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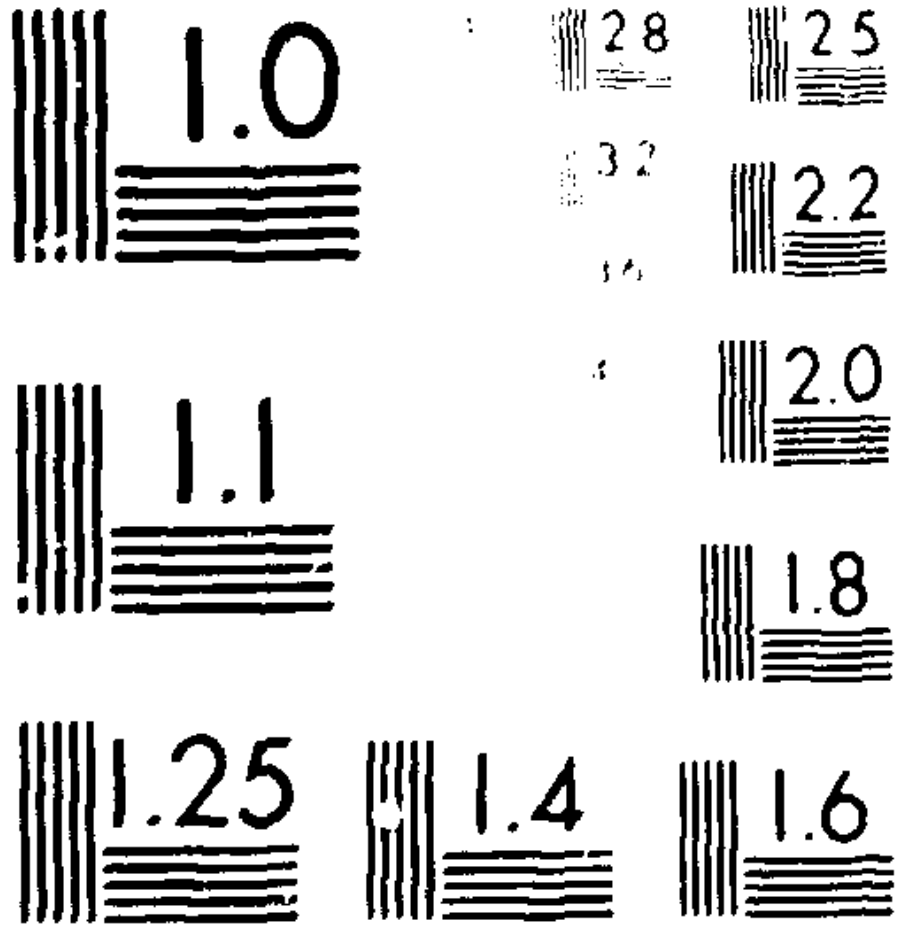
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Users' Guides to the International Patent Classification (IPC)*.

II - Iron and Steel.

Industrial and Technological Information Bank (INTIB)

Industrial Information Section
UNIDO Technology Programme

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FOREWORD

The Industrial and Technological Information Bank (INTIB) came into existence in 1977 as a UNIDO pilot operation in four industrial sectors: Iron and Steel, Fertilizers, Agricultural Machinery and Implements, and Agro-Industries. After its successful completion, INTIB has become a permanent activity of UNIDO covering, for the time being, 20 industrial sectors. Its main objective is to facilitate the choice of technology for decision makers in developing countries.

Users' Guides to the International Patent Classification (IPC) were produced by WIPO in co-operation with the European Patent Office in the four sectors selected for the pilot operation of INTIB. They are intended to facilitate access to patent information through the use of the UNIDO Thesaurus of Industrial Development Terms. The Guides stress the importance of patent information for technology selection and describe the process of the identification of patent documents using the International Patent Classification (IPC).

It is hoped that this document will be of assistance to industrial information facilities in developing countries in identifying technologies of relevance to investment decision-making on the basis of appropriate choices of technologies.

Dr. Abd-El Rahman Khane
Executive Director

PREFACE

This Users' Guide to the International Patent Classification (IPC) is one of a series dealing with the use of the IPC to retrieve technological information from patent documents. Each Guide considers a well-defined technical section of direct relevance to the development process in developing countries and gives detailed guidance as to how pertinent technological disclosures contained in patent documents may be identified by using the IPC.

The series of Users' Guides to the IPC so far covers the following technical sections:

Guide No. I - Fertilizers
Guide No. II - Iron and Steel
Guide No. III - Agricultural Machinery and Implements
Guide No. IV - Agro-Industries

The Guides have been produced by the World Intellectual Property Organization, Geneva, in consultation with the European Patent Office, Munich, following an agreement with the United Nations Industrial Development Organization, Vienna.

REVISED EDITION
GENEVA, 1981

Arpad Bogsch
Director General
WIPO

Contents

INTRODUCTION

1. Today, in many fields of technology, scientific and technological development is advancing at a very fast pace. Scientific and technological information is assuming increasing importance as a vital resource in the development of national economies, and has become a major factor in the formulation of national policy decisions.

2. Scientific and technological information is primarily to be found in patent documents and in technical and scientific books and periodicals. Access to that information, which is vast and rapidly expanding, demands the use of an efficient, widely accepted, classification system. This Guide describes, in general terms, the usefulness of patent documents as a source of technological information and explains how the International Patent Classification (IPC) may be used to retrieve technological information concerning IRON AND STEEL.

PATENT DOCUMENTS AS A SOURCE OF TECHNOLOGICAL INFORMATION

3. In this Guide, the expression "patent documents," means published patents for invention and published patent applications. It also includes other published documents reflecting other forms of protection for inventions, such as inventors' certificates or utility models.

4. By technical and scientific books and periodicals is meant such books and periodicals which contain texts that describe solutions to technical problems. They are sometimes referred to in English as "non-patent literature."

5. The expression "patent information" is used in this Guide not (as in some other contexts) to indicate information about patents and patent applications but to mean the technological information content of patent documents.

Characteristics of patent documents

6. In searching for, and retrieving, technological information, patent documents have more practical importance than periodicals and books. This is so for several reasons, the most important of which are briefly described in the following paragraphs.

7. One reason is that patent documents should and, in fact, usually do, disclose solutions of technical problems more clearly, more completely and in more detail than most periodicals and books. They have to do so; otherwise the said disclosures do not qualify as "patents for invention".

8. Another reason is that patent documents bear classification symbols of a classification system--the IPC--which was so devised that it should facilitate the finding of the state of the art in a given technology. Later parts of this Guide give a detailed introduction to the IPC and deal exhaustively with the retrieval, by use of the IPC, of patent documents concerned with IRON AND STEEL. Articles in periodicals and books usually do not show any classification symbols or, if they do, the classification is usually one which has not been devised for the purposes of finding the state of the art.

9. An additional reason for which patent documents are generally more useful than periodicals and books is that patent documents are drafted in a certain style and their contents are divided in certain parts which follow each other in a certain order. And this is true not only in respect of the patent documents of a given country but also in respect of the patent documents of all countries. The resulting advantage is that a searcher reads documents which have a structure with which he is familiar. Such uniform structure does not always exist in the case of articles in periodicals and books.

10. Finally, there is still another reason for which patent documents are more useful than periodicals and books. This reason lies in the fact that, characteristically, any given patent application tries to prove that the invention claimed in it is something new, and something representing the required inventive step, in relation to former inventions claimed in older patent applications.

11. Patent documents also possess a certain number of specific characteristics that make them eminently suitable for retrieval of technological information, e.g.: they normally disclose information on new inventions earlier than is disclosed in other sources of technological information; a high proportion of patent documents contain an abstract; patent documents belonging to the same family* are frequently in a number of different languages.

12. The preceding assertions can be proven by statistics. It is estimated that only less that 10% of all the publications cited against the average patent application are citations of articles in periodicals or book The rest, that is, on average more than 90% of the publications cited against the average patent application, are citations of patent documents.

13. Patent documents are, then, useful sources of technological information with clear advantages over other sources of technological information. There are, however, a certain number of limitations to this usefulness, which are the following:

(a) new technology is not always sufficiently inventive to be patentable;

(b) even where a patent has been granted by an examining Patent Office, this is not a guarantee that the invention is absolutely new;

(c) although patent documents should be, and generally are, written in a way which allows the invention to be executed on the basis of them alone, it will frequently be cheaper and faster in practice to execute it with the cooperation of the inventor (for example, by acquiring his know-how and blueprints under a contract concluded with him) than without such cooperation.

