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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

001100

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FOREHORD

The Industrial and Technological Information Bank (INTIB) came into existence in 1977 as : 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 INTIE. 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

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PREFACE

This Users' Guide to the Internatical 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 | - | Pertilizers |
|-------|-----|-----|---|--|
| Guide | No. | II | - | Icon 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.

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INTRODUCTION

1. Joday, 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 formalution 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 now the International Patent Classification (IPC) may be used to retrieve technological information concerning IRON AND STEEL.

PATENT DOCUMENTS AS & 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

5. In swarching for, and retrieving, technological information, patent documents have more practical importance than periodicals and books. This is so for several reamons, 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 inmention".

3. Another reason is that patent documents bear classification sympols 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 teen 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 is inst 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 plueprints 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 (Pederal 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 sympols 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 Straspourg Agreement Concerning the International Patent Classification which provided a worldwide forum for the development of the IPC.

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

18. The IPC, being a means for obtaining an internationally uniform cl ssification 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 upproximately 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 sympols, principles, rules and application of the Classification contained in Volumes 1 to 3. 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 Sympols

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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:

- 9 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 | 8 | PERFORMING OPERATIONS: TRANSPORTING |
| Section | С | CHEMISTRY AND METALLURGY |

- 3 -

- 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 Gl. Each subclass symbol consists of the class symbol followed by a capital letter, e.g. A Gl 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

- <u>sub-group symbol</u>, 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:

| | | | | | | or | |
|-----------------|--------|------------|----|---------|-----|--------|----------|
| 1 A | 01 | i | 3 | 1/ | co | 1 | 1/24 |
| Section | | i | | i i | | 4 | 1 |
| Class | 3 | 1 | | i J | | 1 | i |
| Su | ib-cla | s s | | ا اس | | ţ | 1 |
| l | Main | Grou | .p | | | i 1 |) |
| ۱ ۱ <u> </u> | | | | Sub-grc | מני | | ا |

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: "Malleabili-ing white cast-iron by heat treatment giving oxidation of carbon by using gaseous agents."

29. In many cases, a class, sutclass 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) <u>Precedence Note</u> 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 establich 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.

16. 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 turk 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 assential to consult any notes or references appearing in the title of the relevant class, since these may also affect the subclass content. 57. 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. 7 960 547) and by the Intertnational 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 Infolmation (SDI) or international refer al services which, in many cases, contain also references to patent documents.

44. In "iew 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, Bulyaria, Canada, Cuba, Cyprus, Czechoslovakia, Denmark, Egypt, Finland, Prance, 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, Soviel Union, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America, Yugotlavia, 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 mank 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 sympol. An alternative service gives information concerning one, or a selected number of, IPC sympols. 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 livelihood 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). Tha 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 norm. 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 rajor 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 furrith 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 obstaining the state of the technology in a given industrial sector in the most economic way by consulting selected patent documents.

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

- Step I determine which of the UNIDO Thesaurus Reywords (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 grop (the average number of patent doc ments published with a p_cicular 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 apove-mentioned INPADOC (Möllwaldplatz 4, A-1041 Vienna, Austria) or by national Patent Offices or libraries (some of these institutions provide 3uch 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 rechnological level in a particular field specified in the "ser's request and also copies of relevant patent documents.

References

- Strasbourg Agreement Concerning the International Patent Classification of March 24, 1971 (WIPO Publication No. 275).
- 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).
- World Patents Index; World Patents Abstracts (Derwent Publications Ltd., Rochdale House, 128 Theoralds Road, London WClX 8RP, United Kingdom).
- 4. INPADOC, General Information (WIPO/INPADOC Publication No. 426 (E F G)).

[Appendices I to VI follow]

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APPENDIX I

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

IODINE

IRONING

| IODINE | COIB | 7/14 | compounds of - in photo- | G03C | 1/64 |
|-------------------------------|-----------|----------|---------------------------------|----------------------|---------------|
| inorganic compounds of - | COIB | | inorganic compounds of - | COLG | 49/00 |
| 10005081 | C07C | 10/07 | | COLC | |
| IUDOFORM | Curc | 19/0/ | | COLG | |
| (C/NOI | | | organic compounds of - | C07F | 15/02 |
| monanting or handling - in | Rati | | decarburising - by diffusion | C21 D | 3/04 |
| discharge tubes | 11313 | | electrodeposition of - | C25D | 3/20 |
| - exchange | BOIJ | 39/00 | of or with - | C25D · | |
| caralysts comprising - ex- | BOLT | 31/08 | extracting non-metals from - | C21 D | 3/00 |
| change resins | 0013 | 31700 | by diffusion processes | | |
| production of - exchange | C08J | 5/22 | graphitising of - | CZID | 5/14 |
| resin diaphragms | | | aurceaing of - | Card | \$/00 |
| - guns | HOIL | 3/00 | | | 7/00 |
| IONIE I TION | | | heat treatment of - | C21 D | 1/00 |
| IONISATION | | | | | 5/00 |
| - chambers | HOIJ | 47/00 | | | 7/14 |
| ie materia. | CALN | to 47/26 | | STIC | 11/04 |
| nestigating - | GOIN | 27/02 | pretreatment of - ore | C778 | 1/00 |
| | GOIL | 21/30 | mallesbilising of - | C2ID | 5/06 |
| | | | modifying physical properties | C22F | |
| ONONE | | | oi — | | |
| beta - | C07C | 175/00 | of - by working | CID | 7/00 |
| IONTOPHORESIS | | | nitriding of - | CBC | 9/10 11/14 |
| - for medical use | A16N | :/30 | pig — | 60 • 0 | |
| IBID // ID / | | | production of pig - | CIB | 5/00 |
| See also NON-SERROUS | للاغتدا | 11/00 | } | | 11/00 |
| | | | refining of pig - | CIIC | 1/00 |
| norganic compounds of - | COLC | 55/00 | production of iron or steel | C21B | |
| | COLC | | production of iron or steel by | CISC | |
| | COIG | | electrolytic processes | CILB | 11/17 |
| | | | electrothermal processes | C21C | 5/52 |
| IRISES | G02B | | production of steel otherwise | C2IC | |
| | | | than by direct processes | | |
| IRON | | 1 | puddling of - | C21C | 3/00 |
| (the metal) or steel | C21 | | reming or - | C21C | 17/00 |
| see also METAL(S), ME- | | 1 | tempering of - | C21D | 1/00 |
| TAL COMPOUNDS | | | | | 5/00 |
| alloys of - | cuc | | treating molten steel | C21C | 7/00 |
| steel allows | C21C | 38/00 | wrought - | CZIC | 3/00 |
| other alleys of - | C22C | 33/00 | IRONS | | |
| • | | to 38/00 | | | |
| treatment of alloys of - | C21D | | (= implements) | 84.19 | 7/07 |
| neat treatment of alloys of - | CZID | 6/00 | climbing - | A41C | 15/06 |
| Tunering of - | CHD | 5/00 | curling - | A45D | 1/00 |
| carbo-nitriding of - | C23C | 9/00 | fire - | A473 | 49/00 |
| · | | 11/14 | soldering - | 823K | 3/02 |
| carburising of - | C23C | 9/00 | 180NING | | |
| ()er _ | CNC | 11/10 | California construction for the | 04/0 | |
| compounds of - | 474 14 | 1/00 | Tinishing textile fabrics by - | D06C | 15/00 |
| pounda or | | 1 | | DUDE | |
| | | J | | | |
| | | | | | 1.15 |

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[Appendix II follows]

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APPENDIX II

CONTENTS OF IPC SECTION C - CHEMISTRY AND METALLURGY

SECTION C - CHEMISTRY AND METALLURGY

Definitions for Section C:

Aikali metals: Li, Na, K. Rb, Cx. Fr Aikali 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, C. Br, L 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 Nee-metals: 'Light and one-metals Transition elements with atomic numbers 21 to 30 inclusive, 39 to 48 inclusive, 57 to 80 inclusive, 89 upwards

CONTENTS OF SECTION (References and notes omitted)

Seb-Section: CHEMISTRY

| C 91 | INORGANIC CHEMISTRY |
|--------|--|
| C 01 B | Non-metallic elements, compounds thereof |
| C 01 C | Ammonia; Cyanogen; Compounds thereof 14 |
| C 01 D | Compounds of alkali metals, i.e. lithium. sodium, potassium, rubidium, caesium, or francium |
| C 01 F | Compounds of the metals beryllium. magnesium, aluminium, calcium, strontium, barium, radium, thorium, or of the rare-earth metals |
| C 01 G | Compounds containing metals not covered by sub-classes C01 D or C01 F |
| C 02 | TRE LIMENT OF WATER, WASTE WATER, SEWAGE, OR SLUDGE |
| C 02 F | Treatment of water, waste water, sewage, or sludge |
| ငအ | GLASS; MINERAL AND SLAG WOOL 21 |
| C 03 8 | Manufacture, shaping, and supplementary processes |
| C 03 C | Chemical composition of glasses, glazes, or vitreous enamels: Surface treatment of glass: Joining glass to glass or other materials |
| C 04 | CEMENTS: CERAMICS, ETC.; SOUND OR THERMAL INSULATING |

