Descriptive Strategies in U.S. Patents

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ABSTRACT

While the knowledge contained in US patents descriptions is essentially the same as that conveyed by textbooks and journal articles (Myers 1995, Owen-Smith 2003), it must be shaped to claim temporary exclusive property over an invention. To effectively safeguard the value of such property, patents must reveal enough to suggest technical feasibility but conceal detail to cloud the specifications making replication easy. Usually co-authored by inventors and lawyers, the genre is therefore expected to hold a subtle interplay between boosting and hedging and gather traits from interdisciplinary discourses (Hyland 2000), in this case technical and legal. The aim of this study in progress is twofold: 1) to identify the linguistic act patterns used to match the requirements of legal patentability and the commercial interests of inventors, and 2) to bridge a gap in the know-how of readers and technical students by determining the discursive moves and interdisciplinary traits of the genre, comparing them with more familiar instances like manuals or specialized publications. To achieve this purpose, a corpus of 343 US electro-mechanical patents has been analyzed quantitatively and qualitatively with concordancing software at a macro (rhetorical) and microlevel (linguistic realizations). At this first stage of the research, the prime focus has been set on the most common boosting and hedging devices which stylistically feature the genre and may constitute a lexical and discursive *technolectal repertoire* useful for both professionals and engineering students. Among the devices detected, some (e.g. signaling nouns and verbs, repetition, evaluative adjectives and adverbs, inferential markers as code glosses) are signs of a pragmatic deference towards the non-expert members of the discursive community (i.e. lawyers and potential investors) and prove to be efficient means to overcome knowledge asymmetries.

KEYWORDS: Genre Analysis, Corpus Linguistics, Boosting, Hedging, Specialized Language

1. Contrastive genre overview, research aims and framework

The patent document is a genre seldom tackled in the LSP classroom, despite the fact that a considerable number of scientists and engineers often need to claim property over their inventions and discoveries along their professional careers. Myers (1995: 58) notes that their contrastive

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teaching is actually rare, although science and engineering students could be instructed on patent writing by paralleling the patent document to the research article, a genre they are much more familiar with. They could be taught that both report on some type of discovery—a procedure, a substance, or an invention, are products of individual authorship, consist of a title, an abstract, some claims, a narrative, references and graphics (Myers 1995: 98), and contain evaluative devices ultimately oriented towards persuading readers of the benefits and advantages such discovery may bring, but in a dissimilar way. This work is precisely concerned with the appraisal devices employed by patent writers in the light of **Genre Analysis** (Swales 1990, Myers 1995, Bazerman 2004) and **Metadiscourse Theory** (Hyland 2000, 2005), focusing on the linguistic choices used to express **boosting** and **hedging** (i.e. assertiveness and mitigation) in the most central **move** of the document, the description of the invention. To appropriately contextualize the following sections of this paper, let us begin by examining the main analogies and differences between patents and research articles: it can be said that they are **epistemologically convergent** but **discursively divergent**. That is, they basically transmit the same information but present it with a disparate rhetoric and different linguistic resources. As Myers (1995: 58, 66, 73, 91-92) points out, they also differ in their ends, their arenas and their **discourse communities**, as well as in their respective uses of intertextuality and their narrative constructions of future action.

Briefly put, research articles belong to the academic arena, intend to disseminate knowledge, are signposts or transitions on a long route of scientific achievements, and in them the claims are reinforced through the relationship with other texts as theoretical back-up. They address a **community of experts** in the field and therefore much information can be taken for granted, being previous work cited in parenthetical form and the article content organized inductively, starting with the specific case to conclude discussing its broader repercussions. Patents, by contrast, operate in the legal arena, their purpose is a profitable commercialization through ownership—that is why they make property claims and demarcate a territory instead of acting as links between other technical accomplishments, and their discourse community is not as homogeneous as that of the research article since it includes experts ('skilled-in-the-art readers', i.e. inventors/scientists and patent examiners) *and non-experts* in the technical discipline (investors, innovation analysts, etc.). In consequence, it is reasonable to think that in a sense patents should be more informative or explicit than research articles and adhere more firmly to the Gricean quantity maxim, complying with "a principle of full information" (Myers 1995: 93, citing other authors) bridging the knowledge asymmetries existing among the heterogeneous members of the discourse community. This principle, nevertheless, is applied at convenience: certain aspects are thoroughly explained so as to ensure feasibility but others—details endangering exclusivity—are omitted to avoid appropriation.

The textual progression in patents is deductive, commencing with a general area of application and introducing next the specific work to be patented as the most suitable instance of it. **Intertextuality**, in addition, weakens the claims exposed, so citations provide a solid base from the prior art but simultaneously depart from it by restricting the scope of the invention: patents may arise from preceding work but go one or several steps beyond. One further point of convergence between patents and research articles is their **circular relationship**, perfectly embodied in Myers' title *From Discovery to Invention* (1995). Discoveries may lead to inventions and vice versa, during the inventive process new scientific phenomena may be revealed.

