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Race, Markets, and Patents

Shubha Ghosh
Professor of Law
SMU Dedman School of Law

I. Introduction: Patent Law and Racial Categories as Instruments

Intellectual property rights, and particularly patent rights, have commonly been understood as providing economic incentives for creativity and invention. More sophisticated analyses of intellectual property suggest that intellectual property rights serve to shape the structure of markets and transactions in industries driven by innovation and technological development. But can intellectual property also shape culture and the way in which societies interpret and utilize cultural artifacts? Several scholars, including myself, have in recent years addressed these questions by exploring the role of intellectual property in social production and in distributing cultural and economic resources within a society and between the developed and developing worlds. Through their various research agendas, these scholars have attempted to expand our understanding of intellectual property by developing normative foundations for intellectual property beyond economic efficiency and growth. This article follows in the path of this line of scholarship by answering the following question: what should be the relationship between patent law and race?

Consideration of this broad question leads to two foundational questions. The first is: How does race enter into the largely technical and commercial details of patent law? The second is: To the extent that race does enter into patent law, should the treatment of racial categories be different in the context of intellectual property than in other areas such as voting rights, education, crime prevention, housing, or employment? My goal in this paper is to highlight how race has entered into and continues to play a role in patent law and to show how the use of racial categories demonstrates intellectual property's role in shaping and informing culture as well as markets. As a result, these two foundational questions will appear throughout the analysis presented in this paper. However, a preliminary discussion of these two basic questions will motivate my argument.

The media spotlighted the use of racial categories in patent law in 2005 when the Food and Drug Administration for the first time approved a pharmaceutical product for efficacy and safety within a specific racially defined group. The approval of BIDIL, medication for the treatment of hyptertension, solely for use in the African-American and Hispanic populations by the FDA came quickly upon the grant of a patent by the United States Patent and Trademark Office in 2002 for the chemical composition for use in treatment of "a black patient," as stated in the first claim. The racial focus of the claim was the basis for a lively discussion in the scholarly literature, and in the press, about the development of race specific pharmaceuticals in the emerging age of personalized medicine based on genetic identification of disease risks and treatment.

My exposition of racial categories in patent law requires an understanding of the difference between patent *claims* and patent *specifications*. Claims are the portion of the patent document that provides a legal description of the invention. This legal description provides the metes and bounds of the patent and the scope of what can be enforced in an infringement action. Specifications include the other portions of a patent, such as the written description and the abstract, which provide a description of the invention intended for the non-legal audience to read and understand the invention. The specifications must be written so that a person with ordinary skill in the field can read and practice the invention and therefore serve as a disclosure of what the patent owner has invented. While the claims provide the metes and bounds of the patent, the specifications serve as an interpretative aid to understand the language of the claims. For example, the claims for a patent on a method of dying one's hair may describe in broad terms the specific method that the inventor has uncovered. The specifications, by contrast, may law out the types of dyes that might be used, the types of hair to which the method might apply, and the previous inventions for dying hair on which the patent builds. In an infringement action, a court will start with the claims to determine whether the defendant has in fact used the patented method. If there is any ambiguity as to the language of the claims, the court will then turn to the specifications to provide an interpretative context to resolve the ambiguity.

As I demonstrate in Section Two, examples of race specific patent claims are rare, and while the case of BIDIL may be a harbinger of patents to come, the use of racial categories in patent claims is to this date unsual. But my research did uncover extensive use of racial categories in patent specifications for the development of products targeted to racially or ethnically defined markets. In other words, while racial categories have rarely been used to define the legal metes and bounds of a patent, they have served as background context to aid in interpreting the scope of a patented invention.

To illustrate the implication of race in patent law, I document in Section Two patents issued after World War Two that cover products for straightening (or dekinking or conking) one's hair, for skin depigmentation, and for games or toys commemorating Civil Rights leaders, among others, that explicitly or implicitly take race into consideration in the written description. This section also documents patents, which date from the early Nineteenth Century through the Jim Crow era, that make use of negative racial stereotypes as part of the invention. The most memorable, in my mind, is a patent for an arcade type game that included the caricature of a "negro stealing a chicken" as a target. Therefore, even the technical, seemingly dry area of patent law has not been immune from the use of racial categories as part of the implementation of the legal regime promoting economic incentives. These few examples support a broader point: to focus solely on patents as an incentive to invent ignores the broader social context in which invention occurs and patents operate. To ignore this context is to ignore the ways in which the jurisprudence of race and that of intellectual property connect.

While race certainly has not been absent from patent law, the intriguing question is what to make of its presence. At one level, the identification of racial categories in patents arguably reflects deep social hierarchies. If one accepts the proposition that invention is embedded in society, that the types of novel products inventors pursue reflect the social attitudes of the potentially buying public,

then it should not be surprising that we see "negroes stealing chickens" in the patent archive from the Nineteenth Century. Furthermore, if biomedical researchers and pharmaceutical companies currently see certain racial or ethnic groups as potential sources of economic rewards, or perhaps more altruistic as neglected by the medical profession, then racialized patents, like that for BIDIL, reflect a more benign recognition of changes in attitudes towards racial difference. But racial categories in patent law are not simply mirrors of social realities. Arguably, the use of racial categories in patent law may serve to create differences. If patents do crudely incentivize inventive activities or more subtly structure the market within which inventive activity occurs, then the use of racial categories in patent arguably creates racialized boundaries, perhaps not as invidious as WHITES ONLY signs on bathroom doors or drinking fountains, but at least as problematic. As I analyze in Sections Three and Four of this Article, racial categories in patent law force us to re-examine the color blind and accomodationist theories of race in order to assess the normative underpinnings of both patent law and the use of racial categories.

As an example of this normative quandary consider the patent for the chemical composition that constitutes BIDIL. The claim restricts use of the composition for treatment of hypertension in "black patients." Suppose a medical practitioner administers the composition to a patient without the authorization of Nitromed, the company to whom the patent is assigned. If the medical practitioner is sued for patent infringement, the court will have to determine whether the patient who received the drug was black. If the patient is black, then there has been infringement of the patent. If the patient is not black, then Nitromed would argue that the racial identity of the patient is equivalent to "black" in order to succeed on its legal claim for patent infringement under the doctrine of equivalents. In this hypothetical law suit, the court would have to construe the racial identity of the patient in order to determine patent infringement much as courts had to construe the racial identity of defendants to see if there had been a violation of the myriad restrictions on activity under Jim Crow laws.

But the analogy to the Jim Crows laws is in many ways a misguided one in the context of determining the infringement of a race specific patent claim. Under Jim Crow laws, legal entitlements were allocated based on the race with the intention of stigmatizing members of the designated inferior race. In the BIDIL context, there is no intention to stigmatize. Instead, the goal is to provide incentives for the development of pharmaceutical products that benefit neglected racial or ethnic groups. While it is true that a court, in enforcing Nitromed's patent, can enjoin unauthorized users from administering the drug to a black patient but cannot enjoin the administration of the same drug to a non-black patient, the distinction is arguably not based on invidious discrimination. Instead, the analogy is more closely made to the review of affirmative action programs, which deny certain benefits to particular races in favor of others. As with affirmative action programs, the legality of racial categories in patent claims may rest on a compelling state interest, analogous to the diversity rationale recognized in the Grutter decision.

Categorization of racial categories as either stigmatizing or beneficial is only one of many potential problems raised by racial categories in patents. The infringement example assumed that the granting of the injunction by the court based on consideration of race constituted state action. The implicit assumption is that the patent infringement case involving a racially specific claim would be analogous to the enforcement of a racially restricted covenant as in Shelley v. Kramer or the

allowance of peremptory challenges based on race as in Batson v. State of Kentucky. Patent rights, like contractual rights, are private rights, and therefore the superficial conclusion would be that state action does not arise. But in the infringement example, the court is seeking to exclude a party based on the consideration of race analogous to the injunction of sale of real property or to the exclusion of a juror based on race. The black patient is in the same position as an African-American purchaser of real property in Shelley or the potential African-American juror being stricken from the pool. In all three instances, the court is complicit in the act of private party seeking to deny a benefit based on race. Therefore, despite the status of a patent as private property, the existence of state action is not tenuous.

However, the existence of state action in the recognition of racial categories in patent law can readily be seen once patents are recognized as private property rights granted by the state. In the case of BIDIL, a patent examiner, an agent of the state, reviewed the patent application and the available prior art to determine that the use of the chemical compound as limited to black patients is a protected right owned by the patent applicant and secured by the state. Race, therefore, was a factor in the determination by the state to grant the right of exclusion secured through patent law. In this context, however, the consideration of race is different from the use of racial categories in affirmative action programs, in the grant of voting rights, or in the selection of employees, where the racial identity of persons is key to the decision. In the case of BIDIL, the racial identity of the patent applicant or inventor is irrelevant to the decision. Instead, the state is making the decision to grant a right to a specific individual in order to benefit a racially identified group.

This description of the state action applies as well to the use of racial categories in the hair straightening and skin depigmentation patents, where race enters in the specification, but not the claims. When state action is understood in this way, there are three possible responses. One is to conclude that this use of racial categories is different from the stigmatizing uses that arise in conventional racially discriminatory state action because the state is not directly targeting certain groups and therefore is not problematic. The second is to conclude that the state is internalizing and reinforcing private animus and discriminatory attitudes and therefore the state action is suspect. The third is to conclude that the state's consideration of race can be beneficial if it corrects differences that have been created through the use of racial categories. This third approach is the most problematic because it suggests that there are certain uses of racial categories that may be beneficial, creating the difficult task of distinguishing between beneficial and harmful uses of racial categories. As I illustrate in Section Three, distinguishing among these positions requires coordinating the normative goals of patent law with those of the use of racial categories by the state. These various positions can be understood within the extremes of color blind and accommodationist positions, presented in Section Four of this Article.

To summarize, intellectual property is often described as a system of incentives to promote progress through innovation and creativity. This basic proposition has been challenged and extended in many ways. Some argue that intellectual property is better understood as a means of distributing and disseminating creative works rather than creating them. Others argue that intellectual property serves a cultural or semiotic function to affirm cultural and social values in the marketplace. Even others argue that intellectual property serves to distribute resources and share the surplus in markets

among creators, users, and intermediaries. One element common to these normative positions is the instrumental role of intellectual property. Intellectual property law serves to meet certain social goals, rather than affirm and validate natural rights. The challenge to the intellectual property system is the definition of those goals. Understanding intellectual property in instrumental terms helps in the analysis of the use of racial categories. When racial categories appear in patent documents, they are markers for the social context that gives rise to inventions. Validating racial categories in patents may validate racist or racialist social practices. They may also represent the realities of a diverse, culturally rich, and racially defined marketplace. The challenge is to construct a theory of racial categories that helps to justify the instrumental uses of intellectual property. These issues have been explored in the areas of trademark and copyright. The issue of racially insensitive mascots and brands raises questions about the goals of trademark law. The issue of derivative works and copying in cultural forms that are based on reference and appropriation of pre-existing cultural forms raises questions about the goals of copyright law. This Article explores issues of culture and race in the field of patent law to add to the rich literature on culture in the law of copyright and trademark.

The organization of this Article is as follows. Section Two documents the use of racial categories in patent law. Sections Three and Four present the normative heart of the paper, by juxtaposing the normative claims of patent law with the normative purposes of racial categories. Section Three explores the tension between the normative claims of patent law and race. Section Four reconciles this tension by consideration of the twin theories of color blindness and racial accommodationism. Section Five explores the implications of this argument for the role of intellectual property in shaping culture and values beyond economic efficiency and growth and concludes.

II. Negroes Stealing Chickens, Civil Rights Leaders, and Black Patients: A Catalogue of Racial Categories in United States Patents from 1842 to 2006

This Article will focus on the racial categories of African-American and Negro. I chose these two categories because of the recognized and appreciated cultural understanding associated with these two classifications. I have done a cursory look at other categories such as Asian-American, Asian, Oriental, Hispanic, and Hispanic-American. The set of patents I uncovered utilizing the categories African-American and Negro were quite a bit richer for the purpose of my discussion here.

I performed the searches in late November and early December of 2006. The search of "African-American" in either the specifications or the claims resulted in 489 patents with the most recent in November 2006 and dating back to July 1989. The search term "Negro" in either the specifications or claims resulted in over 700 patents with the most recent in July 2006 and the earliest in April 1842. I divided these patents into six categories: (1) patents involving epidemiological data from the African-American population; (2) patents involving hair usually making reference to "Negro hair"; (3) patents involving skin color; (4) patents involving toys; (5) patents involving methods of sorting identities and names; (6) miscellaneous. Here are some general observations on each of these categories. The tables at the end of the Article summarizes

the patents found in categories two through six, with further discussion below.

1. Epidemiological data. This category is the largest containing over 500 patents from the period 1989 to 2006. These patents were in the biomedical or pharmaceutical field, and the specifications were reporting medical studies considering the efficacy of drugs or medical therapies in various communities. Since there were so many patents in this category, I do not present the details of the individual patents in tabular form. Other authors have discussed these patents in greater detail, and I refer the interested reader to their work, cited here. I will, however, discuss a few of these patents as illustration of how racial categories arise in this context.

Two patents illustrate how racial categories are used in the specifications of patents involving pharmaceuticals or medical therapies. In the patent for "Mammalian Selenoprotein Differentially Expressed in Tumor Cells," the abstract describes the invention as for "a 15 kDA selenium-containing protein." The abstract continues to state that "[t]here is a correlation between the presence of a polymorphism at nucleotide positions 811 and 1125 of the 15 kDa selenoprotein gene, and the presence of cancer. This polymorphism is more prevalent in the African-American population." The written description cites some of the scientific literature and studies that document the prevalence of this polymorphism.

The purpose of emphasizing the prevalence within the African-American population is to demonstrate the importance of this invention, a factor that could be relevant to the patentability requirements of utility, novelty, and nonobviousness. To meet the utility requirement, the applicant must show that the invention has applications and solves some practical problem. The reference to the prevalence of the polymorphism in the African-American population aids in demonstrating the practical application of the invention to aid in identifying the existence of a protein associated with certain types of cancers in a designated population. In addition, illustrating the application of the method to the African-American population indicates a problem that was identified in the scientific literature to which this invention would apply. The use of this invention to identify a prevalent polymorphism aids in distinguishing this invention from other identified proteins. Finally, to the extent that this invention is novel, the applicability to a specific population would aid in the argument that the invention is nonobvious based on resolving a previously unmet need or segment of the population, under the secondary considerations articulated by the Supreme Court in *Graham v. Deere*.

The second example of a patent whose specification includes a racial category is one for "Method of Diagnosing and Monitoring Malignant Breast Carcinomas." The method entails identifying certain biomarkers for breast cancer in the saliva of women. The written description provides several examples of clinical trails using the method to identify its efficacy in diagnosing breast cancer. In one of the examples, the applicant discusses demographic and supplemental data obtained from the patients who were part of the clinical trials. As stated in the description, "[t]here were significant differences in race, tobacco use, and menopausal status among the [subjects of the trials]. More African-Americans experienced carcinoma of the breast and benign

tumor lesions than Caucasians." The last sentence is the sole reference to a racial category in the patent.

Racial categories serve different purposes in these two patents. In the Selenoprotein patent, the racial category is used to relevance of the invention to the particular group. The importance of the invention supports the patentability of the invention in identifying the utility, novelty, and nonobviousness of the identified compound. The racial category serves a purely descriptive purpose in the patent for the diagnosing breast cancer. The applicant does not use the differential effects in the two populations as a basis for establishing patentability. Instead, the category is used to summarize one of the clinical trials and to describe the demographic composition of the sample studied. No argument is made to highlight special benefits that might arise for previously underserved or understudied groups. These two patents together illustrate two different ways in which racial categories arise in patent law within the specifications. Racial categories in patent specifications for pharmaceutical or biomedical inventions serve either to support arguments for patentability or to describe background racial characteristics of members of clinical or epidemiological studies.

