

Position Classification Standard for Patent Adviser Series, GS-1221

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SERIES DEFINITION

This series includes positions involving professional scientific or engineering work, and, in addition, legal work pertaining to the analysis of inventions and the evaluation of the patentability thereof. This entails preparing and prosecuting applications for patents; preparing and presenting briefs and arguments and prosecuting appeals and interferences before the Patent Office; making infringement investigations, and rendering opinions on the validity of patents, in order to protect the Government's interest in such inventions.

This standard supersedes and is to be substituted for the standard for the Patent Adviser Series, GS-1221-0, which was issued in October 1950.

DISTINCTIONS FROM RELATED OCCUPATIONS

This series is one of several concerned with the various aspects of patent work. While there are marked similarities in the knowledge and skills required in these occupations, they differ from each other in the manner in which these knowledge and skills are utilized and in the areas of responsibility for and functional relationship to the patent process. Positions concerned with examining patent applications and granting or denying patents based on such applications and adjudicating petitions and appeals from such decisions, are allocable to the [Patent Examining Series, GS-1224](#). These positions are located in the United States Patent Office. Patent Adviser positions, on the other hand, are concerned with formulating the case for the granting of a patent and presenting it to the Patent Office. Both the patent examiner and the patent adviser must be thoroughly familiar with the rules involved, but their functions and objectives are different.

Positions involved with performing professional legal, scientific, or engineering work in connection with negotiating patent licenses, negotiating and settling patent claims, negotiating patent clauses in contracts, providing professional legal advice to contracting officers and other procurement personnel on patent matters, and presenting briefs and arguments before the Federal Courts, and which require that their incumbents possess a degree, or its equivalent, in one of the scientific or engineering disciplines, and in addition, a degree from a recognized law school *and admission to the bar*, are classified to the [Patent Attorney Series, GS-1222](#).

The significant difference between patent attorneys and patent advisers is that patent attorneys are required (while patent advisers are not) to be members of the bar. Membership in the bar is required when the incumbent of a position is "practicing law." Admittedly, what constitutes the practice of law is difficult to define, but for purposes of distinguishing between patent attorneys and patent advisers, the practice of law includes: (1) representing one's client in court;

(2) representing one's client in settling disputes, such as infringements, out of court; (3) representing one's client when the legal implications of the case or problem are such that the acceptance by others of the client's action is based in large measure on awareness of the fact that the action was taken on the advice of a fully qualified patent attorney (i.e., a member of the bar).

Also included within the practice of law are legal endeavors that are difficult to the extent that the public interest is satisfied only by the use of a patent attorney.

SPECIALIZATIONS AND TITLES

The basic title for positions in this series is "Patent Adviser." The appropriate area of specialization from among those listed below is added in parenthesis to the basic title for positions at GS-11 and above because it is not until the patent adviser reaches the GS-11 level that his specialized scientific or engineering knowledge and skills are sufficiently significant to be recognized in the title of his position. Positions classified to the GS-9 level and below are titled "Patent Adviser" with no further designation, since at these levels the patent adviser is learning and applying (within controlled situations) the rules, procedures and practices associated with patent advisory work. Supervisory positions classified to this series are identified by the addition of the term "supervisory" at the beginning of the title; for example, Supervisory Patent Adviser (General). While supervisory patent adviser positions are classified to this series, the guides described herein are confined to coverage of the nonsupervisory aspects of such positions. The supervisory functions will be covered by the [General Schedule Supervisory Guide](#). The specializations:

Chemistry -- This involves the application of knowledge of the principles, practices, theories, and phenomena of the field of chemistry including organic and inorganic chemistry, analytical chemistry, and analytical control methods, electro-chemistry, biological chemistry, physical chemistry, and purification of gases.

Chemical engineering -- This involves the application of knowledge of the principles, practices, theories and phenomena of all phases of engineering and chemistry concerned with the design, erection and operation of chemical plants and laboratories, and the apparatus and processes employed therein.

Electrical engineering -- This involves the application of knowledge of the principles, practices, theories and phenomena of all phases of engineering relating to electrical equipment, apparatus, materials, plants, and systems involved in the generation, transmission, conversion, distribution, control, measurement, or utilization of electrical energy for purposes of motive power, heating, illumination, or the production of localized electric or magnetic fields, when such work is not concerned principally with electronics or electrical communication matters which require application of the concepts, principles, techniques and practices characteristic of the electronics field.

Electronic engineering -- This involves the application of knowledge of the principles, practices, theories and phenomena involved in the design and application of such devices as electron tubes, solid state devices such as transistors or diodes, or other circuit elements; the generation, transmission and detection of electro-magnetic or acoustical wave energy; the acquisition, analysis, processing, modulation, conversion, storage, synthesis, switching, transmission, employment or display of intelligence by radio, television or computer devices; or instrumentation for production, installation, maintenance, regulation or operation of facilities,

systems and equipment utilizing electronic techniques. This specialization covers both electronic engineering and electronic scientists functions.

