

**INTELLECTUAL PROPERTY:
WHAT EVERY BUSINESS MUST KNOW**

SEVENTH EDITION

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cades · schutte

A LIMITED LIABILITY LAW PARTNERSHIP

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MARTIN E. HSIA is a registered patent attorney and has been listed in "Best Lawyers in America" for more than 25 years. Mr. Hsia practices patents, trademarks, copyrights, trade secrets, computer, licensing and entertainment law at Cades Schutte A Limited Liability Law Partnership LLP. He graduated cum laude from Georgetown University Law Center and with honors from Brown University with a specialized major, "Technology and Its Effects on Society: A Multi-disciplinary Approach." Mr. Hsia is also listed in "Martindale-Hubbell Bar Register of Preeminent Lawyers" and "Who's Who in American Law." Mr. Hsia previously worked as a consultant to the Office of Technology Assessment of the United States Congress on patent and energy law projects and is a member of the Patent and Trademark Office Society, the American Intellectual Property Law Association, the International Trademark Association, the Licensing Executives Society, the Intellectual Property Section of the American Bar Association and the Computer Law Association. He is past chair of the Intellectual Property and Technology Section of the Hawaii State Bar Association. Mr. Hsia has given addresses on intellectual property matters to groups as diverse as the American Bar Association, the United States Trademark Association, the Association of University Technology Managers, the Chamber of Commerce of Hawaii, the Rotary Club, the National Association of Paralegals, and a third grade class studying inventions. Mr. Hsia has served as a lecturer and instructor for the Hawaii Institute for Continuing Legal Education, Innovation Workshops sponsored by the U.S. Department of Energy, major Hawaii colleges and universities, the United States Small Business Administration, and other organizations.

CADES SCHUTTE A Limited Liability Law Partnership LLP was founded in 1922 and is one of Hawaii's largest and oldest law firms with approximately 70 attorneys. It is a full service firm with an emphasis on business counseling and offers a wide range of legal services in domestic and international matters.

The firm's practice is divided into multiple practice groups drawn from four departments: Finance, Real Estate and Corporate; Litigation; Tax; and Trusts and Estates. Attorneys from these practice groups and departments, whenever appropriate, work together to achieve the best results for the firm's clients in the most efficient manner.

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EXECUTIVE SUMMARY

Intellectual property rights can be used to protect inventions, brand names, designs, artistic and literary works, and confidential information. Whether to secure these rights must be decided only after evaluating whether the names or products to be protected are valuable enough to justify the costs of securing the rights. If a brand name or product is not valuable enough, then it would be a needless waste of time and money to secure intellectual property rights. However, if a brand name or product will be very valuable, it is very likely that others will copy the brand name and product, so that a lawsuit may need to be filed. Accordingly, the highest quality intellectual property rights should be obtained.

The author's definition of "business" is "providing goods and services (products) to others for a profit." Intellectual property rights are for business, not for hobbies. If you will not be making minimum wage in selling goods or providing services, then you will be engaged in a hobby, not a business.

Even if you intend to license the rights to the name or product to someone else, you must evaluate the value of those rights in order to determine the amount to charge for licensing.

Except for copyright rights, intellectual property rights are determined on a country by country basis. Thus, U.S. patents and U.S. trademarks do not provide any protection outside the U.S. If a name or product will be valuable in a foreign country, you should consider obtaining protection in that country, before someone else steals your name or product in that country.

The fees and costs for obtaining nationwide trademarks protection are about two to three thousand dollars per trademark per class (category) of goods or services, if no problems are encountered and if goods and services bearing the trademark are already being commercially sold or rendered to non-Hawaii residents. Otherwise, the fees and costs will be substantially greater.

The fees and costs for obtaining copyright protection are usually a few hundred dollars for a simple registration, if no problems are encountered. However, copyright rights often must be

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transferred, in writing, to the desired owner, which incurs additional costs and expenses.

The fees and costs for filing a provisional patent application for one version of a simple mechanical device can be as low as several hundred dollars if the client prepares the text of the application and can write well, but a final (nonprovisional) application must be filed within one year afterwards. The fees and costs for filing the final application should be a few thousand dollars if no improvements have been made and the provisional application was of high quality. The fees and costs for preparing and processing the final patent application will depend (in large part) on the patent examiner's skill, experience and examining philosophy, but there is about a 50-50 chance that the processing costs will be less than about three thousand dollars. The costs for keeping the patent alive for its full term of 20 years from filing of the final patent application will be more than six thousand dollars.

The costs for obtaining trade secrets protection are the costs for implementing appropriate security precautions, including appropriate nondisclosure agreements.

The above estimates do not include the costs of providing any legal advice in conferences or correspondence.

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QUICK START GUIDE TO IP RIGHTS

SPECIES OF IP

EXCLUDES OTHERS FROM

Utility patent

Making, using, selling, offering to sell, or importing, invention defined by claims

Design patent

Deceiving ordinary observer familiar with the art into purchasing accused design, supposing is pat. design

Trademark

Creating likelihood of confusion
(and for famous marks, diluting)

Copyright

Making and distributing copies, preparing derivatives, publicly performing, displaying, transmitting

Trade Secret

Misappropriation of valuable confidential information

Right of Publicity

Use of name and identity

WHAT YOU WANT TO PROTECT

TYPES OF IP POTENTIALLY APPLICABLE

Brand of goods or services/Logo

Trademark and (for logo) rarely copyright

Domain Name

Trademark and anticybersquatting

Invention (process, machine, manufactured article, composition of matter, or improvement)

Utility patent, trade secret

Ornamental (decorative) design for manufactured article

Design patent, design registration or utility model (outside US), possibly copyright, rarely trade dress

Website, apps, software

Copyright, trademark, trade secrets, moral rights, right of publicity, and rarely patents

Motion pictures, books, photos, 2-dimensional art, sculptures, databases, music, etc.

Copyright, trademark, moral rights, right of publicity, possibly union residual rights

Information, concept, idea

Trade secret, nondisclosure agreement, sometimes noncompetition agmt

Identity (name, likeness)

Right of publicity registration, trademark

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UTILITY PATENT CHEAT SHEET

A utility patent is granted for a new, useful, and unobvious invention. A US utility patent grants the right to exclude others from making, using, selling, offering to sell, and importing the **CLAIMED** invention in the US for 20 years from the date of filing. Every invention is described in the claims as a combination of elements and limitations: The invention comprises [or consists of]: A+B (attached to A)+C (linked to B)+D (covering C). “Comprises” is open ended – adding elements or limitations does not avoid infringement. “Consists of” is closed – adding elements or limitations does avoid infringement. The patent examiner is an engineer, and mostly examines the claims. The text (specification) and drawings are only a map – the claims are the fences, and define the scope of the patent rights. The requirements for obtaining a patent are as follows:

- (a) Patent Eligible Subject Matter: An invention must be a machine, manufactured article, composition of matter, or process, or new and useful improvement of these. 35 USC 101. Abstract ideas are not patentable, nor are naturally occurring substances. Software may not be patentable.
- (a) Novelty: An invention is new if no single piece of “prior art” (prior publication, public use, patent application, etc.) discloses the invention. 35 USC 102.
- (b) Non-Obviousness: An invention is non-obvious if it provides unpredictably better results than would be expected from the combination of its components. An invention that only achieves the expected result of the combination of its components will be unpatentable as obvious, even if no one has ever combined the components in that manner before. 35 USC 103.
- (c) Utility: An invention that does not work is not useful, and therefore cannot be patented (perpetual motion machines, cures for cancer, etc.). 35 USC 101.
- (d) Enabling Disclosure: A patent application must teach a person having ordinary skill in the art to which the invention pertains (“PHOSITA”) how to make and use the invention, without undue experimentation. 35 USC 112(a).
- (e) Written Description: The application also must contain a written description of the invention in sufficient detail to show PHOSITA that the inventor was in possession of the invention, as of the date the application was filed. 35 USC 112(a).
- (f) Distinctly Claiming: The patent application must include claims particularly pointing out and distinctly claiming the subject matter which the inventor regards as his invention. A patent is invalid for indefiniteness if its claims fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. 35 USC 112(b).
- (g) Best Mode: The patent application must disclose the best mode of practicing the invention contemplated by the inventor. However, a patent will not be invalidated for failure to disclose the best mode. 35 USC 112(a).

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A. INTRODUCTION

Patents, trademarks, copyrights, trade secrets and the right of publicity are legal rights that protect creations of the mind. Patents protect inventions and designs; trademarks protect brand names, logos and other designations of origin; copyrights protect creative authorship; trade secrets protect valuable confidential information used in business. The right of publicity protects the use of a person's name, likeness, signature or other identifying characteristics. For convenience, these rights are sometimes collectively called "intellectual property rights." They are "intellectual" because they relate to mental creations. They are "property rights" because they grant rights of exclusivity, that is, rights to prevent others from using them. Patents and trademarks are sometimes referred to as "industrial property" and copyrights are sometimes referred to as "literary and artistic property." .

Why should you care about patents, trademarks, copyrights, trade secrets and the right of publicity? If you have created a new and valuable invention, you do not want someone else to copy it. If you are using a particular brand name in your business, you do not want a competitor to steal your business by using a confusingly similar name. If you have invested time and money in designing souvenirs, creating computer software, writing a book or song, or producing a movie, you do not want someone to copy or adapt your work. If you have a secret formula or method of doing business, you do not want a competitor to learn that secret. You don't want someone to use your name or picture to advertise his or her business without your permission. A business can protect itself against these types of problems by using intellectual property rights to protect its name and its products.

This booklet addresses trademarks (including right of publicity) first, because every business must confront trademark issues, at least in selecting a name for itself and its products, and because trademark rights are probably the most valuable type of intellectual property right. Copyrights are addressed next because almost every business deals with copyright questions in such matters as artwork, advertising copy, computer software, the Internet, and publications. Patents and trade secrets are addressed next for those inventors and businesses who are interested in bringing new

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products to market. This booklet ends with a brief statement about "the bottom line."

If you do not want to read the entire booklet, please refer to the Quick Start Guide and then select the section that is of most relevance and interest to you, and then read the section about trademarks. Everyone has trademark issues.

B. PROTECTING YOUR NAME:
TRADEMARKS, SERVICE MARKS AND TRADE NAMES

1. Importance. Trademarks, service marks and trade names are absolutely necessary in a free market economy, in which many different companies compete for business. If you could not identify and distinguish competitors from each other, you would not be able to give your business to the better competitor; you would not be able to tell the difference. Imagine trying to buy a car where all the dealers were called "Ford" dealers. In fact, every penny spent on advertising a product is actually spent on promoting the trademark (or brand name) for that product. Every advertisement is intended to increase the sales of the advertiser's products (goods and services), and the only way to be able to tell the advertiser from its competitors is through the advertiser's trademarks. An advertisement would say "buy McDonald's hamburgers", not "buy a hamburger at a hamburger restaurant." Trademarks are, therefore, a handle into the minds of the consuming public. Without trademarks, a business could not distinguish its products from those of a competitor.

Trademarks are very valuable and powerful because advertising of trademarks will often increase the demand for, and therefore the value of, a product. How much would you pay for the right to call a chocolate cookie an "Oreo"? The R.J. Reynolds Tobacco Company paid millions of dollars when it bought Nabisco, many years ago.

2. Rights Protected. Trademarks protect against a likelihood of confusion caused by similar marks, logos or other designations of origin. Trademark law also protects against unfair competition, such as competitors making misleading statements about their or your products.

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3. Most Valuable Type of Intellectual Property. Trademarks are probably the most valuable type of intellectual property. Purchasing decisions usually are not based on whether an invention is protected by patents, copyrights or trade secrets, but are often based on advertising and promotion of a particular brand (trademark) of product.

Further, if a product is patented, proper trademarks usage can extend any market share gained during the life of the patent beyond expiration of the patent. For example, the Xerox Corporation obtained the basic patents covering the xerography process of reproduction and dominated the photocopying field with the help of those patents. While the patents were in effect, the Xerox Corporation built up substantial market recognition and goodwill behind the trademark "Xerox". Now other companies can use the same basic process and compete with the Xerox Corporation's technology. However, the Xerox Corporation was able to retain a large part of its market share after expiration of the basic patents because of the market recognition built up behind the trademark "Xerox". The same occurs when a patent on a drug expires so that generic substitutes become available - the manufacturer can retain some market share through trademark recognition. Thus, the value of a trademark can be considered to be the price difference between branded and generic drugs.

Even if a product is not protected by a patent or copyright, trademark recognition built up through advertising and promotion can increase the demand for, and value of, the product. This is the basis for the entire fashion designer industry, in which handbags can sell for thousands of dollars.

4. Types of Marks. A term used to identify a particular company's goods is a "trademark." The trademark for certain cars manufactured by General Motors is "Chevrolet." A term used to identify a particular company's services is a "service mark." A service mark for insurance services is "Allstate." Product configurations, if recognized in the marketplace as identifying a particular company's goods (like the shape of a Coke bottle) can also be protected as trademarks. For convenience, trademarks and service marks are sometimes just called "marks" or "trademarks."

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Trademarks never exist in the abstract - they are always associated with particular goods and services.

A name used to identify a business is technically a "trade name" (sometimes referred to as a "dba"). If John Doe conducts his business as "Doe and Associates", then "Doe and Associates" is his trade name. Similarly, the trade name of Southland Corporation is "7-11". Of course, the trade name of a corporation could be identical to the name of the corporation itself, such as "Bank of Hawaii", and the trade name of a business also can be used as a trademark for that business' products, such as "DuPont." In service industries, the trade name of a business also can be a service mark for the services rendered by that business, such as "United Airlines."

5. Strength of Marks. Marks come in different "strengths." Marks that do not describe anything about the relevant product or service, or that do not exist in the English language, are "strong" marks and can be protected as trademarks or service marks immediately after they are first used ("Apple" for computers; "Kodak" for film). Marks that suggest (but do not directly describe) something about the product or service also are "strong" and entitled to protection immediately after they are first used ("Igloo" for coolers; "Oasis" for water fountains); these marks require a mental effort to connect the goods and the mark. Certain other types of marks, such as geographic terms, personal names, primarily laudatory marks (marks that praise a product), descriptive marks, misdescriptive marks and product configurations are "weak" and can be protected as trademarks or service marks only after becoming sufficiently known that consumers recognize them as identifying the goods and services of one specific business ("Kentucky" for fried chicken; "Philadelphia" for cream cheese; "McDonald's" for restaurants; "Foremost" for dairy products; "Windows" for computer software). These kinds of marks are called "weak" because they must acquire a "secondary meaning" (become distinctive) in order to be protected; they have a primary meaning (their meaning in ordinary English language) and a secondary meaning (their meaning as identifying the source of the specific business' goods or services). For example, the first time I encountered "Philadelphia" cream cheese, I thought it came from Philadelphia. Now I recognize "Philadelphia" as a brand name for cream cheese.

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Even if these "weak" marks acquire this secondary meaning (become distinctive), competitors can still use them in their primary descriptive sense; a business cannot take a word out of the English language and competitors must be allowed to describe or praise their products. This is called "classic fair use" (to distinguish from "nominative fair use", which is where a company's name is used only to identify that company's goods or services). Further, the scope of protection granted to a weak mark is usually narrower than the scope of protection granted to a strong mark.

6. Generic Terms. The name of a type of product can never be a trademark, because all businesses must be able to name the type of their products ("Car" for cars). Trademarks and service marks always identify the source or quality of goods and services. Words that identify the type of goods or services are called "generic terms" and are not protectable. Trademarks and service marks always modify generic terms: a trademark or service mark indicates a particular source or quality for a type of goods or services. Even though a McDonald's restaurant in Peoria, Illinois may be owned by a different company from a McDonald's restaurant in Honolulu, the term "McDonald's" indicates that the restaurants will have the same quality. Thus, trademarks and service marks are always adjectives, not nouns. A trademark always modifies a generic term. For example, you use "Kleenex" tissues; you don't use a kleenex.

7. Selection. In selecting a new trademark, there are usually two competing considerations. Businesses tend to prefer marks that describe (or praise) the product, because they want the mark to give customers a favorable impression of the product. This is the "advertising function" of a mark. However, as indicated above, marks actually identify the source or quality of a product, because people expect that products with the same mark come from the same source or are of the same quality. This is the "source identifying" function of a mark. Unfortunately, selecting a mark for its "advertising" function will often result in selecting a weak mark, such as a descriptive mark or a primarily laudatory mark. Weak marks are the most difficult to protect because they cannot be protected until they acquire secondary meaning. Weak marks also do not effectively distinguish between competitors' products: they are not distinctive in the consumers' perception because many businesses

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use descriptive or primarily laudatory terms. Thus, weak marks are not entitled to a broad scope of protection. It may be a waste of money for a business to choose a weak mark instead of a strong mark because weak marks are more difficult and costly to protect. Many businesses have spent tens of thousands of dollars trying to protect weak marks, money that should have been spent on the business instead of on attorneys' fees. Unfortunately, these businesses usually did not seek trademarks advice when choosing their marks so that, when it came time to defend or enforce the marks, they had already invested years of work and many hundreds of thousands of dollars in advertising weak marks, so that it was impossible to change. If a business wants a mark that performs the "advertising function" well, the best solution is usually to adopt a "suggestive" mark, which suggests, but does not directly describe, a characteristic of the product, and yet is protectable immediately upon adoption and use. Nevertheless, a business may decide to adopt and use a weak mark if its marketing value is high enough and it is willing to accept the difficulties and costs of registering and defending the mark. After all, a weak mark that succeeds is worth more than a strong mark that fails. These issues of weakness of a mark will arise in almost all countries. Appropriate translations of marks into relevant foreign languages also must be considered.

8. Search. A US search can be performed to find out if others are using a conflicting mark in the United States. The cost for a US search is usually several hundred dollars per mark per class (see below about classes). A search for a mark that contains only words is different from a search for a mark that also contains design elements (such as a logo). Searches for marks that contain design elements are usually more expensive. Although searches can encompass millions of records, they can never be complete or current, because prior unregistered uses probably will not be disclosed in those records, and the records will not be absolutely complete or absolutely up to date. **Even the best professional search should never be considered more than 75% reliable.** If a very large amount of money will be invested in advertising a mark, it may be advisable to have two independent searches performed in two independent databases by two independent search companies.

It is usually advisable to invest in a search for any new mark that will actually be used, because the cost for a search is

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actually very small when compared with the amount usually spent for advertising, promotion, packaging, stationery and signs. The search should at least provide some assurance that the new mark does not belong to some other business.