Students should be also informed about three crucial facts. Firstly, that patent writing is not uniform but subject to national variation, depending on the norms and regulations affecting patents, copyrights and trademarks gathered in the legal codes of each country. The US code, underlying the samples in our corpus, determines the contents to be developed in the sections that make up the patent document and limits the number of words in titles and abstracts, besides dictating the obligatory elements of any independent claim and their sequence. Secondly, that apart from the mandatory moves and sections, there is no **prescriptive stylistics** and the linguistic repertoire of patent writers is mostly acquired by imitation and thanks to the contributions of patent critics. Obscure prose may even prove an asset at court as it can make the patent more defensible and thus prevent commercial competition (Myers 1995: 84). Thirdly, that similarly to research articles the writing process for patents requires successive revisions and the approval from authority figures similar to journal editors and referees—the patent attorney and the patent examiner.

As for the framework adopted in this study, according to Genre Theory, the description of the invention in patents is one of the several **rhetorical moves** that articulate the whole text, in this case defining and explaining the device, substance or procedure to be patented, frequently with numerous allusions to drawings and calculations. Within Metadiscourse Theory, Hyland's approach establishes that boosters and hedges, two categories of interactional or interpersonal metadiscursive items, play an essential role in evaluation. Boosters express certainty in what is being said, mark involvement with the topic and solidarity with an audience or readership by taking a joint position against other voices. Hedges, on the contrary, indicate that the writer's position is open to recognize alternative viewpoints and so withhold absolute commitment to a proposition. They do not show an absolute degree of precision or reliability but emphasize the subjectivity of a stance, presenting the information as an opinion rather than a fact and so permitting negotiation. This dialectic perspective fits in the interplay of certainty/explicitness and vagueness typical of the patent genre.

2. Specific traits of the genre: validity claims and rhetorical moves

The format and contents of US patents are strongly determined by regulations (US Constitution, Article 1, Section 8; US Code Title 35[1]; US Code of Federal Regulations, Title 37[2], and the Manual of Patent Examining Procedure[3] or MPEP). Although there is some variation in the titles of headings within each particular patent, all of them must include the following sections (according to US Code Title 35, Part II, Chapter 11):

(a) Bibliographical data referring to other related patents

(b) Drawings of the invention

(c) Specification

This same regulation indicates that the specification (US Code Title 35, Part II, Chapter 11, Section 112):

> … shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is usually divided in sections which have the following headings[4]: *field of the invention*, *background of the invention*, (*brief*) *summary of the invention*, *detailed description (of the preferred embodiment)*, and *brief description of the drawings*.

The description in the specification must be followed by one or several claims whose function is to determine the extension of the property to be protected by the granted patent. These claims are of two types: independent and dependent. The second type always makes reference to one and only one independent claim. The internal structure and language of the claims is established by the Code of Federal Regulations, Title 37, Section 1.75 as follows:

(a) Whatever is claimed must be based on the previous description

(b) No dependent claim can be referred to another dependent claim

(c) The first claim must be the least restrictive of all

(d) The structure of each independent claim will start with "a general description of all the elements or steps of the claimed combination which are conventional or known", followed by the phrase "wherein the improvement comprises," and conclude with the elements,

steps, and/or relationships constituting what the applicant considers to be new in relation to the prior art.

According to Bazerman (1999: 108), to obtain a patent the applicant must meet the success conditions of a speech act whose goal is to request a status. That status is achieved when an idea becomes a property through patenting. To meet these success conditions a US patent application must be convincing in terms of novelty, non-obviousness, and utility. As it has been mentioned above (US Code, Title 35, Part II, Chapter 11, Section 112), the expected audience is a person skilled in the art: a fictitious legal device to indicate that experts should be able to carry out the invention disclosed in the patent description.

Once the idea of the inventors has obtained the status of ownable property, they are entitled to the following rights (Title 35 of the U.S. Code, Part II, Chapter 14, Section 154):

> …a grant to the patentee…of the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States … for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application was filed…

3. Methodology of the study

Searches were made using a **corpus** of 343 US patents[5] (approximately 2,800,000 **tokens** and almost 30,000 word types) and the freeware **concordancer** *Antconc3.2.1*[6] as tool. This corpus includes samples of electro-mechanical devices, substances, and processes, but it deliberately excludes patents of plants, drugs and medical treatments, and genetic patents which account for less than 10% percent of the body of available patents and their format and language use diverge importantly from the remaining 90% considered here. The patents selected cover the period spanning from 1998 until 2009. From among the lexico-grammatical devices performing boosting and hedging functions relevant for the communicative purposes of patents, we selected, at a first stage and as a result of a preliminary visual scrutiny of the texts, the following: qualifying and quantifying determiners, signaling nouns, resultative verbs, evaluative adjectives and adverbs and inferential markers. The examples selected are of three types: a) total number of occurrences in the corpus; b) the key term and a chain of collocates; and c) tables with nouns ranked by absolute frequency. The second type of examples should provide a clearer picture than presenting individual examples with absolute frequencies.