General -- This involves the application of: (a) knowledge of the principles, practices and theories of general engineering fundamentals such as strength and strain analysis of engineering material and structures; the physical and chemical characteristics of engineering materials such as elastic limits, maximum unit stresses, coefficients of expansion, workability, hardness, tendency to fatigue, resistance to corrosion, and engineering adaptability; and the engineering means of construction and processing; or (b) knowledge of two or more of the specializations of this series; or (c) knowledge of the principles and practices of any field of invention not identifiable with any other specialization of this series.

Mechanical engineering -- This involves the application of knowledge of the principles, practices, theories, and phenomena involved in the generation, transmission, measurement, or utilization of heat and mechanical power. Included are: prime movers such as engines and turbines using air, water, solid fuel, oil, gas, steam and other fluids; power transmission equipment such as shafting, gears, bearings and belts; transportation equipment; materials-handling equipment; containers and packaging equipment; hydraulic and pneumatic equipment; heating, ventilating, air-conditioning, refrigeration and piping systems; construction machinery; heat transfer, applied mechanics; mechanical instrumentation and controls; industrial machinery such as machine tools and plant equipment; and ordnance such as ammunition, fuses, artillery, small arms, mines and turrets.

Physics -- This involves the application of knowledge of the principles, practices, theories and laws of the science of physics including inventions involving applications of the relations between space, time, matter and energy in the areas of mechanics sound, optics, heat, electricity, magnetism, radiation, or atomic and nuclear phenomena.

DEFINITIONS OF TERMINOLOGY

For the purpose of this standard the following terms, most of which are peculiar to the patent profession, have the meanings given below:

Application -- A complete application for a patent consists of:

- (1) a *petition* addressed to the Commissioner of Patents requesting the granting of a patent;
- (2) a *specification* containing a written description of the invention in such concise and exact terms as to enable any person skilled in the art to make and use the invention; (3) *claims* (see definition below); (4) a *drawing* showing every feature of the invention, if it can be illustrated; (5) an *oath* in which the inventor alleges that he believes himself to be the original and first inventor, and that he is sole or joint inventor; (6) a *power of attorney* designating the inventor's official representatives before the Patent Office, and (7) the statutory *fee*.

Claim -- A formal statement specifically pointing out and distinctly defining the subject matter which the applicant regards as his invention, including a detailed description of all essential features necessary to distinguish the claimed invention from what already exists in the art. Novelty, patentability, validity, and infringement are judged on the basis of the scope of the claim.

Interference -- A proceeding instituted by the Patent Office for the purpose of resolving a question of priority of invention between two or more parties claiming substantially the same patentable invention. Such proceedings may involve two or more applications, or applications and patents.

Patent -- A contract by which the Government secures to the patentee the right to exclude others from making, using, or selling his invention for a statutory term of seventeen years, in consideration of the fact that he has perfected and described the invention and granted its use to the public after the statutory duration of his monopoly.

Prior art -- The sum of all public knowledge and development prior to the filing date of the application pertaining to the subject matter embraced in a field of technology of given scope, manifested chiefly in the form of patents and printed publications.

Reference -- Those specific items of prior art which are considered in judging the patentability of a subsequent invention and which are cited by a Patent Office examiner as reasons for rejection of a claim in the patent application.

OCCUPATIONAL INFORMATION

Positions in this series are engaged in a range of functions which collectively are referred to in this standard as patent advisory work. These functions, together with the knowledge and mental demands required for their performance, are discussed below.

These functions do not all represent the same level of difficulty or complexity. Accordingly, functions which are related in terms of difficulty are presented in two groupings, *basic* and *advanced*. The *basic* functions are those which must be learned by all patent advisers at less than full performance levels. Full competence in the performance of these functions is requisite to the independent performance of the *advanced* functions. *Advanced* functions are those which require a thorough grasp of the intricacies of Patent Office practice and procedure and a good understanding of patent statutory and case law.

Basic functions

1. *Evaluating potential invention* -- An invention is usually first revealed by the documents and drawings which describe the idea or inventive concepts of the invention. The patent adviser reviews these documents for completeness and clarity. Through interview or correspondence with the inventors, he secures such additional information or evidence as may be required. The patent adviser evaluates the scientific significance and/or the potential importance to the Government of the invention by applying his knowledge of the technology involved and of the current or planned scientific programs of his agency. In some situations he secures such an evaluation from a technical panel established for that purpose, and makes recommendations as to the desirability of seeking patent protection for the invention.

2. *Conducting patentability searches and rendering opinions on potential patentability* -- The purpose of the patentability search is to make a preliminary determination as to the patentability of the invention in light of the prior art. In planning the field of search the patent adviser studies the invention in detail to identify those points of novelty for which a patent is to be sought. He selects references which are most analogous to the invention and makes a detailed comparison of the structure or function described in each reference, with those embodied in the invention to: (1) determine the specific points of similarity or difference; (2) decide whether the invention is anticipated by the prior art; and (3) render an opinion or report on the potential patentability of the invention. Planning the field of search requires a good knowledge of the Patent Office classification system and a high degree of ingenuity and imagination in visualizing and identifying analogous arts. Reaching a conclusion regarding the potential patentability of the invention requires the making of fine distinctions as to whether pertinent references, singly or in combination, anticipate or serve to limit the scope or breadth of the invention. It also requires careful consideration of the rules of invention as set forth in statute and precedent court decisions.