If a business is going to expand into other countries, searches of the trademark registers in those other countries can be performed for the mark and for any translations into the local language (if any). The costs for such searches vary considerably from country to country, with Japan being among the most expensive, and Australia and New Zealand being among the least expensive.

9. Proper Use and Policing. Trademarks and service marks must be used properly or they can be lost. Some businesses learned this lesson the hard way: they used their marks improperly (or allowed others to use them improperly) and lost all rights to their marks; the marks became generic terms. Escalator, cellophane and aspirin are some examples of marks that were lost because of misuse. Other marks that are on the verge of being lost include Xerox and Kleenex: the owners of these marks spend hundreds of thousands of dollars a year protecting them against misuse through corrective advertising and sending warnings to people who misuse their marks.

It is possible to retain trademark watching services to warn of applications being filed, in the US and/or foreign countries, for potentially conflicting marks, to provide an opportunity to timely object to those applications.

10. State Registration. Trade names, trademarks and service marks can be registered in the Business Registration Division of the Department of Commerce and Consumer Affairs of the State of Hawaii. These state registrations are effective for an initial term of one year and are renewable for terms of five years. A state registration is not effective against prior unregistered users though. Also, the standards for Hawaii state registration are very different from the standards for federal registration and for infringement. For example, a Hawaii state registration can be obtained for a mark as long as it is not "substantially identical" to a mark previously registered in Hawaii, while federal registration will be refused for a mark that is confusingly similar to a previous federally registered mark. The standard for

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infringement is also whether two marks are confusingly similar, that is, whether there is a likelihood of confusion between the two marks when they are applied to their respective goods and services. The Business Registration Division will not allow the registration of marks that are substantially identical to each other. A state registration is not effective against an earlier federal registration. Finally, Hawaii trademark and service mark applications cannot be filed until after the trademark and service mark have actually been used. Prior usage is not required for Hawaii trade name applications. A Hawaii registration may also grant rights to force legal entities to change their legal names.

11. Federal Registration. Service marks and trademarks (but not trade names) can be registered in the United States Patent and Trademark Office, as long as they are commercially used in interstate (or foreign) commerce. A copy of a federal trademark registration is attached to this booklet as Exhibit "A". These federal registrations last for an initial term of ten years (subject to cancellation after six years unless proper affidavits are filed between the fifth and sixth anniversaries) and are renewable for terms of ten years. A federal registration (and almost all foreign registrations) must be restricted to particularly named goods or services, which will be required to be classified in the 45 classes in the International Classification of Goods and Services. The Patent and Trademark Office will allow federal registration of identical marks if the goods and services are different enough that there would be no likelihood of confusion. For example, "Delta" is a trademark for faucets and also a service mark for an airline. For a further example, "Apple" is a trademark for records and also for computers. There are procedures for challenging others' trademark applications and registrations through oppositions, cancellations and concurrent use proceedings. These procedures are beyond the scope of this booklet, but are very similar to lawsuits.

12. Business Only in Hawaii. If you are doing business only in the State of Hawaii and do not intend to expand into other markets, you may think that registration in the Department of Commerce and Consumer Affairs is all that is necessary to protect your rights. However, you still may wish to order a search for federal registrations for at least two very important reasons.

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First, another business on the Mainland might have previously obtained a federal registration (or previously applied for a federal registration that later issues on the Principal Register) for a confusingly similar mark. If so, the owner of that registration can stop you from using your mark in Hawaii if and when it ever expands its business into Hawaii, either directly or through a licensee. This can be quite a shock if you have used the mark for several years by the time the Mainland company expands to Hawaii.

Second, the owner of a federal trademark registration can record that registration with the United States Customs Service. Customs may then prevent any goods with confusingly similar trademarks from entering the country. This can be a major problem for importers.

If your business provides goods or services to non-Hawaii residents, then you should seriously consider obtaining federal registrations, because federal registrations become much stronger after they are 5 years old - Hawaii registrations do not become stronger with age.

13. Mainland and Foreign Business. If you will be doing business on the Mainland, federal registration is an absolute must: a federal registration on the Principal Register prevents other businesses in the Mainland United States from later obtaining rights to your mark in their geographic markets. If you will be doing business in a foreign country, most countries will grant a foreign application the same filing date as a corresponding United States application, if the foreign application is filed within six months of the U.S. application's filing date. Thus, it is very advisable to file all foreign trademark applications within 6 months after filing your U.S. application. Foreign trademark applications can be filed either on a country by country basis, or through an international trademark registration process under the Madrid Protocol, to obtain an international trademark registration and extend the protection of a that registration to other countries.

14. Some Advantages of Federal Registration. Federal registration provides substantial advantages and benefits. First, a federal trademark registration can be recorded with the U.S. Customs Service to prevent the importation of infringing goods. Second, the

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Trademarks Counterfeiting Act of 1984 provides a procedure for seizing counterfeit goods. Third, federal registration allows you to use the federal registration symbol ("R" in a circle, thus "®"). Fourth, after five years of unchallenged use and with the filing of a proper affidavit, a federal registration can become "incontestable", which basically means that the registered mark (especially a weak mark) becomes immune to certain attacks.

15. Applying for Federal Registration. Only an attorney at law can file a trademark application for you (except for some rare exceptions, such as licensed Canada attorneys). Services that offer to file trademark applications but require you to use your own name are circumventing this requirement. Further, you should only work with an attorney who regularly files and prosecutes federal trademark applications - anyone else would not be familiar with all the highly technical and complex issues that arise in federal trademark application filing and prosecution. Ask an attorney how many federal trademark applications s/he has filed and prosecuted before hiring him or her. The author is listed as attorney of record on over 1,000 federal trademark applications and registrations.

Applications for federal registration can be filed before a trademark or service mark is used, based on a bona fide (true) intent to use the mark in interstate (or foreign) commerce. However, a federal registration will not issue until the mark has actually been commercially used in interstate or foreign commerce in connection with the goods or services of the application, and a statement to that effect (a "statement of use") has been filed in the Patent and Trademark Office. Alternatively, the mark can first be commercially used in interstate (or foreign) commerce and the application can then be filed based on that usage, although this exposes the applicant to the risk of an intervening application for a conflicting mark.

The attorneys' fees for preparing and filing an application for federal registration (not including any advice that may be necessary) are normally less than a thousand dollars per mark per class (if the necessary information is provided in an efficient and effective manner), and the filing fee is about \$275 to \$325 per mark per class. If the application is prepared properly and no problems

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are encountered, the application should be approved by the Patent and Trademark Office for publication with very few additional costs. A search and an evaluation of the mark by a competent trademarks searcher will usually disclose whether problems can be expected. However, as indicated above, no search can be complete or current, and sometimes certain kinds of problems cannot be predicted (such as where the mark turns out to be a not unusual surname on the Mainland, but not in Hawaii). It is not advisable to retain an attorney who is unfamiliar with trademarks registration practice to prepare and file an application for federal trademark or service mark registration; some of my clients have wasted hundreds or thousands of dollars for defective applications filed by attorneys who, though possibly competent in other fields, were not familiar with federal trademarks registration practice. Although the U.S. Patent and Trademark Office's website, www.uspto.gov, makes it appear as if you can file your own trademark application, I have never seen anyone do it correctly.

If an application encounters problems, arguments and evidence can be submitted to attempt to persuade the Patent and Trademark Office to approve the application. Of course, attorneys' fees and costs (often substantial if the mark is a "weak" mark or there is a conflicting mark) will be incurred in presenting these arguments and evidence. If the arguments and evidence are successful, the application will be approved for publication.

After an application has been published, anyone who believes s/he will be damaged if a registration is granted has 30 days (which can be extended) in which to oppose the application. If no opposition is filed, then the Patent and Trademark Office will issue a "Notice of Allowance" (unless the application was based on use, or was previously amended to show that the mark has been used in interstate (or foreign) commerce, in which case the registration would issue). You then will have six months in which to start commercial use of the mark in interstate (or foreign) commerce and to file a statement showing use in interstate (or foreign) commerce, which would include specimens showing such use. The attorneys' fees, filing fees and costs for preparing and filing a statement of use are presently about less than a thousand dollars, assuming no problems are encountered and information is provided in an efficient and effective manner, but the advice necessary to avoid problems

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that might be created by improper specimens of use can increase this substantially. Up to five extensions (each for 6 months) for filing a statement of use can be obtained. Each 6 month extension must be separately requested prior to expiration of the preceding 6 month period, and the attorneys' fees and costs for each extension are presently about three or four hundred dollars, and the filing fee is \$150 per extension per class. Thus, a business must budget a few hundred dollars every six months for extensions until the statement of use is submitted, and several hundred dollars for the statement of use, for each class covered by an application. If no statement of use is filed within three years after the date of the notice of allowance, the application will be abandoned; no further extensions are possible.

The Notice of Allowance is effectively a nationwide reservation of the mark, because the only further acts necessary to obtain a federal registration are use of the mark in interstate (or foreign) commerce, and filing the statement of use (with extensions, if necessary). Importantly, the registration, if issued on the Principal Register, will grant certain rights effective from the filing date of the application, not the issuance date of the registration.

The bottom line on federal registration is that it is often possible to obtain a nationwide reservation of rights to a trademark or service mark for one class of goods or services in less than a year for about one or two thousand dollars, if information is provided in an efficient and effective manner and no problems are encountered. This is a small amount considering the amount of money most businesses spend on advertising, stationery and signs. However, for each class, after the Notice of Allowance is issued, several hundred dollars will be incurred for preparing and filing the statement of use and (if the statement of use cannot be filed within six months after the Notice of Allowance) a few hundred dollars will be incurred every six months for extensions to file the statement of use, in order to obtain the registration.

16. Trademark Piracy and Cybersquatting. If you plan to expand to countries outside the United States, you should be aware of the substantial probability of trademark piracy. Most countries in the world allow registration of a mark before it is used. Some

enterprising business in a foreign country might register your mark in its own country and then offer to sell the registration to you for an exorbitant cost when you are ready to enter that country. Even relatively small businesses have been victims of trademark pirates. In my own practice, several of my small and medium sized Hawaii business clients have been victimized by trademark pirates in Japan, Brazil, Australia and Canada. Cybersquatting is just trademarks piracy in cyberspace. The chances of trademark piracy and cybersquatting are much higher than you may expect.

17. Right of Publicity. Every person in Hawaii has a property right in his or her name, likeness, signature or other characteristic. Use of one of these characteristics without that person's permission is an infringement. The right of publicity can be registered, and lasts for 70 years after the death of the person.

C. PROTECTING YOUR ARTISTIC AND LITERARY CREATIVITY:
COPYRIGHTS

1. Subject Matter of Copyright. Any original work of authorship fixed in a tangible medium of expression is protected by copyright. This basically means that if you have expressed some kind of an original idea and that expression is written or recorded on something tangible, that expression of the idea is protected by copyright. Thus, a picture of Mickey Mouse is an expression of the idea of a mouse. If the picture is printed on paper, it has become "fixed in a tangible medium of expression" and is protected by copyright. Vessel hull designs can also be protected at the Copyright Office.

2. Copyright Rights. The owner of the copyright rights in a work has certain exclusive rights, including the exclusive rights to make copies of the work, to distribute copies of the work, to prepare "derivative" works based on the work (such as sequels, movies, etc.), to display the work and to perform the work publicly. These rights are "infringed" if someone exercises one of these exclusive rights without the copyright owner's consent. However, the copyright owner's rights are subject to various limitations, including the limitation known as "fair use." This "fair use" limitation allows copying for certain limited purposes under certain limited circumstances, such as copying a short sentence from a book

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in a book review to illustrate a criticism of the author's style. There is no bright line test for determining whether a particular use is a "fair use." For example, a parody of a song that uses the music and some of the lyrics might qualify as a fair use, depending on the circumstances. There is a myth that you can copy "10%"; this is absolutely false. The amount that can be copied is always determined on a case by case basis.

There are also certain special copyright provisions for certain kinds of products. The copyright law forbids rental of copyrighted software and sound recordings. The owner of a work of visual art might have the right to claim authorship of that work and prevent the distortion or mutilation of that work.

3. Ownership and Transfer. Copyright rights are initially owned by the author of a work. Except for transfers by operation of law (like wills), copyright rights can be transferred only by a written document signed by the copyright owner or the owner's agent. However, except for works made for hire (described below), any transfer of copyright (including a license) can be terminated (cancelled) during a five year period between 35 and 40 years after execution (or publication of the work) if certain procedures are followed. The copyright then will belong to the author or the author's heirs. This termination right cannot be waived or surrendered. Accordingly, no transfer or license should ever be considered to be effective for more than 35 years. This can present a problem in the music, movie, television and publishing industries, where artists and authors sign publishing contracts that assign or license their rights, but their copyrighted works may have value for more than 35 years.

The author of a work made for hire (such as a work prepared by an employee acting within the scope of his or her employment) is the employer, and therefore the employer owns the copyright rights. However, an independent contractor (or freelancer) is almost never an employee, so his or her work is almost never a work made for hire; independent contractors almost always retain ownership of the copyright rights to their works unless the works are certain specialized types of works and there is a written agreement that the works are works made for hire. Of course, independent contractors can transfer their copyright rights by signing written documents as

indicated above. If you are about to hire a freelancer, you should consider requiring that person to sign a written document transferring his or her copyright rights to you before the final payment, as part of your agreement. These freelancers can include, for example, photographers, writers, computer programmers, artists, designers and other independent professionals.

4. Idea and Expression. Copyright protects the expression of ideas, but not the ideas themselves. Thus, a copyright in a picture of Mickey Mouse will not protect the idea of a mouse, and others are free to express the idea of a mouse in different ways, such as Mighty Mouse or Fievel Mousekowitz. This idea/expression distinction is one of the major issues in copyright law today. The issue often arises in the context of copying of computer software. Translating computer software from one language to another is almost certainly copyright infringement. However, copyright does not protect the algorithms of a computer program. There is no bright line test between copying unprotectable ideas and copying protected expression. For example, the appeals courts in different parts of the country have adopted different tests in determining whether enough non-literal elements have been copied to be an infringement.

Copyright protects only against copying; it does not protect against independent creation. If an alleged infringer did not have access to a work, there could not have been any copying. Copyright also does not protect processes, systems, concepts, principles or discoveries.

5. What Products Can Be Protected By Copyright. Copyright rights can be used to protect souvenirs, photographs, motion pictures, software, World Wide Web pages, architectural works, T-shirts, aloha shirts, muumuus, games, sheet music, records, cassettes, compact discs, videotapes, poetry, books, paintings, art objects and the artistic or literary content of other products. The artistic and literary content of almost any product can be protected by copyright. At the very least, the instructions and the packaging can be protected by copyright. You should consult with an attorney knowledgeable in copyright law before selling any product that you want to protect by copyright because you may wish to protect more than just the appearance of the product. You should also consult with an attorney knowledgeable in pre-1978 copyright law before

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using anyone else's possibly copyrighted material in your own product, such as someone else's music, pictures or text. This can be a real problem for multimedia and World Wide Web developers.

6. Copyright Notice. If you sell a product that you want to protect with a copyright, you should be sure that the appropriate copyright notice (like the one on the cover and every page of this booklet) appears prominently (there are other possible forms of copyright notice, but this one should be sufficient unless you are publishing sound recordings).

7. Copyright Registration and Its Advantages. Within three months after first selling a product that has a copyright notice, you should apply for copyright registration. However, if you want to enforce your copyright rights in court, you must register your copyright before you can sue (unless you are a foreign citizen). Further, you can recover attorneys' fees and "statutory damages" only if your copyright rights were registered before any infringement started. "Statutory damages" are an amount awarded by a court to compensate a copyright owner for infringement, without having to prove actual damages, and can range between \$750.00 and \$30,000.00 (up to \$150,000.00 for a wilful infringement).

The attorneys' fees for preparing and filing a copyright application (not including any advice that may be necessary) are usually a few hundred dollars for an entirely original textual or pictorial work with only a single author, but if the work includes contributions by multiple authors or is based on a preexisting work, this amount can increase substantially because of the additional legal issues that must be resolved, such as copyright ownership, transfer and clearance. The attorneys' fees for preparing and filing copyright applications for software (where trade secrets protection is desired), databases and audiovisual works are usually several hundred dollars because of the specialized deposit requirements. The filing fee for a simple copyright application is usually \$55. A copy of a copyright registration is attached to this paper as Exhibit "B".

8. How Long Copyright Lasts. Copyright for works created after January 1, 1978, lasts for the life of the author plus seventy years, except in certain specific circumstances, such as where the

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work is "a work made for hire", or the author is anonymous, in which case copyright usually lasts for the shorter of 120 years from creation or 95 years from first publication.

The duration, ownership and termination of transfer provisions for works that were first created before January 1, 1978, are extremely complicated. If you are not interested in pre-1978 works, you can skip the rest of this section. But if you are, the rest of this section is a very brief and oversimplified overview. If you are involved with a pre-1978 copyright, then you should consult with an attorney knowledgeable about pre-1978 copyrights, which are governed by completely different laws from post-1978 copyrights.

For works copyrighted or published with copyright notice before January 1, 1964, copyright had to be renewed 28 years after the copyright or publication or else the copyright expired. Thus, works that were first copyrighted or published before 1964 have fallen into the public domain (lost all copyright protection) unless their copyrights were renewed. Copyright registration for works that were first copyrighted or published between January 1, 1964, and December 31, 1977, was renewed automatically. The renewal term for works first published before January 1, 1978, is 67 years.

If the author did not survive to renew the copyright for works copyrighted or published with copyright notice before January 1, 1978, the author's heirs could renew the copyright (assuming the renewal deadline described above is met). More importantly, the author's heirs then would have owned the copyright free and clear of any transfers (licenses and sales) executed by the author. For example, the author's heirs will not be bound by any publication agreements made by the author during the initial term of copyright. This happened to the Alfred Hitchcock film "Rear Window."

Certain foreign works may have fallen into the public domain (lost all copyright protection) because of failure to comply with certain formalities required under prior U.S. law, such as renewal, registration and notice. However, the copyright rights for some of these foreign works can be restored if certain procedures are followed. Accordingly, you cannot assume that any foreign originated work is in the public domain.

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9. Relevance to Hawaii. In Hawaii, some major industries that could best use copyright protection are the software, music and tourist souvenir industries, because these industries deal primarily with products of creative expression. Of course, other industries (such as the textile industry) in which the appearance of the goods is important also would benefit from copyright. Any industry in which foreign "knock offs" are a problem could benefit from copyright because registered copyrights can be recorded with the United States Customs Service, which might then prevent infringing imports from entering into the country. This import exclusion is much cheaper than filing a lawsuit against every infringing importer and is especially important in Hawaii because we import so many products from foreign countries. Further, any business catering to the public, such as the entertainment industry or the retail sales industry should be aware of copyright rights because playing copyrighted songs to the public (including music on hold) without a license can be a violation of copyright rights. Performing rights societies, such as ASCAP, BMI and SESAC, offer public performance licenses. Other types of music licensing (mechanical licensing, synchronization licensing, etc.) are beyond the scope of this booklet.