,

| C 04 B | Lime: Cements: Ceramics: Stone or the like: Sound or thermal insulating materials |
|--------|--|
| C 05 | FERTILISERS; MANUFACTURE THEREOF |
| COSB | Phosphatic fertilisers |
| COSC | Nitrogenous fertilisers |
| C 05 D | Inorganic fertilisers not covered by sub-classes C 05 B, C; Fertilisers producing carbon dioxide |
| C CT F | Organic fertilisers not covered by sub-classes COS B, C, e.g. fertilisers from waste or refuse |
| C 02 3 | Mixtures of fertilisers bylonging individually to different sub-classes of class COS: Mixtures of one or more fertilisers with materials not having a specifically fertilising activity, e.g. pesticides, soil conditioners, wetting agents |
| C 06 | EXPLOSIVES: MATCHES |
| C 06 B | Explosives or thermsc compositions: Manufacture thereof: Use of single substances as explosives |
| C 06 C | Detonating or priming devices: Fuzes: Chemical lighters: Pyrophoric compositions |
| C 06 D | Means for generating smoke or mist; Gas-attack compositions; Generation of gas for blasting or propulsion (chemical part) |
| C 06 F | Matches: Manufacture of matches |

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Appendix II

| C 07 | ORGANIC CHEMISTRY |
|----------------|---|
| C 07 B | General methods and apparatus of degame 37 |
| COTC | Acyclic and carbocyclic compounds |
| C 07 D | Heterocyclic compounds |
| C 07 E | A ordine carboordine on heremoveline |
| CUIF | compounds containing elements other than carbon, hydrogen, halogen, oxygen, nitrogen, sulphur, selenium or teilurium |
| C 07 G | Compounds of unknown constitution |
| C 07 H | Sugars: Derivatives thereof |
| COTI | Steroids |
| C 96 | ORGANIC MACROMOLECULAR COMPOUNDS; THEIR PREPARATION |
| | COMPOSITIONS BASED THEREON |
| C 08 B | Polysaccharides: Derivatives thereof 103 |
| C 06 C | Treatment or chemical modification of |
| | rubbers |
| C 06 F | Macromolecular compounds obtained by |
| | reactions only involving carbon-to-carbon |
| | unsaturated bonds |
| C 08 G | Macromolecular compounds obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds |
| COSH | Derivatives of natural macromole tular |
| CONT | Working-up: Ge., and processes of |
| U ••• , | compounding; After-treatment |
| C 08 K | Use of inorganic or non-macromolecular organic substances as compounding ingredients |
| C 08 L | Compositions of macromolecular compounds 123 |
| C 09 | DYES: PAINTS: POLISHES: NATURAL RESINS: ADHESIVES: MISCELLANEOUS COMPOSITIONS: MISCELLANEOUS APPLICATIONS OF MATERIALS |
| C 09 B | Organic dyes or closely-related compounds for producing dyes: Mordants: Lakes 129 |
| 0.00 | Treatment of inorganic materials other than |
| | fibrous fillers, to enhance their pigmenting or filling properties; Preparation of carbon black |
| C 09 D | Inks; Paints; Varnishes; Lacquers; Wood-stains; Chemical paint removers; Pastes or solids for colouring or printing |
| C 09 F | Natural resins; French polish; Drying-oils; Driers (siccatives); Turpentine |
| C 09 G | Polishing compositions other than French polish: Ski waxes |
| C 09 H | Preparation of glue or gelatine |
| C 09 1 | The use of materials other than glue as |
| , | adhesives: Adhesive processes in general (non-mechanical part) |
| C 09 K | Compolitions not provided for elsewhere; Miscellaneous applications of materials |

| C 10 | PETROLEUM, GAS AND COKE INDUSTRIES: TECHNICAL GASES CONTAINING CARBON MONOXIDE: FUFLS: LUBRICANTS; PEAT |
|--------|---|
| C 10 B | Destructive distillation of carbonaceous materials for production of gas, coke, tar, and similar materials |
| C 10 C | Working-up pitch, asphalt, bitumen, tar: Pyroligneous acid |
| C 10 F | Cutting, drying, and working-up of peat 144 |
| C 10 G | Cracking hydrocarbon oils; Production of liquid hydrocarbon mixtures from materials other than hydrocarbons, e.g. by destructive hydrogenation; Recovery of hydrocarbon oils from oil-shale, oil-sand, or gases; Refining mixtures mainly consisting of hydrocarbons; Reforming of naphtha; Mineral waxes |
| C 10 H | Production of acetylene by wet methods; Its purification |
| C 10 j | Production of producer gas, water-gas. synthesis gas from solid carbonaceous material, or mixtures containing these gases; Carburetting air or other gases |
| C 10 K | Purifying or modifying the chemical compositions of combustible technical gases compating carbon monopide 151 |
| C 10 L | Fuels not otherwise provided for: / dding materials to furls or fires to reduce smoke or undesirable deposits or to facilitate soot removal: Firelighters |
| C 10 M | Lubricating compositions; The use as lubricatins of chemical substances either alone or as lubricating ingredients in a composition 153 |
| C 11 | ANIMAL AND VEGETABLE OILS, FATS, FATTY SUBSTANCES AND WAXES; FATTY ACIDS THEREFROM; DETERGENTS; CANDLES |
| C 11 B | Producing (pressing, extraction), refining and preserving fats, fatty substances (e.g. lanolin). fatty oils and waxes, including extraction from waste materials; Essential oils; |
| C 11 C | Fatty acids from fats, oils, or waxes: Candles: Fats, oils and fatty acids by chemical modification of fats, oils, or fatty acids obtained therefrom |
| C 11 D | Detergent compositions; The use of single substances as detergents; Soap and soap-making; Resin soaps; Recovery of glycerol |
| C 12 | BIOCHEMISTRY: BEER: SPIRITS: WINE; VINEGAR: MICROBIOLOGY; ENZYMOLOGY: MUTATION OR GENETIC ENGINEERING |
| C 12 C | Brewing of beer 159 |
| C 12 F | Distillation and reculication of fermented solutions: Recovery of by-products: |

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| C 12 G | Wine: Other alcoholic beverages: Prenaration thereof |
|-------------|---|
| C 12 H | Pasteurisation; Stenlison; Preservation; |
| (, , , , , | Vinegate in emprendies 160 |
| | Pitching and deputching machines: Cellar |
| | tools |
| C 12 M | Apparatus for enzymology or microbiology; |
| | or virus-sulture appearatus |
| C 12 N | Micro-organisms or enzymes: Compositions |
| | thereof: Propagating, preserving, or |
| | maintaining micro-organisms of Ussue: |
| | media |
| C 12 P | Fermientation or enzyme-using processes to |
| | synthesise a desired chemical compound or |
| C 12 O | |
| CIZQ | enzymes or micro-organisms; Compositions |
| | or test papers therefor: Processes of |
| | preparing such compositions: |
| | Condition-responsive control in |
| | inicrosological or enzymological processis |
| C 12 R | Processes using micro-organisms |
| • • • • • | ······ |
| | |
| сIJ | SUGAR OR STARCH INDUSTRY 169 |
| C 13 C | Cutting mills; Shredding knives; Pulp |
| | presses |
| C (3 D | Production and purification of sugar juices 169 |
| C 13 F | sugar and symptonessing of raw sugar, |
| C 13 G | Evaporation apparatus: Boiling page |
| Сізн | Cutting machines for sugar: Combined |
| | cutting, sorting and packing machines for |
| C 13 1 | sugar |
| | Exuracion or sugar from molasses |
| CISK | Synthesis of sugars by hydrolysis of di- or |
| | polysaccharides |
| C 13 L | Starch; Dextrin; Similar carbohyd:ates 170 |
| | |
| _ | |
| C 14 | SKINS; HIDES; PELTS; LEATHER 171 |
| C 14 3 | Mechanical treatment and processing of |
| | skins, hides, and leather in general; |
| | Peit-shearing machines; Intestine-splitting |
| C 14 C | Chemical resonance of bidge china and |
| U 14 U | leather, e.g. tanning, impregnating, finishing: |
| | Apparatus therefor; Compositions for |
| | tanning 172 |
| | |
| Cut C - | HAR METALLURGY |
| 200-20 | CUON: WEIALLUKGI |
| | |

