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On Patent Categories*

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A patent category system featuring eight patent category concepts is proposed. These are obtained through an interpretation of concept structures, which in turn or obtained through a combination of the concepts "material", "form", "forward movement", "backward movement", and "effect". Two anterior derivation principles are employed to narrow down the total of 32 combinations or concept structures, also called "substitutions", to eight concept structures which can be interpreted as patent category concepts. The interpretation of these structures is determined by their essential aspects. The patent category system proposed can be regarded as relatively self-contained and relatively complete.
(Author)

1. Introduction

Inventions amenable to patent law are grouped together into patent categories. Until recently the relevant literature (1) distinguished between the following four patent categories:

1) The category of process
2) The category of product
3) The category of device
4) The category of arrangement,

which categories have recently been reduced in the literature (2) to the following three:

1) The category of manufacturing process
2) The category of operating procedure
3) The category of subject matter,

if not even to the following two (3):

1) The category of process
2) The category of subject matter or of product.

In my opinion, each of these three systems leads to a "dead end" as far as the theoretical applicability of patent law is concerned. – In the following a patent category system comprising eight patent categories will be proposed which appears to be better suited to both patent law practice and theory and whose patent categories break down the totality of all inventions into disjunct classes. As it can be proven that the proposed system of categories is to a certain extent self-contained and complete, this particular breakdown into classes will be valid also for the totality of all future inventions.

In the following analysis, the word "invention" shall mean not only a "patented" invention but also any doctrine for human action which is amenable to patent law. Within this context, a doctrine for human action shall be regarded as "amenable" to patent law if it has been adequately described, is of a technological nature or has to do with technology, can be commercially utilized, satisfies a social need, is repeatable, and does not fall under any legal catalogue of exceptions. Such a doctrine will not necessarily be new, technologically progressive and/or inventive, although it may be any of this. From this point of view the concepts "invention", "doctrine for human action" and "doctrine" are employed synonymously here.– Also, for greater fluency of argument, the expression "concept" will be employed here both for the mental form of thought and for the material form, i.e. the spoken or written word denoting the concept. Only in a few isolated cases will these two forms be explicitly differentiated from one another. As there are various types of concepts, the one employed here shall, in cases of doubt, always be the "classificatory" concept.

Since the category concept has its origin in the realm of philosophy, it will undoubtedly be useful, when drawing up a patent category system, to be familiar with at least a few of the criteria and questions discussed in philosophy when a concept is to be introduced as a "categorial concept" or a system of concepts as a "system of categories". We will therefore start out with a brief examination of the category concept in philosophy (4), (5).

2. On the category concept in philosophy

The category concept was introduced into philosophy by Aristoteles. His system of categories comprises the ten following ones: substance, quantity, quality, relation, where, when, position, possession, action and sufferance. These concepts should be thought of as supreme generic concepts not subordinated to a common higher concept. This system was conceived of by Aristoteles as a means for securing and enhancing the unambiguous clarity of philosophical argument.

In the course of time, this idea of presenting certain concepts of a philosophical doctrine as supreme generic concepts was pursued and realized in the most varied branches of philosophy in the most varied ways. However, these efforts have led to conflicting systems of categories as well, with the result that the inflationary use of the concept "category" is now being deplored and the resigned comment is heard: "What theory of categories one selects depends on what kind of a philosopher one is (6)".– Nevertheless, and no doubt rightly so, the concept category must be regarded as an "essential basic concept of the self-reflection of finite knowledge" (7).

In the drawing-up of a system of categories in philosophy an important part is played by the questions of scope assignment to and derivability of the categories of the system concerned.

The question to what scope or area a given category pertains is asked in order to determine, as it were, what

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one wants to "talk about with the category". Thus, as ancient a philosopher as Plotin already distinguished in his theory of categories between the categories of the thinkable and those of the visible world. And Thomas of Erfurt advocated the view "that a theory of categories, far from being concerned only with the realm of physical reality, should include the realms of the logical, the mathematical, the psychical and the metaphysical as well."

The derivability of a category has to do with the question whether there exists an anterior or higher principle from which a given category may be arrived at or justified. Thus Thomas Aquinas, for example, accepted the conformity of modes of being and modes of assertion as a suitable anterior or higher principle for justifying Aristoteles' ten categories, while Kant perceived, or so he believed, an anterior and/or higher principle for his system of categories in the system of the types of logical judgments then known.

Further questions asked in philosophy with respect to a system of categories have to do with, e.g., whether that system is complete and self-contained, whether its categories are clearly distinguishable from one another, to what extent it presents symmetry, etc.

With respect to the system of patent categories proposed here we will first of all discuss the questions as to the scope and the derivability of its categories.