Then we used Antconc3.2.1 to extract the keywords from the corpus and selected among the results those tokens which could perform as boosters or hedgers. To determine the keywords, we employed as corpus of reference the 4 million word BabyBNC corpus and chose the **Log-Likelihood** algorithm for determining **keyness**. This combination of techniques for sorting out the boosting and hedging lexico-grammatical devices is justified by the lack of part-of-speech tagging tools which would have provided an automatic list of items. With such a list at hand, the goal of producing an exhaustive inventory of boosters and hedgers would have been reachable within a reasonable effort/result ratio.

4. Findings and discussion

With the findings we are presenting next we intend to give a bird's view of the principal boosting and hedging resources used in patents, but the catalogue is not exhaustive and many other sub-functions and linguistic micro-realizations may be at play. Furthermore, some of the items studied here have been singled out for their contextual behavior rather than for their quantitative impact, as is the case of the verb *shall,* which binds the technical and legal registers in this type of documents.

4.1. Quantifiers as determiners

In many grammars, the function of determination includes that of quantification, which may be exact or inexact. *Many, most* and *several,* studied below, realize an *inexact selection* of items and admit pronominal use (Quirk & Greenbaum 1973: 19) whereas *certain,* a particularizing adjective (Downing 1992: 409) also imprecise, can be used with a deictic meaning. The quantification of abstract and non-count referents with *much of* in this corpus is remarkably less abundant (21 occurrences) than the countable demarcation of items by means of *many, most* and *several.* It serves three functions: 1) provide a starting point for the invention (example 1) by reminding of a known and almost axiomatic situation or condition, 2) state the advantages brought by the invention (example 2.*a*) or the faults of prior art (example 2b), and 3) indicate some aspect related to the act of reporting, usually having to do with the focus (example 3.*a*), scope (3.*b*) and sources determining specifications and cautionary observations about the information provided (3.*c*).

> (1) It is known that for *much of* the operating life of a multiple-cylinder engine, the
>   load might be met by a functionally smaller engine having fewer firing
>   cylinders…

(2) *a.* A single rotor also allows the engine to use *much of* the carrier rotation between the end of the expansion phase and the beginning of the combustion phase to cool the components which are heated by the combustion phase.

b. Just as in the piston engine, the torque generated by the rotary engine is zero at the beginning and end of the combustion cycle, wasting *much* of the generated force.

(3) *a.* For instance, while *much of* the foregoing discussion focuses on the use of the transmission controller 40 and the engine controller 30 to determine whether operation in certain gears should be inhibited, the present disclosure is by no means limited.

b. This associated information enables *much of* the checking of commands to be done in a command-independent way by a number of functions.

c. *Much of* this description is based on technical design documents, so the use of words like "must", "should", and "will", and all others that suggest limitations or positive attributes of the performance of a particular product, should not be interpreted as applying to the invention in general.

All these examples are located in the detailed descriptions of the embodiments except for (1), which belongs to the *background of the invention* section. Further research can reveal the function and location within sections and moves of other potentially interesting determiners for the boosting and hedging balance: those expressing **sufficiency** (e.g. *enough of*), **profusion** by means of noun phrases to be contrasted with the occurrences of their one-word counterparts *many* and *most* (e.g. *a great/good deal of, a great/good many of, the/a majority of, plenty of*), **scarcity** (e.g. *a little of, a few/few of, fewer of*) and **totality** and **partiality** (e.g. *the whole of, part of, the rest of, the remainder of, some of*) as well as those consisting of nouns which are categories of **quantification** themselves, such as *amount, quantity* and *number* (e.g. an amount/amounts of, a quantity/quantities of, a number/numbers of), which increase the impression of vagueness for not being subjective or picked from a whole like the above markers.

4.1.1 Quantifying highlights: *many, most* and *several*

Many, *most* and *several* are bivalent items that can work as boosters and hedges. Their assertiveness relies on the idea of profusion but it is vague, so they may be found in negative appraisals of the prior art—introducing enumerations of faults and gaps as well as praising the current invention before a list of benefits and advantages. *Most* (536 occurrences) is more abundant than *many* (369), perhaps

because of its double function: it not only emphasizes amount but also implies some sort of restriction or focus (of evaluation, in sum) lacking in *many.* In other words, *many* can be subsumed in *most* but not the opposite, since a large number does not necessarily imply a majority.

Most might raise the expectation of a negative criticism of the prior art by collocating with *typically* and *recent(ly)* to highlight the exclusivity and novelty of the patent*,* but *typically* refers instead to the detailed description of the invention and *recent(ly)* to the values of components and arrangements in the detailed description. Their frequencies, moreover, are very low (*recent* 12 occurrences, *recently* 8 and *typically* 3). Surprisingly, there are no hits with *generally,* and the prior art is referred to with the adjectival and adverbial collocates *known, favorable/favored* and *common(ly),* and with the nouns *cases and applications* (see examples 4-7):

(4) *Most known* landing gear utilizes a two-speed operation…

(5) *The most favored* type of agent has been the quaternary ammonium compound

(6) As has been previously explained, *the most commonly used* prior art doweling hole drilling machines require a two man crew for their operation.

(7) *4a.* That is, *in most cases,* it has to be mounted with the hydraulic fluid supply port 113 facing upward.

   4b. Most applications apply rotary power to pump a fluid through the device.