3. *Writing patent applications* -- This is one of the key functions of the patent adviser's position since the protection afforded the invention by patent is no better than the application on which the patent is based. The patent application must be sufficiently specific to cover the original invention, and yet sufficiently broad to anticipate a maximum number of subsequent variations or improvements. It must adequately distinguish the invention from the prior art without unnecessary sacrifice of breadth of patent protection. Writing a patent application requires a thorough understanding of the technological principles and concepts embodied in the invention and a high order of scientific imagination in visualizing equivalent embodiments and future uses for the invention. In addition, it requires a thorough knowledge of: (1) Patent Office requirements governing the form and content of patent applications; (2) the relative advantages and disadvantages of alternative methods of writing claims in order to select that method, or combination of methods, most appropriate to the invention at hand; and (3) a high degree of skill in the careful choice of exact words to precisely describe and claim the invention so as to avoid the prior art without undue restriction of the claims. In writing the patent application the adviser must insure: (1) that the invention as

described in the specification is fully covered in the claims; (2) that the invention is adequately illustrated in the supporting drawings (if any); (3) that the drawings are properly referenced in the specification; and (4) that the specification and claims are consistent with each other. An invention described in the specification but not specifically claimed is not afforded protection by the patent. On issuance of the patent, the invention so disclosed becomes public knowledge and may not become the subject of a later patent.

4. *Determining who is the inventor* -- In order for an issued patent to be valid the law requires that the application be filed by the inventor or inventors involved. In those cases where invention arises out of group effort, the identification of the "true" inventor or inventors is not always clear. This requires the patent adviser to make a full investigation of the circumstances surrounding the making of the invention by: (1) studying laboratory notebooks and similar documents; (2) interviewing members of the group and others associated with the work; and (3) reconstructing the history of the making of the invention to determine who, in the legal sense, is the "true" inventor.

Advanced functions

1. *Prosecution of patent applications* -- Upon submission to the Patent Office, the application is subjected to careful study by the Patent Office examiner who determines: (1) that the application complies with the law and the Patent Office rules of practice; (2) that the specification is technically accurate; (3) that the description of the invention is sufficient; (4) that the specification clearly describes what is claimed; (5) that what is claimed will work; (6) that what is claimed is in fact patentably novel, i.e., meets the statutory and case law requirements for invention; and (7) that what is claimed is not anticipated in any one or a combination of prior art references. Objections or requirements raised by the examiner as a result of this study are set forth in Patent Office actions which detail the reasons for the rejection and cite the pertinent prior art or legal references. The burden of persuading the Patent Office examiner that the case should be reconsidered and the patent granted, rests with the patent adviser. The preparation of responses to Patent Office action is another key function of the patent adviser's position. It requires a substantial knowledge of the statutory and precedent case requirements for patentability. Responses prepared by the patent adviser must answer every basis of objection or rejection cited by the examiner. Such responses may take the following forms:
 - a. *Amendments* -- These are documents which modify the application. In preparing an amendment the patent adviser must exercise a thorough familiarity with the technological and/or legal issues involved and give careful consideration to such matters as the potential impact of the proposed amendment on the scope of patent coverage. Writing amendments to overcome Patent Office objections based on the prior art requires the patent adviser to make fine technological distinctions and precisely express them in pointing out the patentable novelty in the amended claim, and how it differs from the prior art.

- b. *Requests for reconsideration* -- These requests arise out of the belief that the Patent Office examiner's action was taken in error. In preparing such requests the patent adviser must specifically and distinctly point out the error and set forth the legal or technical evidence pertinent to its resolution. For example, such requests may involve preparing and filing affidavits or other evidence to establish the utility of the invention or to resolve questions of patentable equivalence.
- c. *Affidavits to overcome later reference* -- An application may be rejected on the basis that a previously issued patent describes the invention in question, even though it does not claim it. Such a rejection may be overcome if the date of completion of the invention can be established as predating the filing date of the reference, but not predating the filing date of the rejected application by more than one year. This requires the patent adviser to secure evidence through review of records and interviews with the inventor and others and file affidavits to establish the date of completion of the invention.
- d. *Requirement for restriction* -- The rules provide that two or more distinct inventions may not be claimed in one application. If, in the opinion of the Patent Office examiner, the application claims two or more distinct inventions, the resultant Patent Office action will require an election as to which invention will be claimed. Questions of separate invention may be difficult to resolve especially where the claims are directed to two or more subparts of the entire device, or where no broad or generic claim is allowed and an election must be made among the remaining narrow, or species claims. Disagreements between the examiner and the adviser on the facts, which are not resolved on request for reconsideration, may, by petition, be referred to the Commissioner of Patents for review.
- e. *Interviews with the examiner* -- The patent adviser may request an interview with the Patent Office examiner in an attempt to resolve issues of the type described above and reach agreement as to mutually acceptable actions which may be taken to place the application in condition for allowance. Failure to resolve such issues results in the issuance of a notice of final rejection which may be appealed to the Patent Office Board of Appeals.
- f. *Appeals* -- The examiner's second or final disallowance of claims on such grounds as: (1) lack of invention, novelty, or utility; (2) abandonment; (3) prior public use or sale; (4) inoperativeness; or (5) inclusion of a number of unrelated subjects (aggregation) or an incomplete combination of elements, may be appealed to the Patent Office Board of Appeals. Such appeals require the patent adviser to: (1) prepare and file a brief setting forth the technical and/or legal authorities and arguments on which the appeal rests, and (2) prepare the response to the "examiner's answer on appeal" which sets forth the grounds and reasons for the rejections under appeals, and counter-arguments to those contained in the appeal brief. In some cases the patent adviser may present oral arguments to the Patent Office Board of Appeals.

