

Searching the patent literature for flavor and fragrance materials

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There are a number of good reasons to search the patent literature to supplement a 'standard' technical library literature search. Much of what is contained in the patent literature is not indexed in such publications as *Chemical Abstracts*, *Medical Abstracts*, and *The Applied Science and Technology Index*. For example, particular compounds covered as a broad genus but not covered specifically usually are not found as specific entries in the various abstracts. The indexing of utilities of chemical compounds, such as food flavor use or perfumery use, also is usually more difficult than the indexing of the chemical compounds themselves. Furthermore, much of the subject matter to be found in the patent literature published prior to the turn of the century does not appear in any of the various technical abstracts. This is particularly true of the uses of chemical compounds and mixtures of chemical compounds or essential oils, which are the subjects of this article.

Only by actually studying a particular patent as it has been issued or published for opposition in a particular nation can it be determined that either (a) the patent in the given nation is being infringed under the patent statutes of that particular nation, or (b) the patent's claims or specification create(s) a circumstance for concluding that the patent is invalid or for concluding that the patent can be made the subject of a successful nullity proceeding or of a successful opposition proceeding.

Use of patent office facilities will make searches more effective when ascertaining the novelty or degree of inventiveness or degree of advance in the art of the use of a known chemical compound or mixture of chemicals or natural oils. This is particularly true in view of the high degree of specificity of patent classification systems throughout the world. Determination of

that subject matter which is or is not obvious over prior technology (under the varying standards of obviousness of the national tribunals which handle patent litigation) must be made not only by comparison with technology in the same basic classification, but also by reference to analogous technology classified elsewhere. For example, if one is concerned with searching for the allegedly novel use as a tobacco flavorant of a mixture of sesquiterpene X and ketone Y, at least three areas will be searched: the tobacco flavorant art, the organic chemistry art in the sesquiterpene subclasses, and the organic chemistry art in the ketone subclasses. The use of X and Y as tobacco flavorants may never have been made the subject of patent claims or technical articles; but one must always remember that a patent disclosing X and Y may possibly also mention one or more uses of X and Y or a generic group of chemical compounds which includes X and Y. The contents of such a utility statement should be examined for the mention of utility in tobacco (particularly as a flavorant) of X, Y, or a genus containing X and Y.

I submit that the various patent classification systems, utilized in combination with one another, help to determine "invention" or "novelty" or "obviousness." The standard technical literature search if not supplemented by such a patent search, may very likely yield inadequate information.

That part of our industry which is directly involved with taste and aroma enhancement or augmentation has a technology which is classified according to the following eight major groupings for the purposes of patent searching.

1. The use of materials such as natural essential oils, synthetic chemical compounds, and mixtures of chemical compounds and essential oils as flavorants or flavor enhancers which are added to ingestible substances such as food, chewing gum; medicinal products including chewable vitamin tablets, cough syrups, mouthwashes, toothpastes and tooth powders; and pet foods.

2. The use as flavorants or flavor enhancers of materials such as natural essential oils, synthetic chemical compounds, and mixtures of chemical compounds and essential oils which are added to tobacco, smoking articles (in the filter and the tobacco portion), tobacco substitutes, and chew-

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ing tobacco.

3. The addition of such materials as natural essential oils, synthetic chemical compounds, and mixtures of chemical compounds and essential oils to impart, modify, or enhance aromas in perfume compositions, colognes, and perfumed articles such as soaps, cosmetics, detergents, and bleaching liquids and solid compositions.

4. Novel chemical compounds which either have uses in themselves with respect to imparting, augmenting, or enhancing foodstuffs, tobaccos, perfumes, other flavors, tobacco articles and perfume articles; or are chemical intermediates useful in producing other compounds which themselves have perfumery or flavor uses.

5. Novel process syntheses (or "processes") for manufacturing the classes of chemical compounds as defined above.

6. Apparatus or equipment specially designed for producing the classes of substances as described in 1 through 4 above, and for carrying out the processes defined in 5 above.