14. Each year more than one million patent document are published by some 70 countries. Some countries publish a patent document as a patent application and later as the granted patent. Other countries publish only the granted patent. The following twelve countries publish 80% of the world's total patent documents:

Japan	439,000	Canada	23,000
Germany (Federal Republic of)	146,000*	Spain	21,000*
Soviet Union	70,000	Australia	21,000
France	58,000	Netherlands	18,000
United States of America	49,000	Sweden	16,500
United Kingdom	43,000	Italy	12,000

(Based on WIPO Statistics for 1979) * including utility model publications

THE INTERNATIONAL PATENT CLASSIFICATION (IPC)

15. The IPC is based on an international multilateral treaty administered by the International Bureau of WIPO (the Strasbourg Agreement Concerning the International Patent Classification of 1971). The symbol or symbols of the classification to which the technical invention described in a patent document belongs are usually indicated on the patent document by the Patent Office of the country where the application was filed. Thus, the document will be retrievable according to its subject matter with the help of the IPC.

16. The IPC is now applied by over 40 Patent Offices which, taken together, issue over 90% of the patent documents of the world. By the end of 1980, some ten million patent documents had been provided with the classification symbols of the IPC. Approximately 4.0 million of them are in English, 2.0 million in French and 1.5 million in German. The remainder are in various other languages, mainly Dutch, Japanese and Russian.

17. Many years of international cooperation, which started in 1956 under the auspices of the Council of Europe, resulted, in 1971, in the Strasbourg Agreement Concerning the International Patent Classification which provided a worldwide forum for the development of the IPC.

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* Patent documents published in different countries but relating to the same invention are generally called a "patent family".

18. The IPC, being a means for obtaining an internationally uniform classification of patent documents, has as its primary purpose the establishment of an effective search tool for the retrieval of patent documents by Patent Offices and other users to establish the novelty and evaluate the inventive step (including the assessment of technical advance and useful results or utility) of patent applications.

19. The IPC, furthermore, has the important purposes of serving as:

(a) an instrument for the orderly arrangement of patent documents in order to facilitate access to the information contained therein;

(b) a basis for selective dissemination of information to all users of patent information;

(c) a basis for investigating the state of the art in given fields of technology;

(d) a basis for the preparation of industrial property statistics which in turn permit the assessment of technological development in specific areas.

20. Keeping the IPC up to date and allotting its symbols to new patent documents is one of the largest international efforts, at least in terms of expert manpower at international and national levels, in information processing today. At the international level, an estimated 120 work-months per year, and, at the national level, an estimated 240 work-months per year, are devoted to revising the IPC and adapting it to newly developing technologies and the needs of the users. The yearly effort to allot the IPC symbols to new patent documents is estimated at approximately 600 work-months (90,000 hours) of work by highly qualified Patent Office staff. It should be emphasized that such new patent documents can, subject to a possible check of the classification allotted, be directly inserted into the appropriate place in a search file organized according to the IPC.

21. The third edition of the IPC came into force on January 1, 1980. It comprises nine volumes, being the Guide and the Classification itself. The Guide, which is contained in Volume 9, explains the layout, use of symbols, principles, rules and application of the Classification contained in Volumes 1 to 8. In the following paragraphs a short outline will be given of the system and principles of the IPC as well as of the most important rules.

Layout and Use of Symbols

22. The IPC is a hierarchical system comprising the following classification levels, which are listed in hierarchical order:

Sections,

Classes,

Subclasses,

Groups (main groups and subgroups).

23. These different classification levels are characterized by a letter or a number. A complete classification symbol consists of a combination in which each of these levels is represented. The third edition of the IPC consists of:

8 sections,

118 classes,

617 subclasses, about

7,000 main groups, and approximately

47,000 subgroups.

24. The IPC is divided into eight sections, each designated by a capital letter (section symbol), as follows:

Section A HUMAN NECESSITIES

Section B PERFORMING OPERATIONS; TRANSPORTING

Section C CHEMISTRY AND METALLURGY

Section D TEXTILES AND PAPER

Section E FIXED CONSTRUCTIONS

Section F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

Section G PHYSICS

Section H ELECTRICITY

25. Each class symbol consists of the section symbol followed by a two-digit number, e.g. A 01. Each subclass symbol consists of the class symbol followed by a capital letter, e.g. A 01 B.

26. Each group symbol consists of the subclass followed by two numbers separated by an oblique stroke, either as:

- main group symbol, which consists of the subclass symbol followed by a one to three digit number, the oblique stroke and the number 00:

  Example: A 01 B 1/00

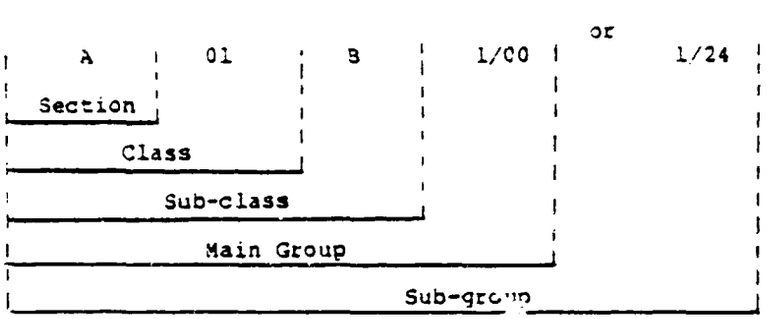
- sub-group symbol, which consists of the subclass symbol followed by the one to three digit number of its main group, the oblique stroke and a number of at least two digits other than 00:

  Example: A 01 B 1/24

  Any third digit after the oblique stroke is to be read as a decimal subdivision of the second digit, e.g., "/215" is to be read as "twenty one point five," and not "two hundred and fifteen."

27. A complete classification symbol comprises the combined symbols representing the section, class, subclass and main group or sub-group:

Example:



28. The hierarchy among groups is determined solely by the dots preceding the titles of sub-groups. These dots are used in place of, and avoid repetition of, the titles of hierarchically directly superior groups:

Example: C 21 D 5/00 Heat treatments of cast-iron
5/04 . of white cast-iron
5/06 . . Malleabilising
5/08 . . . with oxidation of carbon
5/10 . . . . in gaseous agents

Without the use of hierarchical levels, sub-group C 21 D 5/10 would have to have a title such as: "Malleabilising white cast-iron by heat treatment giving oxidation of carbon by using gaseous agents."

29. In many cases, a class, subclass or group title is followed by a phrase in brackets referring to another place in the IPC. Such a phrase indicates that the subject matter identified is classified in the place referred to (or in one or more places where several are referred to). An example of such a reference can be seen in Appendix III to this document under the symbol C 21 B 15/00.

30. In certain places of the Classification, some particular classification rules are specified. The purpose of these rules is to limit multiple classification, to improve consistency and to facilitate searching.

31. The places where such rules apply are clearly marked by a note at the highest place covered by such classification rules. Such rules are:

(a) Precedence Note - The most frequently occurring rule is the "precedence note", indicating which one of two or more places has priority in the classification of a technical subject which can be classified in more than one of these;

(b) Last Place Rule - In certain parts or places of the Classification where a particular technical subject is covered by two or more places of the same hierarchical level or indentation, a "last place rule" has been introduced. According to this rule, such a technical subject is classified in the one of these places which appears last in the Classification. This rule is applied successively at each hierarchical level or indentation at which the technical subject in question is covered by two or more places. In each part of the Classification (class, subclass or group), where this rule applies, this rule is clearly set out in a note specific to the subject matter concerned. The "last place rule" is in effect a systematic precedence rule which obviates the need for separate precedence notes in each of the places concerned;

(c) Other Rules In a limited number of places in the Classification other particular rules exist which are clearly specified in notes at the places concerned.

Relevant sub-groups of the IPC concerned with IRON AND STEEL

32. The aim of identifying basic technical information necessitates the carrying out of a so-called "information search," which is made to familiarize the inquirer with the state of the art in a particular field of technology.

33. Before making a search, it is essential to establish clearly what is being sought, i.e. the technical subject has to be determined. Having formulated a clear statement of the technical subject which is being sought, the searcher has to identify the proper place for this subject in the IPC. Although the IPC is a relatively logical subdivision of technology, it is advisable for the uninitiated searcher to approach the system using the Catchword Index to the IPC, which has been elaborated in several languages, e.g., in English, French, German, Japanese and Spanish.

34. Consideration of the statement of the technical subject sought will bring to mind a word which covers broadly or specifically the field of technology with which this subject is clearly concerned. As most of the words of the Catchword Index are nouns, it is preferable to consider the name given to the relevant process or device, although it may be useful to consider other words. The Catchword Index may indicate to the searcher a precise group of the IPC as the proper place for the technical subject being sought, but often there can only be an indication of the subclass or possibly only the class or range of classes concerned.