- g. *Petitions* -- Petition may be taken to the Commission of Patents: (1) from any action or requirement of the examiner which is not subject to appeal; (2) in cases in which a statute or the rules specify that the matter be determined directly by or reviewed by the Commissioner; and (3) to invoke the supervisory authority of the Commissioner in appropriate circumstances. In these cases the patent adviser prepares a statement of the facts involved, including supporting briefs and memoranda; a statement of the point or points to be reviewed, and the action requested. In cases where facts are to be proven, he secures or prepares exhibits and/or affidavits to provide such proof.
2. *Infringement investigations* -- These investigations are conducted when a patent holder alleges that the agency is infringing his patent. The patent adviser makes a detailed study of the claims of the patent in relation to the device or process involved and based on both technological considerations and interpretation of the claims language, renders an opinion as to whether infringement, in fact, exists. In those cases where infringement is found, or is considered probable, the patent adviser may also conduct an investigation to determine the extent to which the infringing item or process is purchased and/or used by the agency, and a search of the Patent Office and agency records to ascertain whether the Government has been granted a license under the patent in question, or whether the invention was developed under such circumstances as to entitle the Government to a license. Infringement suits brought against the Government in the United States Court of Claims or in the United States District Courts are defended by the patent attorney staff of the Justice Department.
3. *Infringement and validity searches* -- Such searches are conducted when infringement has been found to exist, or when there is reason to believe that a proposed new device or process may infringe an existing patent.
 - a. *Infringement search* -- Involves an exhaustive search of the prior art to determine whether a proposed new device or process may infringe the claims of an unexpired patent.
 - b. *Validity search* -- Involves an exhaustive search of the prior art to determine whether the claims of a specific patent are valid. In conducting such a search the patent adviser makes a detailed study of the file history of the prosecution of the patent application to determine whether the interpretation of the claims arising therefrom is more limited than it would appear from a simple reading of the printed patent. He also investigates whether a public use or sale existed and makes an exhaustive study of prior domestic and foreign patents, text books, trade papers, technical reports and journals, catalogs, magazines, and similar documents to determine whether or not a complete written description of the invention set forth in the patent alleged to be infringed, was in existence more than one year prior to the filing date of that patent.

At this level of patent advisory work, opinions regarding claims validity are based primarily on technological considerations and interpretations of the language of

the claims derived from study of the prosecution history, but occasionally may include opinions based on consideration of appropriate legal precedents regarding the defenses that can be offered in support of the validity of the claims. This work is made difficult in part because of the fact that annotations and other legal search aids are not as extensive or comprehensive in the field of patent law as in many other fields of law. This complicates the location of pertinent precedent cases.

4. *Preliminary statements in interferences* -- This involves the drafting of a statement, signed by the inventor, stating facts which, if proven, will establish the date on which an invention was made. This requires the patent adviser to make a careful search for and evaluation of all evidence which will prove priority of invention, and to exercise considerable care and skill in preparation of the statement. In drafting such a statement the patent adviser must be fully aware of the legal and procedural requirements involved and fully familiar with the evidence and proofs acceptable to establish that the inventor was the first, in order of time, to complete or perfect his invention.

The prosecution of an interference beyond the preliminary statement stage involves: (1) preparing and filing motions to amend or dissolve the interference including a statement of the requested action, the facts supporting the request and the reasons why the request should be granted, supported by citations of the applicable law and pertinent legal precedents; (2) preparing responses to briefs filed by other parties in the interference; (3) pleading motions before the Patent Office interference examiner; (4) examining and cross-examining witnesses in the taking of testimony; and (5) presenting oral arguments before the Patent Office Board of Interference Examiners. The successful performance of this work requires a thorough knowledge of both general and patent law and the exercise of judgment of a high order in the evaluation of alternative courses of action, the selection of tactics, and the presentation of written and oral arguments in support of motions.

The ultimate responsibility for the prosecution of interference cases before the Patent Office or in the courts rests with the patent attorney staff of the Department of Justice. However, in some cases, the working relationship between the attorney of the Justice Department and the patent adviser of the agency involved in the interference is such that the latter participates with the former in the evaluation of alternative courses of action, the development of evidence, and the presentation of written and oral arguments in support of motions. This is so, not because of the patent adviser's legal prowess, but because of his intimate familiarity with the intricate and sometimes obscure, scientific or engineering ramifications or implications of the case.