7. Special apparatus, such as containers for storing or dispensing the classes of substances described above, for example aerosol bottles and room odorizers.

8. Materials and articles capable of storing such substances for relatively long periods of time prior to effecting a slow release of these substances, for example, microencapsulated perfumes, food flavorants, and tobacco flavorants; and molecular sieves specially adapted for use in conjunction with perfumes, food flavorants, and tobacco flavorants.

(Groups 1 through 3 are intended to include mixtures of one or more essential oil and chemical compounds with a suitable carrier or vehicle, useful as indicated, and in addition the processes which include the step or steps of addition of one or more essential oils or chemical compounds to such materials as a foodstuff, a tobacco, a perfume composition, a cologne, a soap, a detergent, or a cosmetic.)

I will describe in detail, with appropriate examples, patent searching techniques, and patent classification methods for substances defined by Groups 1 through 3 above. Such searching techniques and patent classification techniques will be discussed in the context of a cross section of the available patent search systems: the patent offices of the United States, Canada, West Germany, and Australia; and the International Patent Classification (IPC). I do not intend the scope of this paper to cover every possible patent search system available. (The

Swedish classification system was derived from the German classification system and is very similar to it. The Netherlands classification system, also derived from the German system, is being replaced by the use of the International Classification system. Some South American classification systems are different from the foregoing systems, e.g. in Argentina the chemistry class is 32.)

Obviously, a complete search of the prior art requires use of *all* classification systems and *every* possible class and sub-class where the subject matter being searched may be disclosed! Also obviously, the goal of carrying out the complete search is unrealistic. But from a practical standpoint, I cannot sufficiently emphasize that searches using any classification system usually require more than one class and sub-class. Thus, for example, where an investigator wishes to ascertain the novelty and unobviousness, or "state of advance in the art" of the food flavor use of chemical compound X (which compound *might* be novel, or the synthesis or syntheses for which *might* be novel) not only must classes covered in Group 1 be searched, but, in addition, the classes covering groups 4 and 5 listed above. In some instances, therefore, the following examples will illustrate searching techniques which also cover groups other than 1, 2, and 3.

Group 1

Under the U.S. Patent Office classification system these substances are located in class 426 (Food or Edible Material: Process, Compositions and Products), subclass 531 (broadly, Products Per Se or Processes of Preparing or Treating Compositions, Involving Chemical Reaction by Addition, Combining Diverse Food Material, or Permanent Additive), subclasses 533-538 which are "indented" under subclass 531, or subclasses 590-599, 650, and 651. Subclass 533 covers flavor materials produced by means of a chemical reaction taking place between two or more compounds (e.g. cysteine and thiamine). There are no further indents or more specific subclasses under subclass 533. However, subclass 534, also indented under subclass 531, covers the use as flavorants of identifiable substances, mixtures of known substances and compounds having known structures. Further indented under subclass 534 are subclasses 535-538 inclusive: 535—Sulfur containing, 536—Heterocyclic, 537—Hetero-N-atom, and 538—Carbocyclic.

Thus, if the compound in question contains a sulfur atom, it is classified in subclass 535. If the compound in question is a reaction flavor it should be classified in subclass 533, even if, for example, there is an identifiable thiazole present in the reaction product, the thiazole containing a sulfur atom as well as a hetero-N-atom.

Beverage flavors, however, are located in subclasses 590-599. Pertinent excerpts of the two pages of the Patent Office *Manual of Classification* which include class 426 and subclasses 531, 533-538, 590-599, 650, and 651 are shown in Table I.