35. A sample page of the Official Catchword Index appears in Appendix I to this document and shows, for example, the catchword "IRON" with a number of subordinate entries with references to specific places in the IPC.

36. If use of the Catchword Index does not lead to a pertinent field of search, the "Contents of Section" (see Appendix II to this document) appearing at the beginning of each section of the IPC should be consulted. The eight sections should be scanned and the possible classes should be selected. Thereafter, the searcher should turn to those classes in order to select the subclass (or subclasses) which most satisfactorily covers the subject. The references and notes appearing in the selected subclass title should be checked for an indication of subclass content and for possible distinctions between subclasses, which in turn may indicate that the location of the desired subject is elsewhere. It is also essential to consult any notes or references appearing in the title of the relevant class, since these may also affect the subclass content.

37. When the correct subclass has been identified, the main group which, in the light of its full wording and any existing notes and references, most clearly includes the subject being sought should then be selected.

38. The most indented sub-group (i.e., having most dots) under the selected main group, which still covers the subject sought, should be chosen for search.

39. After completing the search in a chosen group, it should be considered whether the superior group (i.e., having fewer dots) under which it is indented should be searched, since a wider subject which includes the subject sought may be classified there.

40. Appendix III to this document shows an excerpt of the IPC giving the whole of sub-class C 21 B relating to the manufacture of iron or steel, and Appendix IV shows photocopies of front pages of patent documents published by the United Kingdom Patent Office (GB Patent No. 2 009 244), by the United States Patent and Trademark Office (US Patent No. 3 960 547) and by the International Bureau of WIPO (PCT International Application No. WO 80/02652).

41. Appendix V gives an exhaustive list of thesaurus terms as defined by UNIDO as relevant to the industrial sector "IRON AND STEEL." Against each term is listed the IPC symbol(s) most appropriate for the technological subject of the term. Where necessary detailed explanatory notes are given.

42. Against each IPC symbol, or group of symbols, statistical information giving the patent activity in each industrial sector is given in Appendix V. The statistics give the number of patent documents published in the year 1978, based upon information received from INPADOC (see paragraph 47 below), on which the symbol, or group of symbols, is printed. The total number of patent documents relevant to each industrial sector may be estimated by multiplying the figure given in Appendix V by a factor of 10, although that factor naturally varies between industrial sectors.

RETRIEVAL OF PATENT DOCUMENTS RELATING TO IRON AND STEEL USING THE IPC

43. There are several ways to take cognizance of the enormous amount of technological information contained in patent documents, namely, the consultation of patent document collections organized according to the IPC or other (national) classification systems or the consultation of secondary sources of patent information, e.g., patent gazettes, abstracts services, Selective Dissemination of Information (SDI) or international referral services which, in many cases, contain also references to patent documents.

44. In view of the enormous amount of patent documents published each year, the user will almost certainly like to restrict the number of patent documents which he is interested in reading to a strict minimum. It is, therefore, likely that he will first rely on a secondary information source for a first selection of relevant documents.

Patent gazettes

45. To assist users in identifying primary sources of patent information, most Industrial Property Offices publish patent gazettes (also named official gazettes or official bulletins). These gazettes usually contain a certain number of indexes, e.g., by classification symbol, by name of applicant, etc., and contain entries consisting of bibliographic data relating to and marked also on the newly published patent documents. Some of these gazettes also contain abstracts of patent documents.

Abstracts services

46. As set forth above, many patent gazettes contain abstracts, as also do patent documents (see Appendix IV containing the first page of US Patent No. 4,040,819). There are also many patent documents which are officially published in a given language but of which abstracts--that is, a description of their technological content in a few lines--are available in another language. For example, the Japanese Patent Office publishes English abstracts of a substantial portion of its published unexamined patent applications,

whilst Derwent Publications Limited, a private firm in London, publishes each year tens of thousands of abstracts in English of patent documents published in many languages, including Russian and Japanese. Chemical Abstracts, a publication of Chemical Abstracts Service (CAS), a subsidiary of the American Chemical Society, Columbus, Ohio, United States of America, publishes abstracts in the chemical and chemical engineering field supplemented by indexes produced weekly.

International referral services

47. A truly international referral service for patent information came into existence in 1972. In that year, the International Patent Documentation Center (INPADOC) was created in Vienna by virtue of an Agreement between WIPO and the Republic of Austria. INPADOC stores, in a machine-readable data bank, the most important bibliographic data of each patent document, i.e., the title of the invention, its classification symbol, relevant dates, names and numbers. The said bibliographic data are either obtained from Industrial Property Offices in machine-readable form or input by INPADOC on the basis of the announcements published in patent gazettes.

48. At present, bibliographic data pertaining to patent documents published by the following 46 countries are included on a current basis in the data bank of INPADOC: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Cuba, Cyprus, Czechoslovakia, Denmark, Egypt, Finland, France, German Democratic Republic, Germany (Federal Republic of), Greece, Hong Kong, Hungary, India, Ireland, Israel, Italy, Japan, Kenya, Luxembourg, Malawi, Monaco, Mongolia, Netherlands, Norway, Philippines, Poland, Portugal, Republic of Korea, Romania, South Africa, Soviet Union, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America, Yugoslavia, Zambia. The data bank is growing at a rate of 16,000 patent documents per week (more than 90% of the world total) and is the largest computerized data bank of bibliographic data relating to patent documents in the world.

49. INPADOC processes the bibliographic data and provides services to government authorities and the public. The data bank can be used for answering many kinds of questions, the two most important being the following. Firstly, the data bank can be asked to identify all the patent documents belonging to any given symbol of the more than 54,000 symbols of the IPC. Here lies of course the main usefulness of the Center in giving industry and other users access to the achievements of modern technology. The Patent Classification Service (PCS) provided by INPADOC gives, on microfiche, the bibliographic data of each patent document belonging to each IPC symbol. An alternative service gives information concerning one, or a selected number of, IPC symbols. An example of the PCS is given in Appendix VI to this document. Secondly, the data bank can provide all the patent documents which in various countries have been filed for the same invention by--usually, but not necessarily--the same person, company or enterprise. Thus, one can obtain information at a glance as to the likelihood of the invention being protected in various countries, and, which is of greater interest for the purpose of access to technological information, as to the likelihood of the invention being described in different languages. INPADOC is also studying the possibility of using its services in the preparation of industrial property statistics.

50. To replace the burdensome scanning of various patent gazettes published by many countries, INPADOC publishes each week an international patent gazette, the INPADOC Patent Gazette (IPG). The IPG, which is published on microfiche, consists of three basic indexes, i.e., by number, by IPC symbol, and by standardized applicant's name, respectively, each containing references to all patent documents stored in INPADOC's data bank in the previous week. The index by IPC symbol, the Selected Classification Service (SCS), is particularly useful as a current-awareness service. An example of the SCS is given in Appendix VI. Users thus can follow easily and week by week any field of technology or the activities of any given company, enterprise or applicant.

Access to the primary sources of information

51. Each Patent Office has a collection of all the patent documents it has published. Each major Patent Office also has complete, or largely complete, collections of patent documents published by the Patent Offices of the other countries or at least of most of them. These collections are either in

numerical order or classified order or both. Some libraries (in developed countries) also have more or less complete collections of domestic and foreign published patent documents. Members of the general public usually are allowed to consult such collections. In major Patent Offices and major libraries, specialized staff is usually available to assist the public in locating published patent documents it is interested in.

52. Patent Offices and the libraries mentioned above are usually equipped to furnish copies of published patent documents contained in their collections to anyone who wants them and pays the prescribed price. Unit prices, mostly independent of the number of pages of the patent document, range from US dollar 0.50 for a US patent to approximately US dollars 5.00 for a Soviet Union patent. The average price per patent document, on standing order, is approximately US dollars 2.00.

53. It should be emphasized that the patent document collections available throughout the world are the result of a broad free-of-charge exchange of currently issued patent documents among countries and, more especially, among the Patent Offices of those countries under bilateral and multilateral exchange agreements. The patent documents are exchanged in the form of paper copies or in microform. It is estimated that a total of more than 15 million copies of patent documents per year are exchanged in this way. Secondary sources of patent information in the form of patent gazettes are also exchanged free of charge on a broad basis. In order to promote national and regional infrastructures, WIPO has successfully developed and sponsored procurement and exchange of primary and secondary sources of patent information for developing countries.

Conclusions

54. This Guide is intended to give the basic approach in obtaining the state of the technology in a given industrial sector in the most economic way by consulting selected patent documents.

