Selection of Patents for the Chemical Abstracts Service Data Base†

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Patents have been a vital part of *Chemical Abstracts* (CA) ever since the publication of Volume 1, Issue 1 in 1907. The installation of a computerized patent processing system in July 1980 has allowed Chemical Abstracts Service to improve significantly its consistency in selecting chemical patent documents for abstracting in CA. Recent extension of patent coverage to include additional kinds of documents and documents issued to nonnationals from certain countries is noted. Use of the International Patent Classification as a key for selecting by computer those documents with chemical content is emphasized.

INTRODUCTION

Since July of 1980, Chemical Abstracts Service (CAS) has been using a computerized system for the selection of chemical patent documents and the determination of patent families.[1,2] Chemical patent documents that are selected are those whose content falls within the overall definition of chemistry and chemical engineering used by CAS. CAS defines chemistry to include all compositions and structures of matter, the changes matter undergoes, and the theories and laws that govern these compositions, structures, and changes. Chemical engineering includes the development and application of manufacturing processes and tools, apparatus, and equipment used by the chemical engineer. The determination of patent families involves bringing together the various individual documents the owner of an invention has acquired to obtain international protection for the invention.

Figure 1 gives an overview of the CAS automated patent processing system. Each week CAS receives a computer tape of bibliographic records for the most recently published patent documents of 50 countries from the International Patent Documentation Center (INPADOC) located in Vienna, Austria. First, those records that are of interest to CAS are selected from the weekly tape. Then a determination is made to see if the record is a member of a patent family. In making this determination, a record is compared with the data of about 2.2 million patent records contained in the CAS patent master file. If a record belongs to a family that contains a previously abstracted member, the record is termed an "equivalent", and the entire family, along with the abstract citation, is cited in the weekly issued Patent Index. If the record is the first member of a family to be received, it is termed a "basic", that is, suitable for abstracting and indexing. The document for the basic record is ordered, the bibliographic data for the abstract heading are prepared, and an abstract and index entries are written. On appearance of the abstract in *Chemical Abstracts*) (CA), the document number of the abstracted document and the CA abstract number also appear in the weekly issued Patent Index.

SELECTION BY COUNTRY

The primary focus of this paper is on the selection portion of the CAS automated patent processing system. The first step of this process is to select, from 50 countries covered on the INPADOC weekly tape, those records that correspond to the 26 countries and two international organizations currently covered in CA. These 28 entities are listed in Table I along with their corresponding ISO (International Organization for Standardization) country codes. These codes are used in the actual selection process.

The asterisk associated with certain countries indicates that abstracts are prepared only for those documents whose applicants are resident in that country. The origin of this national coverage practice is almost synonymous with the beginnings of CA and was first used with Canadian patents in 1910. Nonnational patents were not covered on the rationale that if a patent issued to a nonnational was significant, it would issue in the applicant's own country. For example, a Canadian patent issued to a U.S. applicant was not covered on the assumption that the applicant had also filed in the U.S. and the invention would be covered when the U.S. patent was issued. One of the reasons for such a practice in the early years of CA was that it reduced the amount of duplicate abstracting for members of the same patent family since, at that time, bibliographic data useful in determining family members very often were lacking.

The advent of the quick-issuing publication, i.e., the unexamined application, more refined techniques for determining family members, and the desire on the part of CAS to make patent information available to the CA user as quickly as possible, resulted in a reexamination of this practice and a continuing effort to eliminate it. In 1974, CAS covered documents issued only to nationals for 21 countries. With the elimination of this practice for Australia, the Democratic Republic of Germany, and India in 1982, there are only eight countries whose nonnational patents CAS currently does not cover. It might be noted that the use of the automated patent processing system has allowed the complete coverage of all equivalents from all countries, regardless of nationality, since 1980.