EVERYONE must avoid downloading photos or movies from the Internet without permission, because there are several photographers and movie studios whose attorneys file lawsuits for unauthorized downloading and require many thousands of dollars to settle.

D. PROTECTING HOW YOUR PRODUCT LOOKS: DESIGN PATENTS

Another way to protect the appearance of your products is by a design patent. Design patents are granted for new, ornamental and unobvious designs for manufactured articles. Design patents last for fifteen years and protect against products that are so similar in appearance that an ordinary observer would be deceived into purchasing the infringer's product instead of the patented product. Design patents are usually much cheaper than utility patents (which are the type of patents most people think about) and protect only the ornamental appearance of manufactured articles. It sometimes takes less than a year to obtain a design patent. One major advantage of design patents is that they protect regardless of whether anyone has previously had access to the patented product.

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By contrast, as noted above, copyright protects only against copying, but not against independent creation. A copy of a design patent is attached to this booklet as Exhibit "C".

The attorneys' fees for a preparing and filing a design patent application for a single version of a design are usually several hundred dollars (not including any advice that may be necessary), the drawings will usually cost several hundred dollars, and the filing fee is about \$500 for individuals and small companies. Because these costs are only slightly higher than the cost for a patent search, often a design patent application will be filed without a search. Over half of the design patent applications I file are allowed when they are first examined. If a design patent application is rejected, then arguments and amendments can be submitted, but this will usually cost a few thousand dollars, depending on the rejection. After a design patent application is allowed, several hundred dollars will be incurred paying the issue fee and otherwise preparing the application for issuance. It is possible to obtain foreign design patents or design registrations through country by country applications, or through an international process under the Hague Agreement. Utility models also may be available in certain foreign countries.

E. PROTECTING HOW YOUR PRODUCT WORKS: UTILITY PATENTS

1. General Background. A utility patent grants the right to exclude (prevent) others from making, using, selling, offering to sell or importing an invention in the United States. An invention is a machine, manufactured article, composition of matter or process, or any new and useful improvement of these things. A copy of a utility patent is attached to this paper as Exhibit "D".

If maintenance fees are timely paid (every 4 years), a patent based on an application filed on or before June 7, 1995, will last for the longer of 17 years from issuance or 20 years from the date of filing of the original patent application. A patent issuing from an application filed on or after June 8, 1995, will last from the date of issuance until 20 years after the filing date of the first U.S. patent application, if maintenance fees are timely paid. The term also may be extended if the Patent and Trademark Office took too long to process the patent application.

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A provisional patent application can be filed that describes how to make and use the invention and discloses the best way to practice the invention, but that does not contain claims (see below). **This provisional patent application will not be examined by the Patent and Trademark Office.** However, the provisional patent application can be the basis for a final (nonprovisional) patent application. A provisional application is like an airline, restaurant or hotel reservation; it holds your place in line until you file a final (nonprovisional) patent application claiming the inventions disclosed in the provisional patent application. However, the final (nonprovisional) patent application **MUST be filed within one year after the provisional application is filed.** The provisional patent application will be automatically abandoned one year after it is filed. Filing a provisional patent application does not start the 20 year period for calculating the patent term. Most importantly, a provisional application only benefits inventions that are disclosed in it. Inventions that are disclosed in the final (nonprovisional) patent application, but not the provisional application, cannot claim the provisional application's filing date.

Because a provisional patent application does not need to contain claims, it can be prepared by a non-attorney who is a good writer, with a patent attorney providing advice, guidance and editorial comments about how to write the application. This can save thousands of dollars in attorneys' fees, because the provisional application can be filed and then the invention can be commercialized during the one year before the final (nonprovisional) application must be filed. If the invention is not commercially successful during this one year period, the provisional application can be allowed to become abandoned, thus avoiding the costs of preparing and filing a final (nonprovisional) patent application. The final (nonprovisional) patent application must be prepared by a patent attorney because it must contain claims. However, a patent will never issue unless a final (nonprovisional) patent application is timely filed, examined and allowed. A provisional application can never issue as a patent.

For European countries and many other important foreign countries, patent applications must be filed in these countries before the invention is publicly disclosed anywhere in the World.

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If patent applications are not filed in these foreign countries before the invention is publicly disclosed anywhere in the World, then the invention will probably fall in the public domain in these foreign countries.

An invention must be new, useful and unobvious in order to be patentable. An invention is new if it is not identically disclosed in a single piece of the "prior art", which is the body of specific types of knowledge defining the state of the art at the time the invention was made. Thus, if the invention is a widget that includes "A" attached to "B" and mounted on "C", it will not be new if a single prior art reference (such as an issued U.S. patent) describes a widget that includes "A" attached to "B" and mounted on "C".

If a single piece of the prior art (a "reference") does not identically disclose the invention, the invention still will not be patentable if it is "obvious" from the prior art. An invention is obvious if the components of the invention are disclosed in separate prior art references, and the combination of the components achieves only the expected result of the combination. Referring to the example above, if one prior art reference discloses "A" attached to "B" and another prior art reference discloses "C", but the combination only achieves the expected result of the combination of "A", "B" and "C", then the invention is probably obvious and therefore unpatentable. In other words, if an invention only follows the conventional wisdom in a technological art, then it would be obvious. But an invention that goes against the conventional wisdom in a technological art would not be obvious.

As a practical matter, almost all inventions are useful, so that it is rare for a patent to be denied because the invention is not useful. However, certain types of inventions are considered not to be useful and therefore probably would not be patentable. These would include perpetual motion machines, eternal youth potions, and chemicals with no ultimate use. Also, abstract ideas and laws of nature are not patentable. Other types of inventions were previously considered unpatentable, but due to technological advances, might now be considered patentable, such as cures for baldness and cancer and controlled nuclear fusion. Software and

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apps may not be patentable, in and of themselves, but may be patentable if they are part of a process or apparatus.

If an invention is new, useful and unobvious, then a patent can be obtained by filing a final (nonprovisional) patent application (with or without a prior provisional application). The patent application (both provisional and final) must describe the invention in such detail that a person having ordinary skill in the art of the invention could make and use the invention without undue experimentation, and must show that the inventor had possession of the claimed invention. For example, a patent application for an anti-gravity machine must teach a person having ordinary skill how to make and use the anti-gravity machine. The patent application (both provisional and final) also must disclose the best way of practicing the invention known to the inventor at the time of filing that application; the inventor cannot withhold information about a better way to practice the invention. The final patent application (but not any provisional application) also must include one or more "claims" (see below).

2. Business Considerations and Costs. There are various business considerations in deciding whether to apply for a patent, including the expected profits, market value and market lifetime of the product to be patented, whether the available patent protection would be broad enough, whether there are any competitive, non-infringing alternatives, and, of course, the cost of obtaining a patent. Often, investors will not invest money in a new product or company unless the product is (or can be) covered by a patent. However, the value of an invention is determined more by marketing than by technological merit or whether an invention is patented, as indicated below.

Obtaining a patent is the easy part. Monetizing it is the hard part. Most patented inventions fail in the marketplace, usually because of a failure of business execution - lack of cost-effective manufacturing, lack of promotion, lack of distribution, etc. However, some inventions generate millions of dollars. An inventor or business must make the cold hearted, clear eyed, unemotional, objective, business assessment of whether the invention will generate enough money to justify paying the fees and costs to obtain, maintain and enforce a patent.

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The attorneys' fees for preparing a provisional patent application would be several hundred dollars for a single version of a simple mechanical device (not including any legal advice that may be necessary, and the filing fee would be \$130.00 for individuals and small companies.

The attorneys' fees for preparing a final patent application based on a GOOD QUALITY provisional application for a single version of a simple mechanical device would be a few thousand dollars, the drawing costs would be several hundred dollars, and the filing fee would be about \$800. However, the attorneys' fees will be much greater if the provisional application was not of good quality, or if there were changes to the invention after the provisional application was filed, such as new preferred improvements (which must be disclosed).

The attorneys' fees for preparing a final (nonprovisional) patent application not based on a previous provisional patent application for a single version of a simple mechanical device would be a few thousand dollars (not including any advice that may be necessary), and the filing fees and drawing costs would be about one or two thousand dollars.

For more complex inventions, multiple versions of an invention, or non-mechanical inventions, the attorneys' fees and costs will be substantially greater.

The provisional patent application procedure gives small businesses and individuals the ability to file a patent application at a relatively reasonable cost, and then have up to one year to seek funding, determine marketability, or improve the invention. This one year period also provides the ability to determine if the invention will be successful enough to justify the costs and fees of preparing, filing and processing a final patent application. However, the provisional patent application also starts the one year Paris Convention period (see below) for filing foreign patent applications. Thus, the final U.S. application and most foreign patent applications would be due on the first anniversary of the provisional application's filing date. As noted before, for certain countries, foreign patent applications **MUST** be filed before the

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invention is publicly disclosed anywhere in the world. Some countries do NOT allow backdating of foreign applications to the earliest U.S. application's filing date under the Paris Convention.

The provisional patent application does NOT cover any improvements made to the invention after filing, and a provisional application CANNOT serve as the basis for another provisional application. Accordingly, any improvements made after filing a provisional application can ONLY be covered by a second provisional application or a final application based on the provisional application. Thus, the final (nonprovisional) application MUST be filed within one year after the first provisional application.

After the final (nonprovisional) patent application is filed, it will be examined by a Patent Examiner. As noted above, provisional patent applications are not examined and are automatically abandoned after a year. A provisional patent application can never result in a patent, unless a final patent application (based on the provisional application) is filed within a year, and the final application is allowed to issue as a patent.

Patent Examiners vary tremendously in skill, experience and examining philosophy. About half the time, one of my patent applications will be assigned to an experienced Patent Examiner with whom I can work, and then the attorneys' fees and costs for processing (prosecuting) the final patent application may be only a few thousand dollars (not including any advice that may be necessary). Unfortunately, about half the time, one of my patent applications will be assigned to a Patent Examiner who is difficult to work with (usually an inexperienced Patent Examiner). This can multiply substantially the costs and fees for prosecuting (processing) the patent application, and often can prevent a patent from being issued at all. Of course, it is possible that the Patent Examiner will find better prior art than was discovered during the pre-application search (see below), so that the invention would not be patentable at all. You cannot ask that a patent application be assigned to a particular Patent Examiner, so it is impossible to predict the costs and fees for prosecution of any application. However, if the application is ultimately allowed after prosecution, then an issue fee (presently \$500 for small companies and

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individuals) must be paid, and other expenses will be incurred. The patent then will issue.

After the patent issues, maintenance fees must be paid before the 4th, 8th and 12th anniversaries of the issue date to keep the patent alive. The absolute minimum amount of total maintenance fees is presently \$6100 (for small companies and individuals), if they are paid more than 6 months early. There will also be attorneys' fees and costs incurred in processing the paperwork for paying the maintenance fees (presently two or three hundred dollars for each payment). If an invention will not even make enough money to justify paying the filing, issue and maintenance fees, a patent application should not be filed.

It is extremely frustrating to have an inventor spend several thousand dollars in obtaining a patent, and then decide not to pay the first maintenance fee (presently \$800) because the invention is not successful. If the invention would not generate enough money to justify paying an \$800 maintenance fee to keep the patent alive for another four years, then perhaps the patent application never should have been filed in the first place, and the inventor could have avoided spending several thousand dollars. Of course, every inventor believes that his or her invention will make millions of dollars, but the sad fact is that more than 95% of all patents do not earn back the costs of obtaining them. Most of these failures occurred because the inventor did not adequately analyze the business considerations described below.

As you can see from the above, attorneys' fees are slightly more than half the cost of obtaining and maintaining a patent, if the application is assigned to an experienced Patent Examiner who is easy to work with; the rest of the cost is government fees. If the application is assigned to an inexperienced Patent Examiner who is difficult to work with, the attorneys' fees will be increased substantially, and a patent may not be allowed even then.

It is important to remember that a patent only gives the right to exclude (prevent) others from making, using, selling, offering to sell or importing the invention covered by the claims in the patent (see below). If a competitive product can be made that does not come within the claims of the patent, then the competitive product

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will not infringe on the patent. The patent holder will have spent several thousand dollars (at least) on a patent that didn't protect against a competitive product. It is also important to remember that the legal rights granted by a patent will only be valuable if you or others want to make, use or sell a product that comes within the claims of a patent. A patent that covers something nobody wants to make, use, import, offer to sell or sell is worthless.

A very common mistake most inventors make is to try to patent what they want to make, use or sell. You don't get a patent for what you want to do - you get a patent for what your competitors want to do, after your invention is shown to be valuable. Patent coverage that doesn't reach what competitors want to do may not be worthwhile.

A patent is a form of property - it provides exclusionary rights. I am only aware of 3 ways to make money from property - sell it, rent it, or use it. A patent owner MUST analyze how to make money from a patent BEFORE filing a patent application.

Legally, the best a patent can do is to stop competitors from entering the market for the patented invention, as defined by the claims. In economic terms, a patent grants the right to a monopoly in the market for the patented invention, as defined by the claims. Thus, the value of a patent is the additional profit you can make because you have the market for the patented invention (as defined by the claims) to yourself, instead of having to share it with competitors. If competitors were able to sell competing products, you and your competitors would match each others' price reductions, until you and your competitors were making a small profit ("market profit"). However, if you had broad patent protection, you would not have any competitors for the patented invention, as defined by the claims, and could charge whatever price the market would pay. If that price is higher than the price would be if you had competitors, then your profits would be higher than "market profit." The amount of these possible higher profits ("monopoly profits") should always be analyzed in deciding whether to spend the money for a patent. If these potential monopoly profits (over the lifetime of a patent) would be at most a few thousand dollars, the invention probably would not be worth patenting. Further, if there are acceptable non-infringing alternatives for the patented invention,

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then the potential for monopoly profits from a patent would be greatly reduced or eliminated. A patent is only a fence (see below), and a fence that encloses land that no one wants is worthless. A fence is only valuable if it encloses land that people want to enter.

However, beyond the legal rights they grant, patents can be valuable to a business by helping to market its products, or by attracting investors (people often won't invest in an invention unless it is covered by a patent) or by providing an intellectual property portfolio that will be valued by potential future purchasers of the business.

Many inventors have the misconception that if an invention is patented, the invention will be valuable. However, as indicated above, this is not necessarily true. A similar misconception is that an invention with better technology will be more valuable. Although this is sometimes true, it is not always true. The value of a product often has more to do with skilful marketing than the technical merits or patented status of the invention itself.

The Betamax format was technologically better than the VHS format, yet the VHS format was more popular. The laserdisc format predated both Betamax and VHS and was even better than both, but was a market failure when first introduced. Of course, all have been superseded by DVDs and Blu-Ray discs. Also, CDs provided good fidelity, much better than LPs, but many opt for the convenience of MP3s over fidelity, and LPs are now making a comeback.

Another example of good technology that did not initially succeed is airbags. Although the technology was introduced in the 1970's, it was not heavily promoted then and was not successful. Chrysler decided to promote airbags in the late 1980's to distinguish its cars from the competition. Car buyers then started looking for airbags in cars. The other manufacturers decided to add airbags. Now, government regulations require that all new cars have airbags. Again, none of these factors had anything to do with the technological merits of airbags.

Every patented or new product is subject to the same kinds of market and economic risks as unpatented and outdated products. For

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example, if the general economy is in a recession, consumers and companies are not buying any products, new or old. Every patented invention is also subject to the risk of technological obsolescence: I have invented a fantastically cheap way to make slide rules - would you like to invest some money in my invention? Nevertheless, patents can be powerful and effective tools for protecting products. For example, Kodak was forced to withdraw from the instant photography field, at a cost of hundreds of millions of dollars, because it was found to have infringed on several of Polaroid's patents. Even if the inventor does not want to invest the time, money and effort necessary to commercialize an invention, if the invention has been patented, the patent can be sold or licensed for money. If the invention has not been patented, then anyone can make, use, sell, offer to sell or import the invention.

3. Marketing and "Patent Pending". If an invention is not patented, but is sold without a patent, then a competitor can make, use, sell, offer to sell and import exact duplicates of the invention. The competitor can even use a sample of the invention to make a mold from which to make the duplicates.

On the other hand, because purchasing decisions are rarely based on whether a product is patented (except in certain highly technical industries), a product can be marketed successfully even if it is not patented. For example, a product could be the first on the market and build up substantial recognition and goodwill behind its trademark. Competitors could copy the product, but they could not copy the trademark (if it is properly selected, used, registered and enforced).

Products are often marketed before any patent is issued because it usually takes 2 years or longer to obtain a patent. If the product would have little or no future market value by the time a patent issued, it would not be advisable to apply for a patent. For example, computer software evolves so rapidly that a program will often be obsolete by the time a patent would issue, so software is usually protected by other means, usually copyrights and trade secrets. However, computer programs that will still be valuable when a patent issues are sometimes patented.

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A notice stating "Patent Pending" or "Patent Applied For" can be placed on a product after a patent application is filed (but not before). Do not put a patent pending notice on a product until a patent application has been filed; the penalty for false patent marking is \$500.00 per violation. This notice warns other people that you may obtain future patent rights in the invention, and functions like a "No Trespassing" sign because it may discourage infringers.

4. Fences. A patent is only a fence around an invention. Each claim in a patent is a different fence (for information about claims, see below). If an invention is valuable, then it may be worth the money to build a fence around it by obtaining a patent. Indeed, people might not invest in the invention if it is not protected by a patent. However, if the invention is not valuable, then protecting it with a patent probably would not increase its value; building a fence around a worthless piece of land does not increase the value of the land. Most patented inventions do not make enough money for their inventors to cover the costs of patenting them. Yet, many valuable inventions are patented. Among the valuable inventions used every day that were once patented are the telephone, the electric motor, Velcro®, the paper clip, the stapler and the transistor.