 C 21
 METALLURGY OF IRON
 173

 C 21 B
 Manufacture of iron or steet
 17

 C 21 C
 Processing of pig-iron, e.g. refining, manufacture of wrought-iron and steet: Treatment in moiten state of ferrous alloys
 174

•

.

| C 21 D | Modifying the physical structure of ferrous metals: General devices for heat treatment of ferrous or non-ferrous metals or alloys; Making metal malleable by decarbursation, tempering, or other treatments |
|--------|---|
| C 22 | METALLURGY: FERROUS OR NON-FERROUS ALLOYS: TREATMENT OF ALLOYS OR NON-FERROUS METALS |
| C 22 B | Production and refining of metals: Pretreatment of raw materials |
| czc | Alloys |
| C 22 F | Changing the physical structure of non-ferrous metals and non-ferrous alloys 180 |
| C 23 | WORKING OR TREATMENT OF METALS, OTHER THAN BY MECHANICAL MEANS: COVERING MATERIALS WITH METALS: INHIBITING CORROSION OR INCRUSTATION IN GENERAL |
| C 23 C | Apparatus and processes for which provision is not made elsewhere, e.g. in classes 805, 844, or in sub-classes C03 C, C 23 D, F, C 25 D, F 27 B, for covering metals or covering other materials with metals; Diffusion processes for surface treatment of metals |
| свр | Enamelling of, and applying a vitreous layer to, metals |
| C 23 F | Chemical surface treatment of metals not covered by sub-classes C 23 D, C 25 D; Inhibiting corrosion or incrustation in restand |
| CZG | Cleaning and de-greasing of metallic objects by chemical methods other than electrolysis 183 |
| C 23 | ELECTROLYTIC OR ELECTROPHORETIC PROCESSES: APPARATUS THEREFOR |
| C 25 B | Electrolytic or electrophoretic processes for the production of compounds or non-metals; Apparatus therefor |
| C 25 C | Processes for the electrolytic production, recovery or refining of metals; Apparatus therefor |
| C 25 D | Processes for the electrolytic or electrophoretic production of coatings: Electroforming: Apparatus therefor |
| C 25 F | Processes for the electrolytic removal of materials from objects; Apparatus therefor |
| C 30 | CRYSTAL GROWTH 189 |
| C 30 B | Single-crystal growth: Unidirectional solidification of eutectic materials or unidirectional demixing of eutectoid materials: Afer-treatment of single crystals: Doping processes for crystals in general; Refining by zone-melting of materials in general; Apparatus therefor |

[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)

Noce

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

| | General features |
|------------------------------------|-------------------------------|
| MAKING PIG-IRON | MAKING IRON |
| in blast furnaces 5/00, 7/00, 9/00 | MAKING LIQUID STEEL BY DIRECT |
| Other processes | PROCESSES |
| · | |

.

| 3/00 | General features in the manufacture of pig-ires (mixers for pig-irea C21 C 1/06) |
|-------|---|
| 3/02 | by applying additives, e.g. fluxing agents |
| 3/04 | . Recovery of by-products, e.g. siag |
| 3/06 | . Treatment of liquid siag (slag wool C 03 B; slag stones C 04 B) |
| 3/05 | Cooling slag |
| 3/ i0 | Siag pors: Siag 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 siag 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 8 66 8 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 | . Beil-and-hopper arrangements |
| 7/20 | with appliances for distributing the burden |
| 1/22 | . 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 comoustion 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 15 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 records |
| 13/06 | in multi-storied furnaces |
| 13/08 | in rotary furnaces |
| 13/10 | . in heartn-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 | Metailothermic processes. * g. thermit reduction |
| 15/04 | from iron carbonyl |

[Appendix IV follows]

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APPENDIX IV

UK Patent Application mGB m 2009244 A

- (21) Application No 7845036 (22) Date of filing 17 Nov 1978
- (23) Claims filed 17 Nov 1978
- (30) Priority data
- (31) #3525
- (32) 22 Nov 1977
- (33) Italy (IT)
- (43) Application published
- 13 Jun 1979
- C218 13/04 (52) Domestic classification
- C7D 5K6 5L3 5L5 5M3 SN1 5N5 5N6 F4E 78 7H 75 7T 7V1 7X3
- 7Y4 7Y8 A19F (58) Documents cited 38 1510992
- GE 1406118 GE 1379067
- GB 117674(-(58) Field of search
 - C7D
 - F48
- (71) Applicant Kinglor Metor SpA, 33042
- Succio (Udine), italy (72) Inventor
- Franco Colautti (74) Agent
 - Kings Patent Agency

(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 (preheating) 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 (1-4) provided by burners (13) to surply 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.



GB 2 009 244 A

United States Patent 1191

Kirkpatrick et al.

(11) 3,960,547 [45] June 1, 1976

[54] STEELMAKING PROCESS

- [75] Inventors: James W. Kirkpatrick, Poland Township, Mahoning County; W. Fergus Porter, Polund; 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; | |
|------|------|----|--------|----------|--|
| ••. | | | | 78146 | |

| 11511 | Int C12 | C71C 7/00 |
|-------|-----------------|--|
| 1591 | Field of Connet | 75/46 60 43 74 3 |
| [20] | Field of Search | ······································ |
| | | 75/44 S |

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Primary Examiner-M. J. Andrews

Atturney, 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



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Appendix IV

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION



INTERNATIONAL APPLICATION FUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

| (51) International Patent Classification ³ : B01J 8/24: C22B 5/14; C21B 13/00; F27B 15/12 | AI (| (11) International Publication Number: WO 80/02652 43) International Publication Date: 11 Decamber 1980 (11.12.80) |
|--|--|---|
| (21) International Application Number: PCT/SE (22) International Filing Date: 28 May 1980 (| 80/00153 28.05.80) | (74) Agents: BURMAN, Tore et al.; Bergling & Sundbergh AB, P.O. Box 7645, S-103 94 Stockhoim (SE). |
| (31) Priority Application Number: 7 | 904689-2 | (a) Despand Sales AU, BR, JP, 30, 03. |
| (32) Priority Date: 29 May 1979 (| 29.05.79) | Published |
| (33) Priority Country: | SE | тик инсталона search пероп |
| (71) Applicant (for all designated States except US). KOPPARBERGS BERGSLAGS AB [SE/S 80 Faiut (SE). | : STORA E]; S-791 | |
| (72) Inventors: and (75) Inventors/Applicants (for US only): BENGTSS [SE/SE]; Pelles krok 7. Borlänge (SE). COL. Harald [SE/SE]; Kyrkbacksvägen 15. Fahm FLINK, Sune, Natanaei [SE/SE]; Sporregatan 10, (SE). WIDELL, Björn [SE/SE]; Flintmästar Västerås (SE). | ON, Eric LIN, Per. (SE). Västerås rpatan 37, | |
| | | |

(54) THE 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 (5). 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 conjoustion air is supplieu to the bottom of the upper reaction chamber. The apparatus also comprises means for preheating the grou oxide material with the exhaust gas from the reactor and for passing said preheated iron oxide into the lower reaction clumber. The apparatus also comprises means for stripping the exhaust gas from CO2 and H2O and recycling it to the mactor to be used as fluidizing gas.



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APPENDIX V

UNIDO THESAURUS TERMS, SECTOR 'LEON AND STELL' AND THEIR INC EQUIVALENTS

The CHIDO Thesenrus terms in the sector 'Iron and Steel' are divided into the following subsections:

Ore Protreatment Coke Iron Making Steel Making Casting of Steel. Hetal Working Deposition and Electroprocessing Building and Construction

The relevant krawwed will be found in the appropriate subsection.