SELECTION OF KIND OF DOCUMENT

After the patent processing system selects records from the INPADOC weekly tapes by country codes, the next step is to select various "kinds of documents", for example, unexamined and examined applications and granted patents. With the exception of some utility models, most of the kinds of documents on the INPADOC tape are selected. Selection is done on the basis of the World Intellectual Property Organization's Kind of Document code. With the addition of Austrian Kind E, Australian Kind B3, and Swiss Kind A3 in 1982, CAS is currently selecting a little more than 100 different kinds of documents from the INPADOC tape. The new Austrian Kind E is a granted European patent having Austria as one of its designated countries; Austria renumbers the European patent using its own numbering system. The Austrialian Kind B3 is a "Petty Patent". Such documents are

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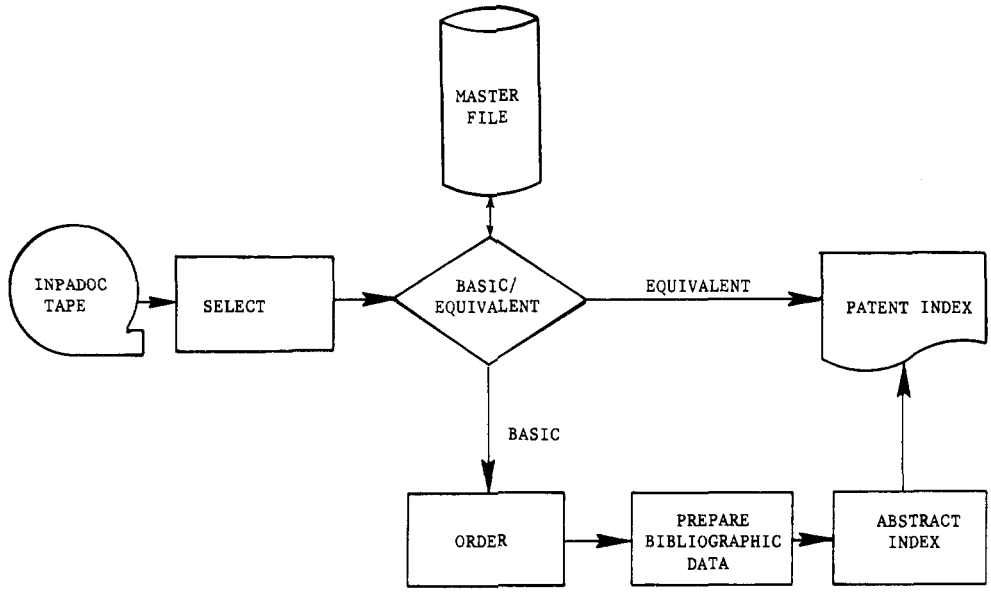

Figure 1. Automated patent processing.

Table I. CAS Patent Selection: Country and Kind Codes

country code	country	kind codes: unexamined	kind codes: examined	kind codes: granted[b]
AT	Austria			B, E[c]
AU	Australia		B1-2	B3
BE	Belgium			A, A1-9, T1-2[c]
BR	Brazil	A		
CA	Canada			A, A1-2, B
CH	Switzerland		A3	A, B
CS	Czechoslovakia[a]			B, L, M, P
DD	German Democratic Republic			C, D, S, T, U, W, Y, Z
DE	Germany, Federal Republic of	A, A1	B,B1,B2[c,d]	C1, C2-3,[c] T[c]
DK	Denmark[a]		B	C[c]
EP	European Patent Organization	A1-2, A3[c]		B1-2[c]
ES	Spain[a]			A1-4
FI	Finland[a]		B	C[c]
FR	France	A, A1-4		A5-8, B1-4[c]
GB	United Kingdom	A1	A[e], B2[c]	
HU	Hungary[a]	A	O	P[c]
IL	Israel	A1		
IN	India		A	
JP	Japan	A2	B4	
NL	Netherlands	A	B[c]	C[c]
NO	Norway[a]		B	C[c]
PL	Poland[a]			B1-4
RO	Romania			B, L, M, P
SE	Sweden[a]		B	C[c]
SU	Union of Soviet Socialist Republics			A1-4
US	United States	A0[f], H		A, E
WO	World Intellectual Property Organization	A1-2, A3[c]		
ZA	South Africa	A, A1		