5. Distribution and Pricing. A patented invention is subject to the same economic and market risks as any other new product. People do not usually buy a product because it is patented, so whether a product is patented does not usually increase demand for the product. Most inventors do not realize that no new product can make money for its inventor unless and until there is a market for it and the invention can be promoted, manufactured and distributed and sold to the ultimate consumer or end user at a price the consumer or end user is willing to pay. For example, in many retail distribution channels, a manufacturer sells to a distributor, who sells to a wholesaler, who sells to a retailer, who sells to the ultimate consumer. The price of the product is increased at each step in this distribution channel (usually doubled) because each person in the chain must make a profit from passing the product further along the chain. If the manufacturer's cost is too high, the price to the ultimate consumer will be too high and the product will not sell. From the above, it can be seen that the

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manufacturing cost therefore should be less than 1/8 of the price that the ultimate consumer is willing to pay in some distribution channels. Of course, the margin can be less in other channels, such as direct Internet sales. Indeed, for some goods and services, the advent of flat rate shipping by the United States Postal Service and Internet marketing may have provided an alternate channel of promotion and distribution that overcomes the major business disadvantage of Hawaii's geographic isolation, especially for high value products.

6. Inventor's Organizations; Selling An Invention to Industry. Many people believe that they can sell a patent to industry for money. Some unscrupulous "inventor's organizations" take advantage of this belief and advertise that they will submit an inventor's idea to industry for a small fee. More and more fees are requested later and the inventor ends up only with a marketing study prepared on a word processor. Even worse, the inventor could have spent less money and obtained a patent, and the invention might be unpatentable because no patent application was filed within one year after the first offer to sell the invention (see below).

Most companies in industry are flooded with ideas submitted by inventors and many companies have been accused of stealing inventions. Some actually have. To protect themselves against being accused of stealing an invention, most companies will not review an outside invention ("not invented here" syndrome), or they will review an outside invention only if the inventor has agreed that the invention will not be secret. However, keeping the invention secret is often the inventor's only protection. Usually, the inventor will have to agree to the company's conditions for reviewing the invention, unless the inventor is well known in the particular technology and the company strongly believes that the invention may be worthwhile.

7. Scope of Protection; Claims. Some people believe that someone can change an invention "10%" and avoid infringement. This idea is absolutely wrong. The scope of protection granted by a patent is measured by the claims, which are the numbered paragraphs at the end of every patent. Each of these claims is a "fence" (see above) and is a checklist of elements and requirements that must be included in a product or process in order for that product or

process to be infringing. If one of the elements or requirements of a claim is missing from a product or process, then that product or process does not literally infringe on the claim. On the other hand, if all the elements and requirements in a claim are present in a product or process, then the product or process infringes, even if additional elements are present (except for some chemical and other special inventions). **The claims must be read very carefully; a product or process might avoid infringement because of only one word that is in a claim but is not "met" in the product or process.** However, even if this "literal" infringement is not satisfied because one word in a claim is not met, infringement still might be found if the product or process contains an "equivalent" of the missing word.

8. Search. In order to determine whether an invention is patentable, usually a preliminary patentability search is performed in the Patent and Trademark Office. The cost of such a search for a single version of a simple mechanical invention is usually a thousand dollars for a single simple mechanical device, and more for a more complex technologies and inventions. Searches for computer, electronics, chemical, biotechnology and other more complex inventions will cost a few thousand dollars. More elaborate searches, including searches of non-English patents and publications, are also available at costs ranging up to several thousand dollars. No patentability search can be complete, however, because many references that may prevent patentability of an invention are not contained in the records of the Patent and Trademark Office (such as many foreign and domestic publications) or are not available to the public (such as unpublished pending patent applications), and because references are often missing or misfiled in the Patent and Trademark Office's records.

9. Relevance to Business. Because we live in the United States, with higher labor and real estate costs than many other countries, most manufacturing businesses are at a disadvantage when competing with foreign manufacturers. A patent would be one way for a U.S. manufacturer to protect against a foreign manufacturer marketing a competing product.

10. Foreign Patents. If a product is worth patenting in the United States, then it may be worthwhile patenting in foreign

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countries as well. However, each country has different patent laws, and many countries require that an invention be practiced in that country within a certain time after the patent is issued or the patent will be licensed at a nominal fee or cancelled. Special permission must be obtained from the U.S. government to file foreign patent applications (usually automatically granted to U.S. patent applications).

Most developed and developing countries in the World are members of the Paris Convention, which allows you to back-date your foreign patent applications in those countries to your U.S. filing date if your foreign applications are filed within one year of your U.S. filing date. Because most other countries in the world grant patents to the first applicant and because many events can occur within one year after filing of your U.S. patent application that will destroy your foreign patent rights, it is absolutely critical that all foreign patent applications be filed in Paris Convention countries within one year of your U.S. filing date.

If you file a provisional patent application, **YOU MUST FILE ALL YOUR FOREIGN PATENT APPLICATIONS WITHIN ONE YEAR OF YOUR PROVISIONAL PATENT APPLICATION**. Thus, if you file a provisional patent application, your final U.S. and foreign applications are all due on the same date, one year after filing.

If you are likely to sell, manufacture, or license an invention in foreign countries, or if a competitor is likely to sell or manufacture in foreign countries, you should certainly consider obtaining patents in those countries. Also, if your invention will be manufactured in a foreign country (which is quite probable considering the extremely high costs of manufacturing in Hawaii and the Mainland), the most likely infringer may be your own manufacturer, or a company that splits off from your own manufacturer. Your own manufacturer is ready to manufacture your product in quantity, and it would be relatively easy to make some extra units for sale to your competitors in the U.S. or in foreign countries. You might not be able to stop this unless you have a patent in that manufacturer's country.

Further, unlike copyrights and trademarks, patents cannot be recorded with the United States Customs Service. Thus, Customs will

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not stop infringing imports from coming into the United States (unless an exclusion order is obtained from the International Trade Commission, which is quite expensive). If you do not hold a patent in the country in which infringing products are being manufactured, you probably will not be able to take action against the manufacturer. Your only choice might be to take legal action against the many importers of the infringing product, which could be much more expensive.

Filing foreign patent applications in each country can be very expensive, especially because translations into the language of the foreign country are necessary if that country's patent office does not accept English. Further, in many foreign countries, annual fees must be paid even before a patent issues, and maintenance fees also must be paid after any patent issues. A foreign patent correspondent also must be retained in each country in which a foreign patent application is to be filed and prosecuted. Of course, each country's patent office has its own national filing fees as well.

11. International Patent Applications. Patent applications can be filed in up to 120 different countries by filing one international patent application in the United States Patent and Trademark Office designating the selected countries.

An international patent application goes through an "international stage" before the application is processed by the national or regional patent offices of the designated countries or regions. Depending on whether an international preliminary examination is requested, the international stage can last 20 or 30 months, measured from the filing date of the international application or the filing date of the first U.S. application, if there was one (provisional or final). An international search report and Written Opinion is issued approximately 16 months after an international application is filed (or 16 months after the filing date of the first U.S. application, if there was one). A U.S. applicant can select the U.S. Patent and Trademark Office, the European Patent Office, or the Korean patent office to perform the international search and international preliminary examination. A copy of an international patent application is attached to this booklet as Exhibit "E".

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The attorneys' fees for preparing and filing an international patent application are several hundred dollars more than the attorneys' fees for preparing and filing a final U.S. patent application (not based on a provisional application), but the filing fees are substantial, and can easily exceed \$5,000.00 (depending on the search authority selected and the number of countries designated), but if there is a worldwide market for a product and the product is valuable enough, the cost and expense very well may be worthwhile. In fact, an international patent application can be viewed as an "option" to file patent applications in any or all of the 120 designated countries, because the application can be abandoned before filing any documents with the national patent offices of the designated countries. Viewed in this light, an international patent application can be quite a bargain.

Of course, costs and attorneys' fees will be incurred in the international stage, but these costs and attorneys' fees are usually less than those that would be incurred in processing multiple patent applications in multiple foreign countries in multiple languages through multiple foreign correspondents. However, if patent protection is desired in only two or three countries, having your patent application processed directly by foreign correspondents in those countries (direct national filing) is probably less expensive.

The goal of the international stage is usually to obtain a favorable international preliminary examination report, so that, when the application is processed by the national or regional patent offices of the various countries or regions, only minor processing remains to be done. In fact, the European Patent Office has indicated that, if it issues a favorable international preliminary examination report as the International Preliminary Examining Authority, a European patent conforming to the international patent application probably would be issued.

Further, it is possible to file an international patent application designating the U.S. and choosing the European Patent Office as a search authority so that, assuming no unforeseen problems, a first office action containing a search by the U.S. Patent and Trademark Office and an International Search Report by the European Patent Office would both be received within one year of

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filing (if the first U.S. application is not a provisional application and the U.S. examiner issues a first office action in less than a year). This would provide two independent searches by two of the foremost patent offices in the world before the one year deadline for filing foreign patent applications in Paris Convention countries. This information could be invaluable in deciding whether to pursue foreign patent protection in those Paris Convention countries that cannot be designated in an international patent application (such as South Africa and Argentina).

12. Patent Attorneys and Agents. You should know that only registered patent agents and registered patent attorneys can file and prosecute (process) patent applications for others. A registered patent attorney must (1) have an engineering, chemistry, physics, or other technical college degree; (2) be an attorney at law; and (3) take and pass the patent bar exam (39% pass rate when the author took the exam). Every registered patent attorney has a registration number. If you are considering hiring someone to advise on patent law, be sure s/he is a registered patent attorney. A patent agent must meet these same requirements, except the s/he is not an attorney at law, and therefore cannot advise on legal matters beyond obtaining patents from the U.S. Patent and Trademark Office. Of course, inventors are free to file their own patent applications, but this is not a recommended practice, especially if the product will be important to the business.

13. Don't Lose Your Patent Rights Accidentally! You must be very careful not to offer for sale, use, advertise or otherwise disclose a new invention unless and until you have considered whether you want to obtain foreign patent protection. In many countries in the world (including Taiwan and most countries in Europe) an invention cannot be patented if it was made available or disclosed to the public or described in a printed publication anywhere in the World before a patent application was filed in that country. In fact, even showing a product to a manufacturer for a price quote might destroy patentability in some countries.

You MUST file a US patent application within one year after the invention was first offered for sale, or first publicly disclosed.

14. Technical Information. If you need certain technical information to be able to complete an invention, the University of Hawaii's Office of Technology Transfer and Economic Development (539-3816) can help you contact various federal technology transfer centers. The goal of these centers is to make technology developed in federal laboratories available to private industry for commercialization.

15. Post Grant. After a patent is issued, it can be challenged in various ways, including ex parte reexamination, inter partes review, and lawsuits. These post grant challenges are beyond the scope of this booklet.

F. TRADE SECRETS

1. Definitions. Trade secrets are just what their name implies: secrets that are used in a trade. Trade secrets last for as long as the secret can be kept. For example, the formulas for Smith Brothers cough drops and Coca Cola (Classic) have been protected as trade secrets for many, many years. Trade secrets are basically confidential information used in business that have been the subject of reasonable efforts to maintain their secrecy and can include customer lists, processes, formulas and computer programs. Hawaii has adopted the Uniform Trade Secrets Act, due in part to the author's efforts.

2. Trade Secrets and Ideas. Trade secrets are the only way in which abstract ideas can be protected. Thus, many, if not most, commercially marketed computer programs are protected by a combination of copyrights and trade secrets because algorithms (mathematical ideas and methods) are not patentable.

3. How Long Trade Secrets Last. Trade secrets are protectable only as long as they are kept secret. If trade secret information is not the subject of reasonable efforts to maintain secrecy, it will lose its trade secret protection. However, products protected by trade secrets are vulnerable to "reverse engineering", in which a competitor purchases a sample of the product and attempts to duplicate it. Therefore, trade secrets are best suited for processes in which the end product does not disclose the trade secret process (for example, a new process for making ball

bearings), secret formulas that cannot be analyzed (for example, the formula for Coca-Cola) and products that otherwise cannot be reverse engineered easily or lawfully (for example, computer software distributed only in machine readable form under a license that forbids disassembling or decompiling).

4. What Trade Secrets Protect. Trade secrets law protects against misappropriation of trade secrets. However, in order to be protected under trade secrets law, the information must have been treated as a trade secret by the owner; at the very least, access to the information must have been restricted. Further, trade secrets law does not protect against reverse engineering and independent invention.

5. Documents. Trade secrets must be the subject of reasonable efforts to maintain secrecy. This will usually require, at a minimum, that any persons to be entrusted with trade secrets be required to sign adequate Nondisclosure Agreements BEFORE the trade secrets are disclosed. If the trade secrets being disclosed are valuable enough, then noncompetition agreements can be required as well, but noncompetition agreements must be reasonable in time, scope and manner to be enforceable, and some types of noncompetition agreements are unenforceable (software related businesses; California). Nondisclosure agreements vary tremendously in complexity and quality - many are available as "standard" forms, but most fail to address critically important issues. A high quality nondisclosure agreement costs several hundreds of dollars to draft, and a noncompetition agreement costs even more.

G. PROTECTING PLANTS: PLANT PATENTS

1. Plant Patents. Plants can be patented! This comes as a surprise to many people, but any cultivated plant that can be asexually reproduced (except for tuber propagated plants) can be patented if it is a distinct and new variety of plant. A plant patent grants the right to prevent others from asexually reproducing the plant or selling or using the plant so reproduced. This can be a very important and valuable right; the seedless orange was once patented. Plant patents may become very important in Hawaii if diversified agriculture continues to grow.

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2. Plant Variety Protection. Plants that can be sexually reproduced can be protected under the Plant Variety Protection Act. Certificates of plant variety protection can be issued for any novel variety of sexually reproduced plant (other than fungi, bacteria and first generation hybrids).

H. PROTECTING SEMICONDUCTOR CHIPS

The Semiconductor Chip Protection Act of 1984 provides protection for "mask works", which are a series of related images, however fixed or encoded, having or representing the predetermined, three-dimensional pattern of metallic, insulating, or semiconductor material present or removed from the layers of a semiconductor chip or product. In a very real sense, a mask work is the architectural plan for a semiconductor chip product. The term of protection for mask works is 10 years from the date on which the mask work is registered or on which it is first commercially exploited anywhere in the world, whichever is first. Mask works are registered in the Copyright Office and the registration fee is \$120.00. The mask work notice ("M" in a circle and the owner's name) can be affixed to a semiconductor chip after registration.

I. LICENSING

A detailed review of the law and practice of licensing is beyond the scope of this booklet. However, there are many very important business principles that must be kept in mind. First and foremost is that granting a license is only giving permission to someone to use your intellectual property (renting intellectual property). If you don't have the right to stop someone from doing something in the first place, you can't give her a license. If you can't give her a license, then she won't pay you money for a license. For example, if you have a great product but can't get a patent because the product was publicly used in the United States more than a year ago, then you can't sell a license to someone else to make the product. Because the product is unpatentable, it is free for everyone to make, use, import, offer to sell and sell.

There are also several very technical requirements for licenses about which only a knowledgeable licensing attorney will be able to

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provide advice. For example, every trademark license must contain quality control provisions, patent licenses cannot require payment of royalties beyond expiration of the patent, copyright licenses at a specified royalty rate must be granted to anyone who wants to make a phonorecord of a published CD, and some foreign countries do not allow license agreements to contain post-expiration prohibitions on the practice of secret processes. Of course, there are many different business issues involved in negotiating licenses as well, such as whether the license will be exclusive or not, the base on which royalties will be charged, audit provisions and other issues. Accordingly, it would be advisable to have all license agreements reviewed by an attorney familiar with both licensing law and the specific type of intellectual property being licensed.

Intellectual property licenses take on many forms, the more common of which include software agreements, publishing contracts, manufacturing agreements, and franchise agreements. Because these types of agreements include licenses of intellectual property, someone who is not knowledgeable about intellectual property law probably will not be able to provide complete advice.

The licensing of intellectual property also must take into account various business considerations, including the amount and basis for calculating royalties, the territory to be licensed, the responsibility for stopping infringement, the types of records to be kept, ownership of improvements, and a myriad of other matters.

J. THE BOTTOM LINE

The bottom line costs for intellectual property protection can range from a few dollars to thousands of dollars, and depend on the type and degree of protection required.

1. DCCA. Businesses often register their own trademarks, service marks and trade names at the Department of Commerce and Consumer Affairs and pay only the \$50.00 + \$1.00 archives fee.

2. Simple Copyright Registrations. Businesses often can register their own copyrights and pay only the \$55.00 registration fee. However, this is not recommended because of the various hidden issues that must be resolved in order to register a copyright

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properly, such as whether the work is a work made for hire and whether title to the work has been properly transferred to the copyright claimant. Copyright registrations will usually issue a few months after filing.

3. Trade Secrets. Trade secrets do not have any registration fees but the cost of maintaining adequate security measures can range from the purchase of locking file cabinets to elaborate remote personnel identification systems. Adequate nondisclosure agreements must be obtained though, which cost several hundred dollars.

4. Patent and Trademark Office. The costs and attorneys' fees for preparing and filing design patent, trademark and service mark applications in the Patent and Trademark Office are usually a few thousand dollars (not including any advice that may be necessary).

The costs and attorneys' fees for preparing and filing a United States provisional patent application for a single version of a simple mechanical invention would be about one or two thousand dollars per invention (not including any advice that may be necessary). The costs and attorneys' fees for preparing and filing a final patent application based on a HIGH QUALITY provisional patent application, where there have been no changes to the invention, would normally be a few thousand dollars per invention (not including any advice that may be necessary). The costs and fees for preparing and filing a final patent application not based on a provisional application would be several thousand dollars per invention (not including any advice that may be necessary). The costs and attorneys' fees for preparing and filing an international patent application are usually several thousand dollars per invention (not including any advice that may be necessary), although substantial portions of the filing fees can be deferred for up to a year.

After any patent, trademark or service mark application is filed in the Patent and Trademark Office, additional attorneys' fees will be incurred in filing requests for extension and statements of use and responding to "office actions", and additional costs, such as issuance and maintenance fees, will be incurred.

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Trademark and service mark applications based on previous use in interstate commerce can issue approximately 1 year after filing, assuming that no rejections or oppositions are encountered. When "intent to use" trademark and service mark applications will issue depends on when the mark is first actually used in interstate commerce and when a statement of use is filed. Assuming no unusual problems, United States utility patent applications typically take 2 to 3 years to issue, except in certain highly technical areas, such as biotechnology, in which processing time is considerably longer. United States design patents typically take about a year to issue. Foreign patents typically do not issue based on an international patent application until more than 3 years after filing.