Subsection: Ore Pretreatment

| Keyward | Comments/Clarification | Equivalent symbols of the IPC (Third Edition) | Statistical data (No. of patent documents published in 1978) |
|------------------------------|------------------------------|---|--|
| AGELONERATION/ SERTEREING | | (C 22 B 1/16 - 1/22 (F 27 B 21/00 - 21/06 | 256 68 |
| BALL/HOD CHOSERES | | B 02 C 17/00 - 17/24 | 302 |
| CYCLONES | | B 04 C | 421 |
| | (with flat spiral flow) | 3 04 C 1/00 | 7 |
| | (with unidirectional vortex) | 3 04 C 3/00 - 3/06 | 73 |
| | (with reversal of vortex) | 3 04 C 5/00 - 5/30 | 210 |
| ELECTROSTATIC SEPARATION | | B 03 C 7/00 - 7/12 | 30 |
| FROTE FLOTATION | | B 03 D 1/02 - 1/26 | 416 |
| GURATORY CROSHERS | | B 02 C 2/00 - 2/10 | 90 |
| JAM CROSHERS | | B 02 C 1/02 - 1/10 | 41 |
| NAGETIC 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 |
| NASHING/WET-SCREEKING | | 3 03 B | 645 |
| | (shaking tables) | B 03 B 5/04 - 5/06 | 9 |
| | (jigs) | B 03 B 5/10 - 5/24 | 37 |
| 1 | 'heavy media separation) | B 03 B 5/25 - 5/46 | 82 |
| | (spirals, e.g. Sumphrey's) | B 03 B 5/52 | 6 |