[a] Only documents issued to nationals are abstracted. [b] Includes author certificates and reissues. [c] Covered only as equivalents. [d] Discontinued for all applications filed after January 1981. [e] Old law only. [f] U.S. Government applications published via National Technical Information Service (NTIS).

similar to Australian patents but are limited to one claim and a maximum term of 6 years. The Swiss Kind A3 is an examined application in the area of time measurement or textile improvement, the only areas in which the Swiss publish examined applications.

Records for the Hungarian unexamined and examined documents and U.S. unexamined applications are not available on the INPADOC tape. CAS staff select these Hungarian and U.S. documents from the Hungarian Official Gazette and Government Reports Announcements & Index, respectively. It should be noted that by law the U.S. Patent and Trademark Office must maintain U.S. patent applications in strict secrecy. However, U.S. Government agencies that fund research work resulting in patentable inventions often publish the application independently through the National Technical Information Service (NTIS).

SELECTION BY INTERNATIONAL PATENT CLASSIFICATION

Having selected by country and kind of document code, the patent processing system then takes the final step in the process: selecting those records that correspond to documents within the scope of the CAS definition of chemistry and chemical engineering. CAS staff have found the International Patent Classification (IPC) system to be a most useful tool in selecting those records.[3]

Table II. IPC Selection Table[a]

class or subclass	subgroups[b]	subject matter
		A: Human Necessities
A01N	A	biocides, herbicides, and plant growth regulators
A21D	P	baking additives and preservatives
A23B	A	ripening and preservation of fruits and vegetables
A23C	P	dairy products
A23D	A	butter substitutes, edible oils, and fats
A23F	P	coffee, tea, and substitutes
A23G	P	cocoa, chocolate, confectionary, and ice cream
A23J	P	proteins and phosphatides
A23K	P	fodder
A23L	P	miscellaneous food preparation and preservation
A24B	P	manufacture and preparation of tobacco
A24D	P	tobacco products and accessories
A61K	A	medical, dental, and toilet preparations
A61L	P	sterilization, disinfection, and deodorization
A62D	P	chemical fire extinguishers
		B: Performing Operations; Transporting
B01B	P	boiling and boiling apparatus
B01D	P	separation
B01F	P	mixing
B01J	P	chemical and physical processes
B01L	P	chemical and physical laboratory apparatus
B03D	P	flotation and differential sedimentation
B04B	P	centrifugal apparatus
B05D	P	application of liquids to surfaces
B09B	P	solid waste disposal
B22C	P	foundary molding
B22D	P	casting of metals and other substances
B22F	P	working metallic powder
B27K	P	staining, dying, and bleaching of wood materials
B32B	P	layered products
B41M	P	printing and copying
B41N	P	surface preparation for printing
B44D	P	treatment of artistic works
		C: Chemistry and Metallurgy[c]
C01	A	inorganic chemistry
C02	A	water, waste water, sewage, and sludge
C03	P	glass
C04	A	cements and ceramics
C05	P	fertilizers
C06	P	explosives and matches
C07	A	organic chemistry
C08	A	macromolecular compounds
C09	A	dyes, paints, polishes, natural resins, and adhesives
C10	P	petroleum, gas, and coke industries
C11	P	animal and vegetable oils, fats, and waxes
C12	P	biochemistry and genetic engineering
		C: Chemistry and Metallurgy[c]
C13	P	sugar and starch industry
C14	P	skins, hides, pelts, and leather
C21	P	metallurgy of iron
C22	A	metallurgy of ferrous and nonferrous alloys
C23	P	treatment of metals
C25	P	electrolytic and electrophoretic processes
C30	A	crystal growth
		D: Textiles and Paper
D01C	A	chemical treatment to obtain fibers
D01F	A	chemical features in producing artificial fibers
D04H	P	fabric production
D06B	P	textile treatment
D06L	A	bleaching
D06M	A	miscellaneous textile and fiber treatment
D06N	A	covering materials
D06P	A	dying and printing of textiles
D06Q	A	decoration of textiles
D21C	P	cellulose production
D21H	P	cardboard and paper manufacture
		E: Fixed Constructions
E21B	P	earth drilling
E21F	P	safety devices
		F: Mechanical Engineering; Lighting, Heating, Weapons, Blasting
F01N	P	gas flow silencers and exhaust apparatus
F24J	A	heat production
F25J	P	gas processing
		G: Physics
G01N	P	chemical and physical properties
G03C	P	photosensitive compositions
G03F	P	photomechanical patterned surfaces
G03G	P	electrophotography
G21B	A	fusion reactors
G21C	P	nuclear reactors
G21F	P	radiation protection and decontamination
G21G	A	chemical element conversion
G21H	P	energy from radioactive sources
G21J	P	nuclear explosives
		H: Electricity
H01B	P	conductors, insulators, and dielectrics
H01F	P	magnetic materials and inductors
H01G	P	capacitors
H01L	P	semiconductor devices
H01M	P	batteries
H01S	P	stimulated emission devices
H05H	P	plasma techniques