A third patent is the one for BIDIL, discussed in the introduction. There are two patents on the chemical composition for BIDIL, one issued in 2002 with 54 claims and one in 2004 with 84 claims. The race specific claims are the same for the two patents, and therefore by the rules against double patenting, the claims in the patent issued in 2002 would be effective. The abstracts for both patents use identical language in describing the composition: "The present invention provides methods or [sic] treating and preventing mortality associated with heart failure in an African American patient with hypertension and improving oxygen consumption, quality of life and exercise tolerance by administering a therapeutically effective amount of at least one is isorbinate dinitrate and isorbinate mononitrate." The first claim echoes this race specific aspect of the invention through the following language: "A method of reducing mortality associated with heart failure in a black patient in need thereof comprising administering to the black patient hydralizine ... in an amount about 30 milligrams per day to about 300 milligrams per day and isosorbinate dinitrate in an amount of about 20 milligrams per day to about 200 milligrams per day."

A challenging question is why the claim is limited to a "black patient." The written description presents the clinical trials administered to test the efficacy and the safety of the chemical composition. According to the description, "the placebo group mortality ... did not differ between white and black patients....The inventors unexpectedly discovered that black patients exhibited a significant survival benefit...from treatment with the combination of hydralazine and isosorbide dinitrate." The inventors speculate on why there is this observed difference in response between black and white patients. They cite literature showing the black patients are less responsive to ACE inhibitors than white patients and this difference in turn reflects a less active renin-angiotensin system among black patients. Although the inventors could not identify the source of the difference, the statistical difference uncovered in the clinical trials was the basis for the racially limited claim.

The racial limitations reflect another important dimension to the development of the invention. Both the 2002 and the 2004 patents cite a 1989 patent issued to one of the inventors for a "Method of Reducing Mortality Associated with Congestive Heart Failure Using Hydralizine and Isosorbide Dinitrate." The patent expired in 2003. It is instructive to read the first claim of the 1989 patent and compare it with the more recent ones: "A method of reducing the incidence of mortality associated with chronic congestive heart failure in a patient with impaired cardiac function and concomitant reduced exercise tolerance, comprising the oral administration to said patient in need of the same of a combination of (a) between about 75 and about 300 milligrams of hydralazine, or a pharmaceutically acceptable acid addition salt thereof, per day, and (b) between about 40 and about 160 milligrams of isosorbide dinitrate, per day." The two obvious differences between the 1989 claim and the 2002/2004 claim are the differences in dosages and the absence of any racial limitations. A consideration of these two differences illustrate three points about the role of racial categories in patent law.

The first point is that the 1989 patent would allow the patent owner to prevent uses of the chemical composition on any patient, without regard to race or other characteristic. Perhaps the broad applicability of the invention reflects an assumption that a pharmaceutical invention, or more broadly any invention, can be used by all members of the population absent some evidence, such as the clinical trials documents in the 2002/2004 written descriptions, that the invention empirically is suitable for only one group. Whether this assertion is true, I will argue in the next section, rests on the normative foundations of patent law. But if it is true, the conclusion suggests a baseline rule of race neutrality in patent law with the inventor being permitted to draw racial lines if there is some empirical basis to support the limitation. Since the inventor could not explain the racial disparity in the 2002/2004 patent, the racial limitation arguably need not be explained and can be supported by statistical disparities.

The second point is the role of race specific studies in support of the claimed invention. It is telling that the 1989 written description does not disclose any racial disparities or racial differentiation in clinical trials while the 2002/2004 trials do. This difference may reflect a heightened sensitivity to racial differences in the incidence and treatment of diseases that has arisen in the thirteen year period. While the National Institute of Health did implement guidelines for race specific clinical trials and funding incentives for research in previously underserved populations and diseases in the Nineties, these incentives may have been less important for private, commercial researchers working for industry, such as the inventors of the chemical composition in the BIDIL patent. A more likely explanation is that the inventors were seeking to find some additional commercial exploitation of the invention and discovered the strategy of targeting the invention to a racially defined market. Hence, the clinical trials demonstrated how the chemical composition could be tailored to a racial enclave of the market based on differential efficacy.

Building on the ways in which race seemingly entered into the experimentation on and marketing of a chemical composition, I turn to the third, and most crucial, point that follows from a comparison of the two patents. The second invention builds on the first invention by identification of a different dosage levels and of different efficacy for a racially defined group.

The question is why these two together, or separately, would be sufficient to warrant a second patent on the chemical composition. By itself, discovering a different dosage level of a chemical compound would be enough to satisfy the utility, novelty, and nonobviousness requirements of patentability, assuming that this new dosage level was sufficiently distinguishable from what was in the prior art. The racial limitation, however, is more problematic. If the inventor in fact discovered a new or different chemical composition that worked solely for a discrete group, there may be an argument that she has found something new and nonobvious in light of the prior art. The problem is determining why this distinction occurs as an empirical matter in a way that would warrant generalization from a few clinical trials. Here, the inventor would run across the problem of induction. He may have been able to show that the chemical composition was found not to work on some groups in some cases, but does that warrant a claim, both logical or in the patent sense, for the use of the exclusive use of the chemical composition in all cases?

Even if the logical gap could be resolved, there is still the question of whether modifying an invention for a specifically defined group meets the nonobviousness requirement. The United States Supreme Court in its recent decision in KSR v. Teleflex acknowledged that common sense of the person having ordinary skill in the art can serve to distinguish obvious from nonobvious inventions. Would racially tailoring an invention pass this new test? Assume for the sake of argument that the sealed crustless sandwich patent is a valid one. Assume next that an inventor creates a sealed crustless sandwich that includes a spicy mix of peas and potatoes that in some parts of India is called a kachori. Does this modification of the general invention to the specific, ethnically tailored product meet the nonobviousness inquiry? The answer may rest on the ethnic identity, background and experience of the person having ordinary skill in the art. Whether such elements of identity are relevant to the patentability inquiry rests on how we understand the normative foundations of patent law and the use of racial categories, the focus of Section Three.

In summary, this subsection has documented the patents in the pharmaceutical and epidemiological areas that make use of racial categories. This set of patents have been the subject of extensive commentary. Here I present some commentary on the underlying normative questions raised by the use of racial categories in these patents. While I agree with much of the existing literature on racial categories in patents from the biosciences, my goal in this Article is to address the use of racial categories in patent law more broadly. With that goal in mind, I turn next to a discussion of racial categories in five other areas of invention.

2. Patents involving hair. There were 70 patents in this category, ranging from the period 1904 to 2006. The inventions covered by these patents included combs, pins, methods for straightening hair, treatments for dermatitis and pseudofolliculitis barbae, and methods for hair styling and coloring. The most recent patent, in July 2006, was for a "Braid Removal Device." It is interesting to trace the dates of these patents. The first was in 1904. The next was in 1922. A breakdown by decades is as follows: 1920's: 3; 1930's: 0; 1940's: 2; 1950's: 3; 1960's: 3; 1970's: 5; 1980's: 7; 1990's: 18; after 2000: 28. As is well documented, there has been an active market for products designed to limit traditional African-American features, and these products were

directed to facilitating passing. The patents from the 1950's to the 1970's are consistent with that market. The patents after the 1970's cover a range of medical and cosmetic issues involving hair.

The first hair straightening patent that makes reference to a racial category is the 1904 patent issued to Gael Miller. The patent claimed a combination of a comb and a heating device, which allowed the comb to be heated and remove waves from hair. The claims were for the resulting product and did not cover a method for straightening hair that would be limited to a particular racial or ethnic group. However, the specifications did make use of racial categories:

> It is a well-known fact that persons of the black or negro race generally and quite a large number of persons outside of this race, some even of the white race, have hair which curls so tightly or closely that it cannot be combed into the desired form or parted by any ordinary means or treatment.
>
> By my invention I provide a simple device by the use of which this intensely curly hair may be quickly and easily straightened more or less, and thereby put into condition so that it may be combed and parted. By the use of the said device the hair will not usually be entirely straightened, nor is such a result desired, it being preferred rather simply to remove the intense curl from the hair, so that it may be easily controlled, but leaving the same with a wavy appearance.

The description recognizes that the patented product could be useful for members of the white race as well as those of the "black or negro race." Despite this emphasis on broad applicability, the language of the written description suggests that the product was targeted towards the African-American community. The 1922 patent for a specially designed comb for the purpose of straightening hair was more obvious of the targeted group. The specifications for this comb patent stated: "My invention has for its object to provide a simple and efficient device for combing and straightening the hair of persons of the Negro race and especially designed for women s hair." The two 1926 patents also specifically state that the inventions were designed for use by members of the Negro race, without placing any specific racial limitations in the claims.

To the extent that the passage of the Civil Rights Act of 1964 marks a watershed in consciousness of the stigmatizing and offensive use of racial categories, the uses of racial categories in the hair straightening patents reflect these changing attitudes only gradually. The seven patents on hair related inventions issued on or before 1964 consistently make reference to the Negro race as having particularly kinky or curly hair, creating a close association between the attributes of hair and membership of the group. The written description of one of these seven patents in fact makes reference to the hair of the Negro and Semitic people. The association between hair and race continues to be emphasized in the 1968 patent for a method of dyeing human hair which allowed the chemical composition of the dye to be stored more effectively as well as applied for a longer duration. The written description singles out an experiment on the hair of an "elderly Negro" on whom the dye worked as intended. Two points are striking about the 1968 patent. The first is the general applicability of the invention beyond the needs of any one particular racial group. The second is the use of the racial category as a specific example of the

efficacy of the invention. Whether the choice of Negro hair was conscious or accidental, the use of racial category serves to support the universal applicability of the invention. The inventor through the written description, by pointing out the example of the Negro hair, is emphasizing that the invention works on all types of hair, not just the straight hair that may be the default assumption of someone evaluating the invention for patentability.

The universality of the patented invention becomes an important feature of many of the hair related inventions following the passage of the Civil Rights Act. But the trend towards targeting inventions towards a particular group also continued. For example, the 1975 patent for a "Method and Apparatus for Doing Afro Hairdos" makes specific references to particular type of hairstyle, "most often worn by persons who are of the Black or Negro races, or their descendants, and whose hair naturally has a high degree of curl in it. " But the written description also emphasizes that "this invention is not limited to use by Black persons as it has equal applicability to any other person who may wish to wear their hair in the so-called Afro style." By contrast, the 1982 and 1983 patents for "Hair Straightening Process and Curling Process and Composition" specifically mentions the problems of previous hair straightening processes to straighten the unstraight hair of the Negro race and proposes a solution that is less abrasive and harmful to the scalps. The examples discussed in the written description emphasize experiments of the new process on the hair of Negro subjects. In this case, the inventor recognizes that the hair straightening process is most likely to be used by a person who is African-American and therefore attempts to establish its efficacy with respect to that group.

Racial categories mediate between the universal and the particular in patent law. No inventor limited the claims for hair-related invention to a specific race showing that inventors, or their attorneys drafting the claims, recognized the applicability of the invention across individual consumers, despite their individual racial or ethnic affinity. At the same time, racial categories did play a role in the specifications for two distinct reasons. In some cases, the racial category indicated that the invention was targeted towards a particular sub-class of consumers as the likely beneficiary of the inventions. In other cases, the racial category serves as evidence that the invention works across groups and that the inventor had tested the product or process beyond a narrow group. Racial categories seems to provide context for the invention, demonstrating that the new product or process would have a demand in the marketplace and that this demand would exist beyond certain enclaves of the population.

What is striking is that racial categories seem to continue in this mediating function after the 1980's and in many ways racial categories became even more salient for patenting since 1990. Of course, dividing patents by decades is artificial and may not be the best way to reflect changing social attitudes and historical changes. But the decade breakdown is quite striking in showing the continuing viability of racial categories. Patenting for hair related inventions increased sharply from 1990 to 2006 as compared to the period from 1900 to 1989. I counted 46 hair related patents from 1990 to 2006 in which the racial category of African-American, Negro, or black was used. This is nearly double the 27 hair related patents utilizing one of these three racial categories from 1900-1989. This increase reflects the general increase in patenting that has occurred over the past two decades. The increase may also reflect the lowering of patentability standards that

some scholars have argued occurred with the lowering of the standard for nonobviousness by the Federal Circuit. To the extent that patentability also stimulates or reflects increases innovative activity, the increase in patents may reflect an expansion of inventions stemming from a more prosperous legal and economic environment. Whatever the explanation for the increase in patenting, one clear trend is that the use of racial categories did not abate.

The function served by racial categories, however, does seem to change even though as a general matter racial categories continued to serve their mediating function. For example, many patents for hair relaxers, hair straighteners, hair loss treatment, and hair maintenance are intended for the wide market with the racial categories mentioned as specific examples of the universality of the product. A striking example of this use of racial categories is provided by a patent for an "Adjustable Hand-Held Shower Apparatus," in which the inventor states in the written description: "Damaged hair due to chemical treatments is a problem for many women, especially for African-American women whose hair is inherently delicate and prone to breakage." Putting aside the truth of this statement, the interesting question is why mention this. The reference to the hair of African-American women emphasizes the universal applicability of the invention and its benefits across racially-defined markets.

However, certain inventions are targeted for the needs of the racially delineated group. For example, several patents are for the treatment of pseudofolliculitis barbae, a skin condition resulting from ingrown hair follicles that is particularly prevalent among African-American males. These patents are specifically targeted to address a condition, and a market need, that had been previously ignored or underserved. Patents for certain types of razors and scissors to deal with the problems of ingrown hair follicles and sensitive skin conditions among the African-American population also reflect this targeting of inventive activity.

The 2006 patent for a "Braid removal device" offers a final example of how racial categories mediate the boundaries of racially defined markets. The patent is for an invention that allows removal of braids from human hair in an expedited fashion with minimal damage. The written specification states

> African-Americans genetically have hair that resists the formation of longer lengths. Still, these longer length styles can enhance the appearance. Accordingly, it is common for African-American people to attach braids to their own natural hair.
>
> These braids are formed of either natural hair (from any source) or they are formed of a synthetic material and are attached to the African-American's hair by weaving a length of the person's natural hair into an end of the braid, which is then suspended from the natural hair. Several strands of natural hair are used to secure each braid.

Despite this emphasis on the genetic inclinations of African-American hair, the inventor clarifies that

> In use, a braid is cut at a location that is below where a person's natural hair ends using the cutting device 30. The natural hair was previously woven into the braid so as to secure it (the braid) in position. This is well known in the art of adding braids to people's hair. It is especially common among African-Americans, but can of course be used with people of any race or ethnic background.

The inventor uses the example of African-Americans to delineate the purpose and function of the invention, but is also very quick to emphasize the universal applicability. Given the asserted universal applicability, the interesting question is why mention the racial category at all. The answer seems to be that the racial category helps to delineate the particular market that the invention serves while also illustrating how the invention can be universalized beyond the racial enclave. Racial categories serve to advertise the market for the invention while avoiding any narrowing of the claims to particular uses or markets.

As in the case of biomedical and pharmaceutical patents, racial categories in hair related patents serve to support the patentability of the invention by demonstrating the utility and potential nonobviousness of the invention in meeting an unmet need in the marketplace. But the use of racial categories serve to mediate the particular impetus for the invention with its potentially universal marketability. The hair related patents reflect once again the ways in which background social factors like race can affect the process of inventorship and of patenting. A similar pattern can be observed in the four remaining categories of patents: those involving skin color, those for toys, those for profiling, and the miscellaneous category.

3. Patents involving skin color. There were 25 patents in this category, ranging from the period 1941 to 2004. The inventions covered by these patents included methods for correcting skin color in photographs and color television, methods for curing keloid scars and types of after shave and skin gels particularly suitable to “Negro” or “African American” skin. The breakdown by decade is as follows: 1940'a: 1; 1950's: 0; 1960's: 1; 1970's: 3; 1980's: 4; 1990's: 5; 2000's: 11.