Table I

CLASS 426, FOOD OR EDIBLE MATERIAL: PROCESSING, COMPOSITIONS AND PRODUCTS	
531	<u>PRODUCTS PER SE OR PROCESSES OF PREPARING OR TREATING COMPOSITIONS, INVOLVING CHEMICAL REACTION BY ADDITION, COMBINING DIVERSE FOOD MATERIAL, OR PERMANENT ADDITIVE</u>
532	. With biocide or biostat
533	. Reaction flavor per se, or containing reaction flavor or reaction flavor improver of unknown or undefined chemical constitution
534	. Flavor per se, or containing flavor or flavor improver of identifiable organic chemical constitution
535	.. Sulfur containing
536	.. Heterocyclic
537	... Hetero-N-atom
538	.. Carbocyclic
590	. Beverage or beverage concentrate
591	.. Dry effervescent
592	.. Alcohol containing
593	.. Chocolate or cocoa
594	.. Coffee and substitutes therefor
595	... Whole or ground including additive other than extractive type
596	... Coffee substitute
650	. Flavor or flavor adjunct, acidulant or condiment
651	.. Oleoresin or essential oil

It must be noted here that subclass 531 contains all flavor uses of substances *not included* in any of subclasses 533-538, 590-594, 650 and 651. Actual examples are set forth below to show precisely how the U.S. Patent Office classification system is used.

At this point, I must emphasize that if a special consumable nontoxic substance other than a foodstuff (e.g. flavored dentifrice or chewing gum) is being flavored, then the special consumable substance class controls the search. For example, flavored dentifrices and dental creams are classified in class 424, subclass 49, and chewing gums in class 426, subclasses 3-6, inclusive.

As recently as 1970 class 426 in the U.S. Patent Office was included in class 99, which now, in the United States, covers food processing *apparatus* and is considered to be a class in the mechanical arts rather than covering both the chemical arts and mechanical arts. The Cana-

dian Patent Office classification system, however, is still based to a large extent on the pre-1970 U.S. Patent Office classification systems. Thus, class 99 in Canada is entitled, "Foods and Non-Alcoholic Beverages." Subclass 139 in Canada broadly covers flavors (corresponding to the old class 99, subclass 140 in the U.S. Patent Office Classification system) other than coffee flavors which are classified in class 99 subclass 76.

As a general rule, foodstuff flavors (not used in conjunction with alcoholic beverages) are classified in the International Patent Classification system in class A 23 L subclasses 1/22-1/235 inclusive. The nature of the subclass breakdown in the IPC system for class A 23 L is totally

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dissimilar from the U.S. and Canadian systems. The subclasses of A 23 L include specific synthetic flavor types, for example 1/231 is entitled "meat flavors" and 1/235 is entitled "fruit flavors." A dichotomy between natural flavoring agents (1/221) and synthetic flavoring agents (1/226) exists but the further indents under these subclasses vary as is seen in Table II.

Table II

A 23 I FOODS OR FOODSTUFFS NOT COVERED BY SUB-CLASSES A 23 b to A 23 j; THEIR PREPARATION, e.g. COOKING, PRESERVATION OF FOODS OR FOODSTUFFS IN GENERAL

1/100	Foodst: Their preparation, e.g. cooking
1/22	.. Spices; Flavouring agents or condiments; Sweetening with synthetic agents; Table salts; Dietetic salt substitutes
1/221	.. Natural spices or flavouring agents or condiments; Extracts thereof
1/222	... from fruit, e.g. essential oils (essential oils per se C 11 b 9/00)
1/223	... Dried spices
1/224	... Onions
1/225	... Mustard
1/226	.. Synthetic spices or flavouring agents or condiments
1/227	... containing amino acids
1/228	... containing glutamic acids
1/229	... containing nucleotides
1/23	... prepared by fermentation
1/231	... Meat flavours
1/232	... Smoke flavours
1/234	... Coffee or cocoa flavours
1/235	... Fruit flavours
1/236	.. Artificial sweetening agents

Essential oils, which obviously include flavoring substances, are classified in the IPC system in class C 11 b, subclasses 9/00 and 9/02. Subclass 9/00, entitled "Essential Oils; Perfumes" is, however, limited to the essential oil per se. A process characterized by adding a specific essential oil to a foodstuff would be classified in A 23 L-subclass 1/221 or 1/222. Subclass 9/02 of C 11 b is limited to the recovery (as by refining) of *all* essential oils from raw materials (e.g. peppermint oil).