[a] Summary version. The actual IPC selection table contains over 16 000 individual IPCs. [b] A = all subgroup IPCs in the CAS selection table. P = some subgroup IPCs not in the CAS selection tables. [c] See Table IV for excluded subgroups.

The IPC system is a hierarchical system that classifies patentable technology into smaller and smaller subject areas. The IPC system starts with eight sections, which are further divided into classes, subclasses, groups, and finally subgroups. Consider, for example, the IPC code C13D 3/08. The first character, C, represents the IPC section, the broadest division of the IPC system, and, in this case, indicates chemical or metallurgical content. Thirteen (13) represents the class and indicates the sugar or starch industry. D is the subclass and indicates a finer breakdown, that is, an emphasis on the production and purification of sugar juices. Three (3) represents the group classification and limits the subject matter to purification, while 08 is the subgroup and limits the purification to oxidation and reduction.

In proposing use of the IPC system, staff expressed considerable concern that it would not be accurate enough for chemical selection purposes. Certainly many examples of the inconsistent application of IPCs to patent documents can be found in the literature.[4] Therefore, one of the first tasks was to determine if indeed the IPC could be used to select chemical records. To do this, a set of documents was selected by computer by using a table of IPCs and compared with documents selected by staff. A summary of the IPCs used in the selection process is given in Table II. As shown in Table III, a total population of 4327 records was considered. Although data for such countries as the Netherlands, West Germany, and Japan were of interest, it was not possible to obtain them for several reasons, such as the national/nonnational coverage policy, the existing use of an IPC profile with certain patent offices, and/or the use of an out-of-house selection process. The initial experiment revealed two important areas that warranted further investigation. First and foremost were the 35 records that were missed by the automated selection system. The second area concerned the 215 records that were "overselected" by the computer, i.e., were found to have no chemical content by CAS staff.

Table III. IPC Selection

country	sample	human selection	IPC selection total	IPC selection over-selected	IPC selection missed
Canada	900	322	369	54	10
Denmark	140	2	2	0	0
European	190	113	120	10	3
France	1167	251	337	88	3
Norway	91	1	1	0	0
Sweden	115	4	7	3	0
United Kingdom	960	217	229	21	9
United States	764	216	245	39	10
total	4327	1126	1310	215	35

In looking at the 35 missed "documents", four were of special concern because they contained subject material of a very definite chemical nature. On investigation, two reasons were found for these four records not being selected. First, the IPC associated with the INPADOC record was unintelligible, that is, the field was blank or contained a format error so as to preclude automatic selection. Second, the IPC appeared to be valid but upon investigation was not found in the IPC Manual of Classification.[3] The first problem, that of the missing or incorrectly formatted IPC, was relatively easy to solve. A computer check was installed to ascertain the presence and correct format of the IPC. If an error condition is noted, the record is printed out for staff review. Typically the record contains sufficient title, inventor, and assignee data to determine its suitability for inclusion in CA. If, however, there is any doubt, the document is ordered, and the suitability decision is made directly from it.