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Appendix 7

Subsection: Coke

| Xeyvord Comments/lifeticities The free fittion The free fittion satgettrize/sation (inited Edition) published in 373 satgettrize/sation (inited Edition) published in 373 satgettrize/sation (inited Edition) (inited Edition) cille (inited Edition) (inited Edit | | | Equivalent symbols | Statistical data |
|---|---|--|-------------------------|---|
| BRIQUETTES/BRIQUETTING C 10 L 5/00 - 5/38 221 CHARCIAL C 10 B 33/02 17 CHARCING(DISCLARGING OF COME OVERS (charying devices) (discharying devices) C 10 B 31/00 - 33/14 56 COME COME OVERS (combined charys-discharys) C 10 B 31/00 - 33/14 56 COME COME OVERS/RETORICS (retorts) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (combined charys-discharys) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 14 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 16 (owens - retical chamber) (cowens - retical chamber) C 10 B 1/00 - 1/10 16 </th <th>Keyword</th> <th>Comments/Claricication</th> <th>(Third Edition)</th> <th>oublished in 1978)</th> | Keyword | Comments/Claricication | (Third Edition) | oublished in 1978) |
| BRIQUETTES/BRIQUETTING C 10 L 5/00 - 5/38 221 CRARCIAL C 10 S 53/02 17 CRARCIAL C 10 S 53/02 17 CRARCIAL C 10 S 31/00 - 31/12 72 CREADING OVERSS (discharging devices) C 10 S 33/00 - 31/12 72 CORE (combined charge-discharge) C 10 S 33/00 - 31/12 72 CORE (component charge-discharge) C 10 S 3/00 - 31/12 72 CORE (component charge-discharge) C 10 S 3/00 - 31/12 72 CORE (component charge-discharge) C 10 S 1/00 - 31/12 72 CORE (component charge-discharge) C 10 S 1/00 - 31/12 72 CORE (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 (component charge-discharge) C 10 S 1/00 - 1/10 34 | Ì | | | • |
| INTIGUTTING C 10 1 5/00 - 5/38 221 CHARCINAL C 10 3 5/00 - 5/38 221 CHARCING/DISCLARGING C 10 3 5/00 - 31/12 72 (discharging devices) C 10 3 31/00 - 31/12 72 (discharging devices) C 10 3 31/00 - 31/14 56 (combined charge-discharge) C 10 3 31/00 - 1/10 14 (combined charge-discharge) C 10 3 1/00 - 1/10 34 (combined charge-discharge) C 10 3 1/00 - 1/10 34 (combined charge-discharge) C 10 3 1/00 - 1/10 34 (combined charge-discharge) C 10 3 1/00 - 1/10 34 (combined charge-discharge) C 10 3 1/00 - 1/10 34 (cowns - vertical chamber) C 10 3 1/00 - 1/10 34 (cowns - with seams for applying C 10 3 1/00 - 7/14 13 (cowns - with seams for applying C 10 3 1/00 - 15/02 7 COXING PROCESSES (using indirect hasting) C 10 3 1/00 - 47/18 34 (combined indirect and direct hasting) C 10 3 51/00 - 55/10 60 (combined indirect and direct hasting) C 10 3 51/00 - 55/10 60 (combined indirect and direct hasting) C 1 | | | | |
| CHARCHAL CHARCTRG/DISCRARCTRG OF CORE OVERSS (charying devices) (discharging devices) (discharging devices) (discharging devices) (discharging devices) (combined charge-discharge) C 10 B 31/00 - 31/12 C 10 B 37/00 - 33/14 C 10 B 37/00 - 13/14 C 10 B 1/00 - 11/10 C 10 B 3/00 - 3/02 C 10 B 3/00 - 1/14 C 10 B 3/00 - 1/14 C 10 B 3/00 - 1/14 C 10 B 1/00 C 10 C 10 C 20/06 C 10 B 1/00 C 10 B 1/00 C 10 B 1/00 C 10 C 20/06 C 10 C C C C C C C C C C C C C C C C C C | BRIQUETTES/BRIQUETTING | | C 10 L 5/00 - 5/38 | 221 |
| CARACTERSC OF CORE OVERSS(charying devices) (discharqing devices) (combined charge-discharge)C 10 B 31/00 - 31/12 C 10 B 33/00 - 33/1472 72 72CORE(combined charge-discharge)C 10 B 33/00 - 33/1456 10CORE(combined charge-discharge)C 10 B 3/00 - 13/1456 10CORE OVERS/RETORTS(retorts) (ovens - vertical chamber) (ovens - berisontal chamber) (ovens - with conveyers inside) (ovens - with conveyers inside) (ovens - with conveyers inside) (ovens - vith conveyers inside) (ovens - other type) (c 10 B 1/00 - 7/1434 13 14CORENC PROCESSES(using indirect heating) (combined indirect heating) (combined indirect heating)C 10 B 1/00 - 15/02 10 B 1/00 - 15/027CORENC PROCESSES(using indirect heating) (combined indirect heating) (combined indirect heating) (combined indirect and direct (other processes, e.g. milti-step) (cot 10 B 15/00 - 53/08195 195CORENC/QUENCHING COME (doors, lids, etc.) (for extraction of the distillation gases) (cotex could, gases)C 10 B 13/00 - 25/24 10 B 13/00 - 25/24122CORENC/QUENCHING COME (ther processes, e.g. milti-step)C 10 B 13/00 - 25/24 10 B 13/00 - 25/24122CORENC/QUENCHING COME (ther processes, e.g. milti-step) (cotex overs, foundations)C 10 B 13/00 - 21/2610EXAMING OF COME OVENS(for extraction of the distillation gases) (cotex textis, e.g., linings c 10 B 13/00 - 21/2611CORENC/QUENCHING COME (ther processes, foundations)C 10 B 13/00 - 21/2611EXAMING OF COME OVENS (ther metalis, e.g., linings casings, | CHARCOAL | | C 10 B 53/02 | 17 |
| CALARTHS OF COME STATES(charging devices) (discharging devices) (combined charge-discharge)C 10 B 31/00 - 31/12 5672 72COME(combined charge-discharge)C 10 B 3/00 - 31/14 5656COME(combined charge-discharge)C 10 B 3/00 - 31/14 5656COME(retorts)C 10 B 1/00 - 1/10 5 10 L (partiy)34COME(retorts)C 10 B 1/00 - 1/10 5 10 L (partiy)34COME(retorts)C 10 B 1/00 - 1/10 5 10 L (partiy)34COME(retorts)C 10 B 1/00 - 1/10 5 10 D - 7/1434(retorts)(retorts)C 10 B 1/00 - 7/14 1313(retorts)C 10 B 1/00 - 10 - 7/1413(retors - inclined chamber)C 10 B 11/00 1616(retors - inclined chambers)C 10 B 11/00 1616(retors - other types)C 10 B 15/00 - 15/01 27COMING PROCESSES(using indirect heating, e.g. estenial: acabustion)C 10 B 15/00 - 15/01 2(retorts)(retorts)C 10 B 49/00 - 49/22110(combined indirect and direct indirect and direct coling)C 10 S 55/00 - 55/1060(for liquid asterials otical powdar; vood; briquest)C 10 B 39/00 - 39/18157(comting comtacting estimation of the distillation gases)C 10 B 39/00 - 21/24122(for extraction of the distillation gases)C 10 B 19/00 - 21/26149(there tracting)C 10 B 3/00 - 21/26149157(comting)(retactis, e.g., linings casings, foundations) </th <th></th> <th></th> <th></th> <th></th> | | | | |
| CONCEC 10 B 31/00 - 31/1272CONCE(discharqing devices)C 10 B 33/00 - 33/1456CONCE(combined charge-discharge)C 10 B 35/0010CONCE(combined charge-discharge)C 10 B 15/0010CONCE(comes - vartical chamber)C 10 B 1/00 - 1/1034(covens - vartical chamber)C 10 B 1/00 - 3/025(covens - vith conveyers inside)C 10 B 1/00 - 5/2026(covens - vith conveyers inside)C 10 B 1/00 - 15/027(covens - vith seams for applying extental chambers)C 10 B 1/00 - 15/027(covens - vith seams for applying (covens - vith seating, e.g.C 10 B 15/00 - 15/027(covens - other types)C 10 B 15/00 - 55/1060(covens - other types)C 10 B 15/00 - 55/1060(covens - other types)C 10 S 13/00 - 55/1060(covens - other types)C 10 S 13/00 - 25/24122(covens - other types)C 10 S 13/00 - 25/24122 <th>OF CORE OVENS</th> <th></th> <th></th> <th></th> | OF CORE OVENS | | | |
| COMEZ(discharging devices) (combined charge-discharge)C 10 B 33/00 - 33/1456COMEZ(combined charge-discharge)C 10 B ; C 10 L (partly)2,365COMEZ OVERS/RETORYS(restorts)C 10 B 1/00 - 1/1034(covens - vertical chamber)C 10 B 1/00 - 1/1034(covens - horisontal chamber)C 10 B 3/00 - 5/2026(covens - horisontal chamber)C 10 B 3/00 - 5/2026(covens - with scans for applying sectamized pressure)C 10 B 1/00 - 1/1413(covens - with scans for applying sectamized pressure)C 10 B 13/00 - 13/227(covens - with scans for applying (covens - other types)C 10 B 15/00 - 15/027(covens - other types)C 10 B 15/00 - 47/4834(covens - other types)C 10 B 15/00 - 47/4834(covens - other types)C 10 B 51/00 - 47/4834(covens - other types)C 10 B 51/00 - 53/08195(covens - cover types)C 10 B 51/00 - 53/08195(covens - cover types)C 10 B 51/00 - 53/08195(covens - cover types)C 10 B 51/00 - 53/08195(cover types)C 10 B 19/00 - 59/1010(cover types)C 10 B 19/00 - 19/18157(cover types)C 10 B 25/00 - 25/24122(cover types)C 10 B 27/00 - 27/0619(cover types)C 10 B 27/00 - 23/ | | (charging devices) | C 10 B 31/00 - 31/12 | 72 |
| CONE(combined charge-discharge)C 10 B 35/0010CONE(combined charge-discharge)C 10 B ; C 10 L (partly)2,365CONE OVERS/RETORTS(retorts)C 10 B 1/00 - 1/1034(covens - vertical chamber)C 10 B 3/00 - 3/025(covens - vertical chamber)C 10 B 3/00 - 3/025(covens - vertical chamber)C 10 B 3/00 - 7/1413(covens - vertical chamber)C 10 B 3/00 - 7/1413(covens - vertical chamber)C 10 B 1/0016(covens - vertical chambers)C 10 B 1/0016(covens - vertical chambers)C 10 B 11/0016(covens - vertical presence)C 10 B 11/0016(covens - vertical presence)C 10 B 15/00 - 15/017(covens - other types)C 10 B 15/00 - 47/4834(combined indirect and direct hasting)C 10 B 51/037(combined indirect and direct materials migrasistic or particular materials migrasistic or particular (covens)C 10 B 39/00 - 55/1060(covens processes, e.g. multi-stepC 10 J 39/00 - 57/20255255(could chamber)C 10 B 39/00 - 19/18157157(cover processes, e.g. multi-stepC 10 B 39/00 - 23/24122(cover processes)(cover strastin of the distillation gases)< | | (discharging devices) | C 10 B 33/00 - 33/14 | 56 |
| COME C 10 B; C 10 L (partly) 2,965 COME OVERS/RETORTS (retorts) C 10 B 1/00 - 1/10 34 (ovens - vertical chember) C 10 B 1/00 - 1/10 34 (ovens - botisontal chember) C 10 B 3/00 - 3/20 5 (ovens - botisontal chember) C 10 B 3/00 - 5/20 26 (ovens - both conveyers inside) C 10 B 3/00 - 5/20 26 (ovens - inclined thembers) C 10 B 1/00 - 1/14 13 (ovens - inclined thembers) C 10 B 13/00 4 (ovens - other types) C 10 B 13/00 16 (ovens - other types) C 10 B 15/00 - 15/02 7 CONING PROCESSES (using indirect heating) C 10 B 47/00 - 47/48 34 (ovens - other types) C 10 B 51/00 7 10 (doing direct heating) C 10 B 53/00 - 53/08 195 (for liquid saterials mixed with coal) (for liquid saterials mixed with coal) C 10 B 55/00 - 55/10 60 (for settraction of the distillation grass) C 10 B 27/00 - 27/06 195 157 CCONING/QUEMENTING OF CONE OVERS (for estrealis e.g. linings casings, founda | | (combined charge-discharge) | C 10 B 35/00 | 10 |
| CONTE OVERS/RETORTS (retorts) (retor | COTTE | | C 10 B: C 10 L (partly) | 7 968 |
| CONE OVERS/RETORTS (retorts) C 10 B 1/00 - 1/10 34 (overs - vertical chember) C 10 B 3/00 - 3/02 5 (overs - boshive torrevers inside) C 10 B 3/00 - 5/20 25 (overs - beshive torrevers inside) C 10 B 3/00 - 7/14 13 (overs - beshive type) C 10 B 1/00 - 7/14 13 (overs - beshive type) C 10 B 1/00 - 7/14 13 (overs - other type) C 10 B 1/00 - 7/14 13 (overs - other type) C 10 B 1/00 - 15/02 - 7/14 14 (overs - other type) C 10 B 1/00 - 15/02 - 7 7 CONTING PROCESSES (using indirect heating) e.g.g. C 10 B 15/00 - 15/02 - 7 7 CONTING PROCESSES (using indirect heating) C 10 B 49/00 - 49/22 - 110 10 (combined indirect heating) C 10 B 51/00 - 53/08 - 53/08 - 190 195 (for inguid materials or g.g. coal powder; vocd; briquets) C 10 B 55/00 - 55/10 - 60 60 (for extracting of the distillation gases) C 10 B 19/00 - 39/18 - 157 157 CCOLING/(UDENCHING OVERS (doers, lids, etc.) C 10 B 27/00 - 27/06 - 49 122 (for ex | | | | 4,703 |