55. For those individuals and institutions who have easy access to patent libraries and to the updated official editions of the IPC the way of action is straightforward:

Step I - determine which of the UNIDO Thesaurus Keywords (Appendix V) reflect the main features of the technology in question;

Step II - find out (using the second column of the Appendix V) which of the IPC units correspond to that keyword;

Step III - consult the IPC to find out (from the definitions of main groups and subgroups) the groups to be searched;

Step IV - select patent documents published within a certain period and classified by the symbols of the given IPC groups (the average number of patent documents published with a particular subgroup symbol is about 20 per year);

Step V - analyse selected documents and, if necessary, other relevant documents cited in the selected ones.

56. Selection and reproduction, if necessary, of the relevant patent documents (Step IV) for the interested users may be performed on a commercial basis by the above-mentioned INPADOC (Möllwaldplatz 4, A-1041 Vienna, Austria) or by national Patent Offices or libraries (some of these institutions provide such a service).

57. Governmental institutions of developing countries may also avail themselves of still another possibility, namely, the WIPO State-of-the-Art Search program. Established as one of the forms of technical assistance to developing countries, this program enables a user to receive, free of charge, a report on the latest achievements and the general technological level in a particular field specified in the user's request and also copies of relevant patent documents.

References

1. Strasbourg Agreement Concerning the International Patent Classification of March 24, 1971 (WIPO Publication No. 275).

2. The International Patent Classification, Third Edition, 1979, and the Official Catchword Index to the Third Edition (published by Carl Heymanns Verlag KG, Steinsdorfstrasse 10, Postfach 275, Munich, Federal Republic of Germany).

3. World Patents Index; World Patents Abstracts (Derwent Publications Ltd., Rochdale House, 128 Theobalds Road, London WC1X 8RP, United Kingdom).

4. INPADOC, General Information (WIPO/INPADOC Publication No. 426 (E F G)).

[Appendices I to VI follow]

APPENDIX I

SAMPLE PAGE OF THE
OFFICIAL CATCHWORD INDEX
TO THE INTERNATIONAL PATENT CLASSIFICATION (IPC)
1979 (THIRD EDITION)

IODINE see also HALOGENS	C01B	7/14
inorganic compounds of —	C01B	
IODOFORM	C07C	19/07
ION(S)		
generating or handling — in discharge tubes	H01J	
— exchange	B01J	39/00 to 49/00
catalysts comprising — exchange resins	B01J	31/08
production of — exchange resin diaphragms	C08J	5/22
— guns	H01J	3/00
IONISATION		
— chambers	H01J	47/00 to 47/26
investigating —	G01N	27/62
measuring —	G01N	27/00
using — in measuring pressure	G01L	21/30
IONONE		
beta —	C07C	175/00
IONTOPHORESIS		
— for medical use	A16N	1/30
IRIDIUM see also NON-FERROUS	C22B	11/00
inorganic compounds of —	C01G C01B C01C C01G	55/00
IRISES	G02B	
IRON		
(the metal) or steel see also METAL(S), METAL COMPOUNDS	C21	
alloys of —		
steel	C21C	
steel alloys	C22C	38/00
other alloys of —	C22C	33/00 to 38/00
treatment of alloys of —	C21D	
heat treatment of alloys of —	C21D	6/00
annealing of —	C21D	1/00 5/00
carbo-nitriding of —	C23C	9/00 11/14
carburising of —	C23C	9/00 11/10
cast —	C21C	1/00
compounds of —		
compounds of — in photosensitive materials	G03C	1/64
inorganic compounds of —	C01G C01B C01C C01G	49/00
organic compounds of —	C07F	15/02 17/02
decarburising — by diffusion	C21D	3/04
electrodeposition of —	C25D	3/20
electrolytic surface treatment of or with —	C25D	
extracting non-metals from — by diffusion processes	C21D	3/00
graphitising of —	C21D	5/14
hardening of —	C21D	1/00 5/00 7/00
heat treatment of —	C21D	1/00 5/00 7/14
— ore		
mining — ore	E21C	41/06
pretreatment of — ore	C22B	1/00
malleabilising of —	C21D	5/06
modifying physical properties of —	C22F	
modifying physical properties of — by working	C21D	7/00
nitriding of —	C23C	9/10 11/14
pig —		
production of pig —	C21B	3/00 5/00 11/00
refining of pig —	C21C	1/00
production of iron or steel	C21B	
production of iron or steel by electrolytic processes	C25C	
production of iron or steel by electrothermal processes	C21B C21C	11/12 5/52
production of steel otherwise than by direct processes	C21C	
puddling of —	C21C	3/00
refining of —	C21C	
spongy —	C21B	13/00
tempering of —	C21D	1/00 5/00
treating molten steel	C21C	7/00
wrought —	C21C	3/00
IRONS (= implements)		
branding —	B44B	7/02
climbing —	A43C	15/06
curling —	A45D	1/00
fire —	A47J	49/00
soldering —	B23K	3/02
IRONING		
finishing textile fabrics by —	D06C	15/00
— boards	D06F	

[Appendix II follows]

APPENDIX II

CONTENTS OF IPC SECTION C - CHEMISTRY AND METALLURGY

SECTION C — CHEMISTRY AND METALLURGY

Definitions for Section C:

Alkali metals: Li, Na, K, Rb, Cs, Fr
Alkaline earth metals: Ca, Sr, Ba, Ra
Lanthanides: elements with atomic numbers 57 to 71 inclusive
Rare earths: Sc, Y, Lanthanides
Actinides: elements with atomic numbers 89 to 103 inclusive
Refractory metals: Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W
Halogens: F, Cl, Br, I, At
Noble gases: He, Ne, Ar, Kr, Xe, Rn
Platinum group: Os, Ir, Pt, Ru, Rh, Pd
Noble metals: Ag, Au, Platinum group
Light metals: alkali metals, alkaline earth metals, Be, Al, Mg
Heavy metals: metals other than light metals
Iron group: Fe, Co, Ni
Non-metals: H, B, C, Si, N, P, O, S, Se, Te, noble gases, halogens
Metals: elements other than non-metals
Transition elements: elements with atomic numbers 21 to 30 inclusive, 39 to 48 inclusive, 57 to 80 inclusive, 89 upwards

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CONTENTS OF SECTION (References and notes omitted)

Sub-Section: CHEMISTRY

Appendix II

Appendix II

[Appendix III follows]

APPENDIX III

IPC SUBCLASS C 21 B

C 21 METALLURGY OF IRON

→ C 21 B MANUFACTURE OF IRON OR STEEL (preliminary treatment of ferrous ores or scrap C 22 B 1/00; electric heating per se H 05 B)

Note

This sub-class covers the production of iron or steel from source materials, e.g. the production of pig-iron, and apparatus specially adapted therefor, e.g. blast furnaces, air heaters (furnaces in general F 27).

Sub-class Index

3/00 **General features in the manufacture of pig-iron** (mixers for pig-iron C 21 C 1/06)
- 3/02 . by applying additives, e.g. fluxing agents
- 3/04 . Recovery of by-products, e.g. slag
- 3/06 . . Treatment of liquid slag (slag wool C 03 B; slag stones C 04 B)
- 3/08 . . . Cooling slag
- 3/10 . . . Slag pots; Slag cars

5/00 **Making pig-iron in the blast furnace**
- 5/02 . Making special pig-iron, e.g. by applying additives, e.g. oxides of other metals
- 5/04 . Making slag of special composition
- 5/06 . Using top gas in the blast furnace process (in coke ovens C 10 B)

7/00 **Blast furnaces** (lifts associated with blast furnaces B 66 B 9/06)
- 7/02 . Internal forms
- 7/04 . with special refractories (refractory materials C 04 B)
- 7/06 . . Linings for furnaces
- 7/08 . Top armourings
- 7/10 . Cooling; Devices therefor
- 7/12 . Opening or sealing the tap holes
- 7/14 . Discharging devices, e.g. for slag
- 7/16 . Tuyères
- 7/18 . Bell-and-hopper arrangements
- 7/20 . . with appliances for distributing the burden
- 7/22 . Dust arresters
- 7/24 . Test rods or other checking devices

9/00 **Stoves for heating the blast in blast furnaces**
- 9/02 . Brick hot-blast stoves
- 9/04 . . with combustion shaft
- 9/06 . . Linings
- 9/08 . Iron hot-blast stoves
- 9/10 . Other details, e.g. blast mains
- 9/12 . . Hot-blast valves or slides for blast furnaces (valves in general F 16 K)
- 9/14 . Preheating the combustion air
- 9/16 . Cooling or drying the hot-blast

11/00 **Making pig-iron other than in blast furnaces**
- 11/02 . in low shaft furnaces
- 11/06 . in rotary kilns
- 11/08 . in hearth-type furnaces
- 11/10 . in electric furnaces