Since race consciousness has focused consistently on skin color as both the basis for stigmatization and for affirmation, the reference to Negro or African-American skin color provides insights in how racial categories are used in patent law. As with hair, skin color serves often as a descriptive marker to identify potential beneficiaries of the invention. This descriptive use of a racial category aids in both particularizing the invention, defining a specific market enclave to be served by the invention, and universalizing the invention, demonstrating how the invention does not serve only the majority racial group in the market. This latter use is arguably more recent, consistent with the change in attitudes arising from the Civil Rights Era. What is interesting is to gauge the stigmatizing uses of the racial category. The patent documents do not explicitly invoke stigmatizing or stereotypical uses of racial categories, as, for example, we will see in the toy patents in the next subsection.

However, many of the inventions implicitly suggest the stigma resulting from racial categories. A striking example of this implicit stigma is provided by the 1974 patent for "Skin Depigmentation," which shocked me when I first discovered it for two reasons. First, the invention invoked the history of passing and the necessity of passing through blanching one's skin for the purposes of assimilation and avoidance of discrimination. Second, the patent was issued in 1974, almost ten years after the passage of the Civil Rights Act and twenty years after Brown v Board of Education, providing stark evidence that the need for skin depigmentation perhaps had not abated after the changes in race consciousness. Upon closer inspection of the patent, however, I discovered that the written description, while making use of a racial category, emphasized the biomedical uses of the invention to aid those who had suffered from certain debilitating skin disease. The 1974 patent, as well as the other patents in this category, illustrates the complicated consciousness over skin color and the resulting ambiguity in interpreting both the use of racial categories and of inventions. The specific examples I discuss in this subsection highlight the multiple ways in which race and patent law intersect.

The 1941 patent for an "Apparatus for comparing, matching, or detecting colors" is the most striking of this group of patents for illustrating the complex attitudes towards skin color existing at the time and continuing onto the present day. The inventor's written description paints a broad scope for the invention:

> This invention relates to an apparatus for comparing, matching or determining colors, such as human skin colors, paint colors, dye and fabric colors, and all other colors, for the purpose of identifying an unknown color or color shade of a 5 general color, or comparing one color or shade of a color with another for the purpose of determining and recording the specific shade or color classification of any particular color shade with relation to a standard or established color scale or an arbitrarily prescribed scale.

The apparatus allows for the side by side comparison of a given color with a template that allows for the matching and categorizing of a particular color shade. Descendants of this device can be seen in hardware stores in order to identify particular colors of paint to match existing samples.

Fans of the novelist Ralph Ellison, however, will appreciate the juxtaposition of human skin color with paint and fabric colors. In Ellison's novel Invisible Man, published about twelve years after the grant of this patent, the eponymous hero works in a paint factory where the whiteness of the colors used to decorate the national memorials in Washington, D.C. function as a metaphor for racial homogeneity and the fear of blackness and difference that haunt the novel. The written description, however, shifts quickly from the casual linking of human skin color to paint color towards a more ominous turn in the following paragraph:

> The invention provides an apparatus designed and adapted for general uses of the character described, but which is particularly designed and adapted, in the exemplified form shown, for the purpose of determining and indicating the skin colors of human beings so as to furnish a valuable and important aid to police

> authorities in the detection, apprehension and conviction of persons guilty of criminal offenses, or, conversely, showing the innocence of persons charged with such offenses.

The invention could easily have been included in the discussion below of patents having to do with sorting identities and names since it serves as a tool for racial profiling and identification. But I discuss it under this category because of the blunt discussion of skin color and race, as indicated in the following discussion of how the invention can aid in the organization of police records:

> Such records are generally defective, however, in merely specifying the general color of the individual as "black," or "white," for example, which gives no exact information as to the color of the individual s skin. A black man, or individual of the colored race, for example, may be of any color ranging from a light brown to a deep black. Furthermore, an individual classed as belonging to the colored race may have a skin color as white as some individuals among those classed as white, so that his color designation from a racial standpoint is not an aid toward identification. Similarly individuals of the white, yellow, brown and other races vary in skin color, so that the general identification data of the character commonly employed with respect to race and race color, does not give satisfactory information hi this respect.
>
> My invention provides an apparatus and system of Identification which overcomes this objection and by means of which the exact color or color shade of the skin of any individual may be determined and a record thereof made, thus giving accurate information of a valuable sort for use in apprehending and convicting persons guilty of offenses against the law or proving the innocence of persons taken upon suspicion or unjustly charged with such offenses.
>
> My invention also provides an apparatus which may also be used by manufacturers, military, naval and immigration authorities and others in comparing, determining and recording colors, as hereinbefore set forth and as hereinafter more fully described.

The written description has been quoted in full to provide the general flavor of this particular patent and to emphasize how it reflects striking attitudes towards skin color as a marker for race and tool for law enforcement. Some of these attitudes continue to be demonstrated in the patents for sorting identities of individuals, discussed below.

The equivalence between human skin color and the color of paints and dyes used on manufactures and textiles has a parallel in the contemporary discussion over trademark protection for colors as a form of trade dress. In that context, color serves as marker that cannot be inherently distinctive but can gain distinction through association or the creation of secondary meaning. This discussion in trademark is paralleled in the patent area by the recognition that

human skin color may also be as artificial or arbitrary as the paint applied to a commodity. But the inventor of the 1941 patent demonstrates some degree of ambiguity to the artifice of human color. The concern with "exact information" on color and the close connection drawn between one's color status and membership in the "colored race" suggests that the inventor views human skin color as in some ways essentializing, as fundamental and immutable to the identity of the person being sorted and categorized. Therefore, the skin color patents demonstrate an ambiguity in thinking, perhaps even a confusion, between color as artifice and color as essence. Modern trademark law resolves that confusion in the context of colored commodities in favor of artifice by rejecting inherent distinctiveness for colors. The ambiguity, however, continues in patent law as illustrated by three subset of skin color patents: (1) skin color and appearance, (2) skin color as a marker for medical processes, and (3) skin color as condition requiring treatment.

Several patents make reference to skin color as a dimension of appearance which the inventor recognizes in the construction of the invention. For example, there are several patents involving color photography in which the attributes of the photographic process or the new type of film include the ability to accurately represent flesh tones, specifically the skin color of African-Americans or Asian-Americans. These inventions are touted as allowing the user to more accurately capture natural skin colors. Unlike the apparatus described in the 1941 patent, these inventions treat skin color as a cosmetic condition which provides a basis for defining the usefulness and value of the invention. Other examples of these cosmetic patents includes patents for different types of cosmetic compositions and products such as for after shave and skin care creams. Skin color for these inventions indicates a cosmetic surface difference which the particular inventor recognizes and incorporates into the design and purpose of the invention.

A second set of inventions recognizes skin color as an aspect of appearance but treats color as a marker for identifying certain users of the product, much like racial categories are used in the biomedical patents discussed above. For example, a 1988 patent for "Devices and methods for treating memory impairment," a continuation of a 1987 patent, describes a treatment for memory loss that involves application of a pharmaceutical composition to human skin. In describing clinical trials, the inventor notes in the written description that "[t]here does not appear to be any difference in rate between Caucasian and Negro skin at pH values of 8 and 9. However, differences were observed between these two skin types in experiments at lower pH values." Here, skin type serves as a descriptive marker to help identify the efficacy of the invention much like self-identified ethnicity is used in the area of pharmaceutical invention.

While the cosmetic patents and the biomedical patents support an understanding of skin color as appearance, patents dealing with treatment of certain conditions involving skin color illustrate a connection between skin color and social status and perception. This connection, however, is ambiguous. Skin color sometimes serves as an indicator of disease, and the reference to skin color in these patents highlights skin color as an aspect of surface appearance as opposed to an essentialist dimension of identity. For example, the 1970 patent for a "Method of Treating Hyperpigmentation" covers "compositions of matter useful as depigmenting agents and to processes for utilizing such compositions in the treatment and control of hyperpigmentation." One part of the patented composition was identified from the "leukoderma that was observed in

Negro workers was traced to the use of benzyloxyphenol as an antioxidant in the protective rubber gloves worn by the workers." Similarly in the 2000 patent for a "Method and Apparatus for Detecting and Measuring Conditions Affecting Color," skin color is a reference to detect and identify disease:

> The invention can afford good evidence of jaundice resulting from medical conditions other than hyperbilirubinemia. Liver disorders in adults and children produce jaundice, for example. These and other skin color characteristics can be factors in diagnosing additional diseases that affect skin color. It has been observed, for example, that at least among dark skinned individuals, such as African Americans or others of African descent, skin color is affected by tuberculosis.

While these two and other patents present skin color in descriptive terms and avoid treating color in essentialist terms, the 1974 patent for "Skin Depigmentation" reflects a more ambiguous approach to treatment of "hyperpigmented" skin. While the written description begins with reference to diseases of the skin, the inventor identifies why depigmentation is sometimes desired:

> This hyperpigmentation is generally viewed as cosmetically undesirable and psychologically disabling. ...It is also often desirable to decolorize normally pigmented skin to generally increase "fairness" of appearance or to blend hypopigmented areas into surrounding normal skin, for example in the treatment of generally dark-skinned people suffering from vitiligo.

Here, the written description goes beyond mere treatment of disease to treating "normally pigmented skin" presumably to deal with the "psychologically disabling" effect of skin color. Two views of skin color are apparent in this invention. The first is the conception of skin color in purely cosmetic terms about appearance. The second, however, appeals to an essentializing role of skin color reflecting social stigma associated with dark skin tones and societal preferences for fair colors. While such views would not be surprising in the Nineteenth Century, they are quite striking in a government document dated 1974. Even if the language is vestigal, reflecting outmoded attitudes in a transition period of race consciousness, the salient question is whether the government should sanction such justifications for inventive activity through the patent grant. This question, the focus on Section Three of this Article, becomes even more sharp in the context of patents involving toys, which arguably illustrate the most striking examples of racial stereotyping in the invocation of racial categories.

4. Patents involving toys. There were 63 patents in this category, ranging from the period 1863 to 2006. The inventions included card games involving African and African-American culture, educational tools to test knowledge of culture, teaching tools targeted to skills in the African-American population, and a sundry of dolls and apparatuses that incorporated stereotypes of the African-American population. The breakdown by decades is as follows:

1860's: 3; 1870's: 1; 1880's: 4; 1890's: 5; 1900's: 4; 1910's: 6; 1920's: 9; 1930's: 2; 1940's: 2; 1950's: 0; 1960's: 1; 1970's: 2; 1980's: 2; 1990's: 7; 2000's: 15. The inventions prior to the 19950's were largely for toys that incorporated stereotypical images and caricatures of African-Americans, such as an electric target machine which included a "negro carrying a chicken" in 1940. A patent from 1969 was for a "Doll Having a Plurality of Changeable Ethnic Features," including those of a "Negro." The inventions in the 1990's and 2000's covered educational card games and board games. The most recent patent uncovered, from April 11, 2006, was for a "Teaching Circumference Instrument," and its specifications referred to the reduced educational skill levels of African-Americans and Latinos.

Prior to the 1960's, the toy patents are a series of racial stereotypes that reflect then contemporary attitudes of what caricatures consumers found amusing. In the first of this series, a 1863 patent for an Automatic Dancer, one of whose inventors was a fellow named appropriately enough James Crow, describes the invention as spring toy, similar to what we would call a bobblehead, which would include "the figure of a negro or any other human figure." The head of the figure, the inventors describe, could be interchanged, "so that the head of the negro can be removed and that of a clown put in its place." The 1947 patent, the last in this series, was for a movable toy wagon which included representations of human figures as passengers. According to the inventor, "the heads of these figures, in keeping with the idea of physical attractiveness, may be painted to simulate children of diverse races, such as Caucasian, Mongolian, Negro, and Malay races." The image of inclusiveness in the 1947 patent contrasts with the stereotype of the Negro buffoon represented in the 1863 patent and many of the patents thereafter. For example, the 1907 patent entitled "Target" is for a carnival game in which the target is a "Negro's head," at which "the ball may be thrown." The inventor of this game informs us that

> the player aims to strike either eye of the head, and the target is so constructed that the eye may be put out by the ball. In practice, I construct both eyes so that each may be put out independently of the other, and I also provide an opening in the negro's mouth through which a ball may pass, and a net behind the opening to catch the ball.

A 1940 patent for a target game included a target "which may for example simulate a negro carrying a chicken, or any other suitable design." As the written description provides:

> We illustrate, however, means for reversing the movement of the target structure in response to every hit so that the negro, if hit, may reverse his direction of movement. It will be understood, of course, that the housing 54 may simulate a negro, a hen house being illustrated at A in Fig. 1. As soon as the target is initially moved, with the negro moving toward the hen house, a successful hit will cause him to reverse his direction of movement and leave the hen house. This of course is merely one example of a practical use of our invention.

The use of stereotypical imagery should not be too surprising since games and toys illustrate the times. Furthermore, the imagery in these mechanical shooting games are not too far removed

from the many stereotypes of drug lords, pushers, and pimps that animate contemporary video games. But the prevalence of this imagery in patent documents should be noted as examples of how inventorship and the administrative review of patent applications readily included ethnic stereotypes as illustrative examples of invention.

The image of "children of diverse races" conjured in the 1947 patent serves a watershed from the first set of patents to the second set which begins with the 1969 patent for a "Doll Having a Plurality of Changeable Ethnic Features." While stereotypes still persist, as the reference to "Caucasian, Mongolian, Negro or Malay" races indicates, the written descriptions suggest that the toys are designed with a broader, more inclusive market in mind. According to the written description, the inventor of the 1969 "contemplated that the ethnic doll may be made to represent four basic races of universal man, namely the European white or so-called Caucasian race; the Afro-American or Negroid race; the American Indian race and the Oriental race. However, it will be understood that the present invention is not limited to these four races and that other types of human representation may be exemplified in the ethnic doll of the present invention." The inventor's discussion of the prior art is telling:

> Dolls of the prior art each represent a particular ethnic group. For example, separate dolls are utilized to represent the white or the colored races and, similarly, separate dolls are used to represent European, Oriental or Indian races. If it were desired to acquaint a child with the various different races or ethnic groups, this would therefore require a full set or complement of dolls. For many parents or educational systems or schools this would be a relatively expensive procedure.
>
> In view the foregoing, it is an object of the present invention to provide a single doll, hereinafter designated as an ethnic doll, which can be made representative of the various races or ethnic groups. In accordance with the foregoing object, it is another object of the present invention to provide an ethnic doll which can be manufactured at a relatively low cost and sold at a relatively low price. In accordance with the foregoing objects, it is a further object of the present invention to provide a highly novel doll construction which will have a high appeal to children of various different races or ethnic groups.

The goal of inclusiveness continues post-1969 in patents for other dolls that have multiple ethnic features, mancala-like games, and board games celebrating Kwanza and African-American civil rights leaders.[1]

The theme of diversity and pluralism continues in the last two patents in this set, a 2005 patent for "Teaching Cylinder Instruments" and a 2006 patent for "Teaching Circumference Instruments" both granted to Gerald Bauldock. Sr., an inventor in the field of education. Both patents are for three dimensional visual aids that serve as educational toys to help elementary age

[1] Separate discussion here of 1976 patent 3940863

students learn the relationships among size, shape, area, and volume. Each invention is justified in terms of benefits to particular ethnically or racially defined communities:

> African Americans and Latinos obtain college degrees at only half the rate of white students. The partnerships between government agency, industry, academia and private organizations are trying to address these issues along with many others. This invention provides a method for teaching the geometric concepts of a cylinder and the equations involved.

Although the patent claims are not limited by race, like the pharmaceutical patents discussed above these two educational toys are defined in terms of unmet needs in racially or ethnically defined target markets. The racial categories serve to identify particular needs in addition to the universal application and appeal of the invention.

The toy patents offer a snapshot of changing racial attitudes, illustrating a sharp shift from the use of offensive and predictable racial stereotypes to a more inclusive use of racial categories, which may contain inherent stereotypical dimensions. Serving both as a portrait of the social context of inventorship and of changing social and cultural attitudes, these inventions ranging from the prototypical bobblehead to the contemporary educational toy demonstrate the cultural history and background to the use of racial categories. As with the other set of patents discussed in this section, the question of the normative implications and importance to be given to use of racial categories requires examining these patents in the broader context of the instrumental goals of patent and of race, the topic of Section Three.