| CONTING PROCESSES (covens - vertical chamber) (ovens - horisontal chamber) (ovens - inclined chamber) (ovens - inclined chambers) C 10 B 3/00 - 1/02 C 10 B 5/00 - 5/30 C 10 B 7/00 - 7/14 13 (ovens - inclined chambers) (ovens - inclined chambers) C 10 B 1/00 C 10 C 10 B 1/00 C 10 C 10 B 1/00 C 10 C | CORE OVERS/RETORTS | (retorts) | C = 10 = 1/00 + 1/10 | 7.4 |
| CONTING FROCESSESContinuent, Continuent, | | (grens - vertical chapter) | C = 10 = 3/00 = 3/07 | 34 |
| CONTING FUNCTION CONTRACTOR CONTRACT C 10 B 17/00 - 7/14 13 (overss - bashive type) C 10 B 9/00 4 (overss - inclined chambers) C 10 B 17/00 - 7/14 13 (overss - inclined chambers) C 10 B 17/00 - 7/14 13 (overss - inclined chambers) C 10 B 11/00 16 (overss - other types) C 10 B 15/00 - 15/02 7 (overss - other types) C 10 B 15/00 - 47/48 34 (overss - other types) C 10 B 49/00 - 49/22 110 (overss - other types) C 10 B 49/00 - 49/22 110 (overss - other types) C 10 B 51/00 - 53/08 135 (using direct heating) C 10 B 51/00 - 49/22 110 (combined indirect and direct C 10 B 51/00 - 53/08 135 (for liquid materials or for inquid materials mixed with coal) C 10 B 53/00 - 55/10 60 (for stractist motion of the distillation grass) C 10 B 39/00 - 39/18 157 DETAILS OF CORE OVERS (doors, lids, etc.) C 10 B 25/00 - 25/24 122 (for extraction of the distillation grass) C 10 B 29/00 - 29/08 40 EEATING OF CORE OVERS (preheating) C 10 B 19/00 1 | | (overs - horisonral chamber) | C = 10 = 5/00 = 5/70 | 26 |
| CONTING F and the expension of the series of the transformed symptonC 10 B 1/00 = 7/1413(ovens - beshive type)C 10 B 1/00 = 7/144(ovens - with means for applying mechanical pressure)C 10 B 11/0016(ovens - other types)C 10 B 15/00 - 15/027(using indirect heating, e.g.C 10 B 47/00 - 47/4834(using indirect heating)C 10 B 49/00 - 49/22110(combined indirect and direct heating)C 10 B 51/007(combined indirect and direct heating)C 10 B 51/0055/10(for liquid materials of for particular strad with combined indirect processes, e.g. multi-stepC 10 B 55/0055/10(for extraction of the distillation gases)C 10 B 39/00- 39/18157DETAILS OF COME OVENS(doers, lids, etc.)C 10 B 27/0027/0649(cher details, e.g. linings casings, foundations)C 10 B 17/001ELATING OF COME OVENS(preheating)C 10 B 17/001(electricallyC 10 B 19/00(by other means)C 10 B 13/00 | | (mane - with menune inside) | -30 = 3/40 = 3/40 | 40 13 |
| CONTING FIRCTIONEContinue organContinue organCon | | (orang - stat conveyers instal) | C 10 B 7/00 - 7/14 | <u>د</u> ا ر |
| CONTING PROCESSES(overs - with means for applying mechanizal pressure)C 10 B 11/0018CORTING PROCESSES(using indirect heating) (using indirect heating)C 10 B 15/00 - 15/027(using indirect heating) (using indirect heating)C 10 B 47/00 - 47/4834(using indirect heating) (combined indirect and direct heating)C 10 B 49/00 - 49/22110(combined indirect and direct heating)C 10 B 51/037(specially adapted for particular input materials arised with coal)C 10 B 55/00 - 55/1060(for liquid materials arised with coal) (other processes, e.g. multi-step coking)C 10 B 39/00 - 57/20255COULING/QUENCHING COREC 10 B 39/00 - 39/18157DETAILS OF COME OVERS(doors, lids, etc.) (for extraction of the distiliation games)C 10 B 17/001(electrically (by burning gas)C 10 B 17/001(by other means)C 10 B 17/001(by other means)C 10 B 13/005 | | (overs - inclined chembers) | C 10 B 7/00 | 16 |
| CONTING PROCESSES (overs - other types) C 10 B 15/00 1 CONTING PROCESSES (using indirect heating, e.g. external combustion) C 10 B 47/00 - 47/48 34 (using indirect heating) C 10 B 47/00 - 47/48 34 (using indirect heating) C 10 B 47/00 - 47/48 34 (using indirect heating) C 10 B 47/00 - 47/48 34 (using indirect heating) C 10 B 51/00 7 (combined indirect and direct heating) C 10 B 51/00 7 (complexing) (specially adapted for particular materials, e.g. coal powdar; wood; brighted) C 10 B 55/00 - 55/10 60 (for liquid materials or for liquid materials mixed with coal) (c 10 B 39/00 - 57/20 255 255 (cours, lids, etc.) C 10 B 39/00 - 39/18 157 157 DETAILS OF COME OVERS (doors, lids, etc.) C 10 B 25/00 - 25/24 122 (for extraction of the distillation gases) (c 10 B 17/00 1 122 (other details, e.g. linings casings, foundations) C 10 B 17/00 1 1 ETATING OF COME OVERS (preheating) C 10 B 17/00 1 1 <th></th> <th>(overs - inclined chargers)</th> <th></th> <th>10</th> | | (overs - inclined chargers) | | 10 |
| (ovens - other types) C 10 B 15/00 - 15/02 7 COXING 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 (combined indirect and direct heating) C 10 B 51/00 7 (specially algoted for particular materials, e.g. coal powder; C 10 B 53/00 - 53/08 195 (for liquid materials mixed with coal) C 10 B 55/00 - 55/10 60 (other processes, e.g. multi-step (other processes, e.g. multi-step (doors, lids, etc.) C 10 B 39/00 - 39/18 157 DETAILS OF COME OVENS (doors, lids, etc.) C 10 B 25/00 - 25/24 122 (corter ovens) (doors, lids, etc.) C 10 B 27/00 - 27/06 49 (other details, e.g. linings casings, foundations) C 10 B 29/00 - 29/08 40 ELATING OF COME OVENS (preheating) C 10 B 17/00 1 (by other means) C 10 B 21/00 - 21/26 61 1 | | (ovens - with means for applying mechanical pressure) | C 10 B 13/00 | 2 |
| CORING PROCESSES(using indirect heating, e.g. external combustion)C 10 B 47/00 - 47/4834(using direct heating)C 10 B 49/00 - 49/22110(combined indirect and direct heating)C 10 B 51/007(specially signed for particular materials, e.g. coal powder; wood; briquets)C 10 B 53/00 - 53/08195(for liquid materials mixed with coal) (other processes, e.g. multi-step coking)C 10 B 55/00 - 55/1060COGLING/QUENCHING COMEC 10 B 39/00 - 39/18157DETAILS OF COME OVENS(doors, lids, etc.) (for extraction of the distillation gases)C 10 B 25/00 - 25/24122(other details, e.g. linings casings, foundations)C 10 B 17/001EDATING OF COME OVENS(preheating) (electrically (by burning gas)C 10 B 17/001(by other means)C 10 B 19/005 | | (ovens - other types) | C 10 B 15/00 - 15/02 | 7 |
| Image: construct of the set | CORTIG PROCESSES | (using indirect heating, e.g. external combustion) | C 10 B 47/00 - 47/48 | 34 |
| Image: second | | (using direct heating) | C 10 B 49/00 - 49/22 | 110 |
| (specially sispted for particular materials, e.g. coal powder; wood; briquets)C 10 3 53/00 - 53/08195(for liquid materials mixed with coal) (other processes, e.g. multi-step coking)C 10 3 55/00 - 55/1060(course processes, e.g. multi-step coking)C 10 7 57/00 - 57/20255COOLING/QUENCHING COMEC 10 8 39/00 - 39/18157DETAILS OF COME OVENS(doors, lids, etc.) (for extraction of the distillation gases)C 10 3 25/00 - 25/24122(doors, lids, etc.)C 10 8 27/00 - 27/0649(doors, lids, e.g. linings casings, foundations)C 10 8 17/001ELATING OF COME OVENS(preheating) (electrically (by burning gas)C 10 8 17/001(by other means)C 10 8 21/00 - 21/2661 | | (combined indirect and direct heating) | C 10 B 51/00 | 7 |
| (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 T, 57/00 - 57/20 255 COOLING/QUENCHING CORE C 10 B 39/00 - 39/18 157 DETAILS OF CORE 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 19/00 - 29/08 40 FEATING OF CORE OVENS (prebeating) C 10 B 17/00 1 (by other means) C 10 B 21/00 - 21/26 61 | | (specially adapted for particular materials, e.g. coal powder; wood; hriquets) | C 10 3 53/00 - 53/08 | 195 |
| (other processes, e.g. multi-step coking) C 10 7.57/00 - 57/20 255 COOLING/QUENCHING COME C 10 8 39/00 - 39/18 157 DETAILS OF COME OVENS (doors, lids, etc.) C 10 3 25/00 - 25/24 122 (for extraction of the distillation gases) C 10 8 27/00 - 27/06 49 (other details, e.g. limings casings, foundations) C 10 8 29/00 - 29/08 40 EEATING OF COME OVENS (preheating) C 10 8 17/00 1 (by burning gas) C 10 8 21/00 - 21/26 61 (by other means) C 10 8 23/00 5 | | (for liquid materials or for liquid materials mixed with coal) | C 10 3 55/00 - 55/10 | 60 |
| COOLING/QUENCHING CORE C 10 B 39/00 - 39/18 157 DETAILS OF CORE 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. limings casings, foundations) C 10 B 29/00 - 29/08 40 ELATING OF CORE OVENS (preheating) C 10 B 17/00 1 (by burning gas) C 10 B 19/00 1 (by other means) C 10 B 21/00 - 21/26 61 | | (other processes, e.g. milti-step coking) | C 10 7 57/00 - 57/20 | 255 |
| DETAILS OF COKE OVENS (doors, lids, etc.) C 10 3 25/00 - 25/24 122 (for extraction of the distillation gases) (c 10 3 25/00 - 25/24 122 (other details, e.g. linings casings, foundations) C 10 3 25/00 - 27/06 49 ELATING OF COKE OVENS (preheating) C 10 3 29/00 - 29/08 40 (electrically C 10 3 17/00 1 (by burning gas) C 10 3 21/00 - 21/26 61 (by other means) C 10 3 23/00 5 | COOLING/QUENCHING CORE | | C 10 B 39/00 - 39/18 | 157 |
| Initiality of Cure OVERS (doors, lids, etc.) C 10 3 25/00 - 25/24 122 (for extraction of the distillation gases) C 10 3 25/00 - 25/24 122 (other details, e.g. limings casings, foundations) C 10 3 29/00 - 29/08 40 SEATING OF CORE OVERS (preheating) C 10 3 17/00 1 (electrically (by burning gas) C 10 3 19/00 1 (by other means) C 10 3 23/00 5 | | | | |
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| EXATING OF CORE OVENS (other details, e.g. linings casings, foundations) C 10 3 29/00 - 29/08 40 EXATING OF CORE OVENS (preheating) C 10 3 17/00 1 (electrically C 10 3 19/00 1 (by burning gas) C 10 3 29/00 - 21/26 61 (by other means) C 10 3 23/00 5 | | (for extraction of the distillation games) | C 10 B 27/00 - 27/06 | 49 |
| ELATING OF CORE 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 | | (other details, e.g. linings casings, foundations) | C 10 B 29/00 - 29/08 | 40 |
| (preheating) C 10 B 17/00 1 (electrically C 10 B 19/00 . (by burning gas) C 10 B 21/00 - 21/26 61 (by other means) C 10 B 23/00 5 | FLATING OF COLE OVENE | | | |
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| (by burning gas) C 10 B 21/00 - 21/26 61 (by other means) C 10 B 23/00 5 | | (electrically | C 10 B 19/00 | , |
| (by other means) C 10 B 23/00 5 | | (by burning gas) | C 10 B 21/00 - 21/26 | 61 |
| | | (by other means) | C 10 B 23/00 | 5 |
| INCRUSTATION REMOVAL C 10 B 43/00 - 43/14 68 | INCRUSTATION REMOVAL OF PREVENTION | | 7 10 B 43/00 - 43/14 | 68 |
| MECHANICAL PRETREATMENT OF THE CHARGE INSIDE (e.g. levelling, compressing) C 10 a 17/00 - 37/06 15 | MECHANICAL PRETREATMENT OF THE CHARGE INSIDE | (e.g. levelling, compressing) | C 10 B 17/00 - 37/06 | 15 |