13/00 **Making spongy iron or liquid steel, by direct processes**
- 13/02 . in shaft furnaces
- 13/04 . in retorts
- 13/06 . in multi-storied furnaces
- 13/08 . in rotary furnaces
- 13/10 . in hearth-type furnaces
- 13/12 . in electric furnaces
- 13/14 . Multi-stage processes

15/00 **Other processes for the manufacture of iron from iron compounds** (general methods of reducing to metal C 22 B 5/00; by electrolysis C 25 C 1/06)
- 15/02 . Metallothermic processes, e.g. thermit reduction
- 15/04 . from iron carbonyl

[Appendix IV follows]

APPENDIX IV

(12) UK Patent Application (19) GB (11) 2 009 244 A

(21) Application No 7846036
(22) Date of filing 17 Nov 1978
(23) Claims filed 17 Nov 1978
(30) Priority data
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(32) 22 Nov 1977
(33) Italy (IT)
(43) Application published 13 Jun 1979
(51) INT CL²
C21B 13/04
(52) Domestic classification
C7D 5K6 5L3 5L5 5M3 5N1 5N5 5N6 F4B 7B 7H 7S 7T 7V1 7X3 7Y4 7Y8 A19F
(56) Documents cited
GB 1510992
GB 1406118
GB 1379081
GB 1176744
(58) Field of search
C7D
F4B
(71) Applicant
Kinglor Metor SpA, 33042 Buttrio (Udine), Italy
(72) Inventor
Franco Colautti
(74) Agent
Kings Patent Agency Limited

(54) Carbothermic Production of Sponge Iron

(57) A carbothermic process for producing sponge iron by reducing iron ore in an externally heated vertical retort (10) comprises

(a) conveying a charge (135) of cal or coke and iron ore at a uniform speed of descent through a first (pre-heating) zone (11), then

(b) conveying the charge (135) at a progressively slower speed of descent through a second heating zone (12) provided by burners (13) to initiate the reduction reaction, and then

(c) conveying the charge at the same speed of descent as in (b) through a third heating zone (14) provided by burners (13) to supply and maintain the heat required to complete the reduction reaction, wherein the average outside temperature of the second zone (12) is higher than the average outside temperature of the third zone (14) in the retort (10.

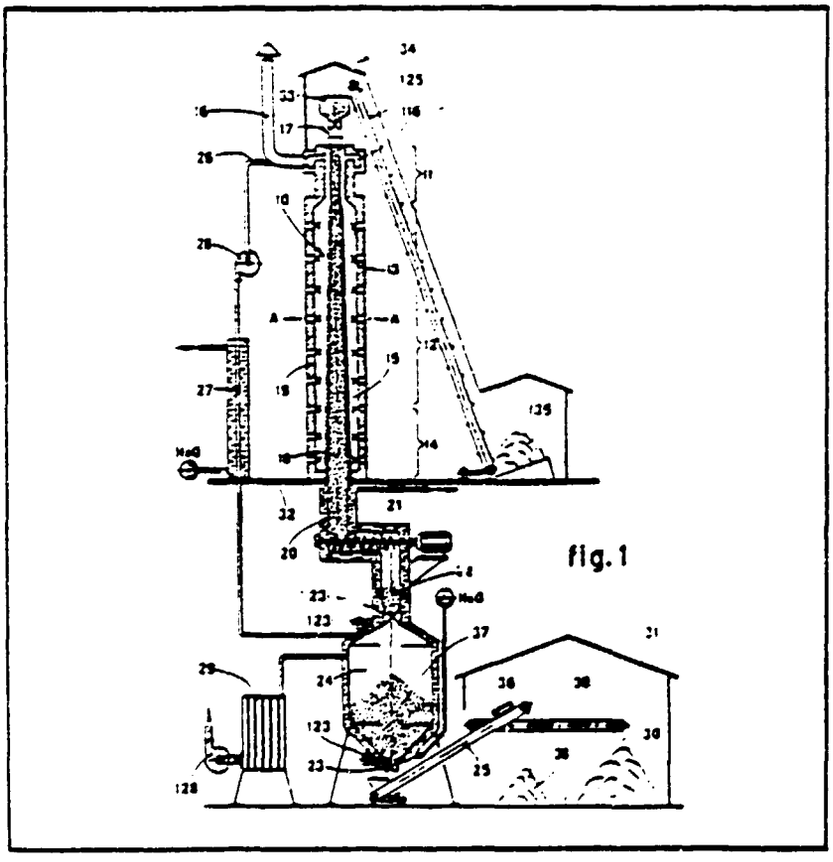

fig.1

GB 2 009 244 A

Appendix IV

United States Patent [19] [11] 3,960,547
Kirkpatrick et al. [45] June 1, 1976

[54] STEELMAKING PROCESS

[75] Inventors: James W. Kirkpatrick, Poland Township, Mahoning County; W. Fergus Porter, Poland; William E. Shepherd, Youngstown, all of Ohio

[73] Assignee: Youngstown Sheet and Tube Company, Youngstown, Ohio

[22] Filed: Dec. 18, 1972

[21] Appl. No.: 316,294

[52] U.S. Cl. ..... 75/60; 75/44 S; 75/46

[51] Int. Cl.[2] C21C 7/00

[58] Field of Search ..... 75/46, 60, 43, 44 R, 75/44 S

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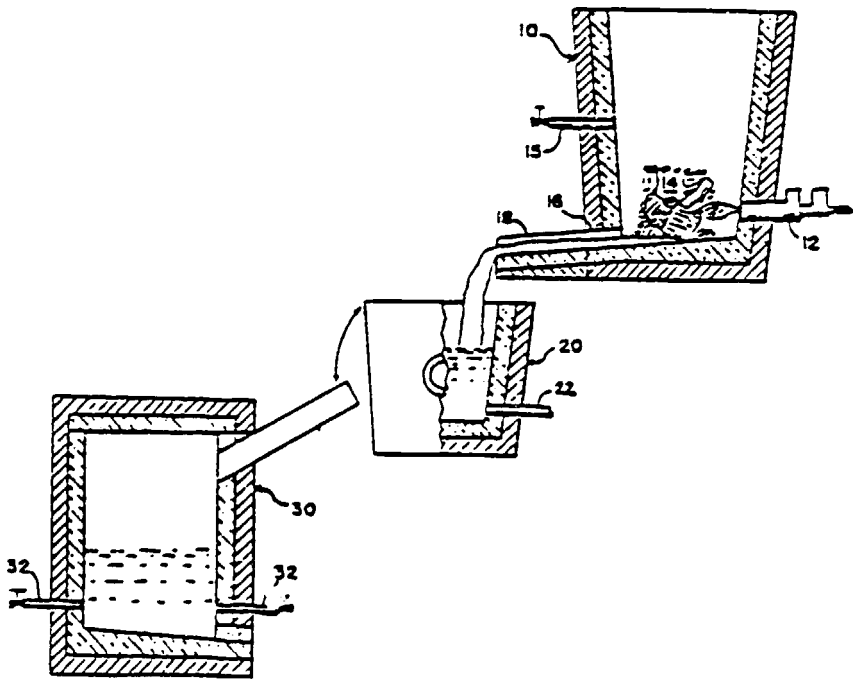
Primary Examiner—M. J. Andrews
Attorney, Agent, or Firm—John Stelmah

[57] ABSTRACT

Process for producing refined steel including the provision of molten iron, adding molten steel to said molten iron to provide a molten mix, adding iron bearing material in unmolten form to said mix, and refining the mixture by blowing essentially pure oxygen therethrough.

4 Claims, 1 Drawing Figure



Appendix IV

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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A1

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(33) Priority Country: SE

(71) Applicant *(for all designated States except US)*: STORA KOPPARBERGS BERGSLAGS AB [SE/SE]; S-791 80 Falun (SE).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: BENGTSSON, Eric [SE/SE]; Pelles krok 7, Borlänge (SE). COLLIN, Per, Harald [SE/SE]; Kyrkbacksvägen 15, Falun (SE). FLINK, Sune, Natanael [SE/SE]; Sportregatan 10, Västerås (SE). WIDELL, Björn [SE/SE]; Flintmästargatan 37, Västerås (SE).

(74) Agents: BURMAN, Tore et al.; Bergling & Sundbergh AB, P.O. Box 7645, S-103 94 Stockholm (SE).