Notice that though there is a restrictive meaning in all examples, in (5) and (6) it is part of an adjective and not a determiner, so (5) and (6) would be better studied under the heading of evaluative adjectives. *Many* fulfils two primary functions. One is to justify the need for the invention, equivalent to the "finding a niche" in Swales' CARS model for research articles (Swales 1990: 141), by expressing its novelty and versatility or by signaling its need directly (e.g. "In many cases, one desirable property may be…"). The expression of novelty and versatility is preferably realized through the collocations in examples (8-11), which often collocate with *other* (e.g. *many other* applications/modifications/embodiments/devices/variations/types/ways):

(8) *many modifications* and variations are possible

(9) *many* suitable/alternative ways

(10)*many changes and modifications*/*substitutions* can be made

(11) the *many features and advantages of the invention*

The second function consists in setting a familiar point of departure in the prior art or practice an *indirect boosting* by mentioning its drawbacks instead of praising the present invention overtly. Prior art may be mentioned as *cases, styles, types, methods, variations* and less commonly as *patents* (example 12), all of which go after *many* and the adjectives *known/conventional.* Curiously enough, no concordances were found for *many + previous/former* or *many + traditional.* Sometimes *many* forms part of a chronological marker which, followed by an impersonal action, introduces the prior art (see example 14):

(12) There are *many known methods* for sensing whether the parking brake 164 is engaged or disengaged that would…

(13) *Many patents* have described useful acylated nitrogen-containing compounds including U.S. Pats. Nos. 3,172,892; …

(14) Over *many* years there have been attempts to provide a continuously remarkable transmission ("CVT").

In spite of being minority occurrences, it is striking that the expression of prior art disadvantages is ten times more abundant (23 occurrences) than that of advantages (2 instances) and includes the collocation *many + of* (examples 15-18):

(15) …but without *many of* the drawbacks of a two-stroke piston system.

(16) …may not accurately represent *many of* the possible bias torque that the actuator arm experiences.

(17) *Many of* them do not have the functional and safety equipment requires to be street legal,

(18) …with *many of* the same faults as the 277 patent.

In the case of *several* (429 concordance hits) the most remarkable trends seem to be the following: (a) it can occur after verbs introducing lists of elements or characteristics; and (b) it is very frequently followed by nouns designating categories or to avoid precision or as a means to deliberately diminish the accuracy that would be expected in a technical description of functions.

The first trend mentioned above deserves to be stressed because this type of verbs is specifically mentioned in the Manual of Patent Examining Procedure (MPEP). Section 2111.3 of the MPEP establishes that in patent claims *comprising*, *including*, *containing*, *characterized by*, and *group of* must be interpreted as open-ended and not excluding "additional unrecited elements or method steps" leaving the claim open enough to include unspecified items "even in major amounts". This same section of the MPEP determines again for patent claims that *consisting of*, *group consisting of*,

and *consist of* are to be interpreted as closed terms and therefore exclude "*any element, step or ingredient not specified in the claim … except for impurities ordinarily associated therewith*." As a consequence, beyond the bivalence of *several*, some verbs can precede it in any section of the patent, whereas some other verbs can only combine with it in the description.

Combining anywhere in patent with preference in claims	Combining preferably outside claims
comprise (1)	combine (1)
comprises (4)	connect (2) / connects (1)
contain (2)	covering (1)
contains (1)	has (11) / have (4) / having (1)
containing (1)	integrating (1)
includes (2)	offer (1) / offers (1)
	provide (3) / provides (2) / provided (1)
including (3)	use (1) / uses (1) / using (1)
	utilizing (1)

Table 1: Verbs introducing lists of elements and combining with *several*

The sparse occurrences of *several* in this context could indicate that for the purpose of the patent using hyperonymic nouns is enough to delimit the scope of the patent and describe its components in a manner as general as possible. Even the verbs that tend to be in the claims, when combined with *several* occur almost exclusively in the description section, where its interpretation is less problematic legally-wise. Still, this combination seems to be shunned as it does not meet the interests of the patentee.

Section 1.56 of the Consolidated Patent Rules (37 CPR) indicates that all the people involved with the prosecution and filing of a patent have a duty of "candor and good faith … which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section." And section 1.105 (a)(1)(viii) 37 CPR states that part of the information is "Technical information known to applicant concerning the related art, the disclosure, the claimed subject matter, other factual information pertinent to patentability, or concerning the accuracy of the examiner's stated interpretation of such items.*"* Following these information requirements, one would expect the patent drafters to be very precise when referring to the technical details of the invention. However, the commercial interest of the inventors would be damaged if their description is too precise. Therefore, *several* is used in combination with several nouns and adjectives to profit,

as Prampolini (1998: 97) affirms, from the capacity granted by vagueness for choosing the degree of precision required by the circumstances.

At the highest point of imprecision we would find combinations of *several* with nouns that refer to categories when setting the patented invention into the general field of technology to which the invention belongs. The examples 19, 20, 21, and 22 below illustrate some of these clusters:

> (19) *several + [additional / alternative / exemplary] + embodiments*,
> (20) *several different + [configurations / forms/ factors]*,
> (21) *several + [additional / advantageous] + features*,
> (22) several + [advantages / applications / components / details / effects / elements / etc].