3. Scope of a patent category

When a patent law specialist, in catching a fragment of a conversation, hears a patent category concept being mentioned he will undoubtedly assume, provided he is listening with attention, that the conversation has to do with an invention or with inventions in general. This relationship mentally established by him seems to justify the assertion that a patent category concept pertains to the realm of inventions. But to make sure that this is really so we will lay down a decision criterion telling us when we may say of a patent category concept that it pertains to the realm of inventions and when we may not. This decision criterion, consisting of the two parts E1 and E2, shall read as follows:

E1) A patent category concept pertains then and only then to the concept "realm of inventions" if at least one doctrine falls under the scope of the patent category concept *and* if all doctrines falling under this scope produce, when realized, an "ontic effect", i.e. a change of reality.

E2) By an "ontic effect" only the following changes shall be meant:
1) The fact of a thing
2) The production of a thing
3) The destruction of a thing
4) The effect of a thing.

The decision criterion (E1, E2) shall hereinafter be designated as the "scope criterion". This criterion is an arbitrary definition, so that its correctness need not be justified; at most, the intention is to be justified with which it is introduced. As such a justification the fact might be advanced that this criterion makes it easier to talk about patent categories, establishing as it does a relationship between highly abstract concepts and the possibility of changing reality (8). It deserves to be noted here that in this criterion the objectivity of reality occupies a most central position (9). Furthermore, a doctrine of any kind whose realization produces an ontic effect as per E2 does not yet, for this reason, pertain to the field of inventions, since this requires that it be proven in addition that this doctrine is amenable to patent law and belongs to a patent category.

It is of course possible to reject this criterion as "weak" or "farfetched" and to replace it by another one. However, for the time being it provides an answer to the philosophical question as to the scope of a patent category.

4. Anterior principles for the derivation of the patent categories

It would appear reasonable to regard the scope criterion as one of the two sources of the patent category concepts. For, since four types of ontic effects are distinguished in the scope criterion, it should also be possible to formulate at least four different patent category concepts. However, a change of reality cannot only be ascertained from and described in terms of the thing as such; rather, it can also be ascertained (in a specialized way, as it were) by paying attention to the material of the thing and the shape of the thing. From this point of view, eight ontic effects would have to be distinguished, namely:

1) The fact of a material
2) The production of a material
3) The destruction of a material
4) The effect of a material
5) The fact of a form
6) The production of a form
7) The destruction of a form
8) The effect of a form

From this point of view, it should be possible to formulate at least eight patent categories, so that the 1st derivation principle reads as follows:

1) The patent category concepts result from a differentiation according to material and form of the ontic effects described in the scope criterion.

Now the patent category concepts are legal concepts, even if they are "ontically anchored" here, as it were, by the scope criterion. Therefore it is necessary to name yet a second source of the patent category concepts, namely: a specific, desired legal situation. Such a situation is particularly important for the patented doctrines, which should preferably confer "strong" rights upon the persons holding them, meaning that the holder of a patented doctrine should be able to exclude, in a simple and easily understandable way, any other person subjected to the same laws from making use of his patented doctrine. However, since this fellow-subject may likewise be the holder of a patented doctrine it is not desirable that both holders should be able, because of a duplicate issuance of patent rights, to exclude each other mutually and totally from use. In other words: it is desirable that as few fellow-subjects as possible should participate, in a competitive sense, in one and the same exclusion right granted by a given patented doctrine, and it is furthermore desirable that two different doctrines should not result in factually identical exclusion rights. In simpler terms this desired legal situation can be expressed as

follows: The exclusion rights should overlap as little as possible.– The 2nd derivation principle is then formulated as follows:

2) The patent category concepts should be so selected or construed that the totality of all patented doctrines will present the least possible overlapping of exclusion rights.

The exclusion rights will of course be oriented to the essential features of the doctrine concerned, or in other words: a doctrine will emphasize in particular the essentiality of those features which constitute the basis of the exclusion rights. Now what features, if any, may in general be termed "essential" is determined by the given patent category.

These two derivation principles may of course be likewise rejected and replaced by others. For the time being, however, they appear to have answered the philosophical question as to the anterior principles on which category determination may be based.

Before, however, deriving the patent categories in conformity with the aforementioned principles, we will, in the next section, place the derivation question on a broader basis of discussion.

5. The dichotomy "essential/nonessential" as applied to concepts and concept characteristics

In the concept pair "stringed instrument/violin" the relationship between both concepts is one of genus and species.– In the concept pair "material/form", however, the two concepts have no such relationship. Rather, in this concept pair the relationship is of the type for which W. Wundt used the term "Begriffsbeziehung" (conceptual relation) (10). The two concepts "material" and "form" were called "relational concepts", and the relationship existing between them was interpreted in the sense that relational concepts mutually complement one another in a certain way. Such mutual complementation may e.g. be perceived in the fact that the concept "material" is never used in a manner suggesting that there can be material without form; in other words, the concept "form" complements the concept "material" in a certain tacit way; it constitutes (together with other conceptual contents) something in the nature of a "limiting concept" or a "flanking concept" ensuring correct use of the concept "material". Conversely, the concept "form" is never used in a manner suggesting that form can be realized without material. In other words, the concept "material" is then tacitly acting as a flanking concept ensuring correct use of the concept "form" (11).

