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# Forensic Engineers in Patent Litigation

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**Abstract**

When patents are challenged in court, technical experts are called upon for several reasons. Patent attorneys are engineers, but depend on experts to help them understand the patents in suit and the state of the art at the time the invention was made. The ideal expert for a particular case will have worked in the same field and be familiar with the technical literature, products and technologies pre-dating the invention. If a product is accused of infringing one or more patents, the engineer must be able to evaluate the accused product with respect to the asserted patent claims. The engineer may review the patent application and prosecution history, perform tests, research prior art patents, literature, and products, and interpret the language used in the patents. Like other types of Forensic Engineering assignments, written reports and court testimony are often required. However, patent cases involve some unique terminology and legal concepts, which will be outlined in this paper.

**Keywords**

Patent, State of the art, Ordinary skill in the art, Infringement, Invalidity.


The United States of America

The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extensions.

## What is a patent?

A Patent grants the inventor a monopoly on his invention for a period of time; seventeen years from the date of issue on most existing patents. The rules changed recently to a period of twenty years from the date of application. Others are prohibited from making, selling or using the invention without permission from the patent owner. If patented products become commercially successful, they are sometimes copied, and patent disputes may occur. The more successful the invention, the greater the potential damages at stake in patent litigation.

Patents are intellectual property, and the "boundaries" of the covered property are defined by the "claims" at the end of a patent. If a patent

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holder believes that his "property" has been stolen, he has the option of initiating a lawsuit for patent infringement. A patent holder must prove that the accused device falls within the boundaries of the asserted patent claims. A defendant accused of patent infringement may argue non-infringement based on his own interpretation of the patent claims in suit, or may argue that the patent is invalid, or both. Accordingly, a plaintiff must assume that the validity of his patent(s) may be challenged. When disputes arise, the correct technical interpretation of patent claims becomes a central issue to be resolved.

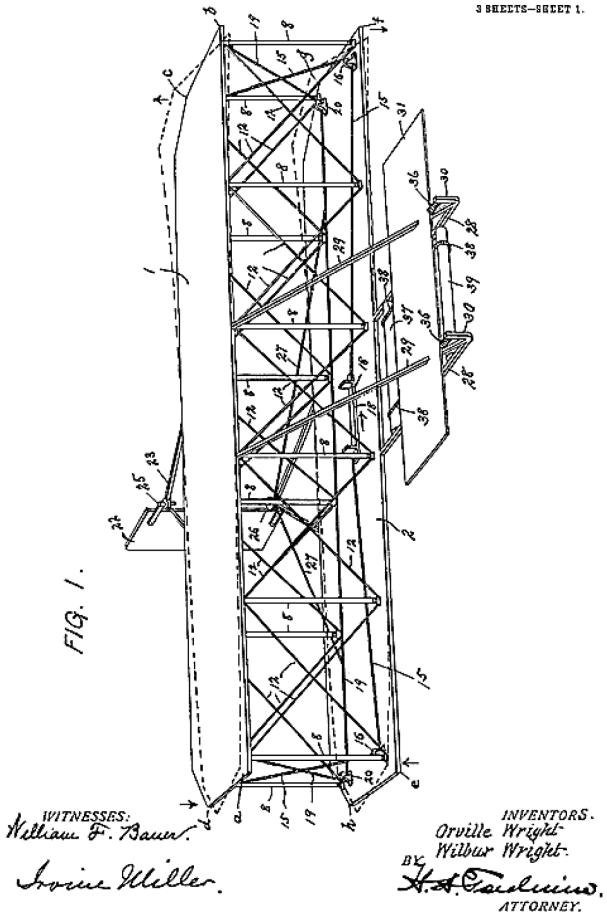
**The role of the expert**

Technical experts are usually called upon to interpret the patent claims in suit, review the accused infringing product or process and evaluate the prior art patents and literature that establish the state of the art at the time the invention was made. The law requires a "person of ordinary skill in the art" to understand and interpret patents. Forensic Engineers are well suited to work in patent litigation, especially when their area of technical expertise is a good match with the patent technology.

Although this paper is not intended to be a complete discussion of patents and patent litigation, it should help the Forensic Engineer to be better prepared when interviewing with a patent attorney for an assignment as expert in a patent dispute. Patent attorneys look for experts who have the right technical background. Experience with deposition and court testimony are also important. Prior patent litigation experience and familiarity with patent terms and the patenting process is also of value. The following are a few specialized terms used in patent cases:

The **person of ordinary skill in the art** is a legal fiction found in patent law. This fictional person is considered to have the normal skills and knowledge in a particular technical field, without being a genius. The patentee is entitled to be his own **lexicographer**, defining terms within the patent **specification**. The meaning of terms defined within the patent take precedence over common usage or dictionary definitions.