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9. Legal Enforcement. A discussion of the costs and procedures for enforcing intellectual property rights in court is beyond the scope of this booklet. However, you should be aware that intellectual property litigation is highly complex and likely to be more expensive than other forms of litigation because of these complexities. Further, it is not advisable to retain an attorney in intellectual property litigation who is not familiar with intellectual property law because there are many technical aspects of intellectual property law about which a general litigation attorney would not normally be aware. It is much more difficult to come into a case after it has been mishandled by a general litigation attorney than to have the case handled correctly from the beginning. I have had the unfortunate experience of representing a client on appeal from a trial in which that client was not represented by an intellectual property attorney. The Court of Appeals for the Federal Circuit ruled that certain defenses were waived because they were not raised at trial. That client is now out of business. Also, it should be mentioned that courts may require that the owner of intellectual property rights prove that it is suffering irreparable harm, that is, harm that cannot be repaired by the payment of money, before ordering an infringer to stop.

CONCLUSION

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This paper has presented an oversimplified overview of several very complicated and technical areas of law. Nevertheless, businesses should have at least a rudimentary awareness of the types of intellectual property protection available and a ballpark estimate of their costs. It is only with this type of information that intelligent business decisions can be made about whether to obtain intellectual property protection and the types of protection to obtain.

ImanageDB:165957.3

The United States of America



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The Mark shown in this certificate has been registered in the United States Patent and Trademark Office to the named registrant.

The records of the United States Patent and Trademark Office show that an application for registration of the Mark shown in this Certificate was filed in the Office, that the application was examined and determined to be in compliance with the requirements of the law and with the regulations prescribed by the Commissioner of Patents and Trademarks, and that the Applicant is entitled to registration of the Mark under the Trademark Act of 1946, as Amended.

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Int. Cl.: 35

Prior U.S. Cls.: 100, 101 and 102

United States Patent and Trademark Office

Reg. No. 2,105,115

Registered Oct. 14, 1997

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CORPORATION)
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HONOLULU, HI 96814

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AND SERVICES OF OTHERS THROUGH A
FREQUENT PURCHASER PROGRAM, IN
CLASS 35 (U.S. CLS. 100, 101 AND 102).

FIRST USE 9-20-1996; IN COMMERCE
9-20-1996.

OWNER OF U.S. REG. NO. 919,577.
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FORM TX

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REGISTRATION NUMBER

TXu

329 650

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Day

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Year

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Issue Date ▼

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Coauthor of entire text of computer program

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Year Born ▼

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THOMAS J. TAYLOR

date ►

Handwritten signature (X) ▼

Thomas J. Taylor

4/22/88

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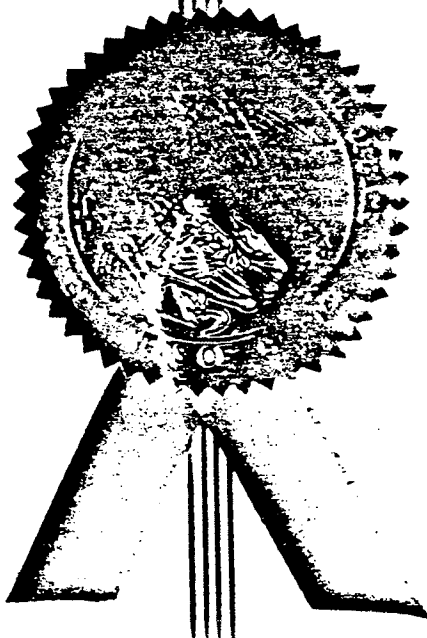
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original, and ornamental design for an
article of manufacture. The title and
description of the design are enclosed.
The requirements of law have been
complied with, and it has been deter-
mined that a patent on the design shall
be granted under the law.*

Therefore, this

United States Patent

*Grants to the person or persons having
title to this patent the right to exclude
others from making, using or selling the
design throughout the United States of
America for the term of fourteen years
from the date of this patent.*

Jeffrey M. Samuel

Acting Commissioner of Patents and Trademarks

Melvinia Gary
Attest

EXHIBIT "C"

[54] WATERBOARD FIN

[76] Inventor: Lawrence S. Bucknell, 62-202
Kamehameha Hwy., Haleiwa, Hi.
96712

[**] Term: 14 Years

[21] Appl. No.: 150,533

[22] Filed: Jan. 28, 1988

[52] U.S. Cl. D21/231; D12/317

[58] Field of Search D21/230, 231, 236;
D12/317; 114/126, 127, 129, 132, 140; 441/74,
79

[56] References Cited

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Washington Post Newspaper, 1/29/87, "How Stars and Stripes and Kookaburra III Differ".

Primary Examiner—Wallace R. Burke

Assistant Examiner—Kay H. Chin

Attorney, Agent, or Firm—Martin E. Hsia

[57] CLAIM

The ornamental design for a waterboard fin, as shown and described.

DESCRIPTION

FIG. 1 is a rear perspective view of a waterboard fin showing my new design, the broken line being for illustrative purposes only and forming no part of the claimed design;

FIG. 2 is a top plan view thereof;

FIG. 3 is a rear elevational view thereof;

FIG. 4 is a front elevational view thereof;

FIG. 5 is a bottom plan view thereof; and

FIG. 6 is a right side elevational view thereof, the left side elevational view thereof being a mirror image of that shown.

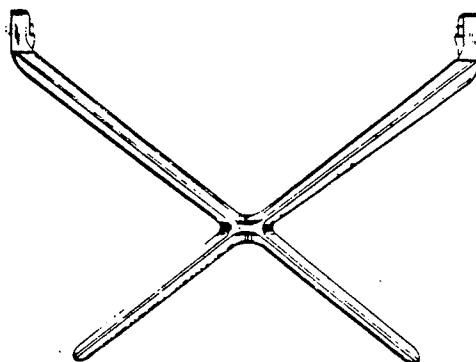
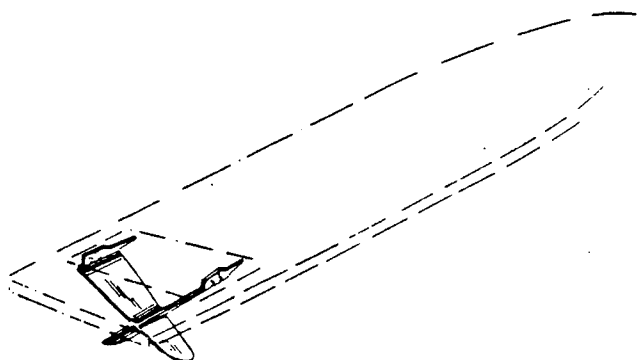


FIG. 1

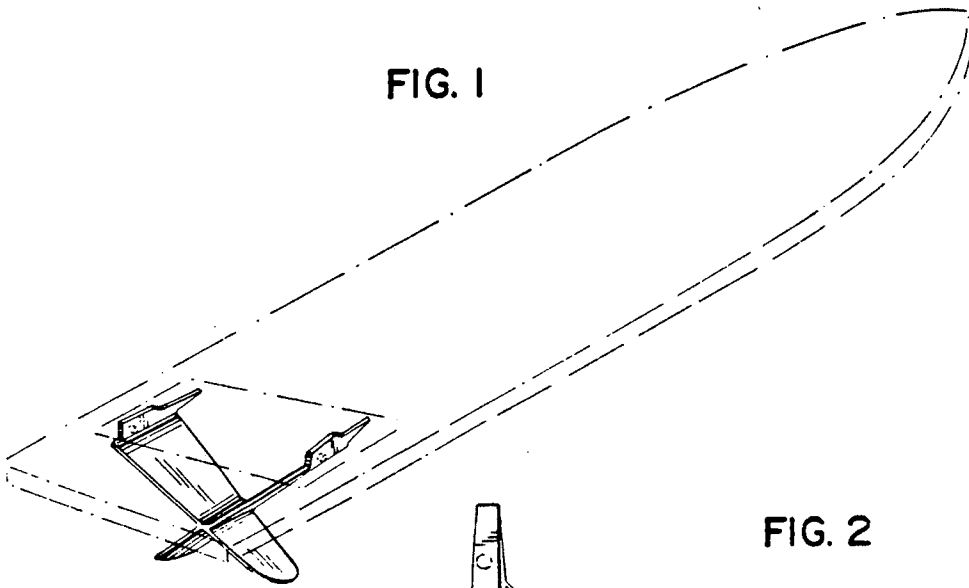


FIG. 2

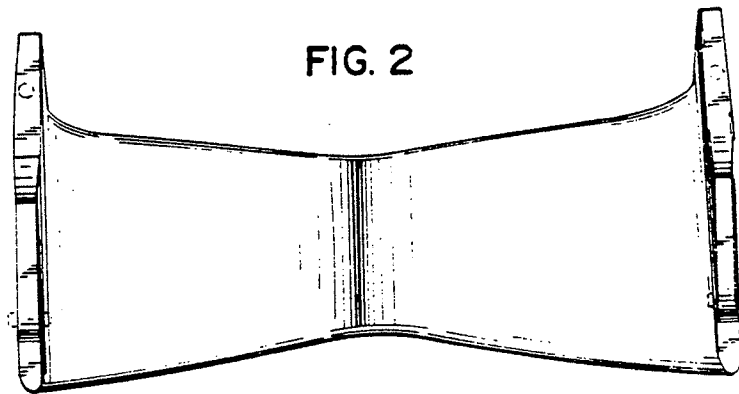


FIG. 3

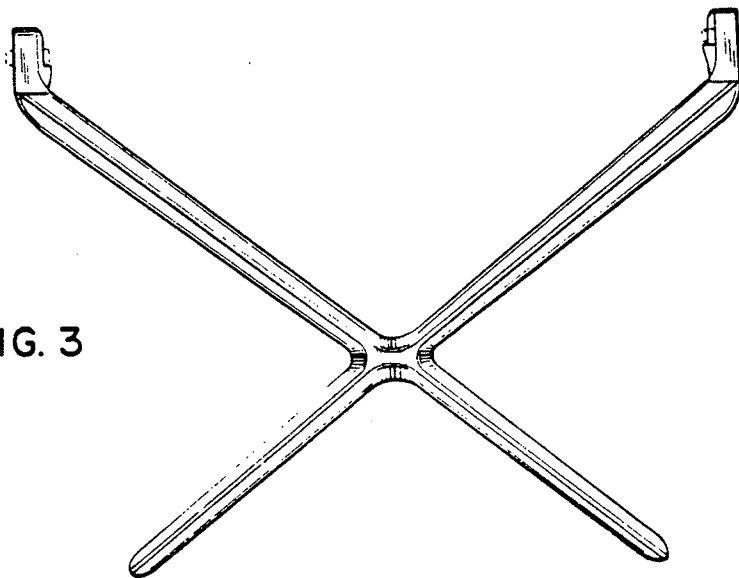


FIG. 4

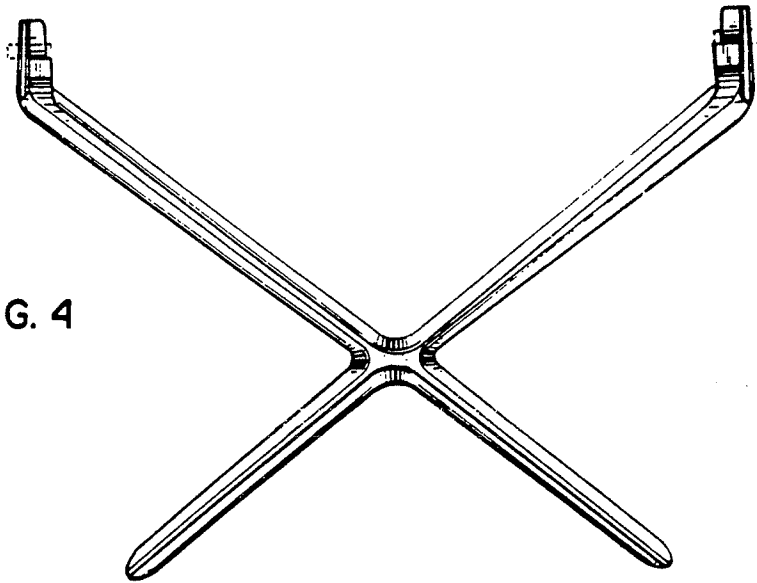


FIG. 5

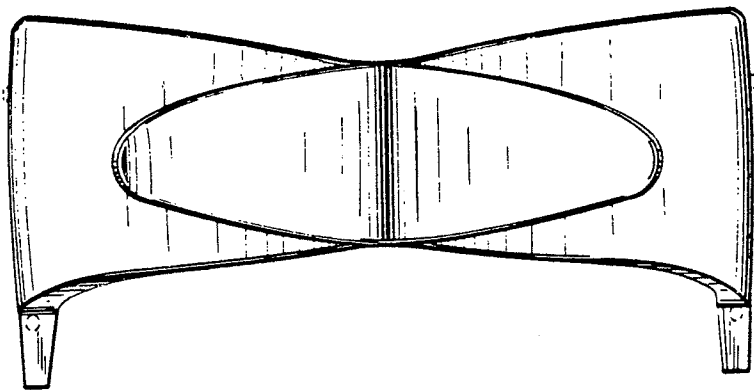
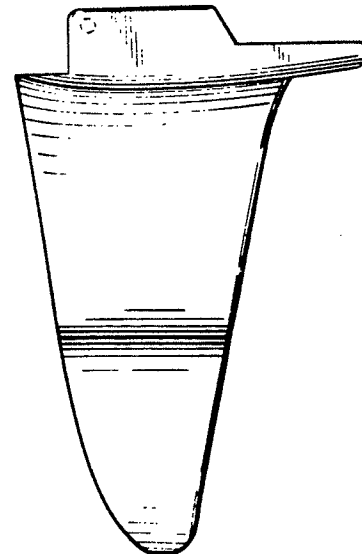


FIG. 6





US005094045A

United States Patent [19]
Tamashiro

[11] **Patent Number:** 5,094,045
[45] **Date of Patent:** Mar. 10, 1992

[54] **TERMITE BARRIER**
[75] **Inventor:** Minoru Tamashiro, Kailua, Hi.
[73] **Assignee:** University of Hawaii, Honolulu, Hi.
[21] **Appl. No.:** 656,112
[22] **Filed:** Feb. 13, 1991

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Related U.S. Application Data

[63] Continuation of Ser. No. 225,244, Jul. 27, 1988, abandoned.
[51] **Int. Cl.³** A01M 1/20
[52] **U.S. Cl.** 52/101
[58] **Field of Search** 52/101
[56] **References Cited**

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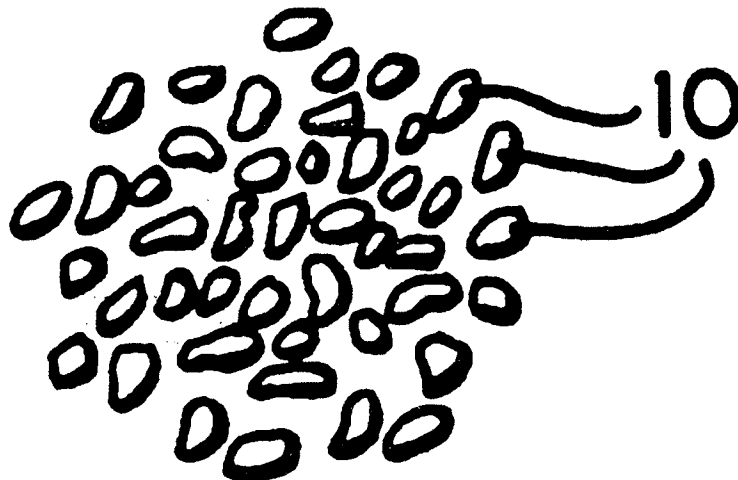
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Primary Examiner—David A. Scherbel
Assistant Examiner—Michele A. Van Patten
Attorney, Agent, or Firm—Martin E. Hsia

[57] **ABSTRACT**

A termite barrier comprising granular material having granules with sizes ranging from 1.7 millimeters to 2.4 millimeters made of sand, gravel, rock or basalt.

51 Claims, 1 Drawing Sheet



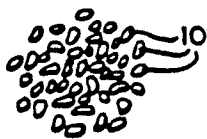


FIG. 1

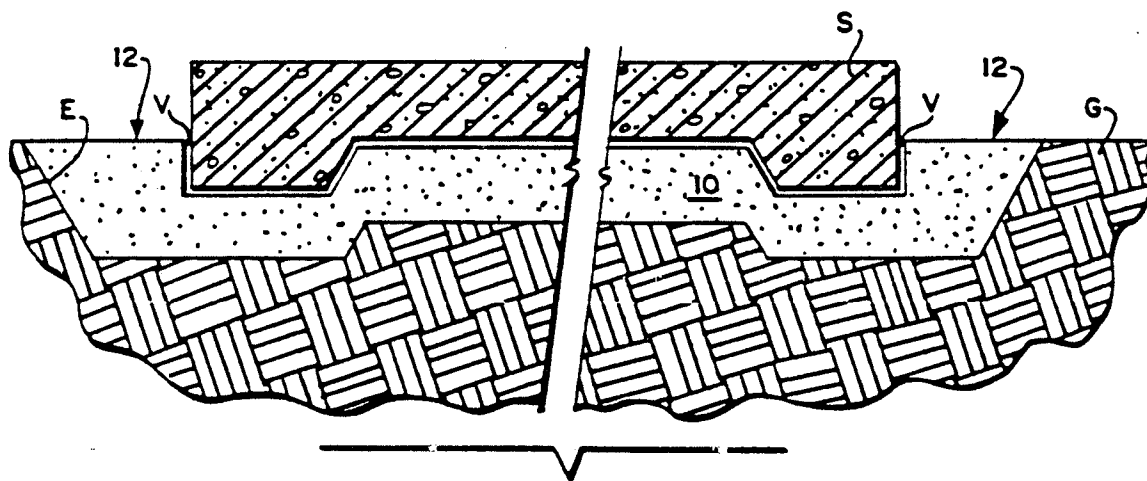


FIG. 2

TERMITE BARRIER

This is a continuation of copending application Ser. No. 225,244, filed on July 27, 1988, now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to a termite barrier to prevent the penetration of termites from the ground into a building.

The problem of termites penetrating into buildings from the ground and causing structural damage is old. Further, the damage caused by such termites can be extremely costly to repair. For example, the Formosan termite, which is among the smallest but most destructive of termites, reportedly causes millions of dollars of control and repair costs each year. The Formosan termite is capable of penetrating concrete, tin, copper and hard plastic, so some form of protection is often necessary to prevent damage to structural members exposed to the Formosan termite.

Many approaches have been tried to prevent termites from penetrating into structures.

One approach is to incorporate insecticide impregnated materials into the construction of a building. For example, U.S. Pat. No. 2,899,771 to Burris teaches the placement of a vapor barrier comprising an insecticide impregnated polyethylene film placed between a concrete slab and the ground. Similarly, U.S. Pat. No. 2,952,938 issued to Abrams teaches the use of a resin coated felt layer impregnated with an insecticide that is intended to spread into the ground underneath. Currently, it is common practice to treat the ground beneath a building with chemicals prior to construction in order to poison the soil against termites.