There are at least two directions in which this conceptual relationship can be investigated more profoundly. In the first investigative direction, attention centers on the concepts actually concerned, and it is e.g. investigated why, how, in what way, etc. the concept "form" complements the concept "material".– In the second investigative direction, on the other hand, the question is examined whether there is any sense in rating the interrelated concepts against one another. Can e.g. one of them be ranked as "essential" and the other one as "nonessential"? It is this second investigative direction with which our subsequent analysis will be concerned.

Of an isolated concept it is initially impossible to say that it is either "essential" or "nonessential". But if a concept is not isolated but rather occurs together with other concepts within a text of coherent contents, then there is a very real possibility that its relationship with other concepts may be termed either "essential" or "nonessential".

Now we will assume that for any concept it will be possible at least on some occasion to find two texts with coherent contents of such a nature that in one of them the given concept is to be regarded as "essential" and in the other one as "nonessential". Under this assumption, it can be said of any concept, be it isolated or not, that it has the property of being "essential" as well as "nonessential", with the understanding, however, that for a specific concept in one and the same coherently structured text it shall always be true that in that context it is to be regarded throughout as either essential or nonessential.– It is obvious, no doubt, that the actual concepts and the coherent contexts must be clearly and lucidly structured if one is to be able to declare, with certainty and intersubjectivity, that a given concept is either essential or nonessential. This clarity and lucidity undoubtedly is not attained by all actual concepts and interrelationships, especially since there are vague and equivocal concepts, too. Let these concepts, then – unless their contents are clarified on this occasion – be excluded from the following considerations.

It is furthermore assumed that the dichotomy "essential/nonessential" is not confined to pairs of concepts but makes sense also in multirelational situations where there are more than two different concepts, e.g. one essential and two nonessential ones, or three essential and two nonessential ones, etc.

To permit these two assumptions (i.e. the property of a concept of being "essential and nonessential", and its property of having multiple relations with other concepts) to be formalized, we will make the following stipulations: An arbitrary conceptual variable, i.e. a vacant spot in a linguistic expression into which an actual concept can be inserted to produce a meaningful statement, shall be denoted by the capital letter "B". An arbitrary conceptual variable shall be changed into a specific one by means of an added lower right index (subscript), e.g.: "B_1".

Furthermore it is stipulated that the concepts "essential" and "nonessential" shall be termed "values", more specifically: "conceptual values", to be abbreviated by the letters "w" and "u" (12). Using these conceptual values and their abbreviations, the conceptual variables can be characterized in addition by an upper index (superscript), resulting in two indexing possibilities each both for the arbitrary conceptual variable (B^w and B^u) and for the specific conceptual variable (e.g. B_1^w and B_1^u).

These stipulations now permit the drawing up of a table of concept values (13). It contains in its head from 1 to n specific concept variables without superscripts. In the body of the table the concept values are so arranged that, when read line by line, they form all possible combinations with one another. Since each specific concept variable in the table head is assigned two values, the number of all possible w–u combinations in the lines of the table body is found to be 2^n, meaning that there result 2^n lines of w–u alignments.– Line 1 in the body of Table 1 has the combination and alignment "w,w"; the 2nd line in the body of Table 1 has the combination

and alignment "w,u", etc. The concept value table thus constitutes a complete listing of all combinations and all alignments of the concept values.

In the next step, all values of Table 1 are equipped with their variables; the variables indexed are then grouped together on the given line by means of brackets, while inside the brackets they are separated from one another by diagonal marks, see e.g. Table 2. Such a bracketed expression may be called a "concept variables construct". Four such variables constructs occur in Table 2, with the construct (B_1^w/B_2^w) occupying line 1 of the body of Table 2.

In a further step, actual concepts are substituted for the specific variables, with the preassigned values being carried along by the substituted concepts as superscripts. If, for example, the concept "material" is substituted for the specific variable B_1 and the concept "form" for the specific variable B_2, then Table 2 is transformed into Table 3, which we may term the "Table of Substitutions". It features four substitutions, with the substitution ($Material^w/Form^w$) being found in line 1 of the body of Table 3.

In a final step, the substitutions are explained or interpreted by means of suitable concepts. Table 4 contains three interpretations, with the interpretation "Thing" being found in line 1 of the body of Table 4. The substitution ($Material^u/Form^u$) of Table 3, on the other hand, does not appear to be interpretable.

B_1 ; B_2	Constructs	Substitutions	Interpretation
w / w	(B_1^w/B_2^w)	($Material^w/Form^w$)	Thing
w / u	(B_1^w/B_2^u)	($Material^w/Form^u$)	Material
u / w	(B_1^u/B_2^w)	($Material^u/Form^w$)	Form
u / u	(B_1^u/B_2^u)	($Material^u/Form^u$)	–
Table 1	Table 2	Table 3	Table 4

A concept consists of elements which in turn again are concepts (14). Seen thus, the possibility of interpreting a substitution E_g by means of a concept B_f makes the substitution E_g appear as an "element" of the concept B_f. In other words: the substitution E_g is a statement on the structure of the contents of concept B_f (15). If one distinguishes between a syntactic and a semantic structural statement as defined here, then the individual construct may be regarded as a syntactic and the individual substitution as a semantic structural statement.