The second problem, the instance where the IPC had a correct format but was not included in the IPC manual, was of more concern. One approach to solve the problem would be to put all IPCs in the IPC manual into a table and match each incoming IPC on the INPADOC records against the table. However, the size of such a table, about 50000 separate IPCs, and the fact that most of the documents of interest to CAS were to be found in the chemical section, i.e., Section C, did not seem to warrant the inclusion of the entire IPC directory into the selection process. Instead, efforts were taken to review all documents with a C Section IPC to ensure that they contained chemical content. As a result, it was decided to supplement the C Section IPCs used for selection with a table of C Section reject IPCs, i.e., those C Section IPCs whose documents do not contain chemical information.

At first blush, it might appear odd that an IPC in the C Section, which is entitled "Chemistry", would not contain chemical information. To appreciate this, one must understand that the IPC system is based on an industry, art, or human activity approach to classification. As a result of this approach, there are some aspects of certain industries that CAS does not consider as chemistry. For example, most of the sugar classifications deal with chemical processing, but a few deal exclusively with mechanical equipment. Specifically, IPC C13D 1/06 pertains to sugar cane crushers. Since CAS typically does not include purely mechanical equipment in its coverage, such an IPC would be placed in the C Section Reject Table. Table IV provides an indication of the types of documents with a C Section classification that are not routinely included in CA.

By developing this table of C Section reject IPCs and combining it with the selection table, it was possible to include all C Section IPCs in the selection mechanism. By checking each incoming C Section IPC on the INPADOC record with both the selection and rejection tables, it is possible to detect

Table IV. IPC C Section Reject Table[a]

subclass	subgroups[b]	subject matter
C03B	A	apparatus for manufacture of glass products
C05F	P	apparatus for manufacture of fertilizer
C06C	P	fuse manufacture and packing
C06D	P	generation of gas pressure by decomposition
C06F	P	mechanical manufacture of matches
C10B	P	mechanical aspects of petroleum, gas, and coke industries
C10C	P	mechanical processing of pitch, asphalt, and tar
C10F	A	cutting, drying, and workup of peat
C10H	P	acetylene generators
C10J	P	devices for producer gas and water-gas production
C11B	P	mechanical refining of fats and fatty oils
C11C	P	apparatus for candle preparation
C11D	P	mechanical apparatus for soap making
C12C	P	mechanical devices in alcoholic beverage manufacture
C12H	P	mechanical treatment of alcoholic beverages
C12L	A	pitching and depitching machines and tools
C12M	P	apparatus for enzymology and microbiology
C12N	P	mechanical processing of microorganisms
C12Q	P	measuring and testing of microorganisms
C12R[c]	A	microorganisms
C13C	A	sugar and starch raw material processing apparatus
C13D	P	apparatus for juice production
C13F	P	apparatus for sugar and syrup production
C13H	A	apparatus for sugar cutting, sorting, and packaging
C13L	P	apparatus for starch production
C14B	A	mechanical treatment of skins and hides
C21B	P	apparatus for iron and steel manufacture
C21C	P	apparatus for pig iron manufacture
C21D	P	apparatus for ferrous metal and alloy manufacture
C23D	P	application of layers to metals
C23G	P	apparatus for cleaning metals
C25B	P	regulators of interelectrode distance
C25D	P	parts and assemblers for electrolytic coating

[a] Summary version. The actual reject table contains a little fewer than 800 IPCs. [b] A = all subgroup IPCs in the reject table. P = some subgroup IPCs in the reject table. [c] Additional, nonobligatory classification identifying microorganisms. Selection is based on the classification of the process and not the identity of the microorganism.