5. *Identifying unreported inventions* -- This involves responsibility for reviewing technical reports emanating from contractor and/or Government laboratory or research facilities and interviewing technical personnel to identify that work which may represent invention, in order to secure reports of invention and determine who will file the patent application. The performance of this work requires that the patent adviser exercise a comprehensive knowledge of the current state of the technology involved, and a high

degree of scientific perception in recognizing those developments which may represent patentable invention.

6. *Determining rights to title to inventions* -- This determination requires the patent adviser to investigate the facts and circumstances surrounding the making of the invention and to apply a thorough familiarity with the statutory and regulatory requirements of the agency patent program, or the provisions of the contract involved in determining whether title to the invention must be taken by the Government or may remain with the employee or contractor. In the latter circumstances the patent adviser is responsible for insuring that appropriate licenses or other agreements are executed to secure or protect the Government's interest in the invention.

EVALUATION OF NONSUPERVISORY PATENT ADVISER POSITIONS

There are two fundamental factors which taken together determine the level of difficulty and responsibility of the work of this series. These are: (1) the nature and extent of responsibility for the performance of patent advisory functions, and (2) the technological complexity of the art. The levels assigned to these factors by reference to the criteria set forth herein, in almost all instances, will determine the grade of the position according to the conversion table at the end of the standard. However, the determination of the final grade value of some positions may depend upon consideration of the stature of the individual in the profession. Discussion of the fundamental factors and the additional element follows.

(1) Nature and extent of responsibility for the performance of patent functions

This factor is designed to measure the extent of responsibility for the performance of basic or advanced work as influenced by the nature and extent of the supervisory control exercised over the work, the extent of responsibility for formulating opinions and making recommendations, and the personal work contacts involved. The factor is expressed in terms of five levels of ascending difficulty numbered I through V.

The functions discussed under the headings basic and advanced represent a range of difficulty and complexity; however, within this range they are sufficiently related to warrant equal credit for classification purposes. Not all positions involve performance of all of the functions listed as representative of a given heading. Accordingly, credit may be granted for basic or advanced advisory work if most of the various functions described in the group are fully performed for a significant amount of time. On the other hand, the functions described in each group are sufficiently related so that no extra classification weight is warranted for the performance of all the function in the group.

(2) *Technological complexity of the art*

This factor is designed to measure the level of difficulty of the scientific and technological concepts with which the patent adviser must be fully familiar in order to perform the advisory work described in Factor 1. For purposes of the evaluation of this factor in patent adviser positions, one scientific or technological discipline is considered to be equivalent of any other, i.e., the standard does not attempt to rank the inherent differences in difficulty of the several scientific specializations. However, in recognition of the differing levels of difficulty and complexity within a scientific discipline this factor is expressed in three levels ranging, in ascending order, from A through C. These levels are differentiated from each other in terms of those general characteristics arising from the state of the art, which tend to complicate and make more difficult the comprehension and expression of the scientific concepts involved. The illustrative examples accompanying the level definitions for this factor are provided as "touchstones" to the intent of the various levels, and should be considered in that light.

The nature of invention is such that the work of the patent adviser frequently crosses technological or scientific lines. While this "crossing of lines" has the effect of increasing the breadth and scope of the knowledge requirements in a given position, a certain amount of variety is inherent in this occupation and has been considered in establishing the basic grade values under Factor 2.

THE EFFECT OF INDIVIDUAL STATURE IN THE PROFESSION

From time to time, incumbents of patent adviser positions are encountered who have achieved outstanding stature in the eyes of their agency, or of the profession at large. Normally, patent advisers are in a position to achieve this exceptional degree of recognition only after they have matured in the profession and progressed in the organization to a point where their opinions or recommendations are sought by other members of the profession as the best possible source for authoritative opinions in the area of specialization pursued by such incumbents. Accordingly, this concept is for consideration only in the case of positions whose incumbents have reached the full performance level.

Outstanding stature may arise out of recognition of the breadth and depth of an employee's knowledge in his particular area of scientific or technological specialization, or out of his expertness in a particular aspect of patent advisory work. In either case, his standing is such that his opinions are widely recognized as especially authoritative and are sought after and given special weight. For example, should a patent adviser become recognized by the management and patent officials of his agency as an expert in a particular area of patent advisory work, or in his particular scientific or technological specialty, and as a consequence the most complex or significant problems are referred to him for his evaluation, opinion, or solution, he has attained outstanding stature in this area of his work. In this situation he is looked to as the authority for his agency on that subject. In such a case the individual has brought something to the position which cannot readily be replaced if he subsequently resigns. Hence, the fact that management

would be forced to look elsewhere for such authoritative opinions should the incumbent be replaced is considered as evidence that the current incumbent has outstanding stature.

A patent adviser may have brought attention to himself by having once pursued an extremely difficult problem to a successful conclusion. Subsequently, management has looked to him for the continued highly competent handling of matters which it considers of the utmost importance. Generally, this situation is manifest by the assignment of more difficult duties and responsibilities to the individual.