An individual specific variables construct is as a rule the syntactic structural statement on numerous individual concepts. An individual specific substitution, on the other hand, is as a rule a semantic structural statement on a few individual concepts, possibly even the semantic structural statement on only one concept. It is also possible, however, that a freely selected syntactic or semantic structural statement does not yet correspond to any existing concept, or that a suitable concept word, a suitable interpretation does not yet form part of the vocabulary of the language.

The rating, as proposed here, of concepts occurring in dual or multiple conceptual relations can be understood as a synthesis of concept structures, while the interpretation of a structure by means of a linguistic expression can be understood as the synthesis of a concept word. Whether a synthetic concept word will also become a "mental" concept undoubtedly depends in part on whether it will be accepted as a cogitable entity.

A concept is in general characterized by its contents and its scope. However, when a concept is substituted for a variable of a construct it loses ist scope, for the possible conceptual scope of the interpretation is determined by the complete semantic structural statement and by the interpretation itself. The substituted concept acts only through its contents, which is rated either "essential" or "nonessential". This particular manner of action of the substituted concept shall be called its "aspect". Thus it can be said that the 1st interpretation in Table 4 is based on a concept structure in which both the aspect of material and that of form are rated "essential". Neither an essential nor a nonessential aspect tells us anything about the number of any kind of things, for when a concept is substituted, thereby becoming an "aspect", it loses its scope, as mentioned before.

A nonessential aspect is not superfluous, for as a partial statement on the structure of the contents of a concept it is no less important than an essential aspect. A structure reduced by its nonessential aspects is not only a reduced structure but a different one; in the extreme case: not a structure at all.

Whether an interpretation can be termed successful will as a rule be decided by the expert in the field concerned or by the linguistic usage and the conventions of the field in which the given interpretation appears – or is to appear – as a concept.

6. The eight patent categories

Since the aforegoing analysis suggests, but does not provide absolute certainty, that there are exactly eight patent categories, this question shall now be decided with the aid of a number of synthetic concept structures. In this process, such concepts will be preferred to serve as substitutions as may be expected to furnish "good aspects" in the determination of the contents of patent category concepts. The following concepts shall be substituted:

Material	(S)
Form	(F)
Forward movement	(H)
Backward movement	(R)
Effect	(W)

These concepts numbering five, we obtain according to the aforegoing analysis a table with $2^5 = 32$ combinations, 32 lines and 32 substitutions. These 32 substitutions are shown in Table 5, with the five substituted concepts being indicated by their abbreviations S, F, H, R and W (16).

In Table 5, now, each substitution will initially be regarded as the structure of a possible patent category concept. However, since two anterior derivation principles were laid down, it is not possible for all structures, as the following verification will show, to be interpreted as patent category concepts, as otherwise they would violate these derivation principles. The structures to which this applies are the following:

a) Structures 1 thru 8 are excluded from interpretation as they comprise the aspect of material and the aspect of form as "essential" aspects, so that, according to the 1st derivation principle, any possible patent category concepts would have to be regarded as not differentiated according to material and form.
b) Structures 9, 10, 17 and 18 are excluded from interpretation as they comprise the aspects of forward and backward movement as "essential" aspects, so that any possible patent category concepts would violate the 1st derivation principle, combining as they would two types of ontic effects (production and destruction) in an ontically contradictory fashion.
c) Structures 11, 13, 19 and 21 are excluded from interpretation as the element H^w or R^w in these structures makes them appear overdetermined with respect to structures 15 and 23, so that their possible patent category concepts would violate the 2nd derivation principle.
d) Structures 25 thru 32 are excluded from interpretation as they comprise the aspect of material and the aspect of form as "nonessential" aspects, so that any possible patent category concepts would violate the 1st derivation principle to the extent that they would leave the objectivity of the ontic effects out of account.

On the other hand, structures 12, 14, 15, 16, 20, 22, 23 and 24 can on the basis of their essential aspects be interpreted by the following patent category concepts:

I. Patent category of production of material (from the 12th structure)
II. Patent category of destruction of material (from the 14th structure)
III. Patent category of utilization of material (from the 15th structure)
IV. Patent category of material (from the 16th structure)
V. Patent category of production of form (from the 20th structure)
VI. Patent category of destruction of form (from the 22nd structure)
VII. Patent category of utilization of form (from the 23rd structure)
VIII. Patent catecory of form (from the 24th structure)

The patent category system proposed here thus consists of a material category (IV), a form category (VIII), four different process categories (I, II, V and VI), and two different utilization categories (III and VII) (17).