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Subsection: Coke (cont'd)

| Xeyword | Comments/Clarification | Equivalent symbols of the IPC (Third Edition) | Statistical data (No. of patent documents published in 1973) |
|--|--|--|--|
| OTHER APPARATUS PRETREATMENT OF COAL TO IMPROVE COMBUSTION SAFETY DEVICES | (incl. removal of impurities such at sulphur) | C 10 B 45/00 - 45/02 C 10 L 9/00 - 9/12 C 10 B 41/00 - 41/08 | 64 4 28 |

Subsection: Iron Making

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| Keyword | Comments/Clarification | Equivalent sympols 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 refactories) | C 21 2 7/04 - 7/06 | 43 |
| | (top assourings) | 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-end-hopper arrangements) | C 21 8 7/18 - 7/20 | 107 |
| | (dust arresters) | C 21 B 7/22 | 34 |
| | (checking devices, e.g. test rods) | C 21 E 7/24 | 71 |
| FLUXING AGENTS | | C 21 B 3/02 | 9 |
| HEATING OF SLAST- | | C 21 3 9/00 - 9/16 | 179 |
| FURNACES | (brick stoves) | C 21 B 9/02 - 9/06 | 33 |
| | (iron stoves) | C 21 1 9/08 | L |
| | (blast mains, slides, valves) | E 21 B 9/10 - 9/12 | 53 |
| | (preheating) | C 21 B 9/14 | 5 |
| | (cooling of the blast; bumidity control of blast) | C 21 B 9/13 | 27 |
| TRON MAKING | | C 21 B | 1,731 |
| HOR BLAST-FURNACE | | C 21 B 11 30 - 11/10 | 52 |
| PIG-IRCH | (in low shaft furnaces, e.g. melting steel scrap with excess carbon) | C 21 B J1/02 | 10 |
| | (in electric furnaces) | C 21 1 11/10 | 34 |
| PROCESSES OF OPERATING | | C 21 1 5/00 - 5/06 | 128 |
| A BLAST-FURALL | (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 |

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Appendix 7

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 |
| | (purification) | C 21 C 1/00 - 1/06 | 208 |
| | (making cust-irm) | C 21 C 1/08 - 1/10 | 163 |
| | (making wrought-iron) | C 11 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. Midrax, Hyl processes) | C 21 B 13/02 | 101 |
| | (in retorts, e.g. Byl, Armco processes) | C 21 B 13/04 | 5 |
| | (in multi-storied furnaces) | C 21 B 13/06 | 1 |
| | (in rotar; 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 |
| | (milti-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 |
| CROCIBLE PROCESS | | C 21 C 5/02 | l |
| 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 |
| PHEUMATIC PROCESS (1.8. 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 are) | C 21 C 3/00 - 7/10 | 1,794 |
| WROUGHT STEEL | | C 21 C 3/00 | 4 |

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Appendix 7

| Keyvord | Comments/Clarification | Equivalent symbols of the IPC (Third Edition) | Statistical data (No. of patent documents published in 1978) |
|---|---|---|--|
| CASTING | | э 22 с | 2,391 |
| CENTRIFUGAL CASTING | | B 22 C 13/00 - 13/10 | 33 |
| CONT. TOUS CASTING | | B 22 C 11/10 - 11/16 | 42 |
| HIGH PRESSURE CASTING 1.0. INVICTION CASTING | | B 22 C 17/00 - 17/32 | 30 |
| LON PRESSURY CASTING | (e.g. bottom pressure cast) | B 22 C 27/10 - 27/16 | - |
| POST-TREATMENT OF | | C 21 D | 3,868 |
| CASTINGS | (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 sore steps) | C 21 D 1/78 - 1,30 | 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 remeiting) | B 22 C 3/00 - 5/04 | 278 |
| 1 | (of ingots, i.e. suitable for subsequent rolling or forging) | B 22 C 7/00 - 9/00 | 808 |

Subsection : Metal Working

| Keyword | Compents/Clarification | Equivalent symbols of the IPC (Third 7 iition) | Statistical data (No. of patent documents published in 1978) |
|----------|---|--|--|
| BORDIG | (= drilling) - mechanically | B 23 B 35/00-51/00 | 940 |
| | - by Luser beam | 3 23 X 26/00 | 123 |
| | - by electro-erosion | B 23 B 1/00 | 68 |
| CASTING | | 3 22 D | 5,640 |
| 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 | 455 |
| CUTTING | - mechanically | B 23 D | 1,816 |
| | - for making gears etc. | B 23 P | 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 X 11/00 | 828 |
| | - electron beam | B 23 K 15/00 | 213 |
| | - laser | B 23 K 26/00 | 123 |
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Statel Sorking (Cont'd) Cubsection :

Statistical data (No. of patent documenus published in 1978) 256 190 4,257 1,159 566 642 165.5 8,276 4 4,257 3,863 315 309 252 1,159 496 515 4,257 4E 2 3,453 **262** 105 174 187 361 Equivalent symbols of the IPC ("Third Edition) 21 C 1/00-9/00 21 L 22/20-24-16 B 21 C 23/00-35/00 90/6 3/00 00/TI 00/E 3/00 31 D 39/00 B 22 D 19/00 8 23 P 19/00 ¥ 23 ¥ 21 J 21 K 3 22 C Ω ۶4 a B 23 X U ٩. A U 13 FC 13 8 57 58 8 57 58 8 5 0 21 B 21 12 B 23 B 24 64 64 22 **#**# 2 **m** m 0 00 Ø 8 **60** M 87 64 - making or processing by rolling presents (puterent) (including hardening, anneeling, tempering and furnaces therefore etc.) - by welding, soldering, brazing - by banding, folding, punching Lens, Litting together of parts Comments/Clarification grinding, polishing drewing electrolycically
chemically See BLAT TILLIDGA - somal drawing mechanically
 electrolytical
 chenicaliv grinding, pol.
encmelling
mechanically Rigcellaneous - deep drawing - by forging, - by casting - by placing SWITTEN 5 See PURCING SAL BORING Teking 1 . PRIGIDON MORIOI IEAT THEADORT Xeyword SKI UDX-XS PHILSING ENGERICS BNDERDNG PALESTICS DATARING SEEMING DNITTIK DRIFTING DRIMING PORCING JOTHER COL DELLING **STEP**

5 21 3 17/00-25/00 3 21 C 1/00 8 21 C 23/08-23/12 % 21 C 37/06-37/30 8 21 D 3/00 L/20-33/00 3/00 9/00 19/00 19/00 1/00 60 U **B** 23 wiking of tubes without re-moval of material; e.g. bending. straightening other methods of making rubes turning machines for cutting scraw-threads - making by extrusion in general . **х** т TURNING INC