**Patent claims** are the part of a patent that defines the scope of protection granted by the patent. The claims define, in technical terms, the extent of the protection conferred by a patent, or the protection sought in a patent application. The claims are of the utmost importance both during prosecution and litigation. There are two basic types of claims:



- the **independent claims**, which stand on their own, and
- the **dependent claims**, which depend on a single claim or on several claims and generally express particular embodiments as fall-back positions. Dependent claims are narrower than the independent claim from which it depends.

**Prior art** (also known as state of the art) constitutes all information that has been made available to the public in any form before a given date that might be relevant to a patent's claims of originality. If an invention has been described in prior art, a patent on that invention is **invalid**. Prior art patents are sometimes viewed in combination, to argue that an invention would have been obvious in view of the combined prior art references. **Obviousness** is one argument for patent **invalidity**. The fact that a patent examiner has allowed the patent to issue does not prevent it from being challenged.

A patent can be found to be invalid due to **indefiniteness**, if the disclosure is not sufficient for a person of ordinary skill in the art to make the invention. A patent can also be found to be invalid if the named inventor(s) are proven to be false or incomplete.

**Patent infringement** is the commission of a prohibited act with respect to a patented invention without permission from the patent holder. Permission may typically be granted in the form of a license.

**Claim construction** is a term describing the technical interpretation of the patent claims. Opposing parties often disagree on the exact meaning of the claims. Settling disputes over claim construction generally precedes argument over infringement by an accused product.

A **Markman hearing** is a pretrial hearing during which a judge examines evidence from all parties on the appropriate meanings of relevant key words used in a patent claim. It is also known as a "Claim Construction Hearing". The evidence considered in a Markman hearing falls into two categories: intrinsic and extrinsic.

**Intrinsic evidence** consists of the patent itself and prosecution history of the patent.

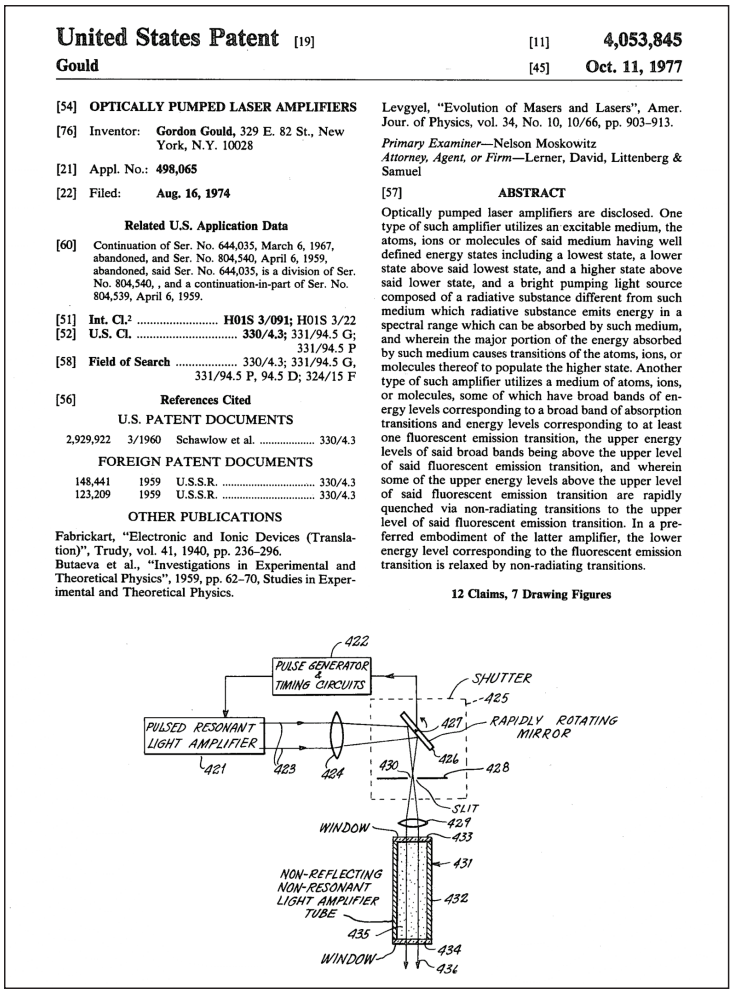
**Extrinsic evidence** is testimony, expert opinion, or published literature. Extrinsic evidence may not contradict intrinsic evidence.