5. Patents for methods of sorting identities and names. There were 7 patents in this category, ranging from the period 1920 to 2005. The breakdown by decade was 1920's:1; 1930's:0; 1940's: 1: 1950's through 1980's:0; 1990's: 2; 2000's: 3. The oldest invention, from 1920, was "Means Employed in the Classification of Names," covering a punch card system for sorting and classifying individuals in a particular geographic area by particular characteristics, such as race. The most recent invention, in 2005, was for a "Patterning System for Selected Body Type and Methods of Measuring for a Selected Body Type," targeted to the garment industry in designing clothing for different body types.

The 1941 patent for an apparatus to match and detect colors discussed above provides one example of a invention whose function is to sort identities, at least identity as reduced to skin color. An earlier example is provided by the 1920 patent for a "Means employed in the classification of names," an invention consisting of a series of punch cards that would allow creators of gazetteers and directories to sort individual citizens and residents by characteristics such as last name, place of birth, or race. The written description for this patent explicitly provides the "negro race" as one example of a sorting characteristic. The 1942 patent for "Selective Filing and Finding System" covers a variant on this filing and sorting mechanism that also expressly identifies race as one of the characteristics. An electronic version of the punch card sorting mechanisms is the subject of the 1998 patents for Attention brokerage. This invention is a

method for targeting advertising based upon the bidding of the participant and her self-identified characteristics, such as ethnicity. Finally, the 2005 patent for a "Machine learning method" covers a statistical method to assess the validity of a machine based problem solving method in the context of medical diagnosis. The written description provides racial composition of the subject population, such as percentage African-American, as one factor that can be coded in the algorithm.

The last patent in this category, from 2006, is less technical than the others in the set, covering a "Patterning system for a selected body type and methods for measuring for a selected body type." The invention covers a device useful in the garment industry to determine standardized body type. The written description could not be clearer:

> This invention pertains to a patterning system and the creation of a standard sizing system for the human body of the Black race. This invention envisages body measurements, size designation, and a patterning system for the Black human body, and specifically, a patterning system incorporating different Black body types in the design of ready-to-wear apparel, apparel fitting forms and other articles of clothing, as well as other items worn on the human body for protection or ornamentation. This invention also envisages a method of measuring in order to form a more accurate patterning system for the Black human body type.

The inventor acknowledges the historic development of different body types associated with ethnicity and the lack of mannequins that reflect differential body type. The invention proposes a ethnicity based solution to the construction of mannequins and other devices in the garment industry to fill in this gap in the garment industry. While the written description for this 2006 patent does expressly refer to the "Black race," the claims are neutral, speaking broadly in terms of an "ethnicity solution" to the patterning of body types.

Racial categories serve as a means of fixing identity as the patents involving skin color illustrate. The few patents discussed here illustrate that using race to assess identity goes beyond skin color to include membership of a racial group and body type. While the discussion of skin color illustrates an ambiguity between race as an essentializing quality and race as an element of surface appearance, the patents discussed in this section suggest an essentialist view of race in determining identity. Whether in using race to target advertising or in defining body type, the patent recipients use the racial category to capture some predetermining fixed characteristic to aid in segmenting the marketplace. In this way, racial categories serve a similar function as in the other patents discussed above.

6. Miscellaneous. There were 51 patents in this category. The inventions were hard to classify into discrete categories. These patents included an 1842 invention for a plow, in which the the specification makes reference to "negro labor," methods for treating sickle cell anemia, and the most recent, "Method and System for Distributed Analytical and Diagnostic Software Over the Intranet and Internet." The last invention permits remote diagnosis of disease in patients

based on characteristics such as the patient's race.

The patents represented here illustrate a wide range of reference to racial categories. The 1842 patent for an "Improvement in plows" describes the invention in terms of its efficacy as compared to "Negro labor." The 1881 patent for a "Sponge-Cup" and the 1890 patent for a "Motion clock" make use of racially stereotyped icons in their design. The cup, for example, is a deskstand for holding pens and other items that includes a "Negro's head" as the centerpiece. The clock includes a mechanical representation of a "negro banjoist." Some of the patents cover inventions to diagnose or treat diseases that may be particularly prevalent among the African-American population, such as the patent for treating sickle cell anemia or crib death. In many of these patents, racial categories serve as descriptive markers summarizing background knowledge or assumptions that are structured in racial terms. For example, in patents covering methods for sort DNA samples or populations based on genomic information, racial categories serve to delineate self-identified groups who are sorted or identified through the patented methods. What unites these patents is the way racial categories are used casually to reflect social understandings of how the benefits of invention may be spread among segmented groups and markets.

The last patent in this set, one from 2005, in some ways brings us back to the pharmaceutical patents with which we began this discussion. A "Method and system for a distributed analytical and diagnostic software over the intranet and internet environment" covers a software based method for tracking patients over a distributed environment such as within a hospital or across hospices. The invention permits a medical practitioner to monitor a large set of patients that are geographically dispersed based on medical and demographic characteristics of the patient, including race. The inclusion of race as a characteristic parallels the use of racial characteristics in biomedical and pharmaceutical patents in the first category of inventions. Racial categories serve to ensure that the inventor has tailored the invention as needed to particular racially defined markets. This tailoring, however, allows the inventor to expand the scope of the invention in terms of its applicability and novelty. Therefore, racial categories reflect social attitudes about race but also serve a function in defining the contours of the invention consistent with patent law.

7. Summary. Racial categories in patent law serve many functions. They can reflect background social attitudes towards race that inform inventorship. These attitudes may be stigmatizing or inclusionary. In addition, racial categories serve a function within patent law allowing the inventor to tailor the invention to racially defined markets and to identify the unmet needs served by the invention. This subsection has in both a descriptive and analytical way presented the uses of racial categories in patent law. The next question is how to assess the use of racial categories within the appropriate normative framework. This question is the subject of Section III.

III. Normative Frameworks for Assessing The Use of Racial Categories in Patent Law

I have made the argument that racial categories do arise in patent law as an empirical matter. The more difficult question is what to make of this observation.

Racial categories do not seem as insidious and as harmful as their use in Jim Crow laws or in the employment or consumer sales context, in which racial stereotyping, bias, and animus serve either individually or collectively to deprive individuals and groups access to key resources. However, there is arguably at least a symbolic harm that arises from the use of racial categories in patent law, what Professor Timothy Holbrook has called "the expressive impact of patents." By countenancing racial categories in the awarding of patents, the state has acknowledge and aligned itself with racial stereotypes and animus. As a remedy, the state would need to avoid the use of racial categories in patent document itself and in the review of patent applications. But the harm is arguably more than only expressive. If the granting of a patent by the state promotes invention and innovation, either as an actual consequence or as a justification, then the state is supporting private decisions to create racially tailored inventions through the patent grant. Such state action is subject to strict scrutiny under the Equal Protection Clause of the United States Constitution to ensure that the racial category is narrowly tailored to serve a compelling interest.

Assessing these three prognoses (no harm, expressive harm, Equal Protection violation) requires addressing the normative foundations for patent law and for the use of racial categories. This section analyzes both of these normative foundations by focusing first on patent law and second on race. My goal is to juxtapose three normative justifications for patent law (incentive theory, market theory, and cultural theory) with liberal and critical theories of racial categories. By juxtaposing these theories, I present a roadmap for assessing the use of racial categories documented in Section Two. This roadmap will be the basis for what I call the left liberal approach to racial categories in patent law presented in Section Four.

A. The Perspective of Patent Law

Justifications for patents are founded in three broad approaches: incentive theory, market theory, and cultural theory. I will present each with some implications for the patents described in the previous section.

1. Incentive Theory

Patents are typically understood as providing an incentive for potential inventors and innovators to develop a useful, novel, and nonobvious process or product. Put most starkly, the promise of market exclusivity, and the resulting economic rents, provided by the patent grant attracts individuals to allocate resources to the process of invention. With this goal in mind, Congress calibrates the patent grant through the terms of patent such to structure incentives to "promote progress in the useful arts," following the constitutional mandate.

According to the incentive theory, whether racial categories in patent law are desirable

depends on the meaning of progress. If progress means pure economic returns to the total wealth in society, then racial categories should be largely irrelevant to the grant of a patent. The scope of a patent should rest on the economic benefits of an invention which need not be correlated with any racial dimensions or uses. This last point implicitly assumes a liberal economic view of racial categories, which, as I discuss below, assumes that race is a veil that masks meritorious factors that support economic development and progress. Under this liberal economic assumption, the use of racial categories is either an unfortunate use of language or a distraction from the goals of economic growth.

Progress, however, may also be consistent with the use of racial categories. If the goal of maximizing economic wealth is distorted through racial discrimination, then the patent grant could arguably be used to target inventive activity aimed at correcting racial discrimination. For example, if medical research has historically ignored the study of diseases prevalent among certain minority groups with the result that aggregate economic wealth is less than it could be, then the patent grant can be structured with the use of racial categories to correct this incorrect allocation of resources. A similar argument could be made for the race-friendly toys and racially targeted hair and skin products discussed in the previous section. According to this argument, racial categories in patent law are a corrective measure to redress discrimination in the choice of inventive activities. While this argument has been couched in terms of wealth maximization, a similar argument would follow if progress were understood in terms of equity as well as wealth maximization. Under this broader criterion for progress, racial categories in patent law serve a redistributive function to promote inventions to meet underserved and unrepresented needs.

Simplistic in its terms, the incentive theory provides the most straightforward understanding of racial categories; they are desirable if consistent with progress in the useful arts. The difficult normative work arises in how progress is understood, particularly in racial terms. According to the incentive theory, the assessment of racial categories in patent law depends on the connection between racial categories and the appropriate measure of progress, which reflects the normative view of race more broadly.

2. Market Theory

As a subset of incentive theory, the market theory of patents views the patent grant as an instrument to create incentives for the commercialization of invention, a tool not solely for invention but also for innovation. However, market theory is not simply an explanation based on incentives. Under the terms of market theory, the patent grant should be designed to reflect market needs and the ability of the patent owner to shape the commercial path of innovation. While the incentive theory assesses patent law solely in terms of the returns to invention as a lure for inventive activity, the focus of market theory is on how patent law reflects the forces of demand and supply in the marketplace. The incentive theory is sometimes referred to as an ex ante theory of intellectual property because of the theory's focus on activities prior to the making of the invention. By contrast, the market theory is referred to as an ex post theory because of the emphasis on how the invention is disseminated after it is made.

Assessing racial categories under the market theory requires more than establishing a connection between patents and progress. Initially, the market theory assumes that connection through the link between patents and commercialization. But the normative implications arise from how the details of patent law are driven largely by considerations of commercialization. For example, the market theory would imply that secondary considerations should play a greater role in the nonobviousness determination than considerations of technical novelty. Furthermore, the market theory would place greater emphasis on licensing practice as the means to disseminate inventions, implying for example a narrower role for defenses to infringement, such as experimental use or repair. As applied to racial categories, the critical question is the role of race in defining markets. To the extent that the use of race is suspect to the goals of commercialization, racial categories should be avoided in the patent grant.

The connection between race and markets is largely a question of the normative framework for racial categories, to be discussed in more detail below under liberal and critical perspectives on race. In terms of the normative foundations of patents, the appropriateness of racially defined markets is parallel to the issue of how broadly or narrowly commercialization should be understood. If one accepts the view that patent law requires the commercialization of every possible variation of an invention, then defining markets in terms of race would be as appropriate as defining markets in terms of any other possible use of the invention. However, if one accepts the view that patent law mandates non-commercialized spaces, sometimes referred to as the public domain, then the question becomes whether commercialization based on race goes too far.

Scholars have debated the scope of commercialization in patent law in terms of cumulative innovation, sometimes referred to as the "shoulder of giants effect." According to this view, innovators need to borrow from predecessors in order to perfect inventions and promote progress. If the scope of patent commercialization is too broad, current patent owners may be hesitant in licensing future innovators or fear of obsolescence or competition. Therefore, the argument goes, the scope of commercialization needs to be narrowed, for example, through such doctrines as experimental use. The implications of this argument for racial categories are not immediately clear. There is no reason to think that cumulative innovation would be directly impeded by racially tailoring an invention. But there is the risk, however, that racial categories may lead to segregation of research efforts along racial lines. To the extent that allowing racial categories leads to divisions of research based on white populations and research based on black populations, as may perhaps happen in the fields of biomedical or pharmacogenetic research, the use of racial categories may inhibit cross fertilization and synergies among researchers and innovators. In other words, race specific patents may lead to the anti-commons problems reported by policy makers and scholars with too many patents too narrowly drawn being issued among too many disparate players.

To summarize, to the extent the market theory is viewed as a subset of the incentive theory, the analysis of the previous subsection applies. However, the market theory introduces unique problems of its own, such as the problems created by allowing patents to be commercialized too broadly. Finally, just as the assessment of racial categories under the

incentive theory rests on the connection between race and progress, so the assessment under the market theory rests on the connection between race and the market.

3. Cultural Theories

Patent law in particular, and intellectual property more broadly, have been justified as an instrument to promote civil society by creating a system of economic and property rights that allow for civic participation and market engagement. The emphasis from this perspective is not on the financial incentives to create and to commercialize inventions, but on the development of and access to knowledge. Yochai Benkler, for example, speaks about social production and the role of intellectual property laws in promoting collaboration among creative peoples, both makers and users. The rules of patent law should be designed to facilitate such collaboration and the social accumulation of knowledge. Madhavi Sunder, to provide another example, has written on the parallels in intellectual property and identity politics and highlighted how the confluence of economic, political, and civil rights shape the contemporary debate over the structure of legal systems. These two scholars, and several others, have broadened the stakes for intellectual property, and their ideas demonstrate how patents are instrumental in the formation of civil society grounded in a knowledge-based economy.

As a normative framework, cultural theories would assess patent laws in terms of the promotion of the values of openness, political freedom, and economic justice. Promoting progress, under the cultural theories of patents implies not the maximization of wealth or the commercialization of inventions, but assuring access to knowledge and resources necessary for human flourishing and community development. With respect to the racialized patents, cultural theories would suggest that the use of racial categories would be justified if they served these humanistic goals. In this regard, Professor Holbrook's notion of the expressive impact of patents resonates. The presence of racial categories in patents, a document issued by the Federal government, demonstrates an endorsement for a particular view of race. If the use of race is disparaging or stereotypical, such as with the reference to Negroes stealing chickens, or through the more than occasional reference to a racial epithet, then the government is acknowledging the background racism and stereotypes that would otherwise be voiced privately. If the patent document, on the other hand, evokes positive views of African-Americans, affirming certain cultural tropes and artifacts from a racially defined community, then the government endorsement serves a positive goal that promotes the inclusion of diverse groups. Assessing racial categories in patent law requires distilling the message being sent by the patent. If the message is one of openness, political freedom, and economic justice, then cultural theories would endorse the use of racial categories in patent law.

But this analysis assumes that patents serve largely a symbolic function as a signal of specific positions that the state should or should not endorse. But the patent instrument is inherently a tool for openness. Protection through a patent substitutes for protection through secrecy. If patents sending negative signals about race should be suppressed or denied, then the government would be encouraging secrecy. Professor Holbrook's notion of the expressive

impact implicitly assumes that denying a patent means that the troubling invention, attitude or signal will disappear from the public realm. While this is true in the trivial sense that the expression will not be publicized, it is not true that it will be converted into a more positive signal. If Professor Holbrook is correct that patents have an expressive impact, then what the government should do in some instances is publicize the negative message and counter it. Just as the answer to negative speech is more and positive speech, so the answer to bad patent signals is positive patent signals and not the relegation of improper uses of racial categories to the domain of secrecy.