Processes for flavoring foodstuffs are additionally classified in the IPC as: A 23 g (cocoa and chocolate); A 23 j (obtaining and working up of proteins and phosphatides for foodstuffs); A 23 k (animal feeding-stuffs; their preparation and preservation); and C 12 g (wine and other alcoholic beverages).

Foodstuff flavors as well as flavors for medicinal products and chewing gum are classified differently in the Federal Republic of Germany and in Australia. In the Federal Republic of Germany, the basic classes are: 23-a (isolation including extraction of essential oils); 34-l (food carriers); 53-k (preparation of foodstuffs); and 30-h (additives to chewing gum). In Australia, food flavorants are classified in classes 34.7 and 36.9.

It is noteworthy that if a claim is allowed to a chemical compound *per se*, or to a process for synthesizing same, even though its only utility is in the food flavor area, the patent will still usually be classified in class 260 (organic chemistry) in the U.S. and International classes

C 07 c or C 07 d if compounds are claimed, or B 01 j if processes are claimed. If a claim is allowed in Canada to a chemical compound *per se*, or process for synthesizing same, even though its only utility resides in the food flavor area, the patent will still be classified in class 260 (organic chemistry), as in the U.S. system.

Group 2

These substances, under the United States Patent Office classification system, are located in class 131 subclass 17 and subclass 144 (Tobacco treatment: with fluids or fluent material: Processes; with fluent *flavoring* material). The two pages of the U.S. Patent Office *Manual of Classification* which include class 131 and subclasses 17 and 144 are shown in Table III. Note the breakdown for class 17.

Table III

CLASS 131, TOBACCO

17R	.. Tobacco compositions
17A	... Reconstituted tobacco
17AB	... Material coated with tobacco dust
17AC	... Tobacco particles bound by added non-tobacco adhesive
17AD	... With tobacco extracts or tobacco paste
17AE	... Tobacco sheet from wet ground or wet-beaten tobacco
140R	.. Processes
140A	... With vacuum
140B	... With material other than water, steam and/or air
140P	... With puffing of tobacco
140C	... Forming reconstituted tobacco
141	... With ferment-containing fluids
142R	... With bleaching or sterilizing material
142A	... Affecting change in tobacco color
143	... With extraction or absorption
144	... With fluent flavoring material

The Canadian Patent Office classification for tobacco flavorants is the same as that of the United States Patent Office ... class 131 subclasses 17 and 144. However, a patent covering a cigarette filter containing an encapsulated flavor would be classified in Canada in class 131, subclass 19.

As a general rule, tobacco flavorants and flavor enhancer compositions, as well as tobaccos and cigar and cigarette filters containing flavorants, flavor enhancers or substances which augment the flavor of a smoking article prior to and on smoking are classified under the IPC system in class A 24 b subclasses 3/12, 15/00, 15/027, and 15/04-15/08 inclusive. For example, subclass 15/04 is entitled "Chemical Treatment of Tobacco Products" but subclass 3/12 is entitled "Steaming, curing or flavoring tobacco."

The Federal Republic of Germany's classification system classifies tobacco flavorants in class 79C (Chemical Treatment of Tobacco), and patents covering tobacco flavoring compositions as classified by the French and Japanese Patent Offices are under the International Classification system in A 24 b (subclasses 3/12).

Group 3

These substances, under the U.S. Patent Office classification, are located in class 252

(Compositions) subclass 522 (Perfume). No further indents exist under this subclass. However, special soap compositions (which would contain a perfumery material) when claimed as such cause the patent to be classified in class 252 subclasses 32-46.7, inclusive. Chemical compounds whose only use is in perfumery are classified in class 260 subclasses (organic chemistry) e.g. cyclic terpenes in subclass 675.5.

The perfume composition class 252 subclass 522 formerly was class 167 subclass 94 in the United States classification system. The Canadian Patent Office classification system continues to use class 167 for inclusion of perfume compositions and colognes.