The **doctrine of equivalents** is a legal rule in patent cases that allows a court to hold a party liable for patent infringement even though the infringing device or process does not fall within the literal scope of a patent claim, but nevertheless is equivalent to the claimed invention. If the function is substantially equivalent, the way it achieves the function is substantially equivalent, and the result is substantially equivalent, the doctrine applies.

A **preferred embodiment** is an example of how the patent can be practiced. A preferred embodiment is only an example and does not limit the claims.

Patent applications are written according to a prescribed format including the following sections:

- Title of the invention
- Cross-reference to related applications
- Background of the invention
- Brief summary of the invention
- Drawings
- Brief description of the several views of the drawing
- Detailed description of the invention.
- Description of a preferred embodiment
- A claim or claims
- Abstract of the disclosure



**United States Patent** [19]
**Gould**

[11] **4,053,845**
[45] **Oct. 11, 1977**

[54] **OPTICALLY PUMPED LASER AMPLIFIERS**

[76] Inventor: **Gordon Gould,** 329 E. 82 St., New York, N.Y. 10028

[21] Appl. No.: **498,065**

[22] Filed: **Aug. 16, 1974**

**Related U.S. Application Data**

[60] Continuation of Ser. No. 644,035, March 6, 1967, abandoned, and Ser. No. 804,540, April 6, 1959, abandoned, said Ser. No. 644,035, is a division of Ser. No. 804,540, , and a continuation-in-part of Ser. No. 804,539, April 6, 1959.

[51] **Int. Cl.**[2] ..... **H01S 3/091;** H01S 3/22
[52] **U.S. Cl.** ..... **330/4.3;** 331/94.5 G; 331/94.5 P
[58] **Field of Search** ..... 330/4.3; 331/94.5 G, 331/94.5 P, 94.5 D; 324/15 F

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[57] **ABSTRACT**

Optically pumped laser amplifiers are disclosed. One type of such amplifier utilizes an excitable medium, the atoms, ions or molecules of said medium having well defined energy states including a lowest state, a lower state above said lowest state, and a higher state above said lower state, and a bright pumping light source composed of a radiative substance different from such medium which radiative substance emits energy in a spectral range which can be absorbed by such medium, and wherein the major portion of the energy absorbed by such medium causes transitions of the atoms, ions, or molecules thereof to populate the higher state. Another type of such amplifier utilizes a medium of atoms, ions, or molecules, some of which have broad bands of energy levels corresponding to a broad band of absorption transitions and energy levels corresponding to at least one fluorescent emission transition, the upper energy levels of said broad bands being above the upper level of said fluorescent emission transition, and wherein some of the upper energy levels above the upper level of said fluorescent emission transition are rapidly quenched via non-radiating transitions to the upper level of said fluorescent emission transition. In a preferred embodiment of the latter amplifier, the lower energy level corresponding to the fluorescent emission transition is relaxed by non-radiating transitions.