Another approach is to use built-in insecticide distribution systems, such as described in U.S. Pat. No. 2,95,418 issued to Griffin and U.S. Pat. No. 4,625,474 issued to Peacock.

A major disadvantage of termite control methods utilizing insecticide or chemicals is the effect of such pesticides or chemicals on the environment. Due to such concerns, many of the insecticides commonly used have been outlawed or restricted by the Environmental Protection Agency of the United States. Further, insecticide treatment often requires special precautions and specially trained personnel during application of the insecticides, which increases the cost of construction. A still further disadvantage of methods utilizing insecticide is the necessity for retreatment at periodic intervals, which increases costs and increases the risk of exposure to insecticides.

Alternative approaches to preventing penetration of termites that do not utilize insecticides include making structural modifications to buildings. For example, U.S. Pat. No. 2,581,521 issued to Davis describes a method of constructing a building that provides a ventilated passage around the building along the junction of the foundation wall and the superstructure. U.S. Pat. No. 2,352,338 to Muirhead describes the use of precast beams filled with a concrete-based homogenous material. U.S. Pat. No. 2,674,765 to Tennison discloses lock joint configurations for metal termite shields. Finally, U.S. Pat. No. 2,347,776 teaches the combined use of insecticide and structural design in order to confine termite damage to certain predetermined areas which are less costly to replace or repair. However, a disadvantage

of these structural inventions is that they increase the complexity of construction.

Thus, there is a need for a termite barrier that does not employ insecticides or other environmentally hazardous substances and yet does not substantially increase the complexity or cost of construction. There is a further need for such a termite barrier that is permanent and does not require retreatment.

It is therefore an object of this invention to provide an effective termite barrier that does not utilize chemical insecticides.

It is a further object of this invention to provide such a termite barrier that may be easily installed and does not substantially increase the cost or complexity of construction.

It is a still further object of this invention to provide such a termite barrier that is permanent.

SUMMARY OF THE INVENTION

These and other objects are achieved by depositing a layer of granular material between a building and the ground, wherein at least 60% of the granules in the material have at least one dimension ranging from 1.7 millimeters to 2.4 millimeters in diameter. Granules of this particular size prove to be too large for termites to move, too small when packed together to find space for tunneling, and too hard to chew. The granules can be made of sand, gravel, rock or basalt, with basalt being the preferred material. Although the maximum penetration of the barrier is approximately one-quarter inch, it is preferred that the barrier be laid down in a layer approximately four inches thick to conform to normal construction practices.

The termite barrier of the present invention can be used in connection with existing construction by digging trenches around a building and then depositing granules in accordance with this invention in the trenches to form a barrier. This process can also be used around individual structural members of a building.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the granules used in the practice of this invention; and

FIG. 2 is a schematic view of a termite barrier in accordance with this invention (not to scale) utilized in connection with a typical slab on grade construction.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1, the granules 10 used for the practice of this invention preferably should have diameters of between 1.7 millimeters and 2.4 millimeters. If the granules 10 are significantly larger than these dimensions, then the termites would be able to tunnel between the granules 10. If the granules 10 are smaller than the preferred size, then the termites would be able to move the granules 10. The granules 10 may range in size and are preferably irregular in shape. It is preferred that at least approximately 60% of the granules conform to the preferred dimensions. The preferred specifications for crushed basaltic rock to be used with this invention are as follows:

Sieve	Size	Percent Passing
4M	4.75 mm	100
8M	2.36 mm	95-100
10M	2.00 mm	75-95

-continued

Sieve	Size	Percent Passing
12M	1.70 mm	35-50
16M	1.18 mm	0-10

The particles should be crushed basaltic rock with the following minimum requirements:

Specific Gravity: 2.80

SiO₂ %: 45

L.A. abrasion, % loss, 500 Revolutions: 20.

Preferably the granules 10 are made of rock, gravel, sand or basalt because they will then be too hard for the termites to chew or break into smaller pieces. Other materials having approximately the same density and hardness also may be used in this invention. The specific gravity of the preferred granules for the practice of this invention is 2.9.

FIG. 2 shows the use of a termite barrier in accordance with the present invention in a typical slab on grade construction. In such construction, an excavation E is made in the ground G to accept a slab S on which a building will be constructed. The granules 10 are deposited in the excavation E in a layer, thus forming a termite barrier 12. In order to prevent settling of the slab S after construction is completed, it is preferred that the termite barrier 12 be compacted, but such compaction is unnecessary for the termite barrier 12 to be effective.

A standard construction practice would be to deposit gravel as "fill" in the excavation E, and then to compact the "fill." The depth of such fill would usually be approximately 4 inches. Accordingly, in order to conform with standard construction practice, it is preferred that the termite barrier 12 have a thickness of at least approximately 4 inches so that the termite barrier 12 also can function as "fill."

It is preferred that a vapor barrier V be placed between the termite barrier 12 and the slab S to prevent the penetration of vapors and moisture into the slab S. Because of the size of the granules 10 in the termite barrier 12, a capillary rise will be induced in any water underneath the termite barrier 12. A vapor barrier V is particularly preferred where the water table may be close to the ground surface, unless base materials coarser than the termite barrier are used.

After the termite barrier 12 has been deposited and compacted and the vapor barrier V has been installed, the slab S can be poured on top of the vapor barrier V.

It is preferred that the edges of the termite barrier 12 be sealed at the edges in order to keep dirt and water from contaminating the termite barrier 12. It is preferred that this seal comprise 2 inches of S4C material or a concrete walkway on a base of granules 10 for the termite barrier 12. Further details about construction methods around the edges of the termite barrier 12 are contained in an analysis performed by soils engineers attached as Appendix 1 and incorporated herein by reference.

Because the invention provides a physical barrier to termites, physical penetration of the barrier by grass, tree roots, shrubs and plants can impair the effectiveness of the termite barrier 12. Of course, bridges across the termite barrier 12 (such as wood chips left on top of the termite barrier 12 next to the wood panelling of a structure) also can impair its effectiveness. Therefore, landscaping, sprinkler design and maintenance should be planned to avoid any such physical penetration.

It will be obvious to those skilled in the art that various changes may be made in the preferred embodiment described herein without departing from the spirit and scope of the invention. Therefore, the invention is not to be limited by what is shown in the drawings and described in the specification, but shall be limited only as indicated in the attached claims.

The invention is intended to cover all modifications, embodiments and equivalents which fall within the spirit and scope of the claims. For example, in the claims, "structure" shall be deemed to mean and include "building", "foundation", "wall", "basement", "structural member", "post" and any other portion of an improvement that is in contact with the ground.

I claim:

1. A barrier for preventing penetration of termites into a structure from the ground, comprising:

a layer of granular material deposited between said structure and the ground, wherein between approximately 45% and approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

2. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 1, wherein approximately 65% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

3. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 1, wherein approximately 60% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

4. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 1, wherein approximately 50% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

5. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 1, wherein approximately 45% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

6. A barrier for preventing penetration of termites into a structure from the ground, comprising:

a layer of granular material deposited between said structure and the ground, wherein between approximately 60% and approximately 50% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

7. A barrier for preventing penetration of termites into a structure from the ground, consisting essentially of:

a layer of granular material deposited between said structure and the ground, wherein between approximately 50% and approximately 60% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

8. A barrier for preventing penetration of termites into a structure from the ground, consisting essentially of:

- a layer of granular material deposited between said structure and the ground, wherein between approximately 45% and approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

9. A barrier for preventing penetration of termites into a structure from the ground, consisting essentially of:

- a layer of granular material deposited between said structure and the ground, wherein between 60% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

10. A barrier for preventing penetration of termites into a structure from the ground, as described in any one of claims 1 to 13, wherein said granular material is selected from the group consisting of crushed rock, gravel, sand and basalt.

11. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 10, wherein said layer for granular material is compacted.

12. A barrier for preventing penetration of termites into a structure from the ground, as described in claim 11, wherein said compacted layer of granular material has a thickness of approximately 4 inches.

13. A barrier for preventing penetration of termites into a structure from the ground, comprising:
depositing a layer of granular material between said structure and the ground, wherein between approximately 45% and approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

14. A process for preventing penetration of termites into a structure from the ground, as described in claim 13, wherein between approximately 50% and approximately 60% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

15. A process for preventing penetration of termites into a structure from the ground, as described in claim 13, wherein approximately 60% by weight of said granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

16. A process for preventing penetration of termites into a structure from the ground, as described in claim 13, wherein approximately 45% by weight of said granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

17. A process for preventing penetration of termites into a structure from the ground, as described in claim 13, wherein approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

18. A process for preventing penetration of termites into a structure from the ground, as described in claim

13, wherein approximately 50% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

19. A process for preventing penetration of termites into a structure from the ground, as described in any one of claims 13 to 18, wherein said granular material is selected from the group consisting of crushed rock, gravel, sand and basalt.

20. A process for preventing penetration of termites into a structure from the ground, as described in claim 19, further comprising:

compacting said layer of granular material.

21. A process for preventing penetration of termites into a structure from the ground, as described in claim 20, wherein said layer of granular material has a thickness of approximately 4 inches after such compacting.

22. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, comprising:

depositing a layer of granular material in said excavation;

compacting said layer; and

pouring said slab over said layer, wherein between approximately 45% and approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

23. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein between approximately 50% and approximately 60% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

24. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein approximately 60% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

25. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein approximately 45% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

26. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein approximately 50% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

27. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein approximately 60% by weight of said granular material consists of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters.

28. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in any one of claims 22

to 27, wherein said granular material is selected from the group consisting of rock, gravel, sand and basalt.

29. A process for preventing penetration of termites to a concrete slab that is to be poured into an excavation, as described in claim 28, wherein said layer has a thickness of approximately 4 inches after such compacting.

30. A process for preventing penetration of termites from the ground to a concrete slab that is to be poured into an excavation, as described in claim 22, wherein approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters in diameter.

31. A building construction for preventing penetration of termites, comprising:

a compacted layer of granular material having a thickness of approximately 4 inches, wherein between approximately 45% and approximately 65% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters;

a vapor barrier placed on top of said layer; and
a concrete slab poured on top of said vapor barrier.

32. A building construction for preventing penetration of termites, comprising:

a compacted layer of granular material having a thickness of approximately 4 inches, wherein between approximately 50% and approximately 60% by weight of said granular material consists essentially of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters;

a vapor barrier placed on top of said layer; and
a concrete slab poured on top of said vapor barrier.

33. A building construction for preventing penetration of termites, comprising:

a compacted layer of granular material having a thickness of approximately 4 inches, wherein approximately 60% by weight of said granular material consists essentially of granules having diameters between approximately 1.7 millimeters and approximately 2.4 millimeters;

a vapor barrier placed on top of said layer; and
a concrete slab poured on top of said vapor barrier.

34. A building construction for preventing penetration of termites, as described in any one of claims 31 to 33, wherein said granules are selected from the group consisting of sand, gravel, basalt and rock.

35. A process for preventing penetration of termites into a structure from the ground, comprising:

depositing a layer of granular material between said structure and the ground, wherein between approximately 45% and approximately 65% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

36. A process for preventing penetration of termites into a structure from the ground, as described in claim 35, wherein between approximately 50% and approximately 60% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

37. A process for preventing penetration of termites into a structure from the ground, as described in claim 35, wherein approximately 60% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

38. A process for preventing penetration of termites into a structure from the ground, as described in claim 35, wherein approximately 45% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

39. A process for preventing penetration of termites into a structure from the ground, as described in claim 35, wherein approximately 65% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

40. A process for preventing penetration of termites into a structure from the ground, as described in claim 35, wherein approximately 50% by weight of said granular material consists of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters.

41. A new use for a granular material that includes between approximately 45% and approximately 65% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

42. A new use for a granular material that includes between approximately 50% and approximately 60% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

43. A new use for a granular material that includes approximately 40% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

44. A new use for a granular material that consists essentially of between approximately 45% and approximately 65% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

45. A new use for a granular material that consists essentially of between approximately 50% and approximately 60% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

46. A new use for a granular material that consists essentially of approximately 60% by weight of granules having at least one dimension between approximately 1.7 millimeters and approximately 2.4 millimeters, comprising:

depositing a layer of said granular material between a structure and the ground to prevent penetration of termites into said structure from the ground.

47. A new use for granular material according to any one of claims 41 to 46, wherein:

said granules are selected from the group consisting of crushed rock, gravel, sand and basalt.

48. A new use for a granular material according to any one of claims 41 to 46, wherein:

said granuels comprise crushed basaltic rock.

49. A new use for a granular material according to any one of claims 41 or 46, wherein said granules have a specific gravity of approximately 2.9

50. A new use for a granular material according to any one of claims 41 to 46, wherein:

said granules are compacted.

51. A new use for a granular material according to claim 50, wherein:

said granules are compacted to a layer approximately 4 inches thick.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 5,094,045

Page 1 of 2

DATED : March 10, 1992

INVENTOR(S) : Minoru Tamashiro

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the title page, item (56): References cited, delete "Abams" and substitute -- Abrams --.

column 1, lines 37-38, delete "stribution" and substitute -- distribution --.

Column 4:

In claim 1, line 8, delete "approximatley" and substitute -- approximately --; in claim 6, line 5, delete "60% and approximately 50%" and substitute -- 50% and approximately 60% --; in claim 6, line 8, delete "approximatley" and substitute -- approximately --.

Column 5:

In claim 8, line 9, delete "approximatley" and substitute -- approximately --; in claim 9, line 5, delete "between" and substitute -- approximately --; in claim 10, line 3, delete "1 to 13" and substitute -- 1 or 6-9 --; in claim 13, line 1, delete "barrier" and substitute -- process --; in claim 13, line 8, delete "approximatley" and substitute -- approximately --; in claim 14, line 3, delete "approximatley" and substitute -- approximately --; in claim 14, line 4, delete "imatley" and substitute -- imately --; in claim 15, line 3, after "said", insert -- granular material consists essentially of --; in claim 16, line 3, after "said", insert -- granular material consists essentially of --.

Column 6:

In claim 22, line 8, delete "approximatley" and substitute -- approximately --; in claim 24, line 2, delete "concrete" and substitute -- concrete --; in claim 26, line 5, delete "oen" and substitute -- one --; in claim 27, line 1, delete "penetratio" and substitute -- penetration --.

In claim 28, line 5, after "of", insert -- crushed --; in claim col. 7, line 48, delete "a concrete slab poured on top of said vapor barrier."; in claim 34, line 4, after "and", insert -- crushed --;

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 5,094,045

Page 2 of 2

DATED : March 10, 1992

INVENTOR(S) : Minoru Tamashiro

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 7:

in claim 36, lines 5-6, delete "approximatley" and substitute -- approximately --.

Column 8:

In claim 41, line 4, delete "approximatley" and substitute -- approximately --; in claim 41, lines 4-5, delete "approximatley" and substitute -- approximately --; in claim 42, line 4, delete "approximatley" and substitute -- approximately --; in claim 42, lines 4-5, delete "approximatley" and substitute -- approximately --; in claim 43, line 2, delete "40%" and substitute -- 60% --; in claim 43, line 4, delete "approximatley" and substitute -- approximately --.

Column 9:

In claim 47, line 1, after "for", insert -- a --; in claim 48, line 3, delete "granuels" and substitute -- granules --.



Signed and Sealed this

Twenty-eighth Day of September, 1993

Attest:

Sandra J. Morton
Attesting Officer

Bruce Lehman

BRUCE LEHMAN

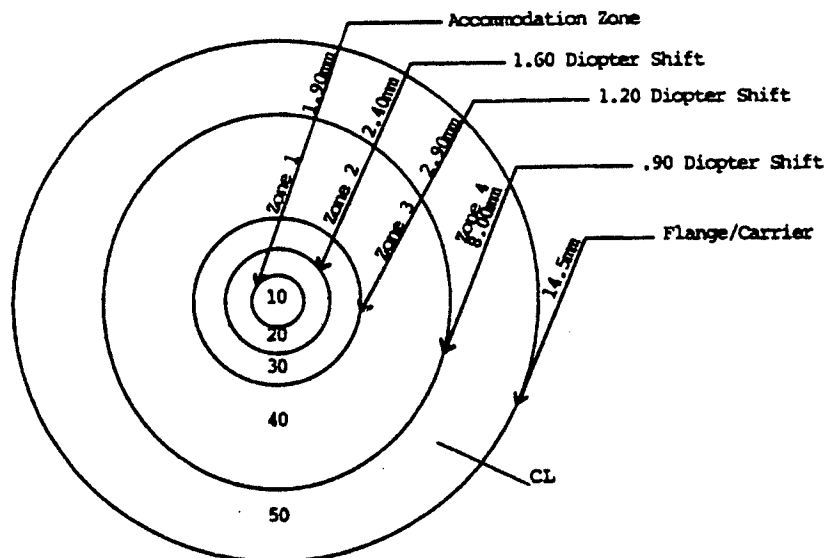
Commissioner of Patents and Trademarks



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US96/15589 (22) International Filing Date: 27 September 1996 (27.09.96) (30) Priority Data: 60/004,567 29 September 1995 (29.09.95) US (71)(72) Applicant and Inventor: DUNN, Stephen, A. [US/US]; 1949 Naniu Place, Honolulu, HI 96822 (US). (74) Agent: HSIA, Martin, E.; P.O. Box 939, Honolulu, HI 96808 (US).		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

(54) Title: CONTACT LENS AND PROCESS FOR FITTING



(57) Abstract

A contact lens with a central region (10) that is optically less than approximately 1.9 millimeters in diameter and that is preferably overcorrected by approximately 25 % to 100 % over the correction needed for reading. Unexpectedly, the central region (10) does not impair distance vision, but compensates for presbyopia and therefore allows a user to focus on objects within a range of near and intermediate distances. A method for fitting the contact lens is also provided.

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DESCRIPTIONContact Lens and Process for Fitting
Technical Field.

5 This invention relates to a contact lens that restores the ability to focus on objects within a range of distances near to the user (referred to as "natural accommodation"), while retaining the ability to see distant objects. More specifically, this invention
10 relates to a contact lens with a conventional spherical concave surface conforming to the curvature of the eye (base curve) and having a non-conventional convex surface (optic curve) combining spherical and non constant aspherical curvature resulting in an optical
15 system that provides true monocular presbyopic correction (correction of presbyopia in each eye independently, instead of partial or full distance correction in one eye and partial or full near correction in the other) and restores the phenomenon of
20 "natural accommodation." Additionally, the invention affords a methodology of fitting that substantially reduces the skill and experience required by the contact lens fitter to a very basic level while affording a high degree of clinical success and patient satisfaction.

