments, it will be appreciated that the invention can be embodied in many other forms. It will further be understood that any reference herein to known prior art does not, unless the contrary indication appears, constitute an admission that such prior art is commonly known by those skilled in the art to which the invention relates.

CLAIMS:

1. A mouse pointing device comprising:
a housing;
5 a motion sensor mounted to the housing and serving to relay positional data from the device to a computer so as to effect motion of a graphic pointer on a monitor associated with the computer; and
a printer located within the housing and configured to receive print data from the computer, the printer being configured to print an image, based on the print data, onto print media external to said housing as the housing traverses said media, said motion sensor providing positional data of the housing relative to
10 said print media to the printer during printing.
2. The device of claim 1, wherein the housing further includes an ink supply for storing ink and supplying it to the printer.
- 15 3. The device of claim 2, wherein said ink supply comprises a removable ink cartridge.
4. The device of claim 1, wherein the printer includes a drop-on-demand inkjet printhead including a plurality of ink ejection nozzles.
- 20 5. The device of claim 4, wherein the housing also includes a print controller including a computer processor into which said print data can be input and converted into a sequence of drop ejection control signals, said print controller operating said ink ejection nozzles in accordance with said drop ejection control signals to cause printing on said print media at a rate determined using a measured relative speed between the printhead and the print media.
- 25 6. The device of claim 1 wherein said motion sensor includes a light source to emit light onto a surface on which said device is used, and a lens through which light reflected from said surface passes to a CCD chip.
7. The device of claim 1, wherein the printer includes a printhead fabricated at least partially using
30 microelectromechanical processes.