At an intermediate point we can find *several* in the company of more specific nouns, now referring to details pertaining to the details of the specific patent, as examples 23, 24, 25, and 26 show, but still avoiding total accuracy:

> (23) *several + [hundred aluminium atoms / several hundreds of zirconium atoms per molecule]*,
> (24) *several + [caterpillar drives / chain drives / extra caterpillar drives]*,
> (25) *several different + [transmission stages / tracks / signals / combinations of containers]*,
> (26) *several + [possible other / of the / type of / types of] + noun.*

And finally, the highest level of accuracy that accounts precisely for the nature of the object, but is still vague in the amount or position (see 27, 28, and 29), which is very infrequent:

> (27) *several 1/8 inch thick aluminium plates,*
> (28) *several individual foot contact times,*
> (29) *several LSS slave GPIO pin connections.*

In 29, the type of connection is very specific, but the number of needed or possible connections remains unrestricted by the use of *several*.

4.1.2. Imprecise quantification: certain

The adjective *certain* occurs only 417 times in the corpus, which does not appear to be particularly frequent in a genre with such a strong liking for vagueness. Possibly, if the frequency of this item is compared with engineering text books and machine specifications, then a more realistic benchmark could be established to determine its real importance for technical descriptions. The two most

relevant contexts for *certain* found among the occurrences of our corpus are: (a) preceded by a preposition and followed by a noun that depicts some kind of scale or range (30, 31, 32, and 33);

(30) *at a certain* + [angle / density / distance / pressure / rate / speed] (18 occurrences)

(31) *after a certain* + period of time (3 occurrences)

(32) *above a certain* + [threshold / speed / value / minimum] (4 occurrences)

(33) [in / over / before / beyond / by / below] + a certain + [length / range / percentage / position / threshold / time / value / velocity] (1 or 2 occurrences for each combination)

and (b) in prepositional phrases introduced by *in* whose purpose is to make a generalization referred to the invention being described. Generalizations by means of prepositional phrases introduced by *in* can be either related directly to the invention patented (34) or to alternatives of the preferred invention being described (35).

(34) *in certain* + [preferred / highly preferred] + embodiments (11 occurrences)

(35) in certain + [applications / areas / cases / circumstances / compositions / conditions / countries / driving situations / gears / implementations / instances / parts and arrangement of parts] (33 occurrences)

4.2. Signaling nouns

Signaling nouns, also referred to in the literature as **carrier**, *metadiscursive,* **shell nouns** and **type three vocabulary**, possess metadiscursive properties (Flowerdew 2008) acting as textual beacons and reminders, especially in patents. Signaling nouns raise the question of how much patent can patents be, since the proportion of direct appraisal by means of signaling nouns, loaded result verbs and adjectives and adverbs exceeds that without. Signaling nouns may be positively or negatively loaded. Positively loaded ones (e.g. *innovation, solution, remedy, advantage, improvement,* etc.) are used to praise the current invention and the negatively loaded to criticize the prior art (e.g. *disadvantage, drawback, problem, error, failure, hazard, inconvenience,* etc.), being on the whole more specific or field-bound (e.g. *lag, loss, wear, breakage, corrosion,* etc.) Below is provided a table with the raw frequencies of the most recurrent items of each sign.

POSITIVELY-LOADED NOUNS	OCCURRENCES
advantage(s)	559
solution(s)	521

efficiency	434
improvement(s)	184
utility	54
convenience	38
interest	26
refinement(s)	21
applicability	20
efficacy	7
usefulness	7
remedy	4
feasibility	4
innovation	2
novelty	1

Table 2: Positive signaling nouns

Although not tabulated yet with a definitive frequency of nominal items until honing our screening and classification procedures further, the positively-loaded word used most frequently seems to be *control* (over 9,000 cases)*,* and this fact might be explained by its collocational versatility. As a noun, it may be part of compounds and fixed collocations within the technical field, either providing a taxonomy of different types (e.g. *power control, steering control, yawing control, voltage control,* etc.) or indicating the means through which it can be attained (e.g. *control programs, control valves, control systems, control units, control modules, control circuits, control signals,* etc.). Also, it can be the direct object of a transitive verb (e.g. *provide control over...*) or a prepositional complement, especially after the prepositions *of, for*, *in* and *under.* It equally calls our attention that full synonyms such as *utility* and *usefulness* or *solution* and *remedy* exhibit very dissimilar frequencies, which could point to stylistic influences given that skilful patent writing is mostly acquired through the revision and imitation of other patent documents. Likewise, there is a big difference between *efficiency* and *efficacy.* Both entail the production of intended results and a general competence, but while *efficiency* refers to good organization, *efficacy* contains the additional nuance of an economy of effort and resources and a minimum waste. Finally, *innovation* and *novelty,* which mark two key validity criteria in the genre, occupy the last position in the ranking, perhaps because they are taken for granted in every patent and implicitly understood in the claims, summary and detailed descriptions offering new elements, functions and arrangements whose originality is clear to those skilled in the art and therefore does not need to go emphasized.