What this suggests is that assessing the use of racial categories rests on more than the mere suppression of bad signals. Instead, patent law needs to promote openness, freedom, and justice through greater access to the process of how patents are assessed and to greater dialogue about the meaning of race. Here, we move beyond the scope of this Article to larger questions of how to structure the system of patent prosecution and review. For the narrower purposes of this article, the argument I am making here is that cultural theories of patent need to consider institutions other than the patent system to assess patent law. If patents are a form of expression and state endorsement, then the meaning of racial categories in patents depends on the meaning of race within other institutions, such as the gaming establishments or the schools or the health care facilities or the shopping centers in which the patented inventions will be practiced. Racial categories in patents need to be assessed, therefore, against the broader culture within which the inventions are made and used. Therefore, even more than under the incentive and market theories of patents, the assessment of racial categories in patent law depends upon addressing contested theories of race within culture more broadly.

To summarize: The incentive theory, the market theory, and cultural theories would assess the use of racial categories in patent law in terms of wealth maximization, the benefits of commercialization, and the creation of open civil society respectively. But understanding the propriety of using racial categories under each of these theories requires understanding, in turn, the connection between race and wealth creation, race and markets, and race and culture. In order to complete this part of the puzzle, I turn next to the issue of liberal and critical theories of race.

B. The Perspective of Liberal and Critical Race Theories

Both liberal and critical theories of race demonstrate a commitment to principles of nondiscrimination, democracy, and equal treatment. The two theories differ, however, in the ability of the institutions of market and democracy to correct for historically rooted and longstanding fears and animus defined in racial terms. In this section, I present liberal and critical theories of race which will provide the basis for assessing the use of racial categories in patent law. In the immediately following section, I synthesize these theories of race with the theories of patents discussed in the previous section to develop an analytical taxonomy of approaches for assessing the patents described in Section Two.

1. Liberal Theories of Race

Color-blindness is the hallmark of liberal theories of race. But there are shades of color-blindness. At the ideal level, proponents of liberal theories aspire to a world in which decisions about the allocation of market resources and the distribution of political power are made without any consideration of race. What this means in practice is that such decisions are made on the merits of the situation and the character of the individual participants. A less idealistic view would recognize that power often, perhaps always, plays some role in the functioning of markets and of politics, but the operation of economic and political power needs to be absent of racial considerations. Color-blindness does not, however, mean social homogenization of either skin tones or culture. Most liberal theorists of race would celebrate a healthy pluralism, the cliched melting pot, so to speak. But such diversity in the public realm is in the cultural realm and a reflection of individual group identity rather than subordination of or discrimination against groups. There is, however, a sense that once racial difference is understood as irrelevant to decision-making, racial difference will go away to be replaced with a mutual respect for individual autonomy and self-creation.

Liberal theories of race retreat from the principle of color-blindness in many instances. In defining the cultural sphere, race can arise as a healthy and much needed ingredient to the promotion of a vibrant and healthy workforce and marketplace. Race may also be an element in remedying past discrimination and continuing obstacles that are historical relics from less liberal times. Therefore, in the affirmative action debate, race can be a factor to be considered in some public decision making but only in a narrowly tailored remedial fashion to correct for specifically identified instances of past group discrimination. Furthermore, race can be used sometimes in the university admissions context to promote the goals of diversity, specifically in public service professions such as law. Race, however, is a constitutional suspect class and only very narrow policy justifications can support its use.

Economist Glen Loury has written about the complexities posed for liberal theories of race by the principle of color blindness. In the 1980's, Professor Loury was a staunch conservation with respect to race, advocating a strict color-blind position that mandated self-help and the avoidance of the culture of victimhood. Recently, Professory Loury has made an about-face for pragmatic reasons and has espoused a critique of strict color-blindness. In his The Anatomy of Racial Inequality (2002), given as the W.E.B. DuBois Lecture at Harvard in 2000, Professor Loury posits three axioms: (1) Race is socially constructed; (2) Race is not an essentialist category, but a social artifact; and (3) As a socially constructed category, race has result in the creation of stigma and prejudicial attitudes harmful to racialized groups. In addition to these axioms, Professor Loury identifies three contexts in which racial categories are used: (a) policy implementation; (b) policy evaluation; and (c) civic construction of a nation's shared purpose and common fate. He argues that color blindness is appropriate only for public decision making in the third fora, but not in the first two. Specifically, racial categories should not be considered in the broad mandate of an open and inclusive society but should be considered in the areas of policy implementation and policy evaluation in order to reach the goal of an open and inclusive society.

Professor Loury presents a pragmatic approach to color-blindness, one that acknowledges the failure of a strict color-blind position to combat continuing stereotypes and animus based on race. The approach almost, but not quite, echoes the critical theory position presented below: almost, because of the emphasis on the recognition that race continues to be debilitating; not quite, because of the appeal to assimilation. Liberal theories of race falter around the principle of assimilation. On the one hand, assimilation supports the goal of inclusion and leads to fairness and equality of opportunity. On the other hand, assimilation can deny difference by mandating that individuals comport their distinctiveness and cultural affiliations to the will of the majority. Pragmatic turns appeal to concepts like diversity or pluralism or phrases like "rainbow republicanism" to accommodate difference to the color-blind principle. Such accommodation leads to charges of balkanization and fragmentation of public spaces and the call for a return to strict color-blindness. Professor Loury's approach attempts to recognize the use of racial categories as an instrument to reach certain policy goals while retaining an open, inclusive civic sphere demarcated along assimilationist lines.

The connections between race and wealth maximization, between race and markets, and between race and culture can be understood against the liberal goal of assimilationism. Under the color-blind principle, in both the strict and pragmatic forms, race should be irrelevant to the goals of wealth maximization and therefore needs to be expunged as a category. More pragmatic forms, however, would recognize that racial animus and the persistence of past discrimination requires consideration of race in the implementation of particular policies, such as admissions or the award of other public benefits. Therefore, the intersection of wealth maximization and color-blindness would support the use of racial categories to reach the goals of corrective justice to remedy past harms.

Liberal theories of race would find little room for racial categories in the market sphere. In such an arena, willing buyers and willing sellers should coordinate solely in order to engage in voluntary, mutual enhancing transactions. While liberal theorists would not deny that the specter of race can appear in the market sphere, the animus arising from race can be cured through proper implementation of race conscious policies in the public sphere through anti-discrimination laws or through race conscious policies in providing benefits, such as education. When racial pluralism arises in the market arena, for example, through the development of enclave or ethnic markets, within which members of certain racially or ethnically defined groups trade with each other, racial categories are a useful tool to promote diversity and cultural pluralism in the marketplace. Such appeal to "rainbow commercialism" would support the use of racial categories as brands, or trademarks, much like the use of colors as a trademark upon the showing of secondary meaning, through which sellers and buyers can signal to each other their willingness to engage in beneficial trades. Racial signals of this sort serve to invite inclusion rather than impose exclusion. As a result, the civic sphere, which includes the market, is enriched.

Finally, when liberal theories of race connect racial categories with culture, the result is the promotion of diversity. The appeal to diversity does not arise from a rejection of the color-blindness principle, but as a necessary complement to the goal of assimilationism. If the difficult truth is that it is illiberal to abolish difference, whether racial or otherwise, while moving towards

the goal of assimilation and inclusiveness, then difference is accommodated by creating a zone within the civic sphere in which difference can flourish but not intrude into the workings of politics or the market. This sphere of cultural diversity is one in which racial categories can be tolerated, even encouraged, as individuals can play out their racial or ethnic identities through celebration of festivals and displays of costumes and customs. The cultural sphere provides an escape hatch from the color-blind realm that allows markets and politics to function in a seemingly neutral manner. Differences are recognized with the understanding that they be put aside in the boardroom and the political arena.

These positions are summarized in Table One, presented in Section C, below. However a complete understanding of how racial categories function within patent law requires considering critical theories of race as well, the subject of the next section.

2. Critical Theories of Race

As a general proposition, critical theories of race express skepticism of the overly optimistic goal of assimilationism that is the hallmark of liberal theories. The criticism is aimed in part at the assumption within liberal theories of the neutrality of assimilation, which serves to mask the way in which economic and political power continues to be distributed on racial lines even after the remedies provided by civil rights laws. Many scholars emphasize how such remedies have failed to provide genuine economic and political power to those who have been subordinated by racial animus and stereotypes. The goal of critical scholarship is to transform legal institutions in a way that implements the principle of anti-subordination and engenders genuine empowerment rather than assimilation within an economic and political structure that is majoritarian and exclusive while purporting to be assimilationist and inclusive.

Critical theorists contrasts with liberal theorists on two counts. First, liberal theories demonstrate a commitment to liberty, particularly freedom from discriminatory conduct based on racial identity. However, such freedom may not translate into actual opportunity and a more equal division of resources as anti-discrimination norms become construed and applied narrowly to permit the efficient functioning of markets and governments. The liberal ideal of assimilation assumes that once formerly subordinated groups are free to participate in markets and politics, the forces of competition will allow the groups and individuals within them to flourish. But this vision assumes that competition will function in a neutral, equalizing manner when in fact the forces of competition may lead to stratification. Second, liberal theories espouse a commitment to equality between the races, but critical theories demonstrate that the liberal notion equality is formalistic, ignoring how historical and social context can create disparities among individuals that otherwise appear equal before the law. Critical theorists seek substantive equality and a distribution of economic and political power to previously subordinated groups.

The push of critical theories to substantive equality and freedom can support many possible avenues for legal reform. For example, Professor Derrick Bell has argued that Brown v. Board of Education should have upheld the “separate but equal” doctrine of Plessy v Ferguson and upheld substantive equality of educational resources between the races. Professor Patricia

Williams, to take another example, has demonstrated that informal law, the law in action as often attributed to the legal realists, can lead in practice to unequal access to economic power among the races through the creation of a double standard between blacks and whites. Formal rules, appropriate enforced, can benefit subordinated groups, but the devil is in the details that liberal theorists often ignore. Contrary to the view traced to the legal realist tradition that law is a veil that masks the real workings of power, some critical theorists espouse a more careful calibration of law and its relationship to power, suggesting that either the law's absence or the law's presence can hurt racially subordinated groups. The hard question is how legal, social, and economic institutions are shaped and the role of individual and group voice in shaping those institutions.

What critical theories tell us about race is that assimilation is not only a difficult and turbulent process, but also a misguided one. At the heart of assimilation is an essentializing of racial identity that requires its dissolution. But the racial bonds are complex ones with many nodes and bases. As Professor Neil Gotanda has noted, race and racial categories arise in many stripes. There are, to cite his typology, formal-race, status-race, and culture-race, and each of these mandates a different approach to curing the ills of subordination. Formal-race entails categories of race that are applied rule-like to establish difference. It is exemplified by the reference to "black patients" in the BIDIL patent or the "WHITES ONLY" signs of the Jim Crow era. The law creates a category that has to be applied as tightly as possible. Status-race is sociological, attributing race based on social markers, like residential neighborhoods or where one buys one's clothing. Status-race arises in how goods might be marketing along ethnic lines, but may also arise without reference to a racial category. Finally, culture-race is an anthropological category, marking distinctions based on practices and artifacts. This type of race arises in the patents for skin color or hair and reflects race as a dimension of culture. Since race is multidimensional and is used in many different ways, it is not surprising that the goal of assimilation is a contested and perhaps fruitless one, absent, in the extreme, the elimination of different races altogether.

This latter point permeates the work of Kenji Yoshino, whose writings on queer theory have implications for the analysis of racial categories in this Article. Professor Yoshino identifies three critical moves in the goal of assimilation, moves that illustrate the futility of assimilationism (and by implication color-blindness). The first move is that of conversion whereby the different other (defined either in terms of race or sexual orientation or gender) is absorbed into majority culture through attempts to eradicate difference. Integration is one part of this move, but at the extremes may include expunging physical differences such as hair texture or skin color. The second move is one of passing, whereby difference is allowed but placed behind a veil of sameness; the different other attempts to adopt attributes of the majority with the aim of acceptance. The final move is that of covering, whereby difference is allowed but silenced; the different other is able to maintain difference but only in a closeted realm that is acknowledged but not integrated into the realm of mainstream civil society. Each of these moves, according to Professor Yoshino, belie the myth of assimilation and serve to further subordinate the other into the cultural, political and economic majority.

The mosaic of critical theories aid in defining the connections between race and wealth

maximization, race and markets, and finally race and culture. These positions are summarized in Table One in Section C and are discussed in detail here. Critical theories would be highly skeptical of the norm of wealth maximization and would suggest that norms of justice and equity should at least supplement, if not trump, considerations of wealth. Within this modified view of wealth maximization, critical theories would advocate for the principle of anti-subordination as a counter to the tendencies of color-blindness percolating up from liberal theories. While on the surface the anti-subordination principle may seem similar to that of corrective justice, critical theories seek more than the remedial measures espoused by liberal theories. The anti-subordination norm entails eradicating all vestiges of racial subjugation and differentiation beyond remedying discrete incidents of discrimination. In the realm of the market, critical theories would endorse pluralism, recognizing the place of ethnic enclaves in shaping markets and countering subordination and discrimination of the past. Under this view, race is more than a brand, a cosmetic label attached to products. Race can serve to invigorate markets by creating connections among groups through economic empowerment and the distribution of real resources to previously marginalized groups. Finally, in the domain of culture, critical theories would advocate affirmative empowerment, allowing badges of racial distinction to flourish and enrich the domains of civic society in addition to the market.

C. When Patent Law and Race Intersect: Summarizing the Positions

TABLE ONE: INTERSECTING THEORIES OF PATENT AND OF RACE		
	Liberal Theories	**Critical Theories**
Incentive Theory	Corrective Justice	Anti-subordination
Market Theory	Race as Trademark	Pluralism
Cultural Theory	Diversity	Affirmative Empowerment

As Table One demonstrates, liberal theories and critical theories complement each other in some ways but offer distinct normative positions on the connections between race and wealth maximization, race and markets, and race and culture respectively. When juxtaposed with the three theories of intellectual property, the theories of race provide normative frameworks within which to assess use of racial categories in patent law. This section has developed an analytical framework from the intersection of theories of intellectual property and race. In Section Four, I apply this framework to assess the proper treatment of racial categories in patent law and answer the question: what should we as legal theorists and policy makers discern from the patents described in Section Two?

IV. Color Blindness versus Accommodation in the Patent System

Identifying racial categories in patent law present an opportunity to revisit fundamental questions about the normative bases for the structure of patent law and the treatment of race. Table One summarizes the various normative positions that one can take towards the use of racial categories in patents. In this Section, I analyze several recommendations that have been offered by advocacy groups and scholars about the proper treatment of racial categories. Although these recommendations have been made in response to the BiDil controversy, understanding them requires appreciating the broader context of race and patent law. Placing these recommendations in the context of the six positions identified in Table One, I then present my own viewpoint that racial categories in patent law should be understood through the lens of cultural theory with several specific recommendations about how the proper place for racial categories in patent claims and patent specifications.

The debate over the racialized patents, and racialized medicine more broadly, has yielded three identifiable positions. First, the NAACP and other advocacy groups have come out in favor of BiDil and race focused medical research and pharmaceuticals. Targeting resources towards racialized medicine, according to this view, corrects for the lack of organized and cumulative attention by the medical community to the needs of minority groups. The second position, advocated by Professors Sullivan and Lilliquist, would find state support of racialized medicine as violating the Equal Protection Clause of the United States Constitution. Professor Sullivan and Lilliquist would permit the use of race in private epidemiological studies in order to identify and target underserved needs, but argue that FDA approval of pharmaceuticals along racial lines does not meet the standard of strict scrutiny under the Fourteenth Amendment. Although these scholars do not directly address the issue of patents, their argument would have some clear implications, which are discussed below. Finally, Professor Kahn addresses the issue of racialized patents directly in his scholarship and expresses skepticism of racialized pharmaceutical patents. While he acknowledges the NAACP position, his view is that drug companies have used the opportunity to narrowly categorize their patents along racial lines to expand their commercial interests rather than to meet the needs of the public, especially underserved groups. His criticism is in line with broader scholarly prognoses of the current patent system, which sacrifices the public interest, whether gauged by the community of scientific researchers or consumers, for commercial aggrandizement.