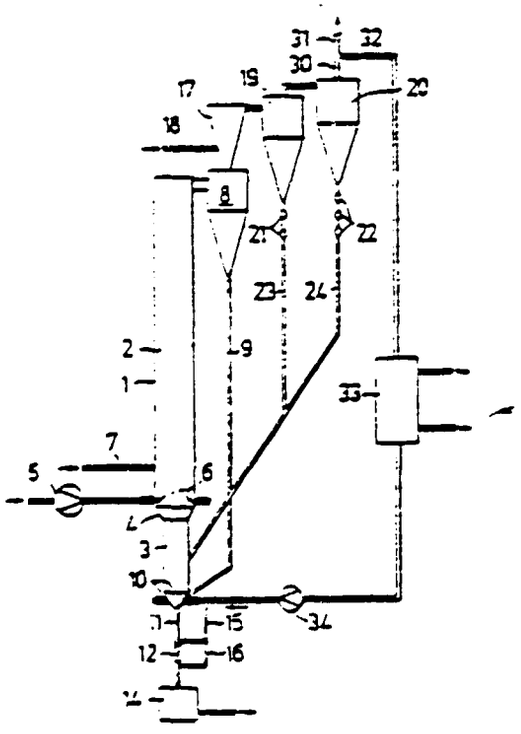
(81) Designated States: AU, BR, JP, SU, US.

Published
With international search report

(54) Title: APPARATUS FOR REDUCING FINELY DIVIDED IRON OXIDE MATERIAL

(57) Abstract

Apparatus for reducing finely divided iron oxide material, comprising a reactor (1) containing a vertical upper reaction chamber (2) connected downwardly to a narrower, vertical reaction chamber (3). A cyclone separator (8) is connected to the upper reaction chamber for separating solid material and recycling it to the reactor so that a circulating fluidized bed can be maintained in the apparatus. In accordance with the invention, a recycling conduit (9) is connected to the bottom of the lower reaction chamber (3). A tapping-off shaft (11) for reduced material is also connected to the bottom of the lower reaction chamber (3). A reducing agent is supplied to the upper reaction chamber, and combustion air is supplied to the bottom of the upper reaction chamber. The apparatus also comprises means for preheating the iron oxide material with the exhaust gas from the reactor and for passing said preheated iron oxide into the lower reaction chamber. The apparatus also comprises means for stripping the exhaust gas from CO2 and H2O and recycling it to the reactor to be used as fluidizing gas.



[Appendix V follows]

APPENDIX V

UNIDO THESAURUS TERMS, SECTOR 'IRON AND STEEL'
AND THEIR IPC EQUIVALENTS

The UNIDO Thesaurus terms in the sector 'Iron and Steel' are divided into the following subsections:

Ore Pretreatment
Coke
Iron Making
Steel Making
Casting of Steel
Metal Working
Deposition and Electroprocessing
Building and Construction

The relevant keyword will be found in the appropriate subsection.

Subsection: Ore Pretreatment

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
AGGLOMERATION/ SINTERING		(C 22 B 1/16 - 1/22 (F 27 B 21/00 - 21/06	256 68
BALL/ROD CRUSHERS		B 02 C 17/00 - 17/24	302
CYCLONES		B 04 C	421
	(with flat spiral flow)	B 04 C 1/00	7
	(with unidirectional vortex)	B 04 C 3/00 - 3/06	73
	(with reversal of vortex)	B 04 C 5/00 - 5/30	210
ELECTROSTATIC SEPARATION		B 03 C 7/00 - 7/12	30
FROTH FLOTATION		B 03 D 1/02 - 1/26	416
GYRATORY CRUSHERS		B 02 C 2/00 - 2/10	90
JAW CRUSHERS		B 02 C 1/02 - 1/10	41
MAGNETIC SEPARATION		B 03 C 1/00 - 1/30	354
PELLETISING/BINDING		C 22 B 1/24 - 1/248	103
ROASTING		(C 22 B 1/02 - 1/10 (B 03 B 1/02	143 6
WASHING/WET-SCREENING		B 03 B	645
	(shaking tables)	B 03 B 5/04 - 5/06	9
	(jigs)	B 03 B 5/10 - 5/24	37
	(heavy media separation)	B 03 B 5/28 - 5/46	82
	(spirals, e.g. Humphrey's)	B 03 B 5/52	6

Appendix 7

Subsection: Coke

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
BRIQUETTES/BRIQUETTING		C 10 L 5/00 - 5/38	221
CHARCOAL		C 10 B 53/02	17
CHARGING/DISCHARGING OF COKE OVENS			
	(charging devices)	C 10 B 31/00 - 31/12	72
	(discharging devices)	C 10 B 33/00 - 33/14	56
	(combined charge-discharge)	C 10 B 35/00	10
COKE		C 10 B; C 10 L (partly)	2,965
COKE OVENS/RETORTS			
	(retorts)	C 10 B 1/00 - 1/10	34
	(ovens - vertical chamber)	C 10 B 3/00 - 3/02	5
	(ovens - horizontal chamber)	C 10 B 5/00 - 5/20	26
	(ovens - with conveyers inside)	C 10 B 7/00 - 7/14	13
	(ovens - beehive type)	C 10 B 9/00	4
	(ovens - inclined chambers)	C 10 B 11/00	16
	(ovens - with means for applying mechanical pressure)	C 10 B 13/00	2
	(ovens - other types)	C 10 B 15/00 - 15/02	7
COKING PROCESSES	(using indirect heating, e.g. external combustion)	C 10 B 47/00 - 47/48	34
	(using direct heating)	C 10 B 49/00 - 49/22	110
	(combined indirect and direct heating)	C 10 B 51/00	7
	(specially adapted for particular materials, e.g. coal powder; wood; briquets)	C 10 B 53/00 - 53/08	195
	(for liquid materials or for liquid materials mixed with coal)	C 10 B 55/00 - 55/10	60
	(other processes, e.g. multi-step coking)	C 10 B 57/00 - 57/20	255
COOLING/QUENCHING COKE		C 10 B 39/00 - 39/18	157
DETAILS OF COKE OVENS			
	(doors, lids, etc.)	C 10 B 25/00 - 25/24	122
	(for extraction of the distillation gases)	C 10 B 27/00 - 27/06	49
	(other details, e.g. linings casings, foundations)	C 10 B 29/00 - 29/08	40
HEATING OF COKE OVENS			
	(preheating)	C 10 B 17/00	1
	(electrically	C 10 B 19/00	1
	(by burning gas)	C 10 B 21/00 - 21/26	61
	(by other means)	C 10 B 23/00	5
INCRUSTATION REMOVAL OR PREVENTION		C 10 B 43/00 - 43/14	68
MECHANICAL PRETREATMENT OF THE CHARGE INSIDE THE OVEN	(e.g. levelling, compressing)	C 10 B 37/00 - 37/06	15

Subsection: Coke (cont'd)

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
OTHER APPARATUS		C 10 B 45/00 - 45/02	64
PRETREATMENT OF COAL TO IMPROVE COMBUSTION	(incl. removal of impurities such as sulphur)	C 10 L 9/00 - 9/12	4
SAFETY DEVICES		C 10 B 41/00 - 41/08	28

Subsection: Iron Making

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
BLAST-FURNACES		C 21 B 7/00 - 7/24	691
	(high top-pressure arrangements)	C 21 B 7/00	93
	(internal shape)	C 21 B 7/02	2
	(special refractories)	C 21 B 7/04 - 7/06	43
	(top armourings)	C 21 B 7/08	5
	(cooling)	C 21 B 7/10	118
	(tap holes)	C 21 B 7/12	63
	(discharging devices)	C 21 B 7/14	46
	(tuyères)	C 21 B 7/16	109
	(bell-and-hopper arrangements)	C 21 B 7/18 - 7/20	107
	(dust arrestors)	C 21 B 7/22	34
	(checking devices, e.g. test rods)	C 21 B 7/24	71
FLUXING AGENTS		C 21 B 3/02	9
HEATING OF BLAST-FURNACES		C 21 B 9/00 - 9/16	179
	(brick stoves)	C 21 B 9/02 - 9/06	33
	(iron stoves)	C 21 B 9/08	1
	(blast mains, slides, valves)	C 21 B 9/10 - 9/12	53
	(preheating)	C 21 B 9/14	5
	(cooling of the blast; humidity control of blast)	C 21 B 9/16	27
IRON MAKING		C 21 B	1,731
NON BLAST-FURNACE PIG-IRON		C 21 B 11/00 - 11/10	52
	(in low shaft furnaces, e.g. melting steel scrap with excess carbon)	C 21 B 11/02	11
	(in electric furnaces)	C 21 B 11/10	34
PROCESSES OF OPERATING A BLAST-FURNACE		C 21 B 5/00 - 5/06	128
	(oxygen enrichment of blast)	C 21 B 5/00	95
	(fuel injection)	C 21 B 5/00	95
	(for special pig-iron, e.g. by adding other metal oxides to the charge)	C 21 B 5/02	6
	(using top gas)	C 21 B 5/06	26