NEGATIVELY-LOADED NOUNS	OCCURRENCES
error(s)	872
problem(s)	474
failure(s)	273
stress	198
disadvantage(s)	82
corrosion	76
aging	75
fatigue	45
drawback(s)	45
difficulty(-ies)	37
deterioration	27
breakage	27
destruction	24
instability	15
deficit	13
malfunction	12
hazard(s)	12
inconvenience(s)	11
danger	7

Table 3: Negative signaling nouns

With regard to the negatively-loaded nouns, we may underline the differences between *problem* and *difficulty,* possibly caused by their degree of specificity (*problem* is more specific then *difficulty*, since not all difficulties are problems but on the contrary, all problems do present a difficulty). Another imbalance is found between *disadvantage* and *drawback,* theoretically full synonyms according to any dictionary. This may be another case of stylistic imitation.

4.3. Evaluative adjectives and adverbs

The meaning expressed by adverbials and many graded adjectives is associated with evaluation—with the writer or speaker's stance and attitude (Conrad & Biber 1999: 56, Hunston & Sinclair 1999:

92). In our corpus, *(the) most* as submodifier and adjectival superlative form is used copiously for evaluative purposes and marginally for specifying ones. As a specification device, it collocates with the adverb *particularly* and refines the scope of the invention in the *Technical Field* section, as part of the invariable pattern *The present invention relates to…and most particularly to…*and may even be resorted to twice alternating with a comparative variation within the same short paragraph, to progress towards an increasing specificity (example 36):

> (36) The present invention relates to internal combustion engines; *more particularly,* to devices for controlling systems in an internal combustion engine; and *most particularly* to an improved hydraulic manifold assembly for controlling the flow of engine oil in variable activation and deactivation of valve lifters in an internal combustion engine, wherein air is automatically purged from the supply gallery…

With an evaluative function, *(the) most* tends to gradate the adjectives *desirable, preferred/preferable* and *important.* This latter highlights components, actions, and parts of processes, collocating with *aspect, point, function, element* and *factor* in attributive position (example 20). (Quasi) synonymic collocations with *relevant, essential, crucial, vital, outstanding, remarkable and interesting,* however, have not been found.

> (37) It is expected that such a composition can provide a piezoelectric device in which the piezoelectric portion, as *the most important* element determining the piezoelectric characteristic of piezoelectric device…

Desirable (240 cases) and *preferred* (1539 occurrences) */preferable* (296) may go in attributive or predicative position but are not always evaluative. An instance of evaluation is example (21), where *most* functions as a submodifier meaning *very*. Examples (38) and (39) illustrates a case of lexicalized and non-evaluative reference typical of the genre:

> (38) The regenerative braking system is applied to the front wheels in the 1st to 3rd embodiment, which is *most desirable,* because vehicles dive frontward at their breaking…
>
> (39) *The most preferred* process of the invention is a process directed to the conversion of a feedstock to one or more olefin(s).

Anticipatory *it-constructions* are always evaluative. In the case of patents it is interesting to observe the behavior of the collocation *it is desirable* that is used mostly to introduce novelty regarding the previous art.

Table 4 below displays the form in which this structure is used in patents. The elements in the first, third and fifth columns are variable and / or optional. There is a combinatory restriction that does not allow elements of the first and third columns to appear simultaneously as they perform the same function and the different placement is due to stylistic choices. Regarding the fifth column, the last two elements are the most frequently combined by far.

Accordingly,		accordingly		for
Alternatively,		also		
For this purpose,		also highly		
For this purpose,		also often		in
Frequently,		frequently		
From this point,		generally		
Furthermore,		highly		- ing infinitive
In addition,	**It is**	in fact*	**desirable**	
In particular,		most		
Moreover,		not		that
Obviously,		particularly*		
Therefore,		probably		
Thus,		therefore		to
When				

Table 4: Variable elements combining with the structure *it is desirable*

Less frequent and with poorer combinatory options, it is possible to find the following variations using modal verbs: *It would be desirable, It can be desirable, It would be highly desirable, It would be also desirable, It would also be desirable*, or *It may also be desirable*. These and the structures mentioned in Table 4 can be further extended with the following combinations:

- [It is desirable head group] + to have + [nominal group]
- [It is desirable head group] + to have + [nominal group] + [nominal group] + preposition
- [It is desirable head group] + to have + [nominal group] + [nominal group] + so that
- [It is desirable head group] + to have + [nominal group] + for + [-ing]
- [It is desirable head group] + to have + [nominal group] + such + [nominal group] + that

- [It is desirable head group] + to have + [nominal group] + that + [present active / passive]
- [It is desirable head group] + to have + [nominal group] + that can + [infinitive] + [nominal group]
- [It is desirable head group] + to have + [nominal group] + that may be + [past participle] + for (purpose)
- [It is desirable head group] + to have + [nominal group] + that may be + [past participle] + for a + [nominal group] + ([that])
- [It is desirable head group] + to have + [nominal group] + that may be + [past participle] + [prep]
- [It is desirable head group] + to have + [nominal group] + with + [nominal group]
- [It is desirable head group] + to have + [nominal group] + to be + [past participle] + rather than

In relation to the language of descriptions, Section 1.58 (c), (1) of the Consolidated Patent Rules –Title 37, states that:

> … Provide a written description of the claimed invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and set forth the best mode contemplated by the inventor of carrying out the invention as required by the first paragraph of 35 U.S.C. 112;

The above described concept of **best mode** is recurrently in the patents by using the adverb *preferably* (2491 occurrences). This adverb is used to exemplify a possible and not exclusive best mode of carrying out what has been explained immediately before the adverb. (See examples 40 and 41 – our italics.)