any C Section IPC that is not in the IPC manual. Records that contain these maverick IPCs are printed out for manual review in a fashion similar to that for missing or incorrectly formatted IPCs. Experience over the past 3 years has shown that these maverick IPCs are due mainly to IPCs that have been used in earlier editions of the IPC manual and have been dropped in subsequent editions. For further refinement of the selection and rejection tables, these earlier editions of the IPC manual have been acquired, and all IPCs from those manuals that may have chemical content have been added to the selection table. All C Section IPCs that are normally excluded from CA coverage have been added to the rejection table. With these refinements, it is now exceedingly rare to find an IPC that is not in either of the tables.

After this problem was solved by establishing a mechanism to detect chemical records which might otherwise be overlooked because of a missing, incorrectly formatted, or erroneous IPC, there still remained 31 records that had been missed because the non-C-Section IPC on the record was not included in the selection table. To determine the seriousness of this problem, various staff members unknowingly "reselected" these documents as a result of "reincluding" them in the normal document selection process. Of the 31 documents missed by the computer, only three were unanimously picked by staff as having sufficent chemical content to be

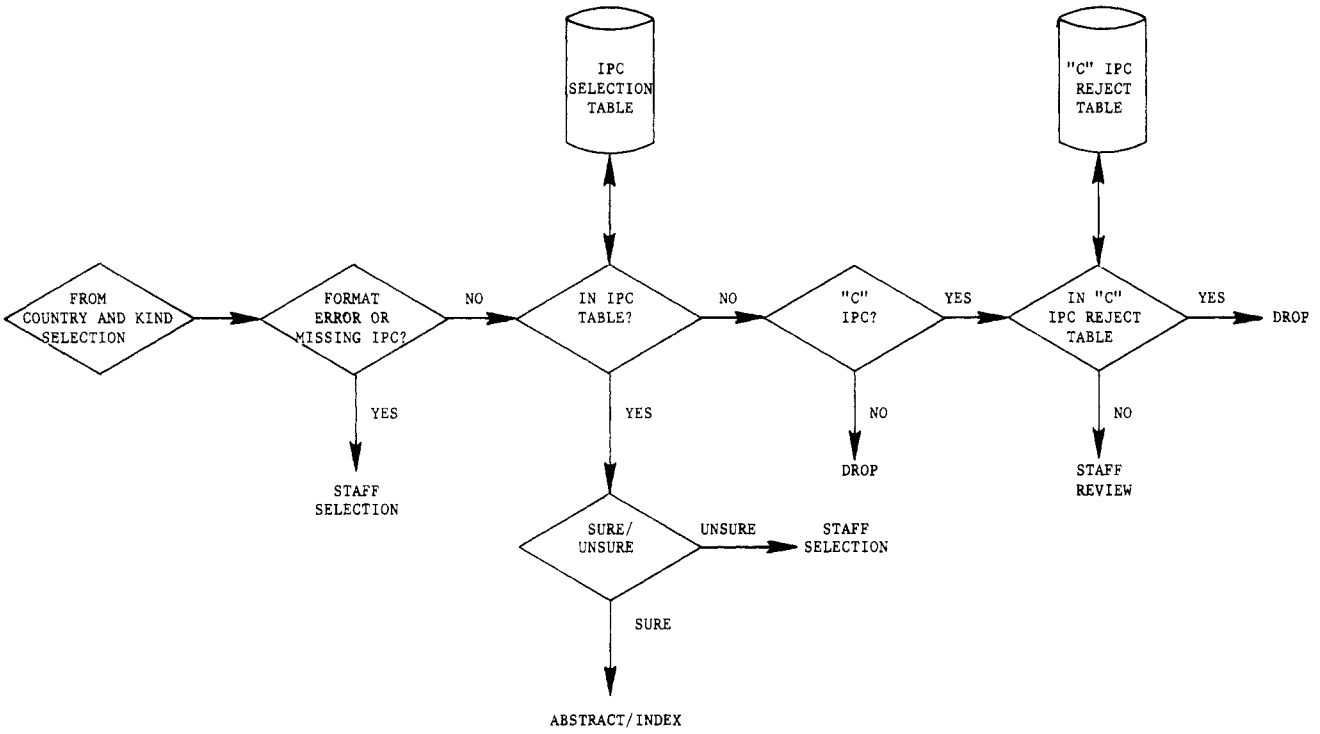

Figure 2. IPC selection.

included in CA, and even these were on the borderline of the CAS definition of chemistry.