Subsection: Iron Making (cont'd)

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
PROCESSING OF PIG-IRON		C 21 C 1/00 - 1/10 C 21 C 3/00	371 4
	(purification)	C 21 C 1/00 - 1/06	208
	(making cast-iron)	C 21 C 1/08 - 1/10	163
	(making wrought-iron)	C 21 C 3/00	4
SLAG		C 21 B 3/04 - 3/10	179
	(special compositions)	C 21 B 5/04	1
	(discharging devices for)	C 21 B 7/14	46
SPONGY IRON		C 21 B 13/00 - 13/14	284
	(e.g. HIB process)	C 21 B 13/00	98
	(in shaft furnaces, e.g. Midrex, Hyl processes)	C 21 B 13/02	101
	(in retorts, e.g. Hyl, Armco processes)	C 21 B 13/04	5
	(in multi-storied furnaces)	C 21 B 13/06	1
	(in rotary furnaces, e.g. rotary kilns)	C 21 B 13/08	29
	(in hearth-type furnaces)	C 21 B 13/10	3
	(in electric furnaces)	C 21 B 13/12	14
	(multi-stage processes)	C 21 B 13/14	33

Subsection: Steel Making

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
CARBON STEEL		C 21 C 5/00 - 5/56	1,167
CONTINUOUS STEEL MAKING	(e.g. spray refining, etc.)	C 21 C 5/56	68
CONVERTER DETAILS	(means for regulating the blow of oxygen or air, etc.)	C 21 C 5/30 - 5/34	195
	(for producing special slags)	C 21 C 5/36	34
	(for removal of waste gases or dust)	C 21 C 5/38 - 5/40	104
	(linings, tuyères, tilting mechanisms, etc.)	C 21 C 5/42 - 5/50	398
CRUCIBLE PROCESS		C 21 C 5/02	1
ELECTRIC STEEL MAKING	(directly from the iron ore)	C 21 B 13/12	14
	(by converting pig-iron electrically)	C 21 C 5/52 - 5/54	283
OPEN HEARTH PROCESS		C 21 C 5/04 - 5/06	27
OTHER METHODS OF STEEL MAKING		C 21 C 5/56	68
PNEUMATIC PROCESS (i.e. IN A CONVERTER)		C 21 C 5/08 - 5/50	797
STEEL DIRECT FROM ORE		C 21 B 13/00 - 13/14	284
STEEL MAKING	(except directly from ore)	C 21 C 1/00 - 7/10	1,794
WROUGHT STEEL		C 21 C 1/00	4

Appendix 7

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
CASTING		B 22 C	2,391
CENTRIFUGAL CASTING		B 22 C 13/00 - 13/10	33
CONTINUOUS CASTING		B 22 C 11/10 - 11/18	42
HIGH PRESSURE CASTING i.e. INJECTION CASTING		B 22 C 17/00 - 17/32	30
LOW PRESSURE CASTING	(e.g. bottom pressure cast)	B 22 C 27/10 - 27/16	-
POST-TREATMENT OF CASTINGS		C 21 D	3,868
	(annealing)	C 21 D 1/26 - 1/32	226
	(normalizing)	C 21 D 1/28	16
	(quenching)	C 21 D 1/62 - 1/66	163
	(tempering)	C 21 D 1/18 - 1/24	64
	(flame hardening)	C 21 D 1/08	6
	(treatments in two or more steps)	C 21 D 1/78 - 1/80	157
	(treatments adapted for particular articles, e.g. springs, rails, knives, gears, crankshafts, etc.)	C 21 D 9/00 - 9/70	1,051
	(methods of heating)	C 21 D 1/34 - 1/52	287
STATIC CASTING	(of pigs, i.e. suitable for subsequent remelting)	B 22 C 3/00 - 5/04	278
	(of ingots, i.e. suitable for subsequent rolling or forging)	B 22 C 7/00 - 9/00	808

Subsection : Metal Working

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
BORING	(= drilling) - mechanically	B 23 B 35/00-51/00	940
	- by laser beam	B 23 K 26/00	123
	- by electro-erosion	B 23 B 1/00	68
CASTING		B 22 D	6,620
CLEANING	- chemically	C 23 G	744
	- electrolytically	C 25 F 1/00	59
	- in connection with mechanical metal-working	B 21 B 45/04-45/08 B 21 C 43/00	75 42
	- by abrasive blasting	B 24 C	495
CUTTING	- mechanically	B 23 D	1,816
	- for making gears etc.	B 23 F	384
	- for making screw-threads etc.	B 23 G	352
	- electrolitically	B 23 P 1/00	918
	flame	B 23 K 7/00	581
	- arc	B 23 K 9/00	1,988
	- resistance	B 23 K 11/00	828
	- electron beam	B 23 K 15/00	213
	- laser	B 23 K 26/00	123

Subsection : Metal Working (Cont'd)

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
DRAWING	- normal drawing	B 21 C 1/00-9/00	470
	- deep drawing	B 21 C 22/20-24-16	190
DRILLING	see BORING		
EXTRUDING		B 21 C 23/00-35/00	642
FINISHING	- grinding, polishing	B 24	4,257
	- enamelling	C 23 D	256
	- mechanically	B 23 P 9/00	41
FORGING		B 21 J B 21 K	1,159 566
FOUNDRY MOULDING		B 22 C	2,391
GRINDING		B 24	4,257
HAMMERING	see FORGING		
HARDENING	see HEAT TREATMENT		
HEAT TREATMENT	(including hardening, annealing, tempering and furnaces therefore etc.)	C 21 D	3,868
JOINING	- by banding, folding, punching	B 31 D 39/00	315
	- by casting	B 22 D 19/00	309
	- by welding, soldering, brazing	B 23 K	8,270
	- by plating	B 23 P 3/00	252
	- by forging, pressing, riveting	B 21 J	1,159
	- assembly; fitting together of parts	B 23 P 19/00	496
	- miscellaneous	B 23 P 11/00	174
MILLING		B 23 C	615
POLISHING	- mechanically	B 24	4,257
	- electrolytically	C 25 F 3/00	187
	- chemically	C 23 F 3/00 C 23 G	34 744
ROLLING		B 21 B B 21 H	3,453 478
SHEARING	see CUTTING		
TUBES	- making or processing by rolling	B 21 B 17/00-25/00	361
	- making by drawing	B 21 C 1/00	262
	- making by extrusion	B 21 C 23/08-23/12	106
	- other methods of making tubes	B 21 C 37/06-37/30	629
	- working of tubes without removal of material; e.g. bending, straightening	B 21 D 3/00 7/00 9/00 15/00 19/00 41/00	207 301 91 69 149 120
TURNING	- in general	B 23 B 1/00-33/00	2,074
	- turning machines for cutting screw-threads	B 23 G 1/00	127

Appendix 7

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
WIRE	- working and processing	B 21 F	809
	- drawing	B 21 C 1/00	262
	- extruding	B 21 C 23/08	-
	- handling	B 65 H	8,915
	- barbed wire	B 21 F 25/00	8
	- articles made from wire	B 21 F 25/00-45/00	312
WORKING	- metal working in general	B 21; B 23; B 24	39,954
	- rolling; see ROLLING		
	- drawing; see DRAWING		
	- extruding; see EXTRUDING		
	- cutting, shearing; see CUTTING		
	- boring, drilling; see BORING		
	- milling; see MILLING		
	- grinding; see GRINDING		
	- polishing; see POLISHING		
	- pressworking = forging; see FORGING		
	- pressworking = stamping, punching, deep-drawing etc.	B 21 D 22/00-28/00	1,020
	- forming, straightening, bending, corrugating	B 21 D 1/00-21/00	1,742
	- electroforming	C 25 D 1/00	197
	- planing, slotting	B 23 D 1/00-11/00	66
	- broaching	B 23 D 37/00-43/00	91
	- sawing	B 23 D 45/00-65/00	431
	- filing, rasping	B 23 D 67/00-73/00	35
	- reaming	B 23 D 75/00-77/00	51

Subsection: Deposition and Electroprocessing

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
DEPOSITION	of metals by:		
	- electrolytic methods (see ELECTROPROCESSING)		
	- hot dipping	C 23 C 1/00	579
	- chemical deposition	C 23 C 3/00	514
	- cladding; plating	C 23 C 5/00 B 23 P 3/00	23 252
	- spraying	C 23 C 7/00	159
	- cementing/diffusion	C 23 C 9/00	357
	- gas plating	C 23 C 11/00	627
	- metal-vapour condensation	C 23 C 13/00	718
	- cathodic sputtering	C 23 C 15/00	314
	- miscellaneous	C 23 C 17/00	112