Individuals who have achieved this outstanding stature bring a plus element to the performance of the assigned duties of their positions, which cannot always be fully evaluated in terms of the criteria spelled out in the body of the standard. In such cases it is appropriate to identify the nature of this peculiar stature and to provide some credit for it in evaluating the position. This extra credit will not normally, in itself, be worth an additional "bonus" grade. However, in evaluating positions which meet the requirements with respect to some elements of evaluation and fall short with respect to other elements, this effect of the individual on the position should be recognized in evaluating the position. In the type of exceptional cases discussed above, this element could have the effect of making a one grade difference in the final evaluation of the total position.

Patent advisers at the trainee level typically bring to their positions a level of technological or scientific knowledge at least equivalent to that described in Level A of Factor 2. Hence, at the lower levels, work assignments are oriented primarily toward the development of proficiency in the various facets of patent advisory work. Typically, such training assignments do not involve a level of technological complexity exceeding that contemplated by Level A of Factor 2. Training assignments involving work of a higher level of technological complexity are subject to such intensive supervisory review of both the patent prosecution and technological aspects of the work, as to negate the influence of the higher level of technology on the grade level of the trainee position. *Accordingly, the technological complexity of the art has no bearing on the grade levels of positions in this series until such positions have achieved at least Level V of Factor 1.*

FACTOR 1, LEVELS OF RESPONSIBILITY FOR THE PERFORMANCE OF PATENT ADVISORY FUNCTIONS

LEVEL I

Incumbents perform various tasks associated with or incident to the performance of basic advisory work. These tasks are assigned primarily for training purposes. Work assignments are selected to orient employees in the application of theory and basic principles to patent advisory work and basic principles to patent advisory work and to ascertain their interests and aptitudes. Incumbents receive specific and detailed guidance and training in all aspects of work assignments. Typically, personal work contacts are confined to members of the immediate patent

staff and are primarily for the purpose of receiving instruction. Incumbents of positions at this level do not make recommendations or decisions.

LEVEL II

Work assignments are selected to provide training in specific aspects of basic advisory work and are accompanied by extensive prior instructions. In light of these instructions and by reference to pre-selected patent statutes and case law and to such guidelines as the *Manual of Patent Examining Procedure* and the *Rules of Practice of the United States Patent Office*, the incumbent plans the approach and lays out the method for accomplishment of the assignment. These approaches and methods are discussed in detail with the supervisor, or a patent adviser of higher grade, before the incumbent proceeds with the work. The supervisor, or a patent adviser of higher grade, is available to provide guidance as questions are encountered in the course of the work, and may, depending upon the nature of the assignment, review the work at various stages of completion. Completed work is presented in draft form and is reviewed in detail for adherence to instructions; completeness; accuracy in the interpretation and application of statutes, case law, and guidelines; soundness of rationale supporting conclusions reached and recommendations made, and for evidence of understanding of the procedural requirements, concepts, and techniques of basic patent advisory work. Personal work contacts may include contacts with inventors for the purpose of obtaining specific factual information required for the evaluation of an invention, or for the drafting of a patent application.

LEVEL III

Incumbents perform basic advisory functions without preliminary instructions from the supervisor. However, the supervisor or a patent adviser of higher grade is available to provide guidance should problems not previously encountered by the incumbent arise in the course of the work. Typically, completed written work is presented in draft form and is reviewed in detail for completeness, adequacy of planning; soundness of methodology; accuracy in the interpretation and application of statutes, case law, and procedural guidelines; and soundness of rationale supporting conclusions reached and recommendations made. Patent applications are given a detailed review for conformity with procedural requirements; consistency and compatibility of the specifications and the claims; appropriateness of the method of claiming selected; consistency and propriety of the language used to describe and claim the invention; and sufficiency and proper referencing of supporting drawings. Incumbents are held responsible for the completeness and accuracy of the facts supporting their opinion and recommendations. Accordingly, their evaluations of invention, and their opinions and recommendations regarding potential patentability are reviewed primarily for soundness of supporting rationale. Patentability searches ordinarily are not repeated by the supervisor, though the classes and sub-classes of art selected for search may be reviewed for appropriateness and adequacy of search coverage.

Assignments involving advanced patent advisory functions are made for training purposes, are accompanied by detailed preliminary instructions, are subject to close supervision in the course of the work, and are reviewed in detail on completion of the assignment.

Personal work contacts typical of this level include: (1) Contacts with inventors to discuss technological aspects of the invention; (2) contacts with inventors to secure additional factual information required to complete patent applications; and (3) contacts with members of the professional and scientific staff and procurement and program officials of the agency to secure their opinions regarding the scientific significance, or significance to the agency of a particular invention, or similar matters. Incumbent accompanies higher-grade patent advisers in interviews with Patent Office examiners, or in conferences with officials of other agencies to observe and to gain experience.

LEVEL IV

Incumbents are responsible for the independent performance of basic advisory functions. No preliminary instructions accompany such assignments. Typically, completed work involving these functions is submitted in final form and is not reviewed in detail. Patent applications covering important inventions which present unusual problems in their description or method of claiming may be reviewed for adequacy of presentation and appropriateness of the method of claiming selected. Applications are accepted as being technologically sufficient, and are not reviewed from that standpoint.