Feeling relatively confident that there was a very low probability that documents with significant chemistry would be missed by using an automated selection process, CAS staff turned to the next order of business, that of dealing with the 215 documents that had been selected by the machine but were found to lack significant chemical content. To understand why there are so many of these documents, one needs to understand another aspect of the IPC system. Many IPCs define subject matter that has a high probability of appearing in CA. For example, almost all documents with IPC class C07, which is entitled "Organic Chemistry" will inevitably contain sufficient chemistry to warrant selection. CAS terms such high probability of chemistry IPCs "sure-select" IPCs. Some IPCs, however, do not carry such a high probability. For example, consider IPC C06B 21/00, which deals with apparatus or methods for working with explosives. Often a document with this IPC will be directed only to mechanical apparatus or processing, in which case it is not suitable for abstracting. However, if the apparatus or processing involves the chemical reactivity of the explosive, it probably will merit selection. CAS has termed such IPCs with a lower probability of chemical content "unsure-select" IPCs.

By assigning a sure-select or unsure-select status to each IPC in the selection table, it is possible to segregate the corresponding documents into two groups, one with a high probability of chemistry, the sure-select group, and one with a lower probability of chemistry, the unsure-select group. The sure-select documents are sent to abstracting and indexing staff without further review while the unsure-selects are screened by staff to remove those lacking in chemical content. About half of the extra machine-selected documents are eliminated by this screening process. The remaining extra documents are elminated in the title editing or abstracting and indexing operations. It must be pointed out that presently there is nothing sacred about a sure-select document. If it contains no new chemistry, it too can be rejected from CA coverage during the title editing, abstracting, or indexing operations.

Figure 2 summarizes the CAS automated IPC selection process. After INPADOC records have been selected by country and kind code, they are checked to see if there is a format error in the IPC or if it is missing. If so, the record is printed out for staff selection. If the format is satisfactory, the IPC on the record is passed on to the selection table. If it is in the selection table, it is labeled "sure" or "unsure". If it is unsure, it is manually reviewed. If it is sure, the document is ordered and forwarded to abstracting and indexing staff, receiving a complete title and additional bibliographic data along the way. If the IPC is not in the selection table, it is checked to see if it is a C Section IPC. If not, the record is dropped. If it is a C Section IPC, it is checked against a C Section rejection table. If it is present, the record is dropped. If it is not present, the record is printed out for staff review.

ASSIGNMENT OF CA SECTION NUMBERS

One final use that CAS has made of the IPC system is to assign by computer preliminary CA section numbers. A CA section is one of the 80 areas of chemistry into which CA is divided and into which abstracts on a particular subject are placed. Thus, a document assigned the IPC C14C 3/08, pertaining to tanning, is placed in CA Section 45 which contains abstracts on leather. CO2F 9/00 is the classification for treatment of water, waste water, or sewage, and documents with this code may go to CA Section 60, pertaining to waste treatment, or to Section 61, pertaining to water. Documents describing explosives are classified by IPC C06B 21/00 and are assigned to Section 50, which covers explosives. Patent documents dealing with layered cellulosic plastic substances are assigned B32B 23/00 and may be placed in Section 38 covering plastics or in Section 43 covering cellulose.