> (40) The retarding system 30 produces a retarding force as the magnet 32 rotates with respect to the inductor 34 to slow the rotation of the axle shaft 20 and thus the wheels 18 when the actuator moves the brake members 24 to the actuated position. *Preferably*, a plurality of magnets 32 is used.
>
> (41) Thereafter, the pressure is temporarily held by the injection molding machine relative to the plastic in the mold cavity 108, *preferably* for at least 1-5 seconds.

4.4. Resultative Verbs

Verbs expressing cause and effect or result, which we have termed **resultative verbs**, also act as signaling words since they contain a strong evaluative load. Common positively-loaded verbs are *maximize, achieve, ensure, guarantee* (+ desirable qualities), *minimize, prevent, avoid, overcome, solve* (+ risks, dangers, problems, disadvantages, costs, etc.), *optimize, improve,* and *refine* (+ resources, performances, etc.). Neutral or unloaded verbs are *cause, result in, lead to, allow,* and *permit,* all of which may be followed by desirable or undesirable consequences. Although not really representative from a quantitative standpoint in our corpus, *tend to,* is used here broadly, with different senses. In its infinitival form it performs a threefold function: it expresses unwanted results (e.g. followed by words like *break, crack, wear,* etc.), praises the present invention by preceding other result verbs, either positively-loaded (e.g. *tend to ensure/promote* + desirable quality), or neutral ones followed by explicit praise (e.g. *tend to result in desirable near net shape products*), or by a copula introducing the praise (e.g. *tend to be less expensive*). Lastly, the third meaning is strictly positional within the detailed description of mechanisms (e.g. *tend to rest on the base plate 2, driven by…*). In the present simple, the most abundant form, *tend to* fundamentally marks those gaps, needs and problems still unresolved by the prior art and that justify the invention.

Again there is a triple way of accomplishing this communicative goal: to begin with, *tends to* may precede specific result verbs of negative load (e.g. *fail, deteriorate,* etc.) or neutral ones going before obvious negative effects indicated by adjectives and adverbs (e.g. *tends to produce unpleasant vibrations*). The last via, implicit and only apprehensible by experts, consists in associating with unloaded result or state verbs without evaluative comment (e.g. *tends to move, increase, push, be large/small,* etc.). The gerund *tending to* is virtually confined to the functional and positional description of mechanisms, which may involve positive consequences—if any (e.g. *tending to increase/decrease/flow/stay, tending to be located at…*). The past tense (past simple and present perfect) is reserved for boosting purposes, most often criticizing the prior art as glosses of overt negative statements including evaluative adjectives/adverbs or signaling nouns (example 42):

(42) *a.* The resulting marine performance was poor because the vehicle *tended to* dip its nose onto the water when under way and flood the passengers…
b. A particular problem relates to … In short, the air within these spaces *has tended to* be warmed.

Less frequent than this indirect boosting, we may find direct praise through references giving an idea of the scope or relevance of the application (e.g. *As a consequence, the scope of application of an electric power steering apparatus has tended to expand in recent years*).

Another verb worth commenting due to its qualitative interest is *shall*. It is mainly conjugated in the third person singular, an unmistakable feature of the legal register, and praises the invention in two ways: through an instructional mode (example 43) and through the **endophoric statement** of obvious advantages (example 44):

(43) *a.* The engine *shall run* in the 4-cycle mode…

b. …control valve member 22, 22 *shall be formed* as separate parts

c. In addition they *shall be securely blocked* to prevent rolling…

d. …in the accompanying drawings *shall be interpreted* as illustrative and not in a limited sense.

(44) Advantages and benefits *shall be apparent* from the description and drawings.

In general, the function of the verbs is highly determined and predictable by their form, and so the prior art is predominantly expressed with the infinitive, the present simple and past tenses (simple and present perfect), whereas the description of the patent depends on infinitives, the present tenses, simple and progressive.

4.5. Inferential markers

The use of an inferential marker (e.g. *therefore, hence, so, such that, so that, in such way that, consequently, in consequence*) preceding an explicit praise of the invention constitutes a **code gloss** and might be interpreted as a strategy of pragmatic deference to non-experts, given the ample discourse community of the genre. Let us remember that code glosses (Hyland 2000, 2005) are a type of interactional or interpersonal metadiscourse items that paraphrase, clarify or explain the message (e.g. *that is to say, in other words, which means,* etc.). Let us think too that an expert in the field, the person skilled in the art*,* would at once identify the positive or negative sign, according to the context and his/her technical background, of unmarked cause and effect relationships such as the ones in example (45):

(45) *a.* These factors typically lead to the use of a permanent magnet.

b. …causing relative rotation…

c. …causing the valve to move.