These three positions on racialized pharmaceutical patents map onto Table One fairly readily. The NAACP position follows from an incentive theory of patents combined with a perspective somewhere between the liberal and critical theory of race. While the NAACP position is not articulated solely in terms of corrective justice, the position does not fully adopt the anti-subordination position of critical theory, although it is probably closer to this side of the spectrum. Allowing race as a consideration in the granting of a patent, or FDA approval, would create incentives to develop diagnostic and pharmaceutical tools to treat previously ignored diseases and to study neglected populations. However, understanding patents solely as an instrument to create incentives ignores the expressive impact of patents and the possible effects of the patents on the markets for pharmaceutical products and health care. Nonetheless, the position would find a critical need to create these incentives that would trump some of the adverse consequences of racialized patents.

Professor Sullivan and Lilliquist's appeal to the Equal Protection Clause echoes liberal theories of race with the normative goal of color-blindness. Their work does not directly address racialized patents, but we can distill their argument from what they say about the Equal Protection Clause and FDA approval. The professors are highly critical of the government's use of racial categories in its decision making, particularly in the awarding of benefits. Consistent with the color-blind principle, they would conclude that the use of racial categories in patent claims would violate the Equal Protection Clause. The more difficult question is how they would treat the use of racial categories in the patent specifications. In the context of the specifications, racial categories do not serve to define who obtains the state benefit and who does not. Instead, racial categories serve a descriptive function to provide context for the invention, serving as an interpretative tool to understand the meaning of the patent and its claims. Given that Professors Sullivan and Lilliquist do not condemn the use of racial categories in epidemiological studies, since this represents private decision making not based on animus, the inference is that they would not condemn racial categories in patent specifications. Putting these pieces together, the position would be that the state cannot consider race in making decisions, but individual inventors can take race into account as background context to their inventions. Note that this position would be consistent with any of the three theories of patents, and since Professor Sullivan and Lilliquist do not directly address patents in their work, it would be speculative to determine which theory they would endorse. What is clear, however, is that their position flows from a strongly liberal theory of race, one that endorses the color-blind principle.

Similarly, Professor Kahn's position also follows from a liberal theory of race, one that would endorse color-blindness and assimilation. But in contrast with Professors Sullivan and Lilliquist, Professor Kahn does have an explicit theory of patents, one that combines the incentive and market theories. His concern is that using patents to promote race specific inventions will both create the wrong set of incentives, by diverting research efforts into tailoring existing drugs along racial lines, and transform the noble goals of serving the unmet health care needs of African-American communities into crass commercial ones. It is important to note that Professor Kahn does support the ambitions of the NAACP in correcting the deficiencies of medical research and health care. But his criticisms echo many of the criticisms of the patent system for creating strong private property rights that benefit established business interests at expense of innovation and meeting the needs of the public.

Furthermore, Professor Kahn's position also echoes traditional color-blind norms. For example, he questions whether an existing chemical composition, such as BiDil, should be granted a patent simply because an inventor discovers a modification that meets the needs of a specific racially defined group. To say that such a modification satisfies the nonobviousness requirement assumes that the baseline for determining obviousness is what works for a white patient. Racially defined patents reinforce existing stereotypes and further segregates medical research along racial lines. Contra to the NAACP position, Professor Kahn notes that the use of racialized patents may have unintended consequences and actually result in medical research becoming focused on modifying existing drugs along racial lines instead of innovating new drugs or therapies or studying orphan diseases. Although Professor Kahn's argument is grounded in a liberal tradition, there is a critical slant to his position. Racialized patents benefit the well-to-do classes who can

afford the new patented therapies at the expense of the needy and continually neglected segments of racially defined communities. In short, granting patents along racial lines is a misguided policy, noble in motives, but counterproductive in practice. Disallowing such patents consistent with the color-blind principle is necessary to avoid this path.

All of these positions raise compelling insights about patent law and the use of racial categories. But each considers only the case of racially defined pharmaceutical patents. My research shows that racial categories, at least those of African-American and Negro, have been pervasive in the patent system. One needs to develop an approach to racialized patents that takes into consideration the full range of inventions where race has emerged as a consideration. I contribute to this debate in light of the patents identified in this Article by endorsing a cultural theory of patent law to assess the use of racial categories in patent law. I also contend that the cultural theory needs to be understood in conjunction with a liberal theory of race that adopts some of the more salient features of the critical theories of race.

As compared to the incentive and market theories, a cultural theory is best suited to address the issue of race in patent law for two reasons. First, cultural theory subsumes the other two. Since cultural theories aim to understand patent's role in structuring civil society, and market institutions are a part of civil society, cultural theories of patent highlight how commercialization occurs within the context of market and non-market institutions. Furthermore, the incentive theory assumes that patents provide incentives by allowing inventors to capture value. As value is determined through forces of consumer need and wants as well as productive technologies, so the sources of value include cultural factors as well as traditional market factors. Therefore, cultural theory also informs the incentive theory of patent.

The argument that cultural theory subsumes the other two theories perhaps proves too much. But there are many instances in which market theory and incentive theory may be perfectly adequate without considerations of culture. For example, understanding how a patent may affect the ability of an inventor to commercialize a new type of chemical process can be satisfactorily addressed through consideration of market factors alone. But the racial dimension of the patents described in Section Two necessitates understanding both the commercial and cultural contexts of these inventions. Therefore, the fact that we are dealing with race supports turning to the cultural theory of patents to assess the inventions described in this Article normatively.

Under the terms of cultural theories of patent, racial categories should be analyzed in terms of their effects on promoting diversity (under a liberal theory of race) or promoting affirmative empowerment (under a critical theory of race). At this point, the analysis can take a number of possible turns depending on whether one is aligned closer with the liberal or the critical theory. Kenji Yoshino, for example, has advocated for rigorous protection of cultural attributes, whether within queer or racial communities as a counterforce to assimilationism. Richard Ford has advocated for a more pragmatic position, one that supports pluralism but does not lead to antagonism among groups. To call Professor Ford's position a catholic one would be ironic, given the battles over doctrine and rituals that has marked Western Christianity, but Professor Ford is concerned that the types of cultural claims endorsed by Professor Yoshino is unsettling

and potentially destructive. A more general point along these lines is made by Madhavi Sunder who identifies parallels between these debates over cultural markers in the arena of identity politics and those over the ubiquity of privatization of information and knowledge in the arena of intellectual property. Her solution is turn to the normative goals of distributive justice to resolve these oppositions and as a means to mediate competing claims through the goal of protecting groups that lack political and economic power. Following her solution, rights claims, whether over culture or over information would be secured for those who have the least access to political and market institutions.

In the context of racialized patents, whether covering pharmaceutical inventions, hair care products, or toys, the use of racial categories should be assessed under a more nuanced application of the anti-subordination principle. The appropriateness of using these categories rests on their effect on perpetuating the subordination of groups by imposing limits on access to critical resources or by perpetuating stereotypes. A nuanced application of this principle would also recognize the principle that civil society mandates some degree of cooperation and harmony among various groups. Therefore, this principle should be applied to avoid claims that would put different groups in opposition and further fragment or balkanize the public arena. I am proposing a pragmatic application of the principle of affirmative empowerment in the context of patent (and implicitly in intellectual property more broadly). Three concrete propositions arise from this argument: (1) the proper treatment of race in claims and specifications; (2) the proper role of race in the nonobviousness analysis; and (3) the proper role of race in the utility analysis. I conclude this Section by discussing each in turn.

1. ***A racial category should not be an element of a patent claim, but may be used in the patent specification.***

Patent claims define the legal rights that will be enforced by the state in an action for infringement. Patent specifications, by contrast, act as an interpretative tool, providing the background context of an invention against which to fix the legal meaning of the claims. The use of a racial category in a patent claim requires the court to define the meaning of that category when a particular invention is used. For example, the claims in the BiDil patent refers to a "black patient." If a claim for infringement arises with respect to this patent, the court would have to determine if in face the invention was used on a black patient. In order to do this, the court would have to fix the meaning of "black" as applied to the racial identity of an individual. In doing this, the court will effectively have essentialized an aspect of individual identity, concluding that one individual is black and another one is not. This essentialization could occur whenever a racial category is used in a patent claim and can be avoided only by preventing racial categories in claim language. Effectively, the patent owner of a patent limited to African-Americans would be the exclusive supplier of that invention to the African-American community while others are free to provide the same invention to non-African-American communities. Race specific patent claims create exclusivity over a particular racially defined market.

The issue is different when racial categories are used in patent specifications because the language of specifications is more fluid and does not become fixed through legal interpretation.

Racial categories in specifications do not create the risk of essentializing identities. Instead, the specifications provide the context against which the claims and the invention can be understood. The presence of a racial category in the specification does not limit the scope of the invention or its application. Most importantly, it does not exclude access to an invention based on the race of the user. For example, if the specification states that an invention was used on a particular racial group in experimental trials or was motivated by practices within racially defined communities, then these factors disclose the background to the development of the invention but do not impose limitations on how the invention can be practiced for infringement purposes. Such disclosure is important for assessing the relevance of the invention and for informing future inventors about the background and context of the invention without excluding access based on race.

My proposal that racial categories should not be allowed in claims, but should be allowed in specifications, parallels my analysis of Professors Sullivan and Lilliquist above, but for very different reasons. Professors Sullivan and Lilliquist follow the strict color-blind principle as applied to state action. My proposal follows from the anti-subordination principle in critical theory when understood within the cultural theory of patents. Within this normative framework, race is an acceptable factor for states to consider as long as it counters historical practices of subordination and does not impose stereotypical or disempowering conceptions of racial identity. Since claim interpretation in patent law fixes the meanings of words for infringement analysis, racial categories in patent claims should be avoided in order to prevent the essentialization of racial identities. However, race can be used as a background factor in order to combat and cure practices of subordination and therefore would be acceptable in patent specifications.

Proponents of the incentive or market theory of patents, however, would find my proposal to work against the promotion of racially tailored or targeted research and development initiatives. Since inventors who pursue these initiatives could not capture the benefits of race specific inventions through claim language, these initiative would be undermined by my proposal. But this objection reflects the critical differences between the cultural theories of patent law and the other two. Incentive and market theories focus on patents as legal instruments to promote the creation and commercialization of inventions respectively. The focus is exclusively on the generation of profits from innovation. The cultural theory of patents emphasizes that the goal of patent law is to promote knowledge and access within civil society of which the market is only one institution. To the extent race specific patent claims serve to essentialize identities and deny access based on race, then the benefits of incentivizing and commercializing race specific innovation needs to be balanced against the subordinating use of racial categories. My proposal strikes the correct balance by allowing racial categories to be considered in the specification in order to have adequate disclosure of the racial benefits of invention without the fears of stigmatization and essentializing.

Since racial claims in patenting are so infrequent, this proposal may have little bite. But to the extent that the claims in the BiDil patent are the wave of the future, as scholars like Professor Kahn suggest, then the arguments against race specific claiming should be kept in mind. This proposal can be implemented in a number of ways. First, Congress could amend the Patent Act or the Commissioner could amend the Manual for Patent Examination and Procedure to prevent

such claiming. Second, courts should look upon race specific claims as they arise in litigation with suspicion, holding that such claims are not enforceable without violating the Equal Protection Clause of the United States Constitution. However, the basis for this violation should be grounded not in the color-blind principle, but on the principle that enforcing such claims requires the state to construe the meaning of racial terms in ways that essentialize the meaning of racial identity and potentially stigmatize individuals based on their racial affiliation. Put another away, the use of the racial category in patent claims is not justified by a compelling state interest in either promoting diversity or curing past discrimination, as required under current law.

One last point to address on this issue is one of self-identification. In the context of BiDil and other pharmaceutical patents, race is often defined in terms of self-identification. But even if the meaning of "black patient" in the Bidil patent claim, or the similar use of racial identifiers in other claims, is fixed through the decision of the user of the invention, the problem discussed here is not cured for two reasons. First, self-identification is not a basis for claim interpretation. While the Federal Circuit has recognized that a patent owner can be her own lexicographer, there is no precedent for interpreting a patent claim through the meaning given by a specific user of a patent. To the contrary, the Federal Circuit has stated that a patent claim should be given its ordinary meaning and the current methodology for interpreting claims seems to eschew idiosyncratic readings. Second, even with self-identification, the problem remains that the patent owner becomes the exclusive provider of the invention to a racially-defined group while other groups are given a wider range of choices. This disparate effect based on race still remains problematic even if individuals are allowed to self-identify as "black." Self-identification may actually lead to a preverse result as individuals may seek to not self-identify as "black" in order to avoid being captured by a monopolist vendor of the invention.

2. ***A racial category should be not a consideration in the nonobviousness of an invention.***

Racial categories may be used to distinguish an existing invention in order to obtain a new patent on the underlying invention. Professor Kahn documents that Nitromed pursued precisely this strategy in obtaining a patent for BiDiL. Many of the patents for toys, specifically for board games, seemingly take traditional games and tailor them to African-American heritage. Such racial tailoring is desirable in order to promote diversity and pluralism within the marketplace and civil society more broadly. But such racial tailoring should not be basis to determine that the invention is nonobvious for two reasons. To understand these reasons, let me first explain the doctrine of nonobviousness.

In order to obtain a patent, an inventor must show that the invention was useful, novel, nonobvious, and enabled. Novelty means that the invention has not been disclosed in all its elements in the prior art. However, even if an invention is novel, a patent may be denied if the differences between the invention and the prior are trivial or obvious to someone who has ordinary skill in the art. For example, I could not obtain a patent on a standard deck of cards because it is already known in the prior art. If I tried to patent a deck of cards that used the

likenesses of presidents rather than kings and queens, such a patent would be denied because I have just made a trivial change to a known invention. The nonobviousness standard is designed to be an objective inquiry that filters out trivial inventions from the field of patenting.

One objection to racial tailoring is the frequent objection that patents recently have been granted to trivial variations on known products. This objection stems from a concern with the integrity of the patent system and the need to promote innovation in the marketplace. Although these criticisms have been made from the perspective of incentive or market theories of patent law, the cultural theory of patents would also provide a basis for trivial patents. If inventors were allowed to take known inventions, whether in the field of biotechnology, pharmaceuticals, or entertainment, and simply place a racial spin on them, then the market could be flooded with products and services that have a veneer of cultural diversity without necessarily affirmatively empowering traditionally subordinated groups. The objection is not based on lack of cultural or racial authenticity, but the fear of racial pandering that would be promoted by allowing race alone to be a factor in the nonobviousness inquiry.

A second objection is the essentializing effect of the use of race in the nonobviousness inquiry itself. To say that adding race alone to a known invention makes the invention nonobvious assumes that the underlying baseline is that of the white majority. As a practical matter, the nonobviousness inquiry is based on the policy of encouraging certain directions of inventive activity. For example, it has been noted that the nonbviousness standard has been lower in biotechnology with the result of promoting faster innovation in that industry. Analogously, the case has been made that considering race as a factor for nonobviousness would spur greater innovation in neglected areas of research and medicine. But applying the nonobviousness standard in this way would tend to continue defining what constitutes normal invention and innovation in terms of majoritarian terms. The risk is that companies will use a race-based non-obviousness standard to create trivial variations of existing inventions rather than develop inventions that target the substantive needs of previously neglected populations.

3. *A racial category can be used in consideration of the utility of an invention.*

In order to obtain a patent, the inventor must demonstrate some application, or utility, for the invention. This utility must be substantial and specific. The utility requirement serves two purposes. First, it ensures that patents are granted to inventions that do have some application and are not merely theoretical or abstract creations. Second, it ensures that the inventor has sufficiently worked on her invention to discover its applications in a substantive and well-defined way.