How well does machine assignment do in terms of assigning documents to CA sections? For 51% of the documents in a total test population of 63 000 documents, there was a one-to-one correspondence, i.e., the machine correctly assigned the document to the appropriate CA section. Seventeen percent had multiple machine-assigned section numbers, one of which corresponded to the correct CA section. Twenty-two percent of the documents were machine assigned to a CA section in the correct section grouping, where a section grouping is one of five major divisions of chemistry into which CA sections

are grouped. For example, the first 20 sections of CA make up a section grouping entitled Biochemistry. Thus, a document assigned by machine to Section 6, General Biochemistry, when it properly should have been placed in Section 11, Plant Biochemistry, would be a case where the machine did not assign the document to the correct section but did assign it to the correct section grouping.

Finally, about 10% of the documents were not assigned to a CA section in the appropriate section grouping. Although at first this appears to be a fairly serious defect, one must once again recognize that the IPC system and CAS view chemistry and its division in a somewhat different manner. For example, the IPC system assignment of a document to the Biochemistry section grouping and the staff analyst assignment to the Organic section grouping seems far apart. However, when one sees that the document is on the fermentation of sugar and the IPC emphasis is on fermentation (biochemistry), while the analyst has chosen to emphasize the carbohydrate aspect, organic chemistry, the seriousness of the misassignment does not seem to great.

The machine assignment of CA section numbers has proven to be a valuable tool by which patent documents are routed to the various analysts who asbstract and index them. It also assists the document analysts in placing the abstract in the appropriate section of CA.

CONCLUSION

In conclusion, it may be said that CAS has been most pleased with its experience in using an automated system for document selection. This system has given CAS users a uniform and consistent selection policy that extends to all countries and in some cases has significantly improved the coverage of chemical documents. In addition, it has given CAS a tool by which patent documents can be routed to the appropriate document analyst, and the analyst is assisted in the placement of abstracts in the proper CA sections.

ACKNOWLEDGMENT

I wish to thank Irvin Tingley, a member of the CAS Selection and Assignment Department, who almost singlehandedly has reviewed every one of the 50 000 IPCs in each of the three editions of the IPC manual and has made them into a highly workable selection and assignment tool. Without his contributions, much of what was done would not have been possible.

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Information Services Providers: Copyright Issues for the Eighties

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The "Information Age" has come about largely as a result of the new technologies which enable the seekers of information to identify sources of the information being sought quickly and efficiently. The information-service company that facilitates the information identification and location process through an information data base retrieval system has a significant stake in the resolution of copyright issues affecting both the owners and the use of copyrighted information by the information seeker. These issues between copyright owners and information users must be resolved if the new technologies are to be extended to anyone having the means of accessing the technology.

INTRODUCTION

Just as surely as historians will view this latter portion of the twentieth century as the commencement of the "Information Age", these same historians will most certainly examine the dynamic role of the information provider in relation to both the information source and the information user. Although the role of the information provider is closely and, perhaps, inextricably related to the continually changing function of new technologies, the copyright protection of information in the scheme of information delivery must surely transcend the technologies that enable the information-delivery process to flourish. Therefore, copyright protection of information serves the purposes of and benefits all those involved in the information delivery scheme, be they information sources, information service providers, or information users.

This paper will highlight some of the significant issues relating to copyright and its application to the delivery of information through utilization of the new technologies. Its purpose is not to resolve controversies but, rather, to illustrate some significant issues as they relate to the information-delivery process and to those who participate in it.

BACKGROUND

From the historical perspective, the library has traditionally been the ultimate source of most of the world's information that exists in written form. Whether or not one views the library's contemporary role as eroding or as expanding due to expanded marketing techniques of information sources, the information institutions in our society are utilizing the new technologies in the maintenance of the information-delivery process. It is important, however, to view the new technologies as "tools" benefiting the information-delivery process, rather than as the process itself, although it is understandable that persons involved in the process may not correctly distinguish the technology from the information.

The Copyright Act of 1976[1] was the culmination of more than 20 years of study by the United States Congress, whereby the copyright laws were to be reconciled with the new tech-

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