The IPC system covers the perfume art in class A 61 k (Preparations for . . . Toilet Purposes) subclass 7/46 (Perfume compositions) and class C 11 b subclass 9/00 (Essential Oils: Perfumes) and subclass 9/02 (Recovery or refining of essential oils from raw materials). If a perfume composition is classed as an essential oil or an artificial essential oil it *theoretically* should be classified in class C 11 b subclass 9/00 rather than class A 61 k subclass 7/46. In most instances classification by European patent offices sets forth *both* of these locations!

In the patent classification system of the Federal Republic of Germany, perfumes are classified in class 23 A and terpenes are classified broadly in class 12 O. In the patent classification system of Australia, perfume compositions are classified in classes 87.1 and 25.1.

Perfumery chemicals, when claimed as such, as opposed to claiming their utilities, are classified in class 260, the subclass depending on the particular functional groups of the organic chemical molecule. When only a process for synthesizing a perfumery chemical or genus of chemicals is claimed as the invention, the classification in class 260 varies according to the process and/or functional groups on the chemical so produced. But, if produced via fermentation, class 195 is the location and if produced via "wave energy," class 204 is the location.

Chemical *processes* are classified differently in the IPC system. Here, class B 01 j includes chemical synthesis unless a new product is produced, whereupon class C 07 c or C 07 d is used as the basic classification.

Summary

When searching the perfumery or flavor use of a chemical, novel or not, two places in each classification system should be searched: all organoleptic *use* class(es), and the chemical *per se* class. At a minimum, the search should cover the U.S. Classification system, the International Patent Classification, the standard chemical literature (e.g. Beilstein and *Chemical Abstracts*), and the standard literature of our industry: Be-doukian's *Perfumery and Flavoring Synthetics*, Arctander's *Perfume and Flavor Chemicals (Aroma Chemicals)* Vol. I and II, and the Fritzsche library bulletin.

me! by Coparel, Inc., a "distinctly American fragrance," has been introduced by a French company to the market with the benefit of all the research information that could be gathered on the fragrance, package, and advertising as well as on the name itself. In fact, everything about "Me!" and Coparel is distinctly American, and presents an interesting departure from the usual participation of French companies in the American fragrance market.

The story begins a few years ago when Delande came into the U.S. market with a very successful French fragrance subsidiary under the Mont Saint-Michel label. In spite of a strong marketing effort this line just did not make the expected impression on the U.S. market. (These expectations were based on the results in France of the same marketing approach.)

The result of this experience was a plan to approach the American market on the basis of careful and extensive research, entirely independent of the experience in France. The marketing was managed by Lewis R. Scanlan, President, and Robert M. Jaffe, Vice President, of Coparel, Inc., a wholly owned subsidiary of Delande. Both have had many years experience in marketing fragrances in the U.S.

The fragrance, package, display, advertising, and all promotional material was thoroughly researched to provide a complete product with broad appeal to the American market. This complete program of research and testing required a full two years from inception to the first distribution to test markets.

"We are fortunate that Delande has a pharmaceutical background," reports Bob Jaffe.

"They understand the importance of research and that it is to be believed, even when it conflicts with personal beliefs and prejudices. They also are accustomed to thinking in terms of years of a product's development before a return is expected."

The supplier of the fragrance was Florasynth, whose fragrance won in an extensive series of tests among submissions from four suppliers.

"We received a great deal of valuable help from Francois Camail in organizing our brief," says Bob Jaffe. "He provided a great deal of technical knowledge of perfumery as well as an awareness of the fragrance market."

Delande S.A. is a public company in France. It had total sales in 1975 of \$70 million, with over 80% in pharmaceuticals. The perfumery division had sales of \$8 million in 1975, an increase of 12% over the previous year. An important part of this increase was the introduction of L'Ambree, a new fragrance in the company's line of colognes. Coparel, Inc. is financed entirely by its parent company, Delande.