Racial categories can be used in determining the utility of an invention, particularly in promoting the affirmative empowerment of racially defined groups. While racial categories in patent claims and in the nonobviousness inquiry may serve to reify stereotypes or essentialize elements of identity, racial categories in the context of utility can serve to identify beneficial applications of inventions that can target inventive activity towards previously ignored or

neglected groups without essentializing them. For example, in the context of racialized medicine, the utility requirement can identify how particular treatments or innovations address orphan diseases. The utility requirement can also identify niche markets, such as for the hair and skin related products described in Section Two. Therefore, utility can be used to promote racial pluralism in inventorship without the problem of essentializing racial categories by using these categories to provide the context for inventions. Furthermore, allowing race to be a factor in the utility analysis would benefit inventors that target some beneficial applications to subordinated communities without imposing the negative implications that would arise from the use of race in the claims or in the nonobviousness inquiry. There are three caveats to this proposal.

First, the utility requirement is just one of five requirements for patentability. Therefore, just because race is an accepted factor for utility does not mean that identifying a racial application will be sufficient for the award of a patent. Having used race to satisfy the utility requirement, the inventor would in addition have to show how the novelty, nonobviousness, enablement, and subject matter criteria are met with non-race based factors. My proposal allows for the consideration of race to promote affirmative empowerment in the civic sphere while avoiding some of the damaging uses of race. I pursue this goal by allowing considerations of race for the purposes of utility, but limiting the use of race in claims and for nonobviousness.

Second, even with the utility requirement there is the risk that race will be used to essentialize groups, particularly through assumptions about race as a genetic marker in the context of pharmaceutical inventions. This danger can be avoided by having a high standard for substantial utility when race is being considered. Epidemiological information on incidence of disease and success of treatment can be data in establishing utility, but, as has been pointed out, it would be dangerous to make any inferences from such data that there is a genetic component of race. Such epidemiological data would be consistent with the view that race is purely socially constructed.

Third, racial categories can arise in a way that perpetuates stereotypes, as evidenced by the various patents on toys from the Nineteenth Century. The utility requirement should be applied to distinguish between beneficial and subordinating uses of racial categories. Once again substantial utility can serve as a filter between these two competing types of uses. If the application of the invention serves to benefit racial groups by including previously excluded groups within civil society, such as through recognizing market niches or products targeted towards emerging segments of the economy, then beneficial utility would be established. Similar targeting orphan diseases would also meet the beneficial utility requirement.

A difficult question is raised by patents that might have both beneficial and subordinating uses. For example, the skin depigmentation patent can be used to correct for skin diseases but can also be used to serve a market that facilitates passing or legitimizes negative stereotypes about non-white skin. Within the cultural theory of patent, such mixed use inventions pose a deep dilemma and reflects schism within communities about individual autonomy in how an individual shapes and defines one's identity. In this case, my proposal is to look skeptically upon inventions that have some subordinating uses and carefully balance the beneficial uses with the potentially

subordinating uses. In the case of the depigmentation patent, the therapeutic benefits of the invention would need to be shown to be substantial to counter the potential subordinating uses.

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I have made the case for assessing race based patents through a cultural theory of patents that incorporates a norm of anti-subordination from critical theories of race. My goal is to use the patent system to promote pluralism and affirmative empowerment within civil society. The approach I propose is designed to coordinate the tensions between commercialization and race in the development of race specific patents and race specific markets. The patents documented in Section Two show that racial categories have been and continue to be present in the patent system. What we make of this history and the continuing presence of racial categories in patenting rests on the normative underpinning of patent law and of our use of race. The proposals I make here provide a path for the beneficial promotion of race in contemporary civil society based on the commercialization of innovation.

V. Conclusion

I end this Article by emphasizing that the argument is just a beginning. By exploring the role of race in patent law, I intend to establish a start for exploring how intellectual property law serves to do more than create financial rewards or promote commercialization. If there is one point to be gathered from this Article, it is that inventorship and creativity occur in a social context and that context is reflected in both what is created and how it is described. The use of racial categories reflects how the language of race can very readily and unsurprisingly enter the language of invention and innovation.

The more difficult question is what to make of this convergence. Liberal theories of race, and the principles of color-blindness and assimilation, would instruct against the use of racial categories in all governmental decision making, including the award of patents. But the color-blind principle works against the role of patent law in promoting progress, which would include progress in assimilating groups previously ignored in the marketplace and other institutions of civil society. If patents promote positive externalities, then why not the positive externalities created through racial inclusiveness and assimilation? I have made the point that a cultural theory of patents, and intellectual property more broadly, is necessary to address this question and specifically a cultural theory that is attuned to the conflicting views of race. From this theory, I have proposed ways in which race can be incorporated into the patent inquiry in order to promote the goals of affirmative empowerment and pluralism by avoiding the essentializing possibilities of patent law documented by other scholars.

So if this is just the beginning, what next? I hope this Article serves as a useful contribution to understanding how race has been used in patent law beyond the domain of pharmaceutical patents, where it has been studied previously. But I am also hoping that the integration of theories of intellectual property with theories of race and culture will lead to greater debate about the place of intellectual property in constructing civil society. The presence of race in patent law shows that the law of intellectual property, with all its promises for the future, is intertwined with lingering dilemmas

from the past.

APPENDIX

TABLES OF INVENTIONS DISCUSSED IN SECTION TWO

TABLE A1: Inventions involving hair			
PATENT NUMBER	**YEAR**	**PATENT NAME**	**INVENTOR NAME**
763012	1904	Brown	Miller, Gael E.
1425757	1922	Comb	Echols, David K.
1607674	1926	Pomade comb	Ives, Olive de Shazo
1593055	1926	Device and process for straightening hair	Arnole, Edith
2238544	1941	Method for reducing or removing wave curl or frizziness from hair	Wheatley, Edward
2390073	1945	Hair treatment	Calva, Jose B.
2576283	1950	Device for permanent waving of hair	Schmidt, Christian
2763270	1956	Hair straightening and rewaving device	Carvey, Talmage G.
2782790	1957	Hair treatment composition and methods for use of same	Bessing, Frank P.; Hersh, Herman I.
3092111	1963	Therapeutic method for abrasion of human skin	Saperstein, Rose B.; Stiefel, Werner K.
3182667	1965	Hair curler with heating and cooling hair contacting jaws	Den Beste, Marion
3369970	1968	Dyeing Human Hair	McLaughlin, Terence P.; Wilkinson, Twinkenham; Wilkinson, John B.
3644084	1972	Treatment of keratin fibers	Yung, Hsiung Du; January, Wolfram Leszek

3837350	1974	Tension (bobby) pin	Terrell, James L.; Curry, Jerome
3892246	1975	Method and apparatus for doing afro hairdos	Woodard, Robert
3981681	1976	Depilitory formulation	de la Guardio, Mario
4148329	1979	Process and composition for treating hair	Jaskowski, Michael C.
4303085	1981	System and method for hair treatment	de la Guardia, Mario - Savannah, Georgia; Cowsar, Donald R. - Birmingham, Alabama
4324263	1982	Hair straightening process and curling process	de la Guardia, Mario
4416296	1983	Composition and method for hair treatment	Meyers, William E.
4373540	1983	Hair straightening process and curling process and composition	de la Guardia, Mario
4524787	1985	Hair relaxer	Khalil, Ezzat N. - Oak Park, Illinois; Cheslow, Ernest- Glencoe, Illinois
4605018	1986	Method for treating hair and anhydrous composition related thereto	de la Guardia, Mario; Hendrix, Charles R., Jr.
4775530	1988	Method for treatment and prevention of pseudofolliculitis barbae	Perricone, Nicholas V., M.D.
5034221	1991	Topical agent of method for treatment of pseudofolliculitis barbae	Rosen, Stewart; Thomas, Robert M.
5477561	1995	Hair maintenance cap	Adkins, Jennipher
5419344	1995	Razor bump electrolysis	DeWitt, Thomas Lee

5589163	1996	Permanent wave composition and method	Neill, Paul - Hinsdale, IL; Brandt, Loralei - Cary, IL; Walling, Priscilla - Darien, IL; Nandagiri, Arun - Libertyville, IL; Meltzer, Norman - Morton Grove, IL
5632975	1997	Composition and method for treatment of dermatitis on the scalp	Earles, R. Martin
5651961	1997	Hair manageability and styling composition	Neill, Paul - Hinsdale, IL; Brandt, Loralei - Cary, IL; Walling, Priscilla - Darien, IL; Nandagiri, Arun - Libertyville, IL; Meltzer, Norman - Morton Grove, IL,
5656265	1997	Hair styling composition and method	Bailey, Peter Lawrence - Wirral, United Kingdom; Gough, Anthony David - Oakley, United Kingdom; Khoshdel, Ezat-Neston, United Kingdom; Polywka, Robert-Guilden Sutton, United Kingdom
5679327	1997	Hair straightening emulsion	Darkwa, Adu Gyamfi - Chicago, Illinois; Vallanueva, Apolonio L. - Northbrook, Illinois
5609859	1997	Hair relaxer composition and methods for preparing same	Cowsar, Donald R.

5728374	1998	Hair manageability and styling composition and method	Neill, Paul - Hinsdale, IL; Brandt, Loralei - Cary, IL; Walling, Priscilla - Darien, IL; Nandagiri, Arun - Libertyville, IL; Meltzer, Norman - Morton, Grove, IL
5810023	1998	Method for styling hair using a flat disk	Jones, Marla Vanessa - New York, NY; Ferguson, Angela - Brooklyn, NY; Williams, Pat Grant - Silver Spring, Maryland
5824295	1998	Composition for decreasing combing damage and methods	Syed, Ali N. - Orland Park, IL; Ahmad, Kaleem - Chicago, IL
5830446	1998	Fluorescent brightening of cosmetic compositions	Berthlaume, Marianne D. - Latham, NY; Raleigh, William J. - Rensselaer, NY; Uriarte, Richard J. - Clifton Park, NY
58492777	1998	Hair relaxer composition and methods for preparing same	Cawsor, Donald R.
5853709	1998	Shaving composition and method for preventing pseudofolliculists barbae	Willis, Isaac - Atlanta, GA; Darkwa, Adu Gyamfi - Olympia Fields, IL; Villanueva, Apolonio L. - Northbrook, IL
6001340	1999	Topical composition and methods for treating pseudofolliculitis barbae and ingrown hair	Rosen, Steven E.; Brown, Robert Lee

6007585	1999	Hair brightening system	Syed, Ali N. - Orland Park, IL; Habib, Wagdi W. - Barrington, IL; Hu, Longsheng - Chicago, IL
5958391	1999	Composition and method for treatment of dermatitis on the scalp	Earles, R. Martin
6009883	2000	Hair straightening noggle	Morrow, Willie L.
6013249	2000	Hair manageability and styling composition and method	Neill, Paul - Hinsdale, IL; Brandt, Loralei - Cary, IL; Walling, Priscilla - Darien, IL; Nandagiri, Arun - Libertyville, IL; Meltzer, Norman - Morton Grove, IL
6012463	2000	Shaving method and shaving kit	Mitchell, Clarence
6325690	2000	Composition for treatment of pseudofolliculitis barbae and skin irritation	Nelson, Webb
6032365	2000	Slotted rotary shaver	Hodges, James L.
6217572	2000	Apparatus and method employing lasers for removal of hair	Tobinick, Edward L.
6080147	2000	Method of employing a flaslamp for removal of hair, veins, and capillaries	Tobinick, Edward L.
6149645	2000	Apparatus and method employing lasers for removal of hair	Tobinick, Edward L.
6156299	2000	Topical composition and methods for treating pseudofolliculitis barbae and ingrown hair	Rosen, Steven E.; Brown, Robert Lee
6165171	2000	Apparatus and method employing lasers for removal of hair	Tobinick, Edward L.
6262105	2001	Method of enhancing hair growth	Johnstone, Murray A.
6264121	2001	Adjustable hand-held shower apparatus	McClary, Nobia

6168589	2001	Apparatus and method employing a simple laser for removal of hair	Tobinick, Edward L.
6390101	2002	Self contained applicator for applying fluid	Alexander, Larry Rush
6488920	2002	Gradual hair relaxation composition	Thomas, Lillie C.
6572843	2003	Method for treating hair	Sorensen, Niels Henrik - Skaevinge, Denmark; McDevitt, Jason Patrick - Alpharetta, Georgia
6579283	2003	Apparatus and method employing a single laser for removal of hair, veins, and capillaries	Tobinick, Edward L.
6595985	2003	Apparatus and method employing parametrically defined pulse groups for laser hair removal	Tobinick, Edward L.
6602493	2003	Hair relaxer system and method therefor	Akhter, Humanyoun - Hinsdale, IL; Syed, Ali N. - Inverness, IL
6517822	2003	Formulations and methods for straightening hair	Buck, Carol J.
6684887	2004	Hair separator and fluid applicator apparatus with improved fluid retention	Alexander, Larry Rush
6703009	2004	Topical compositions and methods for treating pseudofolliculitis barbae and ingrown hair	Rosen, Steven E.; Brown, Robert Lee
6736145	2004	Hair separator and fluid applicator apparatus	Alexander, Larry Rush
6735871	2004	Electrically heated scissors	Todd-Russell, Sammie Jean

6893631	2005	Shaving soap and aftershave gel and methods of use thereof	Mitchell, Jr., Clarence - Nashville, TN; Sanders, Willard - Old Hickory, TN
7041636	2006	Composition for couteracting hair loss	Benton, Melody M.
7073516	2006	Braid removal device	Beamen, Lawrence McGowan
7021317	2006	Hair clip assembly	Nathaniel, Michele

TABLE A2: Inventions involving skin color			
PATENT NUMBER	YEAR	PATENT NAME	INVENTOR NAME
2248148	1941	Apparatus for comparing, matching, or detecting colors	Wilson, John
3367253	1968	Multiple image flash camera	Kuhns, Roger J.; Macone, Frederick W.
3517105	1970	Method of Treating Hyperpigmentation	Miskel, John J.; Neary, Edward R.; Schlesinger, Walter
3705762	1972	Method for Converting Black and White Films to Color Films	
3856934	1974	Skin Depigmentation	Kligman, A.
4506293	1985	Independent fleshtone contours	Hurst, Robert N.
4680172	1987	Devices and methods for treating memory impairment	Leeson, Lewis J.
4765985	1988	Devices and methods for treating memory impairment	Leeson, Lewis J.