However, the praising inferences introduced by markers of deduction may be at times over-explicit, even at a mere clausal level outside the co-text. Example (46) contains three instances of growing explicitness (our italics):

(46) *a. Thus,* advantage of the second embodiment is obtained.

b. Moreover, the production of the plate-shaped elements is simple and *therefore* cost-effective.

c. There is *hence* relative little wear during operation of the system, contributing to its long lifetime.

Even for someone not familiarized with the patent genre or technical issues, the associations of simplicity with cost-effectiveness and of little wear with durability are evident. A reasonable explanation for their use all the same is that they permit a fluid and visible emphasis on the advantages of the invention since there is no separate section for the advantages, which are embedded in abstracts, claims, summaries of the invention and descriptions: the inferential markers most commonly found in patents (with the exception of *consequently* and *logically,* which can go in mid-sentence position between auxiliaries and main verbs), either commence sentences or follow the conjunction *and* (with or without commas), two prominent beaconing locations for the invention's strong points. The most profuse markers are *thus* (1989 cases) and *therefore* (1612), followed by *hence* (351 occurrences), and *consequently* (199). Considerably scarcer are *logically* (15 instances) and the prepositional version *in consequence* (only eight cases). All of them can refer to partial consequences related to the detailed description of the embodiment (e.g. *In consequence the rotation in the opposite direction…, logically + connecting/linked/organized* in mid-sentence position), sometimes pinpointing potential flaws or problems (e.g. *Consequently, a tilt tendency of the vehicle exists if…*) but they may also express a global encapsulating remark, either delimiting the scope of the invention according to immediately preceding premises and endophorically directing the reader to other sections (e.g. *Consequently, the scope of the invention should not be limited to the foregoing description, but should be defined by the appending claims.*). *Therefore* collocates often with anticipatory "*it*" constructions (84 instances), especially containing the adjective *possible* to signal desirable performances or feasible and beneficial applications and modifications that prove the utility and versatility of the patented entity (example 45):

(47) *a. Therefore,* it is possible to simplify an oil piping structure and a cooling water piping structure.

b. Therefore, it is possible to make the system configuration more compact.

Most of the verbs within these *therefore it-structures* convey positively loaded meanings: *lower, restrain, avoid, prevent, reduce, minimize, downsize, stabilize, simplify, detect* (+ undesired effects) and *generate, obtain, confirm, enhance, realize* (+ desired qualities and functions). With a relative frequency these verbs are preceded by a reduced repertoire of evaluative adverbs: *easily* and *accurately* (sometimes combined), *quickly, reliably,* and *significantly,* associated with positively-loaded verbs (e.g. *perform* or *mount*) more neutral than the more obvious *enhance, stabilize* or *simplify* and thus needing the specification provided by the adverbs.

5. Conclusion

The deal by which inventors disclose their technical discoveries in exchange of the exclusive right to sell, manufacture, or use these discoveries is called a patent, but how much is disclosed has a direct influence on the future income of the inventors and therefore the description sections concentrate most of the persuading devices, direct or indirect, which may not be the patent drafters' priority during the writing process. Rather, they may be more concerned with meeting the legal requisites, as regards both format and content. These persuading resources consist in a balanced coexistence of boosters and hedges which may maintain or reduce the knowledge asymmetries among experts and laypersons. Some of the boosters commented in this paper are the glossing structures composed by an inferential marker and an overt praise of the invention, the use of quantifiers such as *many* and *most,* or the preference for loaded result verbs or neutral ones followed by also loaded signaling nouns. Another two strategies, although not examined here, are the possible reiteration of information in the abstract, claims and description sections, and the indirect boosting of the invention implicit in the mention of the flaws of the prior art. Hedging is chiefly found in the vague quantifications of *many, most, several* or *certain* (as well as in *some, few/a few, almost/nearly, one*, *diverse…*) and in the modal choices, for example.

Some of the questions that this research has raised, in view of further investigations, are the following: What are the similarities and differences in the technical descriptions found inside patent licensing contracts and regulations on technology? How are technical descriptions constructed within texts with a legal communicative purpose (patents, contracts, regulations) in comparison to texts with a scientific communicative purpose (textbooks, articles, specifications)? Does the language of descriptions in patents, as the US constitution states, "promote the progress of science and useful

arts" (article 1, section 8), or does it try to meet regulations while hiding as much as possible the technology being patented?

6. Endnotes

[1] http://www4.law.cornell.edu/uscode/35/

[2] http://www.law.cornell.edu/cfr/cfr.php?title=37

[3] http://www.uspto.gov/web/offices/pac/mpep/documents/2100.htm

[4] The wording might be slightly different, but the headings quoted here are the most frequently used.

[5] Downloaded from the website of the US Patent and Trademark Office: http://www.uspto.gov/

[6] Developed by Laurence Anthony and downloadable from: http://www.antlab.sci.waseda.ac.jp/software.html

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