Assignments involving advanced advisory functions typically are not accompanied by preliminary instructions. However, the supervisor, or a patent adviser of higher grade, is available to provide guidance should problems not previously encountered by the incumbent arise in the course of the work. Completed written work involving advanced functions is presented in draft form and is reviewed in detail for completeness; accuracy in the selection, interpretation and application of statutes, case law, and procedural guidelines; adequacy of the response to meet the requirements or overcome the objections stated in the Patent Office action; appropriateness and soundness of rationale supporting recommendations that adverse decisions be appealed or that petitions be filed with the Commissioner of Patents. While incumbents of positions at this level are held responsible for the completeness and accuracy of the facts which support their conclusions and recommendations, the importance to the agency of conclusions and recommendations in infringement matters is such that the factual basis on which they rest may, at this level, be subject to detailed review.

LEVEL V

Incumbents are responsible for the independent performance of *advanced* patent advisory work. Typically, no preliminary instructions accompany such assignments. Completed written work is submitted in final form and is not reviewed in detail. Conclusions reached and recommendations made are generally accepted as being technologically, factually, and procedurally sufficient, and are reviewed primarily in light of policy or other administrative considerations. Most incumbents of positions at this level possess "power of attorney" to prosecute applications before the Patent Office.

In addition to those described at preceding levels, personal work contacts at this level include:

- (1) interviews with Patent Office examiners for the purpose of resolving questions and problems arising during the prosecution of the application, and reaching agreement as to action to be taken to place the case in condition to permit the granting of the patent, and
- (2) the presentation of arguments before the Patent Office Board of Appeals. Similarly, incumbents of positions at this level may confer with attorneys of the Justice Department regarding interference cases or infringement suits. Such conferences are primarily for the purpose of discussing the evidence available or required to support the agency or the Government's position in such litigation, rather than for the purpose of planning the legal tactics or defense to be employed in the prosecution of the case.

FACTOR 2, TECHNOLOGICAL COMPLEXITY OF THE ART

LEVEL A

The technology involved may be characterized as stable in the sense that current progress in the art is gradual and orderly. The principles, concepts and theories on which the art rests, and the terminology associated therewith, are established, well recognized, and accepted by persons schooled in the art. The literature surrounding the art is plentiful and generally readily available. Typically, there is a considerable body of prior art.

Inventions representing this level of technological complexity involve problems which can be solved by the application of the fundamental concepts and techniques basic to the art. Generally, such inventions are comprised of structures, processes or methods which are relatively uncomplicated in their individual elements or in the interrelationships of their several components. Such inventions, however, require the patent adviser to possess considerable comprehension of the underlying theories and concepts involved, and to exercise considerable imagination and ingenuity to identify inventive novelty, distinguish the invention to be patented from prior inventions, and draft claims of as broad scope as the prior art permits.

Subject matter employing basic concepts which do not involve unusual or advanced technological principles is exemplified by a Radio Frequency Tuning Coil Assembly which includes a pair of cylindrically-shaped coils coaxially supported, a magnetic tuning slug adjustably mounted within each of the coils to effect fine tuning, a magnetic cylindrically-shaped tuning element movably mounted over each of the coils to effect coarse tuning, and an electrical shield of cylindrical configuration encasing and housing the coils and their tuning elements.

Typical examples of concepts representative of this level are:

- (1) engineering mathematics through differential and integral calculus,
- (2) descriptive chemistry,
- (3) classical physics,

(4) the engineering sciences, usually including:

- (a) mechanics of solids (statics, dynamics, and strength of materials),
- (b) fluid mechanics,
- (c) thermodynamics,
- (d) transfer and rate mechanisms (heat, mass, and momentum transfer),
- (e) elementary electrical theory (fields, circuits, and electronics), and
- (f) nature and properties of materials.

LEVEL B

The technology involved is relatively unstable. While the basic principles, concepts and theories on which the art rests generally are understood by persons schooled in the art, they are subject to active and intensive reevaluation and extension through both basic and applied research. The scientific vocabulary associated with the art is only partially stabilized in that existing terminology is subject to modification in meaning as the concepts and theories are modified, and new terminology is emerging as a result of current research efforts. Advances in the field, and inventions arising therefrom, frequently represent a significant departure from the more traditional concepts associated with the art, either because of the application of currently accepted concepts or theories to the solution of a new problem, or the application of a new or substantially modified theory or concept to the solution of an old problem. While the literature surrounding the art is fairly plentiful, widespread current research activity makes it difficult to locate and keep abreast of that literature which represents the most current developments in the field. Typically, the body of prior art is not as extensive as at the preceding level.

Inventions representing this level of technological complexity involve problems which can be solved only through the application of advanced concepts and techniques associated with the art.

Generally, such inventions are comprised of: (1) multiple systems embodying two or more sub-systems which are based on the fundamentals of different technological disciplines, and in which at least one sub-system, structure, process, or method represents the level of technological complexity described above; or (2) complex systems which have numerous components and voluminous interrelations and which, because the interrelationships of the components are dynamic rather than static, require such detailed description and illustration that numerous pages of drawings and specifications are required. The drafting of specifications and claims covering inventions of this level of difficulty may be complicated by the necessity to transpose mathematical expressions of the concepts embodied in the invention into language-framed concepts. Such inventions require the patent adviser to fully comprehend both the basic and advanced principles and theories involved; to possess a substantial knowledge of the current state of the art; and to exercise a high order of perception and ingenuity in visualizing equivalents and potential future applications for the purpose of drafting broad claims.