1 $(S^w/F^w/H^w/R^w/W^w)$	17 $(S^u/F^w/H^w/R^w/W^w)$
2 $(S^w/F^w/H^w/R^w/W^u)$	18 $(S^u/F^w/H^w/R^w/W^u)$
3 $(S^w/F^w/H^w/R^u/W^w)$	19 $(S^u/F^w/H^w/R^u/W^w)$
4 $(S^w/F^w/H^w/R^u/W^u)$	20 $(S^u/F^w/H^w/R^u/W^u)$
5 $(S^w/F^w/H^u/R^w/W^w)$	21 $(S^u/F^w/H^u/R^w/W^w)$
6 $(S^w/F^w/H^u/R^w/W^u)$	22 $(S^u/F^w/H^u/R^w/W^u)$
7 $(S^w/F^w/H^u/R^u/W^w)$	23 $(S^u/F^w/H^u/R^u/W^w)$
8 $(S^w/F^w/H^u/R^u/W^u)$	24 $(S^u/F^w/H^u/R^u/W^u)$
9 $(S^w/F^u/H^w/R^w/W^w)$	25 $(S^u/F^u/H^w/R^w/W^w)$
10 $(S^w/F^u/H^w/R^w/W^u)$	26 $(S^u/F^u/H^w/R^w/W^u)$
11 $(S^w/F^u/H^w/R^u/W^w)$	27 $(S^u/F^u/H^w/R^u/W^w)$
12 $(S^w/F^u/H^w/R^u/W^u)$	28 $(S^u/F^u/H^w/R^u/W^u)$
13 $(S^w/F^u/H^u/R^w/W^w)$	29 $(S^u/F^u/H^u/R^w/W^w)$
14 $(S^w/F^u/H^u/R^w/W^u)$	30 $(S^u/F^u/H^u/R^w/W^u)$
15 $(S^w/F^u/H^u/R^u/W^w)$	31 $(S^u/F^u/H^u/R^u/W^w)$
16 $(S^w/F^u/H^u/R^u/W^u)$	32 $(S^u/F^u/H^u/R^u/W^u)$

Table 5: *Substitutions*

Now if there is to be any sort of a criterion suggesting what doctrines fall under what category it is perhaps reasonable to say that only those doctrines shall fall under a given category which conform in their essential features to the essential aspects of that category. An individual doctrine of a given category will then differ from all other doctrines of the remaining patent categories at least in its essential features.

In the following doctrine

"Alloy, characterized in that it consists of 10% nickel by weight, 8% chromium by weight, 0.15% carbon by weight, and otherwise of iron"

the material feature is the only essential one, so that this doctrine must be assigned to the material category. For the same reason the doctrine

"Hydrocarbon, characterized in that its molecule consists of a ring of six carbon atoms interconnected among one another by alternating single and double bonds, with the free valences being saturated by six hydrogen atoms"

must likewise be assigned to the material category. The two materials mentioned, namely steel and benzene, are totally different from one another. However, when these materials, or the analytical data describing their composition, are conceived of as the kernel of a doctrine for human action, then both doctrines describe the same essential feature which corresponds to the categorial aspect of material. Whether the description of steel or benzene in the aforementioned doctrines correctly characterizes the essentiality of the material aspects in the given case is something for the competent expert to decide. Thus the correct identification of the essential aspect by the description of the doctrine will depend, among other things, on whether the given analytical data presents a basis for the individualization of actual materials and whether a statement establishing identity is possible.

The concepts "forward movement" and "backward movement" are employed here with the intention of introducing chronological processes as instruments for categorial determination – but in particular in an attempt to do justice to actual practice in so far as there are not only doctrines for the production of a particular material but also doctrines for the destruction of the same material, hence for a "backward" or opposite movement, as it were, from the production of a material. Thus it may be desirable, for example, to produce a specific fertilizer ("forward movement"). In the case of excessive fertilization, however, it may also be desirable to possess a doctrine describing the rapid destruction of the same fertilizer ("backward movement").

Similarly, doctrines may aim at the production of a specific form, while there may be other doctrines describing the destruction of that very form. Thus there may be a doctrine describing the production of a specific glass bottle ("forward movement"), while there may also be doctrines describing the destruction of such glass bottles ("backward movement") so as to permit recycling of the glass raw material. The decision whether the aspect of forward or backward movement has been correctly identified, in its essentiality, by a doctrine and has been correctly linked up with the essentiality of the material or form aspect must, again, be left to the competent expert.

Now a utilization, one might remark here, is a process

in which neither the production nor the destruction of a material or a form is pursued. However, precisely those aspects regarded as typical for processes, namely "H" and "R", are rated "nonessential" in the associated structures. For this reason, structures 15 and 23 are purposely not interpreted as processes but as utilization categories. An individual reference to utilization may be interpreted as an intention to show the effect or the "possibility" of a material or a form. That something of this nature also amounts to a doctrine is certainly not open to doubt.

Be it remarked in conclusion that instead of the concept "form" one might employ just as well the concept "device" or the concept "installation" or another concept directed at the given spatial relationship.

7. Objections to the system proposed

The patent category system is obtained here through forming, from five concepts, 32 different substitutions conceived of as possible structures of patent category concepts and examined as to their interpretability with a view to the two derivation principles, with the interpretable structures then being interpreted, on the basis of their essential aspects, as category concepts.