Appendix 7

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
ELECTRO-PROCESSING	- electrolytic production, winning, recovery or refining	C 25 C	1,241
	- electroremoval of metal or of other material from metal (e.g. cleaning pickling, etching, descaling etc.)	C 25 F	396
	- electrolytic coating (electroplating)	C 25 D (esp. 3/20, 5/26,5/36)	4,037
	- electromachining	B 23 P 1/00	918

Subsection: Building and Construction

Keyword	Comments/Clarification	Equivalent symbols of the IPC (Third Edition)	Statistical data (No. of patent documents published in 1978)
BUILDING/ CONSTRUCTION	use of steel etc. in the building and construction industry:		
	- arches, frames	E 04 C 3/40	4
	- beams, girders, struts etc.	E 04 C 3/04-3/11	154
	- bridges	E 01 D (esp.9/00)	634
	- bulkheads, sheet-piles	E 02 D 5/04-5/08	40
	- columns, pillars	E 04 C 3/32	38
	- floors	E 04 B 5/10	17
		E 04 B 5/29	4
	- miscellaneous	E 04 B 1/08	15
		1/24	82
		E 04 C 2/08	38
		E 04 H 7/04-7/06	26
		7/14-7/16	13
		7/30	25
		12/08-12/10	39
	- piles	E 02 D 5/28-5/30	57
	- railways	E 01 B	1,543
	- reinforcement	E 04 C 5/00	527
	- roofs	E 04 D 1/06	10
		1/18	4
		3/16	6
		3/30	43
		5/04	-

[Appendix VI follows]

APPENDIX VI
SAMPLE OF INPADOC'S PATENT
CLASSIFICATION SERVICE (PCS)

INPADOC PATENT CLASSIFICATION SERVICE MICROFICHE JULY-1975 PAGE: 3039

IPC	CC	PUBDAT	KD	DOC.NO	IPC (ALL)	CC	PR.DAT	KA	PRIORITY NO.	APPLICANT	TITLE
B21J 9/18	US	750119	A	3859837	B21J 9/18	US	730412	A	73	350650	THE W.S. BAIRD CORPORATION	TOGGLE ACTUATED HORIZONTAL PRESS
	US	750209	A	3863486	B21J 9/18 B21J 13/00	US	796189	A	79	930883	LASSY; DONALD R ICHARD	TRANSFER PRESS
	US	750310	A	3871225	B21J 9/18	DT	730601	A	73	2327893	LANGENSTEIN & S CHEMANN AKTIEN GESELLSCHAFT	SCREW FORGING PRESS
	US	750401	A	3874218	B21J 9/18	US DT	710218 700219	A1 A	71 70	116507 2007505	LANGENSTEIN & S CHEMANN AKTIEN GESELLSCHAFT	POWER PRESS WITH A FLYWHEEL AND SPINDLE DRIVE
	US	750610	A	3888109	B21J 9/18	DT	730112	A	73	2301537	*RIBBACK; BERND*	*FORGING MACHINE*
B21J 9/20	DT	750642	C3	1627536	B21J 9/20	DT	690718	A	67K	63970	AUTOMEN INDUSTR ICANLAGEN AG, WIEN	GLEICHLAUFSTEUERUNG AN HYDRAULISCHEN SC HMIEDEPRESSEN
	FR	741227	A1	2231947	B21D 43/05 B21J 9/20 B30B 1/00 B30B 15/00	DT	730530	A	73	2327526	MASCHINENFABRIK WEINGARTEN AG ,DT	
	FR	750117	A1	2234065	B21J 9/20 B30B 1/00	FR	730626	A	73	7322536	KHARKOVSKY AVIA TSIONNY INSTIT UT,SU	
	SU	750225	T	227100	B30B 1/02 B21J 9/20	SU	690110	A	69	875525		
	SU	750615	T	470408	B30B 15/22 B30B 1/30 B21J 9/20	SU	731010	A	73	1969359		
	SU	750613	T	473631	B30B 15/14 B21J 9/20	SU	731220	A	73	1977866		
	US	750401	A	3879206	B21J 9/20	US	790605	A	79	976767	PROMECAM SISSON PLEMMANN	STROKEPEND PROGRAMMER FOR MACHINE TOOL
	US	750610	A	3888097	B21J 9/20	US	790411	A	79	960217	THE MINSTER MAC HINE COMPANY	MACHINE HAVING A DRIVE SHAFT AND A METH OD OF OPERATION
	US	750617	A	3889503	B21J 9/20	US	790701	A	79	989670	VERSON ALLSTEEL PRESS COMPANY	SAFETY INDICATOR SYSTEM AND METHOD FOR METAL FORMING MACHINES

Appendix VI

I P C SELECTED CLASSIFICATION SERVICE MICROFICHE 08/1979 PRODUCED: 79-02-23 PAGE: 3 103
FRAME: F09

I P C	CC PUB.NO DAT KD	D.C.NO	IPC (ALL)	CC PR.NO DAT PRIORITY NO.	EQUIVALENCES (PUB.DL.)	APPLICANT	TITLE
B01F 3/10					CH 71-05-31 A 507733 DE 70-10-15 A 2014693 DK 75-05-26 B 131094 DK 75-10-27 C 131094 FR 71-01-08 A5 2038173 GB 72-03-08 A 1266122 JP 78-06-28 B4 53020711 NL 70-10-06 A 7014651 NO 73-12-03 B 120619 US 71-11-09 A 3618903		
B01F 3/12	GB 79-02-14 A 1540790	B01F 7/16 B01F 3/12 B01F 15/02	DE 77-05-21 77 2723068	DE 78-11-30 A1 2723068		BAYSSIEWERKE AG	ADHESIVE MIXER FOR ION EXCHANGE SPREADING MACHINES
	SU 79-01-15 T 642290	C07C 63/00 B01F 3/12	SU 76-11-29 76 2423494			INST GAZA AN UK SSR GORLOVSKIJ KOKS OKHRICHESKIJ ZAVOD	METHOD OF DETOXIFICATION OF SOLID WASTE OF PYROLIC ANHYDRIDE PRODUCTION
B01F 3/14	HU 79-01-28 P 172922	B01F 3/14	HU 75-02-05 75AA 881	DE 76-08-19 A1 2602856		KELYEPITESI TERVEZOE VALLALAT ,HU	APPARATUS FOR MIXING SOLID, GRANULAR AND/OR DUST-LIKE MATERIALS INTO FLUID PARTICULARLY FOR PRODUCING SLUDGE AT PIPELINE CARRYING
B01F 5/06	DD 79-01-24 Z 133867	C03C 1/04 B01F 5/06	DD 77-11-14 77 202069			KLINGLER,HERMANN,DD SCHILLE,DIETRICH,DD SCHNEIDER,ANGELIKA,DD	VERFAHREN UND VORRICHTUNG ZUR KONTINUIERLICHEN HERSTELLUNG EINER LICHTWOFSCHUTZSCHICHTDISPERSION
	FR 79-02-02 B1 2282936	B01J 10/00 B01F 5/06	JP 74-08-26 74 97062	DE 76-03-18 A1 2537962 FR 76-03-26 A1 2282936 GB 78-08-16 A 1521989 JP 76-02-27 A2 51024582 JP 78-11-17 B4 53043200 US 77-12-20 A 4064111		MITACHI CHEMICAL CY LTD	
	GB 79-01-04 A 2000195	C22C 1/02 B01F 5/00	CH 77-06-02 77 6766	DE 78-10-02 A1 2844752 DE 78-12-07 A1 2737329 FR 78-12-29 A1 2393073 JP 79-01-09 A2 54002206 NL 78-12-05 A 7805711		ALUSUISSE	PROCESS FOR THE CONTINUOUS PRODUCTION OF METAL ALLOYS
	GB 79-01-10 A 2000448	B01F 3/02 B01F 5/00	AT 77-07-01 77 4685	BE 78-10-16 A1 868643 DE 79-01-04 A1 2825500 ES 79-01-16 A1 471305 FR 79-01-26 A1 2395772 LU 78-12-07 A 79900 NL 79-01-03 A 7806955 SE 79-01-02 A 7967319		WAAGNER BIRO AG	METHOD AND APPARATUS FOR MIXING TWO GAS STREAMS
	GB 79-01-17 A 2000688	B01F 3/04 B01F 5/00	DE 77-07-11 77 2731279	DE 79-02-01 A1 2731279 NL 79-01-15 A 7807424		KUBA KOHLEBEFASR IK BAIERSBRUNN	APPARATUS SUITABLE FOR DIVIDING A FLOWING M

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[End of Appendix VI
and of document]