**12 Claims, 7 Drawing Figures**

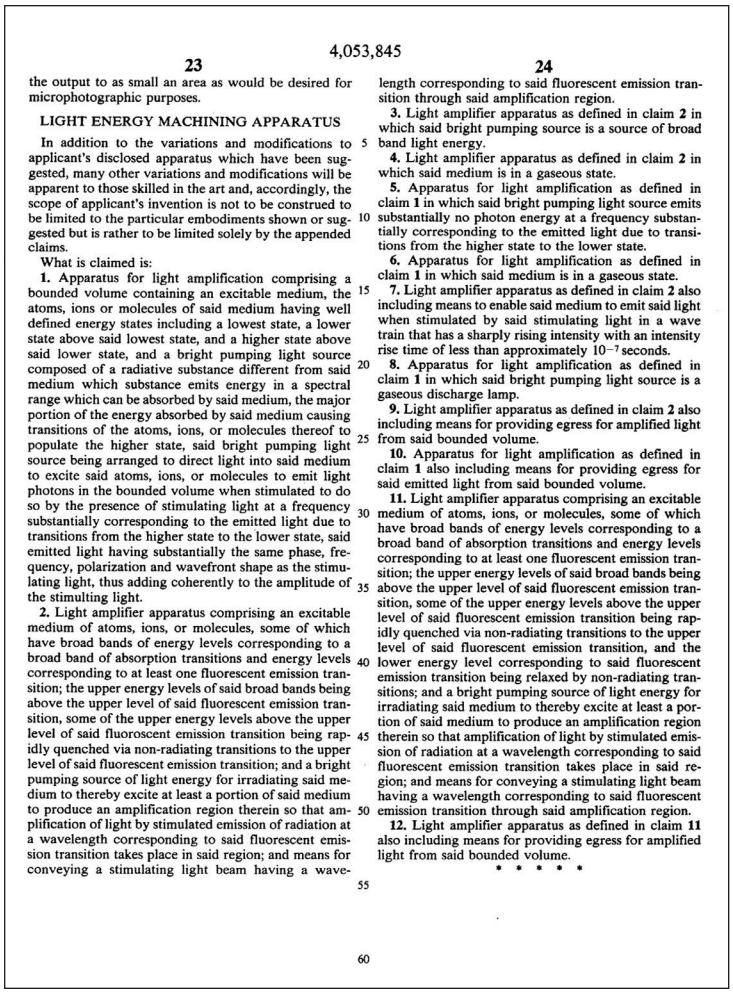


## How to review a patent

Patents are often long and detailed, and you may have a large stack of patents to review. In order to make an initial quick review to get a feeling for the content within a few minutes, the following "quick review" method is suggested: Note the issue date, inventor's name and assignee, if it has been assigned to a company. Next read the abstract and look at the drawings. In many cases, this information will be sufficient to get an overall idea of the content. To understand the scope of patent coverage, review the claims. The entire patent specification can be reviewed in greater detail later, to understand the fine points.

## The long haul

Typical Forensic Engineering assignments may go on for months and years, with brief periods of involvement for the engineer and long periods of inactivity. Patent cases tend to take even longer to resolve, require more continuous activity, and place a heavy workload on experts. Accordingly, the Forensic Engineer should consider his workload, and whether sufficient time is available to accept such an assignment. Since these assignments tend to be large in scope, attorneys usually want to meet with potential experts in person before selecting one or more. Compensation for interview time and travel is usually offered. Multiple, overlapping experts covering different aspects of the technology are common in patent cases.



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the output to as small an area as would be desired for microphotographic purposes.

LIGHT ENERGY MACHINING APPARATUS

In addition to the variations and modifications to applicant's disclosed apparatus which have been suggested, many other variations and modifications will be apparent to those skilled in the art and, accordingly, the scope of applicant's invention is not to be construed to be limited to the particular embodiments shown or suggested but is rather to be limited solely by the appended claims.

What is claimed is:

**1.** Apparatus for light amplification comprising a bounded volume containing an excitable medium, the atoms, ions or molecules of said medium having well defined energy states including a lowest state, a lower state above said lowest state, and a higher state above said lower state, and a bright pumping light source composed of a radiative substance different from said medium which substance emits energy in a spectral range which can be absorbed by said medium, the major portion of the energy absorbed by said medium causing transitions of the atoms, ions, or molecules thereof to populate the higher state, said bright pumping light source being arranged to direct light into said medium to excite said atoms, ions, or molecules to emit light photons in the bounded volume when stimulated to do so by the presence of stimulating light at a frequency substantially corresponding to the emitted light due to transitions from the higher state to the lower state, said emitted light having substantially the same phase, frequency, polarization and wavefront shape as the stimulating light, thus adding coherently to the amplitude of the stimulting light.

**2.** Light amplifier apparatus comprising an excitable medium of atoms, ions, or molecules, some of which have broad bands of energy levels corresponding to a broad band of absorption transitions and energy levels corresponding to at least one fluorescent emission transition; the upper energy levels of said broad bands being above the upper level of said fluorescent emission transition, some of the upper energy levels above the upper level of said fluoroscent emission transition being rapidly quenched via non-radiating transitions to the upper level of said fluorescent emission transition; and a bright pumping source of light energy for irradiating said medium to thereby excite at least a portion of said medium to produce an amplification region therein so that amplification of light by stimulated emission of radiation at a wavelength corresponding to said fluorescent emission transition takes place in said region; and means for conveying a stimulating light beam having a wavelength corresponding to said fluorescent emission transition through said amplification region.

**3.** Light amplifier apparatus as defined in claim **2** in which said bright pumping source is a source of broad band light energy.