Here one might of course object first of all that the five concepts were selected arbitrarily, though not without background. It is therefore wholly conceivable that other concepts lead to more suitable structures and thus to a better system.

However, if one accepts the manner in which the system was obtained, the system itself, including its eight categories, then becomes a legitimate object for criticism, such as may consist, for example, in questions as to its self containedness and its completeness. The system may, in a way, be termed "self-contained", for out of the 32 possible concept structures of Table 5 a total of eight were selected on good grounds as structures of category concepts. The system can also, however, be somehow regarded as "complete", for the 32 structures of Table 5 constitute at the same time the maximum possible number of such structures. It must be admitted, however, that we can only speak here of "relative self-containedness" and "relative completeness", for other suitable substitutions may lead to other patent category systems.

Far more serious is the following criticism in which the system is appraised by applying certain requirements imposed on a customary jigsaw puzzle. The requirements imposed on such a puzzle (of which there are numerous variants, however) include the following:

P1) No puzzle piece shall be lacking
P2) No puzzle piece shall be present doubly
P3) The puzzle pieces must not overlap
P4) The puzzle picture must conform to the master picture, and vice versa.

Transferred to the patent category system, these requirements read as follows:

K1) No category shall be lacking
K2) No category shall be present doubly
K3) The categories must not overlap (i.e. no doctrine shall belong to two categories)
K4) The category system shall correspond to the scope of inventions (i.e. when there is no category lacking, each doctrine shall be assignable to a patent category; in other words: no doctrine shall "lie between the categories").

When requirements K1 thru K4 are met we will say of the system that it possesses the "jigsaw puzzle property".

Re K1) A category would undoubtedly be found lacking if not all types of ontical effects were covered or taken into account by corresponding categories. Of the eight categories obtained from Table 5, however, every single one is assignable to exactly one of the eight types of ontical effects. From this point of view, no category is lacking.

Re K2) Of the eight categories none are present doubly, as all eight categories have different structures.

Re K3) Among other things, the categories differ also with respect to the types and numbers of their essential aspects of its category, there should not be a single instance in which one and the same doctrine is assigned to two categories. From this point of view the categories do not overlap.

Re K4) Unfortunately, however, there do exist doctrines which, although evidently amenable to patent law, are not covered by the categories of the proposed system, hence "lie between the categories", meaning that they cannot be assigned to any of the eight categories. Thus, for example, the following doctrine lies between the categories:

"Procedure for generating tones, characterized in that a silver flute is blown."

The essential features of this doctrine undoubtedly are the following:

G1) Something is of silver
G2) Something has the shape of a flute
G3) Something is blown

These features evidently correspond to the following (essential) aspects:

G1′) The aspect of material
G2′) The aspect of form
G3′) The aspect of forward movement,

so that this doctrine would have to be assigned to a category possessing the 4th structure of Table 5, hence ($S^w/F^w/H^w/R^u/W^u$). However, this structure was expressly excluded from interpretation as a patent category concept.

The shortcoming of a patent category system with respect to requirement K4 shall be called here the "categorial problem of patent law" and be characterized as follows:

"There is at least one doctrine for human action which, although amenable to patent law, cannot be assigned to any patent category".

Of such a doctrine it must be said that it renders the system "problematical" and thus unfit for use.

One might try to solve this problem by introducing additional categories. However, this procedure was already shown to be inadvisable as it would lead to increased overlapping of exclusion rights. This option between two undesirable alternatives shall be termed here the "categorial dilemma of patent law" and be characterized as follows:

"Either (there is a sufficiently large number of categories and therefore an undesirably large overlapping of exclusion rights) or (there are too few categories, compensated for, however, by a tolerably small overlapping of exclusion rights)."

The categorial problem and the categorial dilemma strike me as invariants of patent law which cannot be solved without patent law being fundamentally changed or even upset. In other words: there is no patent category system providing for a desirable legal situation with respect to exclusion rights which does not present this problem situation, or: any other categories proposed will like have to face this problem situation.– This fundamental problem situation is not affected in the least by the formulation of a patent category system which does not consider the question of exclusion rights or even by the rejection of any kind of a patent category system, as this problem situation has its origin in the desired legal situation and not in the category concept.

It seems to me that the only possible way to save the proposed patent category system consists in splitting up, in each given case, the doctrines lying between the categories into such doctrines as can be fitted, instead of the original ones, into one or several of the eight patent categories. – The doctrine cited as an example in K4 can for these purposes be split up into the following doctrines A thru C:

A) "Use of silver as flute material".
Corresponds to the 15th substitution ($S^w/F^u/H^u/R^u/W^w$), hence to the patent category of utilization of material.

B) "Flute, characterized by ... tube ... holes ... mouthpiece ..., etc."
Corresponds to the 24th substitution ($S^u/F^w/H^u/R^u/W^u$), hence to the category of form.

C) "Use of a flute to produce tones".
Corresponds to the 23rd substitution ($S^u/F^w/H^u/R^u/W^w$), hence to the patent category of utilization of form.