4798790	1989	Monoclonal antibody specific for a pigmentation associated antigen	Thomson, Timothy M. - New York, New York; Mattes, M. Jules - Flushing, New York; Old, Lloyd J. - New York, New York; Lloyd, Kenneth O. - Bronx, New York; Roux, Linda - San Diego, California
5461457	1995	Method of determining amount of exposure	Nakamura, Hiroaki
5518728	1996	Cosmetic compositions for non-white pigmented skin	Burdzy, Elisa
5552162	1996	Method for improvement of scar size and appearance	Lee, Raphael C.
5671735	1997	After shave treatment composition	McKenzie, Therman - 647 Watson Bay, Stone Mountain, Georgia: Agard, James - Decatur, Georgia
5869540	1999	Herbal treatments for improving skin appearance	Smith, Walter P.
6111973	2000	Method for producing color-comparable photographs with fleshtone color selections for prosthetic fabrication	Holt, Kenneth Dale; Holt, David Michael
6129664	2000	Method and apparatus for detecting and measuring conditions affecting color	Macfarlane, Darby Simpson - Hastings-on-Hudson, New York; Macfarlane, David Kenneth - Hastings-on-Hudson, New York; Billmeyer, Fred W. - Schenectady, New York

6157445	2000	Method and apparatus for detecting and measuring conditions affecting color	Macfarlane, Darby Simpson - Hastings-on-Hudson, New York; Macfarlane, David Kenneth - Hastings-on-Hudson, New York; Billmeyer, Fred W. - Schenectady, New York
6128516	2000	Method and apparatus for detecting and measuring conditions affecting color	Macfarlane, Darby Simpson - Hastings-on-Hudson, New York; Macfarlane, David Kenneth - Hastings-on-Hudson, New York; Billmeyer, Fred W. - Schenectady, New York
6308088	2001	Method and apparatus for detecting and measuring conditions affecting color	Macfarlane, Darby Simpson - Hastings-on-Hudson, New York; Macfarlane, David Kenneth - Hastings-on-Hudson, New York; Billmeyer, Fred W. - Schenectady, New York
6169536	2001	Color picture quality compensation circuit and related control method thereof	Lee, Kwang-Chun - Kyungsangbook-Do, South Korea; Ha, Yeong-Ho - Daeku, South Korea; Hong, Kyong-Chul - Kyungsangbook - Do, South Korea

6437863	2002	Method and apparatus for detecting and measuring conditions affecting color	Macfarlane, Darby Simpson - Hastings-on-Hudson, New York; Macfarlane, David Kenneth - Hastings-on-Hudson, New York; Billmeyer, Fred W. - Schenectady, New York
6353226	2002	Non-invasive sensor capable of determining optical parameters in a sample having multiple layers	Khalil, Omar S. - Libertyville, Illinois; Wu, Xiaomao - Gurnee, Illinois; Kanger, Johannes Sake - Enschede, Netherlands; Bolt, Rene' Alexander - Enschede, Netherlands; Yeh, Shu-Jen - Grayslake, Illinois; Hanna, Charles F. - Libertyville, Illinois; de Mul, Frits Frans Maria - Almelo, Netherlands
6337320	2002	Reparatives for ultraviolet radiation skin damage	Hersh, Theodore - Atlanta, Georgia; Warshaw, Michael A. - Savannah, Georgia
6630130	2003	Sunless tanning cream	Grimes, Pearl - Los Angeles, California; Palefsky, Irwin - Clifton, New Jersey; Klein, Ken - Fairlawn, New Jersey

6798921	2004	Method for image designating and modifying process	Kinjo, Naoto

TABLE A3: Inventions involving toys and games

PATENT NUMBER	YEAR	PATENT NAME	INVENTOR NAME
40740	1863	Automatic Dancer	Crow, Thomas N.; Crow, James
44378	1864	Automatic Dancer	Stimets, Cassifs P.; Atwood, James
46997	1865	Dancing Toy	Topliff, James M.L.
143121	1873	Improvements in automatic toy Dancers	Browee, Henry L.
258772	1882	Toy Chariot	Kyseb, Louis; Bex, Alfred C.
296724	1884	Toy and Advertising Medium	Burridge, Lee S.; Maeshmak, Newman E.
364221	1887	Equipment for Theatrical Stages	Cubby, John
366441	1887	Advertising Show-stand	Wetzell, Louis P.
462150	1891	Toy Bank	Murray, John
565450	1896	Toy	Gibson, Edward Tinkham

568854	1896	Automatic-Figure Advertising device	Kenny, Paul T.
601287	1898	Game Apparatus	Shoemaker, Lockert K.
627472	1899	Game device	Boyce, Samuel J.
659765	1900	Toy	Reed, John James
672277	1901	Pneumatic Toy	Maull, James L.
859256	1907	Target	Shaules, Herbert A.
844507	1907	Game Apparatus	Falvey, Thomas J.
976495	1910	Advertising Device	Beeves, Percy
960190	1910	Game	Nixon, James Robert
990292	1911	Game	Rigney, William J.
996458	1911	Game apparatus	Coleman, Ava R.
1154331	1915	Toy	Mitchell, Harry J.
1193962	1916	Game	Aley, John B.
1377261	1921	Educational block	Bothne, Esther M.; McClain, Charles A.
1395545	1921	Game	Aley, John B.
1410429	1922	Mechanical Toy	Vaughan, Thomas M.
1474589	1923	Toy	Hoddinott, John K.
1441055	1923	Climbing figure toy	Bellew, Ralph D.
1590563	1926	Dancing figure toy	Childs, Edward Earle

1588143	1926	Pursuit toy	Ross, Joseph A.
1589432	1926	Toy Carnival	Sapp, Philip Allen
1717144	1929	Toy bank	Cola, William
1888005	1932	Amusement apparatus	Markey, Fred L. - Lawrence, MA; Stanton, Joseph R. - Newburyport, MA
2016129	1935	Three dimensional display means	Williamson, Marshall I.
2188292	1940	Electric target maching with reversing target	Hall, Jawn R.; Falkenberg, William P.
2419872	1947	Toy	Beder, Samuel L.
3419993	1969	Doll having a plurality of changeable ethnic features	Rodgers, June M.
3830012	1974	Doll with changeable Face and Belly Portions	Franke, Gunter
3940863	1976	Psychological testing and therapeutic game device	Kritzberg, Nathan I.
4569526	1986	Vectorial and Mancala-like games, apparatus and methods	Hamilton, Clarence Q.
4666160	1987	Apparatus for playing	Hamilton, Clarence Q.
5100140	1992	Wheel of black history game device	Foy, Frank E.
5360217	1994	Collectible factspak card board game	Taylor, H. LeBaron
5454569	1995	Afro American educational quiz game	Walker, Donald P.
5377990	1995	Board game incorporating native American symbols and knowledge	Seeney-Sullivan, Sarah E.
5480337	1996	Combination diverse doll and educational activity playset method	Baker, Jennifer K.

5941757	1999	Neck assembly for infanct simulator	Jurmain, Mary M. - Eau Claire, Wisconsin; Fusi, John C. - New Providence, New Jersey
5947791	1999	Gender neutral doll body with replaceable photographic face	Taylor, Joan Senica
6071171	2000	Realistic doll head system and method therefor	George, Richard L; Wilcox, Reed N.; Thiess, W. Kenn; Anderson, Lane
6109921	2000	Make-up mannequin headnad make-up mannequin kit for use therewith	Yau, Peter
6024361	2000	Kwanza board game	Assoumou, Ngoran
6164872	2000	Educational doll	Winslow, Andrew R.
6238215	2001	Method for training a person to properly support the head of a young infant	Jurmain, Mary M. - Eau Claire, Wisconsin; Fusi, John C. - New Providence, New Jersey
6220864	2001	Three-dimensional educational role-playing game apparatus and method of use	Walawender, Valerie
6244926	2001	Realistic doll head system and method therefor	George, Richard L; Wilcox, Reed N.; Thiess, W. Kenn; Anderson, Lane

6428321	2002	Infant simulator	Jurmain, Richard N. - Eau Claire, Wisconsin; Jurmain, Mary M. - Eau Claire, Wisconsin; Blackledge, Larry P. - Eau Claire, Wisconsin; Oium, Shelia R. - Alma, Wisconsin; Pelkus, Adrian - San Marcus, California; Rybarczyk, Mary E. - Baldwin, Wisconsin
6454571	2002	Infant simulator	Jurmain, Richard N. - Eau Claire, Wisconsin; Jurmain, Mary M. - Eau Caire, Wisconsin; Oium, Shelia R. - Alma, Wisconsin
6457716	2002	Card game having cards with graphic and pictorial illustrations of geographic, historical, and health related facts	Johnson Prillerman, Kathleen O.
6537074	2003	Infant simulator	Jurmain, Richard N. - Eau Claire, Wisconsin; Jurmain, Mary M. - Eau Claire, Wisconsin; Oium, Sheila R. - Alma, Wisconsin

6604980	2003	Infant simulator	Jurmain, Richard N. - Eau Claire, Wisconsin; Jurmain, Mary M. - Eau Claire, Wisconsin; Blackledge, Larry P. - Eau Claire, Wisconsin; Jones, Douglas B. - Mojave, California; Oium, Shelia Rae - Alma, Wisconsin
6752396	2004	Method and system for playing trivia games	Smith, Tommy R.
6872078	2005	Teaching cylinder instruments	Bauldock, Sr., Gerald
7025593	2006	Teaching circumference instrument	Bauldock, Sr., Gerald

TABLE A4: Inventions involving identities and names

PATENT NUMBER	YEAR	PATENT NAME	INVENTOR NAME
1343755	1920	Means employed in the classification of names	Woods, Joseph P.
2294903	1942	Selective filling and finding system	Griffin, Robert O.
5794210	1998	Attention brokerage	Goldhaber, A. Nathaniel; Fitts, Gary
5855008	1998	Attention brokerage	Goldhaber, A. Nathaniel; Fitts, Gary
6116652	2000	Learning materials delivery system	Page, Jeanne M.

6917926	2005	Machine learning method	Chen, Hung-Han - Watertown, Massachusetts; Hunter, Lawrence - Denver, Colorado; Poteat, Harry Towsley - Boston, Massachusetts; Snow, Kristin Kendall - Somerville, Massachusetts
69878549	2005	Patterning system for a selected body type and methods of measuring for a selected body type	Ellis, Stacey L.

TABLE A5: Miscellaneous inventions			
PATENT NUMBER	**YEAR**	**PATENT NAME**	**INVENTOR NAME**
2548	1842	Improvement in plows	Watt, George
246044	1881	Sponge-cup	Stellwagen, Edward J.
439854	1890	Motion clock	Bannatyne, Archibald
465044	1891	Stage and scenic effect for dramatic representations	Jefferson, Charles B.
768258	1904	Coin-controlled vending machine	Allis, Abram Q.
1305835	1919	Changeable pictube	Saalburg, Charles W.
1333782	1920	Automatic stop mechanism for talking-machines	Sheldon, Cecil H.
1561546	1925	Steam generating plant	Kennedy, James E.
1627414	1927	Bowling-pin-setting apparatus and its method of operating	Schaeffer, Lewis D.

1686317	1928	Mule back duster	Feeny, Edmund J.
1792396	1931	Novelty windmill	Robinett, Harley E.
1853124	1932	Cotton picker	Gooding, Howard P.; Henderson, Wiley L.
1912021	1933	Macaroni and means for producing same	Tanzi, Guido
2237751	1941	Image for making animated moving pictures	Bunin, Louis
2315220	1943	Process for the manufacture of polyazoic dyestuffs	Petitcolas, Pierre - Rouen, France; Sureau, Robert Frederic Michel - Mon St. Aignan, France
2328465	1943	Metalliferous substantive dyestuffs	Kopp, George
2694958	1954	Selector means for phonograph and picture projections	Gilbert, Jack
3000782	1961	Materials for embalming human corpses	Landau, Argo E. - Westwood Village, MO; Roberts, Eugene C. - Belleville, IL; Zeilmann, Joseph A. - Hillsdale, MO
3549765	1970	1 - (Substituted) - 5 aminotetragoles and treatment of inflammation of the animal organism therewith	Enkoji, Takashi - Park Forest, IL; Bossinger, Charles D. - Olympia Fields, IL
3636192	1972	Meningococcal polysaccharide vaccines	Gotschilich, Emil C.
3847482	1974	Apparatus for detecting a change in turbidity of a solution	Sokol, Michael; Kent, Frederick
3891209	1975	Psychological testing and therapeutic game device	Kritzberg, Nathan I.

3898002	1975	Method and apparatus for editing a film strip	Kinder, Claude E.; Jones, Robert L., Jr.; Marsh, Walter W.
4055660	1977	Treatment of warts	Meierhenry, Dwight W.
4134395	1979	Method of using magnetic fields to conduct a screening diagnostic examination	Davis, Albert R.
4183048	1980	VIR-controlled hue correction circuit	Isono, Katsuo-Kawagoe, Japan; Sanada, Seiji-Yokosuka, Japan
4482571	1984	Sickle cell anemia treatment and compound	Abraham, Donald J.
4704402	1987	Method for treating sickle cell anemia	Abraham, Donald J. - Murrysville, PA; Witiak, Donald - Mt. Vernon, OH
4782950	1988	Decorative figure article holder	Santoro, Catherine J.
4851816	1989	Crib death (SIDS) warning device	Macias, Helene; Winke Angos
4965074	1990	Method of treating memory impairment	Leeson, Lewis J.
5609159	1992	Method and apparatus for noninvasive determination of a disease state of a human eye	Kandel, Gillray L. - Troy, New York; Schroeder, John - Schenectady, New York
5692500	1997	Pain management and recoding tool and method	Gaston-Johansson, Fannie
5674687	1997	Method for identifying the species origin on a DNA sample	Hershfield, Bennett
5798267	1998	Method for determining alcohol consumption rates	Harasymiw, James W.
5932624	1999	Vitamin supplement composition	Herbert, Victor D.

5954369	1999	Greeting card with kit for health testing	Seabrook, March E.
5971763	1999	Method of teaching, training and practice cosmetology techniques and a make-up mannequin for use therewith	Yau, Peter
6045502	2000	Analyzing system with disposable calibration device	Eppstein, Jonathan A. - Atlanta, Georgia; Samuels, Mark A. - Norcross, Georgia; Ignotz, Keith D. - Duluth, Georgia; Newman, Gregory J. - Atlanta, Georgia
6013628	2000	Method for treating conditions of the eye using polypeptides	Skubitz, Amy P. N. - Minneapolis, Minnesota; Furcht, Leo T. - Minneapolis, Minnesota; Balles, Mark - Indianapolis, Indiana; Gregerson, Dale S. - Minneapolis, Minnesota; Agarwal, Anita - Gainesville, Florida; Wright, Martha M. - St. Paul, Minnesota; Murali, Shobana - Roseville, Minnesota
6322976	2001	Compositions and methods of disease diagnosis and therapy	Altman, Timothy J. - London, England; Scott, James - London, England; Stanton, Lawrence W. - Redwood City, California
6328760	2001	Pulsed plasma radiation device for emitting light in biologically significant spectral bands	James, Robert G.

6291182	2001	Methods, software, and apparati for identifying genomic regions harboring a gene associated with a detectable trait	Schork, Nicholas J. - Shaker Heights, Ohio; Essioux, Laurent - Paris, France; Cohen-Akenine, Annick - Paris, France; Blemenfeld, Marta - Paris, France; Cohen, Daniel - Neuilly-sur-Seine, France
6452188	2002	Spectral reflectance scale method and apparatus	Chuff, Charles
6566065	2003	Method of diagnosing schizophrenia by detecting a mutation in the MTHFR gene	Rozen, Rima
6605646	2003	Vitamin supplement composition	Herbert, Victor D.
6616277	2003	Sequential eye screening method and apparatus	Davenport, Wayne E.

6825336	2004	Polymorphism in human gene association with osteoporosis	Venter, J. Craig - Rockville, Maryland; Zhang, Jinghui N. - Rockville, Maryland ; Liu, Xiangjun - Olney, Maryland; Rowe, William - Rockville, Maryland; Cravchik, Anibal - Gaithersburg, Maryland; Kalush, Francis - Rockville, Maryland; Naik, Ashwinikumar - Gaithersburg, Maryland; Subramanian, Gangadharan - Columbia, Maryland; Woodage, Trevor - Washington, District of Columbia

6812339	2004	Polymorphism in human gene sequences associated with human disease	Venter, J. Craig - Rockville, Maryland; Zhang, Jinghui N. - Rockville, Maryland ; Liu, Xiangjun - Olney, Maryland; Rowe, William - Rockville, Maryland; Cravchik, Anibal - Gaithersburg, Maryland; Kalush, Francis - Rockville, Maryland; Naik, Ashwinikumar - Gaithersburg, Maryland; Subramanian, Gangadharan - Columbia, Maryland; Woodage, Trevor - Washington, District of Columbia
6917829	2005	Method and system for a distributed analytical and diagnostic software over the intranet and internet environment	Kwong, Manlik

6900016	2005	Polymorphism in human genes associated with inflammatory autoimmune disease	Venter, J. Craig - Rockville, Maryland; Zhang, Jinghui N. - Rockville, Maryland ; Liu, Xiangjun - Olney, Maryland; Rowe, William - Rockville, Maryland; Cravchik, Anibal - Gaithersburg, Maryland; Kalush, Francis - Rockville, Maryland; Naik, Ashwinikumar - Gaithersburg, Maryland; Subramanian, Gangadharan - Columbia, Maryland; Woodage, Trevor - Washington, District of Columbia