25 Normally between the ages of 40 and 45, presbyopia or old sightlessness is brought about by loss of elasticity of the crystalline lens of the eye, causing blurred vision at near points due to the reduction of the ability of the eye's natural lens to
30 accommodate the changes in curvature necessary to focus on both near and distant objects.

 When a person is free of presbyopia, the eye retains its full range of natural accommodation. This type of person's vision can be corrected by eyeglasses
35 or contact lenses providing only the correction required for distance vision, and natural accommodation would automatically provide correction for near and

1 intermediate distance vision.

Background Art.

For the contact lens wearer who requires presbyopic (or near vision) correction, in addition to distance correction, a variety of options have been available. These individuals may be fitted with single vision contact lenses corrected for distance, and wear reading glasses for near correction. Another alternative is to provide a contact lens for one eye that is corrected for distance vision and to provide a contact lens for the other eye that is corrected for near vision (this practice is referred to as monovision because only one eye is corrected for near vision), or the fitting of bifocal or multifocal contact lenses.

During the 1950's, a variety of contact lenses were designed for the correction of presbyopia. These contact lenses, although very innovative in design, met with only limited success because the only readily available material was Poly Methyl Methacrylate (Plexiglass), also known as PMMA, which does not transmit oxygen. As bifocal and multifocal designs of the period were quite thick and heavy compared to conventional distance correction contact lenses, these presbyopic contact lenses were uncomfortable to wear for substantial periods of time. Additionally, the fitting of these bifocal and multifocal contact lenses required considerable time and skill on the part of the contact lens fitter.

During the 1970's, both soft contact lenses and rigid gas permeable (RGP) contact lenses were introduced. With the availability of these new materials, renewed enthusiasm brought about several new designs for contact lenses for the correction of presbyopia.

RGP materials provide oxygen transmission through the lens material itself, and afforded new hope for the earlier designs developed in PMMA material.

1 However, lens thickness and resultant patient discomfort
continued to be a problem.

One of the early benefits recognized with soft
contact lenses was the comfort and ease of fitting and,
5 for this reason, by 1995 approximately 85% of new
contact lens wearers are being fitted with soft contact
lenses. As soft contact lenses command such a large
share of the contact lens market, it is natural that
considerable effort would be made to develop bifocal and
10 multifocal contact lens designs in soft contact lens
material.

There are two types of contact lens designs for
the correction of presbyopia -- Alternating (or
Translating) and Simultaneous.

15 (1) In the alternating (or translating) vision
technique, the lenses are very similar in design to
bifocal eyeglass lenses in that the wearer sees through
the distance segment in the upper portion of the lens
when looking straight ahead and sees through a lower
20 near vision segment when the eye (moves) to look down.
Alternating vision lenses have proven to be successful
in RGP designs, but have met with little success when
designed in soft contact lenses.

Perhaps the reason that alternating vision soft
25 contact lens designs were not as successful as the same
design concept in RGP materials was because lens
translation is necessary for this design to be
successful. The translation from distance to near is
achieved through the mechanical action of the lens
30 resting on the lower eyelid and, when the eye looks
down, the lens remains stable on the lower eyelid
causing the pupil of the eye to translate from the
distant vision portion of the lens to the near vision
portion of the lens. Soft lens material by its nature
35 caused this modality to fail as there was insufficient
rigidity in the soft lens to remain properly positioned

1 on the lower eyelid and often the lens would slip underneath the lower eyelid during translation.

(2) Simultaneous vision bifocal or multifocal contact lenses are either concentric or aspheric in design with focal power changing through different areas of the lens. Lenses are fitted so that distance, intermediate and near zones focus images simultaneously on the retina of the eye and the brain then separates out the image desired.

10 Theoretically, with adaptation, the ability to change focus naturally from near to far with no blurring in between can be achieved with simultaneous vision lenses in both RGP and soft contact lenses.

As alternating presbyopic designs proved to be unsuccessful in soft contact lens designs, most of the development work with soft contact lenses was done in the area of simultaneous presbyopic correction with concentric designs or aspheric designs.

During the 1980's, several designs of concentric and aspheric soft contact lenses were introduced. Soft aspheric multifocal contact lenses typically provided relatively weak reading addition power and therefore worked best in early presbyopia.

Reading addition powers are referred to by eye care professionals as "add" power, and represent the difference between the distance correction and near correction prescribed by an eye care professional for eyeglasses or contact lenses. Accordingly, a prescription of "-3 with a +2 add" (which would be typical for moderate presbyopia) would mean that distance vision requires -3 diopters of correction, and near vision requires an additional 2 diopters of plus correction, resulting in -1 diopters of near vision correction. In conventional monovision, the dominant eye would be fitted with a -3 distance correction lens, and the other eye would be fitted with a -1 near correction lens.

1 This type of solution is often satisfactory in
early presbyopia because the user still has some
remaining visual accommodation and the needed add power
is usually between +.75 and +1.25, which is usually low
5 enough for the brain to comfortably select the desired
image in most people. However, conventional monovision
becomes less satisfactory as presbyopia becomes more
advanced because the needed add power increases and
visual accommodation has deteriorated further, so that
10 the visual imbalance exceeds the brain's ability to
select the desired image from the appropriate eye.

Typically, early presbyopes, would be between
the age of 40 and 45, and would require add power of
between +1.00 and +1.50 diopters. Moderate presbyopes
15 would usually be between 45 and 55 years and would
require add power of between +1.50 and +2.00 diopters.
Mature presbyopes would usually be older than age 55 and
require an add power of between +2.00 and +3.00 diopter.

The add corrective power of current aspheric
20 multifocal contact lens designs is usually limited to
only +.75 to +1.25 diopters because the brain must be
able to separate out the desired image (and also
suppress the undesired images) from the multiple images
(near, intermediate or distant) being simultaneously
25 focused by the multifocal contact lens design. In order
to achieve this suppression, the images cannot be too
different from each other. However, if aspheric
corrections are increased in attempts to achieve higher
add powers, the images become too different for the
30 brain to suppress the undesired images, resulting in
blurred vision. Even at add powers of +.75 to +1.25
diopters, many patients suffer some blurring or ghosting
with multifocal contact lens designs because their
brains are not able to completely separate the desired
35 image while simultaneously completely suppressing the
undesired images.

1 Some contact lens fitters may attempt to use
aspheric designs to achieve near distance correction of
up to +2.00 diopters (or more) by undercorrecting the
distance vision of the non-dominant eye by between .25
5 and 1.00 diopters, thereby theoretically providing up to
+2.00 diopters (or more) of near vision correction,
instead of the +.75 to +1.25 diopter correction that
would be provided if that eye had been fully corrected
for distance vision with an aspheric multifocal contact
10 lens. The dominant eye would be corrected to maximum
distance acuity in such a situation. However, this
creates even more blurring and ghosting. This technique
is called modified monovision.

Aspheric optics have been incorporated on both
15 the front and back surfaces of soft contact lenses.
However, it is believed that front surface aspherical
multifocal soft contact lenses provide better presbyopic
correction. Still, only limited success is achieved
because providing add power of +.75 to +1.25 (or more)
20 usually results in reduced distance acuity. For this
reason, many contact lens fitters find it necessary,
when using aspheric soft multifocal contact lenses, to
undercorrect the distance power in one eye to improve
near vision, while correcting the other eye fully for
25 distance vision, as discussed above. When attempting to
fit moderate to mature presbyopes, this modified
monovision almost always results in a visual compromise
similar to that of conventional monovision.

Concentric multifocal lens designs have an
30 advantage over aspheric designs in the fitting and
correcting of more mature presbyopes requiring add power
of more than +1.25 diopters, primarily due to the
availability of higher add power correction and central
power zones of different diameters. Concentric soft
35 multifocal contact lenses have been made with the
central distant correction zones and central near
correction zones. In the latter designs, the central

1 power zones would be corrected by the amount prescribed
to correct near vision. It is believed that central
near add zones have been more successful at correcting
presbyopia than central distance zones, when
5 incorporated in concentric multifocal soft lens designs.
Although concentric center add multifocal designs have
the ability to correct higher add power requirements,
most individuals fitted with this type of lens
experience moderate to significant amounts of visual
10 discomfort due to ghosting of images or a 3-D effect, at
near distances. These effects diminish with adaptation,
but still cause a high portion of wearers to discontinue
the use of this type of presbyopic contact lens.

The reality of the existing art of presbyopic
15 correction with simultaneous vision contact lenses is
that no currently available lens system, be it aspheric
or concentric, provides monocular multifocal correction
for moderate to mature presbyopia. In most cases, some
form of modified monovision is required in an attempt to
20 satisfy the visual requirement for near and far vision.
To this end almost all currently available presbyopic
contact lens manufacturers indicate in their fitting
manuals the requirement of compensating one eye more for
near and the other eye more for distance correction.
25 This is the norm rather than the exception.
Additionally, no currently available multifocal contact
lens has the ability to restore the phenomena of natural
accommodation and successful results are difficult to
achieve and require considerable time and experience on
30 the part of the fitter.

It is therefore an object of this invention to
provide true multifocal correction for moderate and
mature presbyopes requiring up to +3.00 diopters of add
power without the need to compensate one eye for near
35 and the other eye for distance.

1 It is a further object of this invention to
provide rapid patient adaptation with minimal initial
visual discomfort.

5 It is a still further object of this invention
to provide a presbyopic optical system that restores the
phenomenon of natural accommodation.

10 It is a still further object of this invention
to provide a system of fitting and methodology that
allows a contact lens fitter with little or no
multifocal contact lens fitting experience to achieve a
very high degree of success and patient satisfaction.

Disclosure of Invention

 These and other objects are achieved by a
contact lens having a central circular region (an
15 "accommodation zone" or "sweet spot" named zone 1) that
is overcorrected for near vision, and that is small
enough that it does not impair distance vision.
Preferably, a plurality of concentric transition regions
(or rings), optimally two (named zone 2 and zone 3,
20 progressing radially outwardly), are provided between
the sweet spot and the outer region (or ring) of the
lens (named zone 4), which is corrected for distance
vision. Preferably, the sweet spot has a diameter of
between approximately 1.0 millimeters and approximately
25 2.5 millimeters, preferably between approximately 1.5
millimeters and approximately 1.9 millimeters, and
optimally either approximately 1.5 millimeters or
approximately 1.9 millimeters. Preferably, the
transition rings (zones 2 and 3) are each approximately
30 .5 millimeters wide. Preferably also, the remaining
portion of the lens (zone 4) extends radially outward
from the outermost transition ring to at least
approximately 8 millimeters. Because the human pupil
cannot expand beyond approximately 8 millimeters in
35 diameter, the portion of the lens extending more than
approximately 8 millimeters radially outward from the

1 center is not an optical portion and functions only as a carrier.

Preferably, the sweet spot is spherical and is overcorrected by between 25% and 100% over the near
5 vision correction prescribed for the user. Preferably, the remaining optical portions of the lens are aspheric, with different diopter shifts over different regions. Optimally, for high add power, zone 2 provides a diopter shift of approximately 1.6 diopters, zone 3 provides a
10 diopter shift of approximately 1.2 diopters, and zone 4 provides a diopter shift of approximately .9 diopters. For low add power, optimally zone 2 provides a diopter shift of approximately 1.1 diopters, zone 3 provides a diopter shift of approximately .8 diopters, and zone 4
15 provides a diopter shift of approximately .6 diopters.

The contact lens manufacturing lathe disclosed in the example below provided contact lenses that achieved the desired results. However, some experimentation may be necessary to achieve the desired
20 result with different equipment, but this experimentation should not be undue.

The invention incorporates both concentric and aspheric design principles and can be produced with a high add power correction or a low add power correction.
25 In addition, the lens system offers two accommodation zone diameters for different sized pupils to achieve maximum near point acuity without reduction in distance visual acuity.

The higher add power lens has a power transition of 3.7 diopters across the usable optic zone, and the low add power lens has a power transition of 2.6 diopters across the usable optic zone.
30

The accommodation zone should cover approximately 50% of the pupil area for maximum success
35 in distant, intermediate and near visual acuity. The accommodation zone functions to restore the phenomenon of natural accommodation by creating a very small area

1 of over magnification in the center of the pupil of
approximately 25% to 100% over the near vision
correction required by the indicated reading add power.
Surprisingly, distance vision will not be substantially
5 impaired if the accommodation zone covers 50% or less of
the pupil area. Further, the function of natural
accommodation will be restored to an unexpectedly great
extent.

Although the inventor is not sure (and the
10 validity and enforceability of any patent issuing hereon
shall not be affected by the accuracy or inaccuracy of
this explanation), the inventor believes that, in near
vision, a user's pupils constrict, so that the
accommodation zone occupies a large enough portion of
15 the pupil area for the accommodation zone to become
effective. Normal reading correction is prescribed for
approximately 15 inches (approximately 38 centimeters).
Accordingly, the overcorrection of the accommodation
zone (sweet spot) allows the user to see from 8 inches
20 to 15 inches, thus restoring the function of natural
accommodation. In distance vision, however, the pupil
will be normally dilated, so that the accommodation zone
is small enough that the brain ignores the image
generated by it. The constriction of the pupil for near
25 vision is known as "accommodative pupil response."

The accommodation zone is blended to the
distance zone 4 via two zones of non constant
asphericity which allows true monocular correction of
near, intermediate and distant vision. Near vision
30 correction, when tested at the standard distance of
approximately 15 inches (approximately 38 centimeters)
offers normal best corrected acuity and when reading
material is brought closer to the eyes, up to about
eight inches (approximately 20 centimeters), near acuity
35 remains stable and often improves due to the increased
near power created by the sweet spot.

1 Due to the non constant aspheric transition
from the sweet spot to zone 4, adaptation problems
associated with prior designs of concentric or aspheric
multifocal contact lenses are substantially reduced or
5 eliminated completely.

Historically, the fitting of multifocal contact
lenses has been more an art than a science as the
variables associated with fitting presbyopic contact
lenses are considerable. Often success has only been
10 achieved through the process of trying many different
lenses on the patient in the hope of finding a lens that
generates a good presbyopic response. The contact lens
fitter's degree of experience in the fitting of
multifocal lenses has also been a key to achieving a
15 successful fitting with good visual results.

The fitting of lenses according to this
invention requires accurate centering of the lens over
the pupil of the eye in order to achieve the expected
results. To determine the location of the sweet spot
20 relative to the pupil is often difficult because the
pupil may not be aligned with the center of the cornea
or for other reasons. Thus, the invention also
incorporates the use of a diagnostic trial lens with a
white ring corresponding in diameter and location to the
25 sweet spot. The exact position of the center of the
contact lens can be determined and the relative position
of the sweet spot to the pupil and the percentage of
pupil covered by the sweet spot is easily observed. The
use of the diagnostic lens allows the fitter to very
30 quickly determine the proper sweet spot size, which
increases the chances of successful fitting. For
example, if the accommodation zone does not align within
the pupil, the fitter knows that the standard lens
design will not work and a custom lens design with an
35 offset accommodation zone will be required.

Other objects, features and advantages of the
present invention will become more fully apparent from

1 the following detailed description of the presently preferred embodiments for carrying out the invention and the accompanying drawings.

Brief Description of Drawings.

5 Fig. 1 is a top elevational schematic view of a presently preferred embodiment of a contact lens according to the present invention for a person who needs a high degree of reading correction (high add power) and a larger sweet spot;

10 Fig. 2 is a top elevational schematic view of a presently preferred embodiment of a contact lens according to the present invention for a person who needs a high degree of reading correction (high add power) but a smaller sweet spot;

15 Fig. 3 is a top elevational view of a contact lens according to the present invention for a person who needs a lesser degree of reading correction (low add power) and a larger sweet spot; and

20 Fig. 4 is a top elevational view of a contact lens according to the present invention for a person who needs a lesser degree of reading correction (low add power) and a smaller sweet spot.

Best Modes for Carrying Out Invention.

25 The presently preferred best modes for carrying out the present invention are illustrated by way of example in Figs. 1 to 4.

Referring to Fig. 1, shown is a first preferred embodiment of a contact lens CL according to the present invention. The contact lens CL is divided into a central circular region and four concentric ring shaped regions. The central region 10 will be referred to as zone 1, the accommodation zone, or the sweet spot. The immediately adjacent first ring shaped region 20 will be referred to as zone 2. The second ring shaped region 30 immediately adjacent to zone 2 will be referred to as zone 3. The third ring shaped region 40 immediately adjacent to zone 3 will be referred to as zone 4.

1 The maximum diameter of a human pupil when it
is fully dilated is approximately 8 millimeters, so that
the ring shaped region 50 of the contact lens extending
radially outwardly from zone 4 is not an optical
5 surface, but merely functions as a carrier to maintain
the optical surface of zones 1 through 4 in position.

Structurally, the zones can be described as
follows. Zone 1 is preferably approximately 1.5 to 1.9
millimeters in diameter. Zone 2 and zone 3 are both
10 preferably approximately .5 millimeters in width. Zone
4 preferably extends outwardly from a radius of
approximately 2.5 millimeters to approximately 2.9
millimeters to approximately 8 millimeters. Thus, the
lens can be described as having a central sweet spot
15 (zone 1), two .5 millimeter intermediate zones (zones 2
and 3), and a distance zone (zone 4) extending outwardly
from the intermediate zones to the edge of the optical
portion of the contact lens (approximately 8 millimeters
radially outwards from the center). The total diameter
20 of the contact lens CL will be approximately 13 to
approximately 16 millimeters for a soft contact lens, so
that the carrier 50 will normally extend from
approximately 8 millimeters outwards to approximately
13.5 millimeters to approximately 15.0 millimeters, and
25 optimally 14.5 millimeters.

If this invention is practiced in connection
with a hard contact or RGP lens, the total diameter of
the contact lens CL would be between approximately 7.0
millimeters and approximately 11.0 millimeters, and
30 typically between approximately 8.0 millimeters and
approximately 10.5 millimeters, and optimally
approximately 9.5 millimeters.

Zone 1, the sweet spot, is preferably
spherical, although it can be aspherical. Zones 2, 3
35 and 4 are preferably aspherical in order to accommodate
transitions in corrective power across these zones.

1 Conventional contact lenses consist of a
carrier with a central lens portion. The central lens
portion is usually corrected for distance vision. This
is described in U.S. Patent 4, 119, 2312, Evans, which
5 is hereby incorporated by reference.