Of course it is merely a conjecture that any doctrine located between the categories can be satisfactorily split up from the point of view of exclusion rights. However, it seems to me that any doctrine incapable of being satisfactorily split up in this fashion suffers from inadequate description. Inadequately described doctrines, however, cannot render a patent category system problematical, since such doctrines are not amenable to patent law.

With this conjecture, requirement K4 can now also be regarded as fulfilled (since no doctrines remain lying between the categories), so that the system proposed may be said to possess the jigsaw puzzle property as defined here.

8. The division into classes of the totality of all doctrines by the patent category system

If the conjecture mentioned in the preceding section is presumed to be correct, so that the patent category system proposed possesses the jigsaw puzzle property as defined here, then the scopes of its eight patent category concepts divide the totality (M) of all doctrines for human action into eight subsets of which the following is true:

α) No subset is empty.
(This statement results theoretically from the scope criterion. It is proven practically by formulating eight different doctrines in the manner of examples A thru C, which undoubtedly can be dispensed with here, however.)

β) No two subsets have an element in common.
(This statement results from jigsaw puzzle property K3)

γ) The sum of all subsets yields the totality (M) of all doctrines for human action.
(This statement results from jigsaw puzzle property K4 and the conjecture that no doctrine remains "between the categories").

In the theory of classes, the division of a basic class (M) into subclasses with the properties α thru γ is called a "class division" or a "class breakdown". Such a class division is, among other things, a criterion for the quality of a classification.

The breakdown of the set (M) of all doctrines for human action into subsets with the properties α thru γ is also confirmed by the fact that in the set (M) of all doctrines a corresponding equivalence relation can be declared (18), which reads:

"Doctrine 1_x belongs to the same patent category as doctrine 1_y".

This relation is

reflexive, since it is true that: Doctrine 1_1 belongs to the same patent category as doctrine 1_1,

symmetrical, since it is true that: If doctrine 1_1 belongs to the same patent category as doctrine 1_2, then doctrine 1_2 belongs to the same patent category as 1_1.

transitive, since it is true that: If doctrine 1_1 belongs to the same patent category as doctrine 1_2 and doctrine 1_3, then doctrine 1_1 belongs likewise to the same patent category as doctrine 1_3.

Relations with the properties of reflexivity, symmetry and transitivity are grouped together under the name "equivalence relations". The equivalence relation concept can be regarded as the laying down of "equivalence" in precise mathematical terms (19). Here it means that two doctrines 1_1 and 1_2 of one and the same patent category are to be regarded as "equivalent" by virtue of their common inclusion in this patent category.

For an actual division of existing doctrines, e.g. of those available in written form, it should be noted that the propositional statement

"Doctrine 1_x belongs to patent category p_x"

must be capable of being transformed, through suitable substitution of the variables 1_x and p_x, into a propositional statement for any actual doctrine L_1, which statement will be either true or false. If the statement is true for the actual doctrine L_1 and the patent category P_I, then the document containing doctrine L_1 is placed in a store labeled "P_I". If, on the other hand, the statement is false, then doctrine L_1 is not filed under "P_I"; instead, one goes on to examine whether the statement can be rendered true by employing doctrine L_1 and patent category P_{II}, etc. The subdivision procedure presupposes therefore that a criterion is available for deciding whether the statement in question is either true or false. In the light of the aforegoing considerations concerning the patent category system proposed here, such a criterion, to be termed here "truth criterion", can be formulated as follows:

"A doctrine L_1 belongs then and only then to a patent category P_x if the essential features of doctrine L_1 correspond to the essential aspects of exactly one of patent categories I thru VIII."

Since the patent category system proposed is relatively

self-contained and relatively complete, such a division into classes is valid not only for the currently known set (M) of all doctrines for human action but also for any future set of such nature (20).

9. Summary

A patent category system featuring eight patent category concepts is proposed. These patent category concepts are obtained through an interpretation of concept structures. The concept structures, in turn, are obtained through a combination of the concepts "material", "form", "forward movement", "backward movement", and "effect", each rather either "essential" or "nonessential". Two anterior derivation principles are employed to narrow down the total of 32 combinations or concept structures, also called "substitutions", to eight concept structures that can be interpreted as patent category concepts. The interpretation of these structures is determined by their essential aspects. The patent category system proposed can be regarded as relatively self-contained and relatively complete.

However, a critical appraisal of the patent category system proposed shows it to be "problematical" in that its categories are incapable of covering each and every doctrine amenable to patent law. However, it is claimed that any other patent category proposal involving the consideration of anterior derivation principles of the type mentioned here will be similarly problematical.– To solve the problem it is *not* proposed here that the number of categories be increased but rather that a doctrine rendering the system problematical be broken down into other doctrines in such a way that these doctrines will then fall under one or several categories of the system.

It is shown that under a specific assumption the eight category concepts of the system will divide the set (M) of all doctrines for human action (to the extent that they are amenable to patent law) into equivalence classes and that the relationship "Doctrine 1_x belongs to the same patent category as doctrine 1_y" is an equivalence relation which, since the category system is relatively self-contained and relatively complete, will also be valid for any future such sets.