A multiple system is exemplified by a gun turret sight arrangement consisting of an elevation and train control sub-system of electro-mechanical components (gears, drive mechanisms, shafts, cams, planetary arrangements, indicators, clutches, motors, transformers, solenoids, selector switches, etc.), all moving relative to one another and controlled by gun elevation and train

orders electrically transmitted from an electro-optical fire control sub-system of predominantly electrical and electronic components (electronic range, bearing and direction finders, electronic computers, magnetic amplifiers, electronic plotting instruments, electronic indicators, of distance and bearing, cathode ray tubes, electronic sight synchronizers, transmitters, mono- and bi-stable electronic pulse circuits, electronic signal selectors and rejectors, optical sighting apparatus, etc.).

A complex system expressed in abstract concepts is exemplified by an electronic magnitude comparator, which compares and indicates the relative magnitude of two numbers -- expressed as two sets of binary coded electrical digit signals -- by comparing the relative magnitudes of the corresponding digit signals. The values of the numbers to be compared are expressed in terms of electrical pulses and introduced to the comparator through separate input source means, monitored by a clock pulse means, and registered by means of bi-stable elements employing the binary concept. The expression of this concept is in the form of equations of Boolean algebra, a symbolic logic system which facilitates the representation of input data in machine language.

LEVEL C

The technology involved is highly advanced and unstable. The principles, concepts, and theories involved either are new, or represent radical departures from the more commonly accepted principles, concepts, and theories associated with the art. As such they are not widely understood or accepted by persons skilled in the art. The scientific vocabulary associated with technology of this level of complexity generally is in a state of emergence with the result that the scientific community does not share a common understanding of the meanings attached to the language. Advances in the field, and the inventions arising therefrom, frequently represent a major departure from the concepts, principles and theories associated with the field, or represent principles, concepts and theories not previously known. The literature surrounding the technology is sparse and the body of applicable prior art is not extensive.

Inventions representing this level of technological complexity involve problems which can be solved only through the understanding and application of highly advanced concepts and techniques associated with the art. Generally, the characteristics of such inventions are similar to those described at the next lower level, except that in one or more of their components or subsystems, or in the interrelations thereof, they embody concepts of the level of difficulty described above. Such inventions require the patent adviser to fully comprehend the highly advanced, and frequently, highly abstract principles and theories involved, and to exercise a very high order of perception and ingenuity in identifying the most important elements of the invention, visualizing alternative methods of constructing the invention, and visualizing its potential future uses for the purpose of drafting claims. The drafting of specifications and claims covering inventions of this level of difficulty requires a high degree of skill in precisely defining the scientific or technological terminology associated with the inventions and in transposing (where possible) highly abstract mathematical expressions into language-framed concepts.

An illustrative example is that of an automatic control electrochemical cell which comprises an enclosed container having compliant diaphragm sections, a solution of I_3^- and I^- ions

substantially filling the container, anode and cathode electrodes disposed in the solution with contact terminals externally located on the container, a battery connected to supply electrical power to the electrodes, an electrical output circuit including a regulator connected across the electrode contact terminals, and means associated with the apparatus being automatically controlled to cause flexures of the compliant diaphragms in a manner correlative to the deviations of the apparatus being controlled from a desired standard condition, whereby the ionic interactions in response to the diaphragm flexures cause a current flow in the output circuit which enables the regulator to restore the apparatus being controlled to the desired standard condition. This particular example first requires the recognition of being able to utilize ionic solution interaction in response to condition changes for automatic electrical control purposes which heretofore had been unrecognized. In order to comprehend the theory of operation involved, the effects of movement of the I_3 -ions through the solution at equilibrium and under agitation, the effects of the physical flow of the solution under agitation, the rate of electrochemical reaction, the effects on the solution by flexures of the diaphragm, the effects of the geometry and composition of the electrodes on the electrochemical reaction, the chemical and electronic theories and principles of operation and techniques, and the variety of automatic control applications to which the cell could be applied, must all be understood in order to comprehend and explain the subject matter. This example utilizes highly advanced and specialized principles in new and non-analogous environments to produce a pioneering development of which the theory of operation is not too readily understood by those well versed in the advanced technology of the art.

Typical examples of the concepts representative of this level are the following:

- (1) scalar and vector potentials for stationary and electromagnetic fields;
- (2) electromagnetic fields involving Maxwell's equations;
- (3) the wave equations in rectangular and cylindrical coordinates;
- (4) Such functions as:
 - (a) Bessel functions for large and small arguments;
 - (b) spherical and modified Bessel functions;
 - (c) Hankel functions; and
- (5) impedance discontinuities in guides -- resonators.

GRADE LEVEL CONVERSION CHART

Factor 1 Level of Patent Prosecution Responsibility	Factor 2 Level of Technological Complexity of the Art	Grade
I	This Factor 2 is not grade influencing until positions have achieved Level V of Factor 1	5
II		7
III		9
IV		11
V	A	12
V	B	13
V	C	14