Sidebar 2

A Partial History of Patents

There are several interesting patents in the field that have the potential to impact the direction that computerized scent output will take. Unfortunately, in many cases they are being held by companies as preventative patents; these are not being developed into commercial products, and their existence may dissuade other companies from developing working solutions. However, many patents do continue to be have granted despite the existence of prior work in the field. It is interesting to note the assignees of these patents: very few are assigned to fragrance or aroma companies, and the majority are owned by technology companies. This is perhaps indicative of the scarcity of research in this arena by smell companies.

The first patents relevant to this paper would probably be Heilig's Sensorama patents: US 3,050,870 (1962), US 3,469,837 (1969), and US 3,628,829 (1971). There are multiple examples of individual-scale scent output devices. US 4,556,539 (1985, discontinued 1999) has a form-factor resembling a record player; US 5,972,290 (1999) is very similar, except the primary output form is that of a CD player. US 4,603,030 (1986) is a vertically rotating device with a selection of scent chips. US 4,629,604 (1986, discontinued 1999) is a series of pads, each containing a liquid fragrance that can be heated individually with an electric heater. US 5,398,070 (1985) patents a smell emission apparatus in conjunction with a television, and is assigned to Samsung.

Several patents state they specifically provide for computer control. US 5,565,148 (1996), assigned to 3M, includes a virtual reality helmet and a neck-mounted individual smell output device, and claims to be "especially useful for providing a realistic sensory experience in an interactive or non-interactive use, and may be used in...the entertainment industry, the educational training field or a medical arena."

US 5,610,674 (1997) is also a single-individual smell output device, and incorporates a breath sensor to sense the right point to output scent. US 5,716,011 (1998) utilizes a stream of pressurized gas, such as oxygen, to convey scent molecules, although the patent notes that "[a]n overoxygenation of a zone or of a medium may indeed cause an activation of combustion phenomena, resulting in a degradation of some materials such as electric motors." Indeed.

Other patents specifically address themselves to the field of computer control. For example, IBM holds US 5,724,256 (1998), "Computer Controlled Olfactory Mixer and Dispenser for Use In Multimedia Applications," in which scents are mixed by being sprayed onto a rotating device through which air is forced, as well as US 6,024,783 (2000), "Aroma Sensory Stimulation in Multimedia." US 5,727,186 (1998), assigned to BOC Gases, covers the simultaneous display of 3D graphics and smell production. Motorola holds US 5,887,118 (1999), which patents a smell output device in a PCMCIA or PC Card form. US 5,591,409 (1997) includes a "nosephone"[1] device, as does US 5,949,522 (1999).

[1] Nosephone: a head-mounted device for emitting small amounts of scent in direct proximity to the nose, much as an earphone emits sound.

Other patents cover computer-controlled diffusion to large audiences: in particular, US 5,832,320 (1998) covers an Aromarama-like use of the existing ventilation system to blanket an auditorium with scent, while US 3,795,438 (1974) and US 5,760,873 (1998) provide for scent delivery to individual seats.

Rasouli, Arastoopour and Oskouie's US 6,004,516 (1999), assigned to the Illinois Institute of Technology, is an "Apparatus for generating odor upon electronic signal demand." The Israeli company Aromix holds two patents, "Methods and Apparatus for Odor Transmission" (WO 00/15268; Fisch, 1999) and "Methods and Apparatus for Odor Reproduction" WO 00/15269 (Fisch, Fink, Harel, and Lancet 1999), which in part lead to Aromix's purchase by Digiscents.

MicroFab, and their spin-off AromaJet, hold several patents related to inkjet-based scent output, including US 6,325,475 (2001) and US 6,390,453 (2002).