References and Notes

(1) H. Isay: "Das Patentgesetz" (The Patents Act), 1926, p. 80.
(2) G. Benkard: "Patentgesetz Gebrauchsmustergesetz" (Patent and Trade-Mark Law), 1973, p. 203.
(3) Lindenmaier: "Das Patentgesetz" 1973, p. 63.
(4) With respect to categories, cf. also, for example, Ingetraut Dahlberg: "Grundlagen universaler Wissensordnung" (Fundamentals of Universal Organization of Knowledge), 1974.
(5) and: J. Ritter und K. Gründer: "Historisches Wörterbuch der Philosophie" (Historical Dictionary of Philosophy), Vol. 4: J–K, 1976, columns 714–775.
(6) Ritter and Gründer, loc. cit., col. 714.
(7) Ritter and Gründer, loc. cit., col. 774.
(8) "Even if one is not a positivist, it is advantageous to start out from the observable". P. Schifko: "Bedeutungstheorie, Einführung in die linguistische Semantik" (Theory of Meaning; Introduction to Linguistic Semantics), 1975, p. 10.
(9) For example, the ontic effects are not looked at from the vantage point of a changing energy field or ray.– Furthermore the "production" in the 2nd ontic effect is not to be regarded as original creation, nor the "destruction" in the 3rd ontic effect as a dissolution into nothing. Rather, for the scope criterion to be intelligible it suffices to assume that things have existed all along and will continue to exist indefinitely, hence that production and destruction are to be understood (in a philosophically inadequate manner, no doubt) as transitions "from thing to thing". Roughly in the way, therefore, in which chemical reactions are understood as transitions from material to material governed by a law of preservation of mass, even though this law demonstrably is not strictly true.
(10) Cf. W. Wundt: "Allgemeine Logik und Erkenntnistheorie" (General Logic and Epistemology), 1906, p. 110, line 9. Regarding a modern approach see DIN 2330 and I. Dahlberg: Über Gegenstände, Begriffe, Definitionen und Benennungen. In: Muttersprache 86 (1976) No. 2.
(11) The concepts "material" and "form" are to be understood here purely as they are understood in everyday language and not as special terms of any philosophical school.
(12) This stipulation is made in analogy to the terminology of two-valued propositional logic in which the concepts "true" and "false" are used to denote the "values" or "truth values" of propositions.
(13) The table of concept values is drawn up analogously to the definitory scope of the truth value table of two-valued propositional logic.
(14) Cf. W. Wundt, op. cit., p. 107.
(15) The structure of a concept is as a rule extremely complex. A "substitution" within the meaning of the present analysis is therefore only a very coarse simplification of a concept structure. However, it seems that this simplified structure identification suffices for the purposes pursued here.
(16) The value table, the table of constructs and the table of all interpretations (if not listed already under I thru VIII) are omitted here because of space limitations.
(17) In the system proposed there is neither a "means category" nor a "mixed category". The term "mixed category" for something permissible or possible should be avoided, since in my opinion it is on a level, as a contradictio in adjecto with the "triangular circle" or the "wooden iron". The question for which the "mixed category" is resorted to in patent law is not a categorial question at all, much less a question of a lacking supply of categories compelling one to "mix two", but rather a question of a desired legal situation. A typical example in point is the "product-by-process claim": here the applicant is only able to describe a doctrine for the manufacturing procedure of a material. For this doctrine he desires, however, a legal situation such as corresponds to a doctrine of the material category, causing him to formulate his claim (schematically) as follows:
"Material, characterized in that it is manufactured 'in such and such a way'."
A claim thus formulated is then usually regarded as being of a "mixed category", as its introductory part refers to a material and its specifying part to a procedure.– However, without any "categorial mixing" the applicant might just as well have formulated as follows:
"Procedure for the manufacture of a material, characterized in that one proceeds 'in such and such a way'.– With all the rights due to a material claim!"
Although, of course, somewhat unusual, this formulation is less ambiguous, and it shows that what the applicant was after can also be expressed in a "categorially pure" manner. Since the desired legal situation of interest here is not clarified by the Patents Act, it must be – and has been – regulated by jurisprudence, so that in the final analysis and de lege lata no objection can be raised against the "mixed category", needlessly resorted to though it may be.
(18) "Any equivalence relation in a set M produces a class subdivision of M, and conversely: Every class subdivision of a set M corresponds to an equivalence relation in M which produces this class subdivision of M". H. Bartel, E. Anthes: "Mengenlehre" (Theory of Classes), 1975, p. 119.
(19) H. Heuser, H. G. Tillmann: "Lehrgang Moderne Mathematik" (Course in Modern Mathematics) 1973, Vol. 1, p. 234.
(20) The interpretation of the 32 substitutions of Table 5 need not remain confined to the possibility of finding patent category concepts. Another, more general interpretation possibility would consist in regarding these substitutions as concept structures of 32 subset concepts of the class division of a basic set M whose elements can be distinguished from one another by means of the rated aspects of material, form, forward movement, backward movement, and effect.