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Appondix 7

| Keyvord | Comments/Clarification | Equivalent sympols of the IPC (Third Edition) | Statistical data (No. of patent documents published in 1978) |
|---------|--|---|--|
| VIRE | - working and processing | B 21 7 | 509 |
| | - drawing | B 21 C 1/00 | 262 |
| | - extruding | B 21 C 23/08 | - |
| | - handling | B 65 E | 8,915 |
| | - barbed wire | B 21 F 25/00 | 8 |
| | - articles made from wire | B 21 7 25/00-45/00 | 312 |
| WORKERG | - metal working in general | B 21; B 23; B 24 | 39,954 |
| | - rolling; see RCLTING | | |
| | - drawing; see DIAMING | | |
| | - extrading; sev. EXTRUDING | 1 | |
| | < cutting, shearing; see CUTTING | : | |
| | - boring, drilling; see BORTHG | | |
| | - milling; see HILLING | | |
| | - grinding; see GRINDING | | |
| | - polishing; see POLISHING | | |
| | - preseworking = forging; see PORCING | | |
| | - pressworking = stamping, punch ing, deep-drawing etc. | B 21 D 22/00-25/00 | 1,020 |
| | - forming, straightening, bendin overlogating | Ag, B 21 D 1/00-21/00 | 1,742 |
| | - electrofocalog | C 25 D 1/00 | 197 |
| | - planning, slotting | B 23 D 1/00-11/00 | 66 |
| | - broaching | R 23 D 37/00-43/00 | 91 |
| | - sector | E 23 D 45/00-65/00 | 431 |
| | - filing, rasping | E 23 D 67/00-73/00 | 35 |
| | - raming | B 23 D 75/30-77/00 | 51 |

| Subsection: | Deposition | and Elec | croprocessing |
|---|------------|--|---------------|
| كفصني المتعالي متعالي | | Contraction in the local division of the loc | |

| Xeyword | Comments/Clarification | Equivalent symbols of the IPC (Third Edition) | Statistical data (No. of patent documents published in 1978) |
|----------------|-----------------------------|---|--|
| DEPOSITION | of metals by: | | |
| | 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 |
| | - cemeating/diffusion | C 23 C 9/0C | 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 |
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Appendix 7

| Keinold | 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 T | 396 | |
| | - electrolytic coating (electroplating) | C 25 D (esp. 3/20, 5/26,5/36) | 4,037 | |
| | - electromachining | 3 23 P 1/00 | 918 | |
| | | | | |

Subsection: Building and Construction

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| Keyvorá | 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 |
| | - hridges | E 01 D (esp.9/00) | 634 |
| | - bulkheads, sheet-piles | E 02 3 5/04-5/08 | 40 |
| | - columns, pillars | E 04 C 3/32 | 38 |
| | - floors | E 04 B 5/10 E 04 B 5/29 | 17 |
| | - miscellaneous | Z 04 B 1/08 1/24 | 15 82 |
| | | E 04 C 2/08 E 04 H 7/04-7/06 7/14-7/16 | 38 26 13 |
| | | 7/30 12/08-12/10 | 25 |
| | - piles | E 02 D 5/28-5/30 | 57 |
| | - railways - reinforcement | E 01 3 E 04 C 5/00 | 1,543 327 |
| | - roofs | 2 04 D 1/06 1/18 3/16 | 10 4 6 |
| | | 3/30 5/04 | 43 |

(Appendix VI follows)

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

| INPADOC | | PAT | INT CLASSIFICATION SE | AVICE RICHARICHE JULT | •1975 PAGE: 3034 |
|-----------|-----------------------------|---|--|--|---|
| 1 # C | CC PUBBAT KO | 00C.86 IPC (ALL) | C PR.DAT CA PRIGRITT | NO. APPLICANT | TITLE |
| 121J 5/18 | UB 750EEN A | 1114 LISS 324284 | IS 738412 & 73 - 35 | 6550 THE U.S. BAIRD | TOGGLE ACTUATED HORIZOWTAL PRESS |
| | WE 758204 A | 3863486 3213 9/18 | 15 794289 A 79 - 13 | BARS LASST: DOMALS R | TRANSFER PACSS |
| | W5 758318 A | 3071225 SELJ 9/14 | T 736681 A 53 232 | 7893 LARGENSTEIN & S CHENANN ARTIEN EFSTUSSINNET | SCALA LONGING SAESS |
| | UE 758961 A | 3879218 821J 9/18 | 15 710218 AL 71 11 17 700219 A 70 200 | SSAT LANGENSTEIN & S 7545 CHERAMM ARTIES SESTIL SCHAFT | POWER PRESS WITH A FLYWREL AND SPINOLE DRIVE |
| 1213 9/20 | US 758618 A DT 758612 C3 | 1827536 821J 9/28 | IF 736((2 & 73 236)T \$44718 & 678 6 | 1537 RIGRACEI SERMO 3978 RUTHMER INGUSTR ICANLAGEN AS, | FORGING RACHINE GLEICHLAUFSTEHERUNG AR HYDRAULISCHER SC NHIEDERRESSEN |
| | FR 781227 At | 2231447 8218 43/45 821.3 5/28 8388 1/48 | 97 736530 A 73 232 | TS26 RASCHIMENFABRIE VEINGARTEN AG , DI | |
| | 78 750117 AL | 2234065 221J 9/20 3346 1/46 | PR 736626 A 73 732 | 2536 CHARCOVSET AVIA ISLOBAY INSTIT UT.SW | |
| | SU 750225 T | 227140 8368 1/02 | 66 64 61 18 Å 64 67 | 5525 | |
| | SU 756515 T | 476488 4368 15/22 1368 1/38 | SW 731018 A 73 196 | 9359 | |
| | SU 750613 T | 473621 9366 15/14 | N 731228 A 73 197 | 7366 | |
| | US 750401 A | 3574266 821J 9/28 | UE 794645 A 79 | STAT PROMECAN SISSON | STROKEPEND PROGRAMMER FOR MACHINE TOOL |
| | US 758618 A | 3888497 821J 9/28 | US 798911 & 79 - 98 | NELL CORPARY | RECEIPE HAVENS & ORIVE SHAFT AND & HETH OD OF OPERATION |
| | US 754517 A | 1889683 821J 9/28 | US 746781 & 74 44 | 14674 VERSON ALLSTEEL PRESS CONFANT | SAFETY INDICATOR SYSTEM AND RETHOD FOR NETAL FORMING RACHINES |

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| • • | CC PERFECT LD | 9.6.40 | INC CALLS | CC / E. 1 / B& 1 | PE198111 16. | CARIATCENCE2 (MARTHE') | SPPLICIUT | TITLE |
| 017 3/10 | | | | | | Cr 71-65-31 A 50773 DC 70-10-15 A 201463 DC 75-16-27 C 13109 DC 75-16-27 C 13109 DC 75-16-27 C 13109 DC 75-16-27 C 13109 DC 72-03-08 A 1266122 JP 78-66-28 B 5302071 TO 73-12-03 B 120653 TO 73-12-03 B 120653 | | |
| 01F 3/12 | 68 79-02-14 A | 1510790 | 881F 7/16 881F 3/12 881F 15/82 | DE 77-05-21 | 77 2723068 | BE 78-11-36 AL 2723666 | BUSSIEVERKE NG | ADACSIVE BILLE FOR LD ESIVE SPREADING AACH |
| | SU 79-01-15 T | 642294 | Ca7C 63/68 8017 3/12 | SW 76-11-29 | 76 2023000 | | INST GAZA AN UK SSR GORLØVSKIJ KOKS GENIRICHESKIJ ZUPOD | TEINOD OF DETOTICATIO OF SOLID WISTE OF P THALIC ANNTGOIDE PRO UCTION |
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| ia (F 5/44 | 0 79-01-29 Z | 133867 | 283C 1784 801F 1786 | 98 77-11-14 | 77 262664 | | ELINGLER, NEBRAN N. 00 SCHILLE, DIETRIC N. 00 SCHWEIDER, ANGEL | VERFAMELY UND VORBEN UNG ZUR KONTINUTERL MEN WERSTELLUNG EINE LICHTNOFSCHUTZSCHLC TOISPERSION |
| | FR 75-62-62 81 | 2212936 | 1013 10/00 1015 1/00 | JP 74-88-26 | 74 57462 | 0E 74-03-18 41 2537942 FE 75-03-26 41 2242936 GB 78-05-16 4 1521909 JP 76-02-27 42 51420582 JP 78-11-17 84 5304520 | WITACHI CHERICA L CT LTD | |
| | 68 79-01-09 A | 2000175 | C22C 1/62 BOLF 5/00 | CH 77-86-82 | 77 5766 | AC 78-10-62 41 467752 96 78-12-67 41 2737329 98 78-12-67 41 2393673 JP 79-61-69 42 54662206 | 764261228 | POCESS FOR THE CONTI USUS PRODUCTICS OF A TAL ALLOTS |
| | 48 75-01-10 4 | 2000-18 | 801F 3/62 801F 5/00 | AT 77-07-01 | 77 •685 | E 78-18-16 41 46464 BE 78-18-16 41 46464 C5 79-01-16 41 252560 C5 79-01-16 41 471385 F8 79-01-26 41 2395772 LW 78-12-67 4 79900 RU 79-01-03 4 7846555 SE 79-01-02 4 7987319 | WAAGHER BIRD AS | RETHOD AND APPARATUS OR AIXING TWO JAS ST EARS |
| | 68 79-01-17 A | 2000688 | 8817 3/84 8817 5/88 | DE 77-07-11 | 77 2731279 | BE 79-62-61 11 2731279 ML 79-61-15 1 7807424 | LUBA KUNLEBFARE IK BALERBRUNK | APPIBATUS SUITIBLE FO DIVIDING A FLOWING |
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[End of Appendix VI and of document]



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