The present invention differs from conventional
multifocal contact lenses in that a small central
portion of the lens is overcorrected beyond the
correction that would be necessary for reading. This
10 central portion, the sweet spot or accommodation zone,
is small enough so that, surprisingly, it does not
impair distance vision when the user is looking at
distant objects, but it restores the ability to focus on
near objects within a substantial range of distances
15 from the wearer, such as, between 8 inches and 15
inches. It is believed that the transition zones
restore the ability to focus as follows: zone 2
restores the intermediate visual acuity between
approximately 15 inches and approximately 36 inches, and
20 zone 3 restores the intermediate visual acuity between
approximately 36 inches and full distance correction
(infinity).

In determining the appropriate curvatures for
the various zones in the contact lens CL, the correction
25 to restore distance vision must be determined first.
The distance power correction is then applied to zone 4.
The distance power correction is usually within a range
between +20.00 diopters to -20.00 diopters.

After the distance correction is determined,
30 the amount of correction for near vision ("add power")
should be calculated. A person with early to moderate
presbyopia would be prescribed a low additional reading
power of up to +1.75 diopters (referred to as a "low
add"). A moderate to advanced presbyope would require a
35 reading correction from 1.75 to 2.75 diopters (referred
to as a "high add").

1 For a high add presbyope, the aggregate change
in powers across the various zones is preferably
approximately 3.7 diopters. For a low add presbyope,
the aggregate change in powers across the various zones
5 is preferably approximately 2.6 diopters (approximately
70% of the total diopter shift for a high add).

The corrective power of the various zones
preferably does not remain constant within each zone.
Instead, for a high add presbyope, it is preferred that
10 there be as 1.6 diopter shift across zone 2, a 1.2
diopter shift across zone 3 and a .9 diopter shift
across zone 4, so that the total diopter shift across
zones 2, 3, and 4 is 3.7 diopters.

Because the sweet spot is so small, and because
15 it must be centered in the pupil in order for the
invention to function properly, the contact lens CL must
be precisely manufactured in order to be sure the sweet
spot is properly centered over the center of the pupil.
In order to accomplish this critical centering, it is
20 preferred to mark a 1.9 millimeter centered spot,
preferably white, on a pair of trial diagnostic contact
lenses. With such a pair of trial diagnostic contact
lenses, it is possible to detect whether a user's pupil
is off center (and other problems), so that the contact
25 lens of the present invention can be properly
manufactured to center the sweet spot over the pupil.

The inventor has discovered that an
overcorrected central portion of between approximately 1
to approximately 2.5 millimeters, and preferably
30 approximately 1.5 to approximately 1.9 millimeters
(optimally either 1.5 millimeters or 1.9 millimeters) in
diameter does not substantially impair distance vision
of a contact lens. Surprisingly, the inventor also has
discovered that overcorrecting the central portion
35 beyond the correction needed for near vision, restores
an unexpectedly large portion of the function of natural

1 accommodation of the eye so that focus can be achieved
over a range of near distances.

Although, other contact lenses are known with
central areas that are differently corrected than
5 distance portions, those central segments are either
larger than the present invention's "sweet spot," or
they do not overcorrect the sweet spot, or both.

It is preferred that the various zones have
constant widths even if the size of the sweet spot
10 differs. Thus, if the sweet spot is 1.9 millimeters in
diameter, the diameters of zones 2, 3, and 4 would all
be approximately .4 millimeters greater than the
corresponding diameters in a lens with a 1.5 millimeter
diameter sweet spot. It is also preferred that the
15 diopter shifts between zones 2, 3, and 4 remain constant
regardless of the size of the sweet spot for
mature presbyopes. Fig. 2 shows a contact lens
according to the present invention with a smaller sweet
spot.

20 For early presbyopia, the amounts of the
diopter shifts across zones 2, 3, and 4 are preferably
approximately 70% of the diopter shifts for mature
presbyopes. Thus, the preferred aggregate diopter shift
for early presbyopes is approximately 70% of the diopter
25 shifts for mature presbyopes. Thus, the aggregate
diopter shift across zones 2, 3, and 4 would be
approximately 2.6 diopters; the diopter shift across
zone 2 will be approximately 1.1 diopters; the diopter
shift across zone 3 would be approximately .8 diopters
30 and the diopter shift across zone 4 would be
approximately .6 diopters. Figs. 3 and 4 show contact
lenses for early presbyopes with large and small sweet
spots.

Although it is presently preferred to have
35 intermediate zone 2 and 3, it is not known whether the
presence of such zones is critical to the invention.
Further, it is not known whether the manner in which the

1 diopter shift is achieved by the aspheric shape of the
various zones is critical. At present, it is preferred
that the diopter shift take place at a constant radial
rate in each zone, so that there is a different constant
5 diopter shift rate in each of zones 2, 3, and 4.
However, it is also possible that the benefits of this
invention may be achievable by using varying diopter
shift rates within a zone, or to increase or decrease
the number of zones.

10 Further, it is not believed to be critical that
the diopter shifts be effected by shaping the contact
lens. For example, it is possible to achieve the
diopter shift by using material with differing indices
of refraction in various different portions of the lens.
15 Indeed, with appropriate control over the diffusion of
materials with different indices of refraction during
molding of contact lenses, it is possible that the
present invention could be practiced with a lens that is
spherical or that does not have differently formed lens
20 portions.

The sweet spot is preferably overcorrected
between 25% and approximately 100% stronger than the
prescribed reading correction requirement.

For example, for a high add, it would be
25 preferred that the sweet spot be from 3.5 to 5 diopters
more plus add power than the distance zone (zone 4),
between 3.5 to approximately 3.9 diopters being even
more preferred, and approximately 3.7 diopters being
optimal. For a low add, it would be preferred that the
30 sweet spot be from 2.0 to 3.5 diopters more plus add
power than the distance zone (zone 4), with between
approximately 2.4 and approximately 2.8 diopters being
more preferred, and optimally approximately 2.6
diopters.

35

1

EXAMPLE 1

A Microturn 9000 three axis radius lathe with aspheric surface cutting capabilities has been used to make contact lenses according to the present invention with base curves of 8.6 millimeters wet (6.6 millimeters dry). The lenses were manufactured dry from Ocufilecon B (a 53% water content material) and were hydrated afterwards. Therefore compensating calculations were made to achieve the appropriate hydrated parameters, such as base curve, radial expansion, linear expansion, power changes due to changes in index of refraction caused by hydration. When hydrating Ocufilecon B, the linear expansion parameter is approximately 1.35, the radial expansion parameter is approximately 1.30, and the power change parameter is approximately .57. The settings for the various radii of curvature in the various zones (for dry manufacturing using Ocufilecon B) are shown in the following cutting charts:

20

8.60 high add minus power

25

	Zone 1	2	3	4	DIA.	C.T.	DIST.
CENTER	1.10	1.50	1.90	6.00	DIA.	C.T.	DIST.
POWER	1.40	1.80	2.20	6.00	DIA.	C.T.	POWER
p1	6.73	6.98	7.17	7.30		.16	
-.25	6.77	7.02	7.21	7.35		.16	
-.50	6.83	7.06	7.25	7.40		.16	
-.75	6.86	7.11	7.29	7.46		.16	
-1.00	6.90	7.15	7.33	7.50		.16	
-1.25	6.93	7.18	7.37	7.53		.16	
-1.50	6.96	7.22	7.41	7.58		.16	
-1.75	7.00	7.25	7.45	7.62		.16	
-2.00	7.05	7.29	7.49	7.66		.15	
-2.25	7.09	7.33	7.53	7.70		.15	
-2.50	7.13	7.37	7.58	7.75		.15	
-2.75	7.17	7.41	4.62	7.79		.15	

1	-3.00	7.21	7.46	7.67	7.84	.14
	-3.25	7.24	7.51	7.71	7.89	.14
	-3.50	7.28	7.56	7.76	7.94	.14
	-3.75	7.31	7.60	7.80	7.99	.14
5	-4.00	7.35	7.65	7.85	8.04	.13
	-4.25	7.38	7.70	7.90	8.07	.13

8.60 high add plus power

10

		Zone 1	2	3	4	DIA.	C.T.	DIST.
	CENTER	1.10	1.50	1.90	6.00	DIA.	C.T.	DIST.
	POWER	1.40	1.80	2.20	6.00	DIA.	C.T.	POWER
	p1	6.73	6.98	7.17	7.30			.16
15	+.25	6.71	6.95	7.13	7.27			.17
	+.50	6.68	6.91	7.09	7.23			.17
	+.75	6.65	6.87	7.05	7.19			.17
	+1.00	6.62	6.84	7.02	7.16			.17
	+1.25	6.59	6.80	6.98	7.12			.17
20	+1.50	6.56	6.77	6.94	7.08			.17
	+1.75	6.52	6.73	6.90	7.04			.18
	+2.00	6.49	6.70	6.87	7.00			.18
	+2.25	6.46	6.66	6.83	6.96			.18
	+2.50	6.44	6.63	6.80	6.93			.18
25	+2.75	6.40	6.59	6.76	6.89			.18
	+3.00	6.37	6.56	6.72	6.85			.19
	+3.25	6.34	6.53	6.69	6.80			.19
	+3.50	6.31	6.50	6.66	6.75			.19
	+3.75	6.28	6.47	6.62	6.73			.20
30	+4.00	6.26	6.44	6.59	6.70			.20
	+4.25	6.23	6.41	6.56	6.67			.20

8.60 low add plus power

35

		Zone 1	2	3	4	DIA.	C.T.	DIST.
	CENTER	1.10	1.50	1.90	6.00	DIA.	C.T.	DIST.
	POWER	1.40	1.80	2.20	6.00	DIA.	C.T.	POWER

1	p1	6.73	6.93	7.06	7.17	.16
	+.25	6.70	6.89	7.02	7.13	.17
	+.50	6.67	6.85	6.98	7.10	.17
	+.75	6.63	6.82	6.93	7.06	.17
5	+1.00	6.60	6.79	6.89	7.02	.17
	+1.25	6.58	6.74	6.86	6.98	.17
	+1.50	6.56	6.70	6.84	6.95	.17
	+1.75	6.52	6.67	6.80	6.91	.17
	+2.00	6.49	6.64	6.77	6.87	.18
10	+2.25	6.46	6.61	6.73	6.83	.18
	+2.50	6.43	6.58	6.70	6.79	.18
	+2.75	6.40	6.55	6.66	6.75	.18
	+3.00	6.37	6.52	6.63	6.72	.19
	+3.25	6.34	6.48	6.60	6.68	.19
15	+3.50	6.31	6.45	6.57	6.65	.20
	+3.75	6.28	6.42	6.54	6.62	.20
	+4.00	6.26	6.39	6.51	6.59	.20
	+4.25	6.23	6.36	6.47	6.56	.20

20

8.60 low add minus power

		Zone 1	2	3	4			
	CENTER	1.10	1.50	1.90	6.00	DIA.	C.T.	DIST.
	POWER	1.40	1.80	2.20	6.00	DIA.	C.T.	POWER
25								
	p1	6.73	6.93	7.06	7.17			.16
	-.25	6.77	6.96	7.10	7.21			.16
	-.50	6.81	7.00	7.14	7.25			.16
	-.75	6.85	7.03	7.18	7.29			.16
30	-1.00	6.89	7.07	7.22	7.33			.16
	-1.25	6.93	7.11	7.25	7.37			.16
	-1.50	6.97	7.15	7.29	7.41			.16
	-1.75	7.01	7.19	7.33	7.45			.16
	-2.00	7.05	7.24	7.37	7.50			.15
35	-2.25	7.08	7.28	7.41	7.54			.15
	-2.50	7.12	7.32	7.46	7.58			.15
	-2.75	7.16	7.36	7.51	7.62			.15

1	-3.00	7.20	7.40	7.55	7.67	.14
	-3.25	7.23	7.44	7.59	7.71	.14
	-3.50	7.27	7.48	7.64	7.76	.14
	-3.75	7.31	7.52	7.68	7.80	.14
5	-4.00	7.35	7.57	7.73	7.85	.13
	-4.25	7.39	7.61	7.77	7.89	.13

It is preferred that the contact lenses conform to industry standards for inside radii, which for soft contact lenses are presently between 7.5 and 9.5 millimeters, and typically between 8.30 millimeters and 8.6 millimeters. For RGP and hard lenses, the industry standard inside radii are between 7.0 millimeters and 8.5 millimeters, and typically between 7.3 and 8.2 millimeters.

It is presently preferred that the contact lens of the present invention comprise conventional soft contact lens material, such as Ocufilecon B with 53% water content, because contact lenses have been successfully manufactured using this material. However, any conventional soft or rigid contact lens material may be used to practice the invention (as long as appropriate compensations are made for parameters that may change during hydration for soft contact lens material). The inventor believes that Benz 55G or Methafilcon A may be as good as, or better than, Ocufilecon B in the practice of the present invention, but no lenses according to the present invention have yet been made with these materials.

While the present invention has been disclosed in connection with the presently preferred embodiments described herein, it should be understood that there may be other embodiments which fall within the spirit and scope of the invention as defined by the claims. For example, this invention can be practiced with contact lenses that are made by any method now known or

1 hereafter invented, including (but not limited to)
molding, spin casting, or extruding. This invention
also can be applied to intraocular lens implants and
refractive surgical procedures (including radial
5 keratotomy, photo refractive keratotomy, and corneal
implantation) that reshape the cornea. Furthermore,
this invention can be practiced in combination with
spherical or astigmatic (toric) contact lenses. Toric
lens prescriptions comprise spherical power corrections,
10 usually between +20 and -20 diopters (commonly between
+8 and -8 diopters), and cylindrical power corrections,
usually between .5 diopters and 10 diopters (commonly
between 1 and 4 diopters). The present invention can be
practiced within this entire range of toric (astigmatic)
15 lens prescriptions. Accordingly, no limitations are to
be implied or inferred in this invention except as
specifically and explicitly set forth in the claims.

Industrial applicability. This invention can
be used whenever it is desired to provide a contact lens
20 that corrects for distance vision as well as near and
intermediate vision.

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35

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CLAIMS

What is claimed is:

1. A contact lens, comprising:

5 a circular central region overcorrected for near vision, wherein said central region is small enough to avoid impairing distance vision;

at least one ring shaped transition region extending radially outward from said central region;

10 a ring shaped outer region extending radially outward from said transition region corrected for distance vision; and

a ring shaped carrier region extending radially outward from said outer region;

15 wherein said transition region provides at least a partial diopter shift over said transition region between said overcorrection of said central region and said distance correction of said outer region.

2. A contact lens according to claim 1, wherein
20 said central region is between approximately 1 millimeter and approximately 2.5 millimeters in diameter.

3. A contact lens according to claim 2, wherein said central region is between approximately 1.5
25 millimeters and approximately 1.9 millimeters.

4. A contact lens according to claim 1, wherein said central region has a diameter of less than approximately 1.9 millimeters.

5. A contact lens according to claim 2, wherein
30 said central region has a diameter of approximately 1.5 millimeters.

6. A contact lens according to claim 2, wherein said central region has a diameter of approximately 1.9 millimeters.

35 7. A contact lens according to claim 1, wherein said central region is overcorrected for near vision by approximately 25% to approximately 100%.

1 8. A contact lens according to claim 1, wherein
said lens has at least a first transition region and a
second transition region.

5 9. A contact lens according to claim 8, wherein
said lens has two transition regions and each of said
transition regions is approximately .5 millimeters wide.

10 10. A contact lens according to claim 8, wherein
said transition regions are aspherical.

10 11. A contact lens according to claim 8, wherein
said transition regions are spherical.

15 12. A contact lens according to claim 8, wherein
said diopter shift across said first transition region
is at a first constant radial rate and said diopter
shift across said second transition region is at a
second constant radial rate.

20 13. A contact lens according to claim 8, wherein
said first transition region provides a diopter shift of
approximately 1.6 diopters, said second transition
region provides a diopter shift of approximately 1.2
diopters, and said outer region provides a diopter shift
of approximately .9 diopters.

25 14. A contact lens according to claim 8, wherein
said first transition region provides a diopter shift of
approximately 1.1 diopters, said second transition
region provides a diopter shift of approximately .8
diopters, and said outer region provides a diopter shift
of approximately .6 diopters.

30 15. A contact lens according to claim 1, wherein
said outer region has a diameter of approximately 8
millimeters.

16. A contact lens according to claim 1 wherein
optical correction of at least one of said regions is
provided by a material with differing indices of
refraction in different portions.

35 17. A contact lens according to claim 1, wherein
said lens is made from materials selected from the group
consisting of conventional soft lens material, rigid gas

1 permeable contact lens material, or hard contact lens material.

18. An intraocular implant, comprising:

5 a circular central region overcorrected for near vision, wherein said central region is small enough to avoid impairing distance vision;

at least one ring shaped transition region extending radially outward from said central region;

10 a ring shaped outer region extending radially outward from said transition region corrected for distance vision; and

a carrier region extending radially outward from said outer region;

15 wherein said transition region provides at least a partial diopter shift over said transition region between said overcorrection of said central region and said distance correction of said outer region.

19. A refractive surgical procedure, comprising: shaping a human cornea to provide:

20 a circular central region overcorrected for near vision, wherein said central region is small enough to avoid impairing distance vision;

at least one ring shaped transition region extending radially outward from said central region;

25 a ring shaped outer region extending radially outward from said transition region corrected for distance vision;

30 wherein said transition region provides at least a partial diopter shift over said transition region between said overcorrection of said central region and said distance correction of said outer region.

20. A contact lens having a pupil area, comprising: a central accommodation zone covering approximately

35 half of said pupil area overcorrected for near vision by between approximately 25% to approximately 100%;

1 at least one concentric transition region extending
radially outward from said accommodation region; and
 a concentric outer region extending radially outward
from said transition region corrected for distance
5 vision;

 wherein said transition region provides at least a
partial diopter shift over said transition region
between said overcorrection of said central
accommodation zone and said distance correction of said
10 outer region.

 21. A contact lens according to claim 20, having an
add power of between approximately 3.5 and approximately
3.9 diopters.

 22. A contact lens according to claim 20, having an
15 add power of approximately 3.7 diopters.

 23. A contact lens according to claim 20, having an
add power of between approximately 2 and approximately
3.5 diopters.

 24. A contact lens according to claim 20, having an
20 add power of between approximately 2.4 and 2.8 diopters.

 25. A contact lens according to claim 20, having an
add power of approximately 2.6 diopters.

 26. A process for aligning a central region of a
contact lens, comprising:
25 marking a centered spot on a diagnostic contact
lens; and

 detecting whether a user's pupils would be aligned
with said central region.

 27. A process according to claim 26, wherein said
30 spot has a diameter of approximately 1.9 millimeters.