**4.** Light amplifier apparatus as defined in claim **2** in which said medium is in a gaseous state.

**5.** Apparatus for light amplification as defined in claim **1** in which said bright pumping light source emits substantially no photon energy at a frequency substantially corresponding to the emitted light due to transitions from the higher state to the lower state.

**6.** Apparatus for light amplification as defined in claim **1** in which said medium is in a gaseous state.

**7.** Light amplifier apparatus as defined in claim **2** also including means to enable said medium to emit said light when stimulated by said stimulating light in a wave train that has a sharply rising intensity with an intensity rise time of less than approximately $10^{-7}$ seconds.

**8.** Apparatus for light amplification as defined in claim **1** in which said bright pumping light source is a gaseous discharge lamp.

**9.** Light amplifier apparatus as defined in claim **2** also including means for providing egress for amplified light from said bounded volume.

**10.** Apparatus for light amplification as defined in claim **1** also including means for providing egress for said emitted light from said bounded volume.

**11.** Light amplifier apparatus comprising an excitable medium of atoms, ions, or molecules, some of which have broad bands of energy levels corresponding to a broad band of absorption transitions and energy levels corresponding to at least one fluorescent emission transition; the upper energy levels of said broad bands being above the upper level of said fluorescent emission transition, some of the upper energy levels above the upper level of said fluorescent emission transition being rapidly quenched via non-radiating transitions to the upper level of said fluorescent emission transition, and the lower energy level corresponding to said fluorescent emission transition being relaxed by non-radiating transitions; and a bright pumping source of light energy for irradiating said medium to thereby excite at least a portion of said medium to produce an amplification region therein so that amplification of light by stimulated emission of radiation at a wavelength corresponding to said fluorescent emission transition takes place in said region; and means for conveying a stimulating light beam having a wavelength corresponding to said fluorescent emission transition through said amplification region.

**12.** Light amplifier apparatus as defined in claim **11** also including means for providing egress for amplified light from said bounded volume.

* * * * *

If you are being considered for an assignment in a patent case, there are some preparatory steps you can take to improve your chance of being selected. After a check for conflicts and initial discussion, you may be given the patent number(s) at issue. It would be a good idea to review those patents and whatever you can learn about the accused product. Time for this kind of research may not be compensated, but is a worthwhile investment. After having time to think about the technology, the patent claims and the accused product, you will be better prepared to interview for the job.

## Testing

To determine whether an accused product infringes a patent's claims, the accused product must be evaluated. Evaluation could include mechanical measurements, laboratory studies, chemical analysis, or any testing that would help to understand the relationship between the accused product and asserted patent claims. An understanding of the materials of construction and manufacturing methods may also be important.

## Reports

Unlike most other Forensic Engineering reports, expert reports in patent cases usually need to incorporate some specialized material. Multiple reports from each expert are common. Early in the case, experts may opine on the proper meaning of claim terms (claim construction). Review of the accused product(s) may include inspection, testing, a visit to the manufacturing plant, and review of similar products.

If the patent's validity is being challenged, the prior art must be evaluated. The expert report would address each prior art reference, and it relationship (or not) to the asserted patent(s). The prior art references can be voluminous, leading to a voluminous expert report.

Claim charts are typically included in the expert report, outlining each element of the asserted patent claims, in chart form, with corresponding support for the expert's opinion in the patent, prior art references, or other discovery documents. Such charts can go on for many, many pages.

Rebuttal reports and Supplemental reports are also common in patent cases. Because these cases tend to be very technical and document-intensive, you should expect to spend a significant amount of time working alongside patent attorneys to prepare the case.

**Court testimony**

Like other kinds of civil cases, most patent cases are settled before trial. However, when patent cases are tried in court, there are no special qualifications for the judge and jury. The attorneys and experts must teach the court about the technology at issue, the correct interpretation of the patent claim terms, and the accused infringing product or process. The court decides infringement or non-infringement, and awards damages, if appropriate. Half of all patent cases are overturned on appeal, so there is an incentive for both parties to settle if they want fast resolution.

**Conclusions**

The practicing Forensic Engineer is well suited to work as a technical expert in patent litigation. The combination of specific technical expertise and experience working within the legal system make forensic engineers good candidates for this role. Like other specialties, cumulative experience with patents, the patenting process and patent litigation makes an engineer increasingly well qualified with each new assignment. Whether engaged by plaintiff or defendant, the engineer's mission is no different from engagement in other kinds of litigation – assisting the court to understand technical issues, while maintaining the Professional Forensic Engineer's ethical responsibilities.