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Patent Filing System and Examination in India: An Overview in the Context of Process and Product in Chemistry

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Abstract: **Here, a brief history of evolution of patenting system in India along with important sections of the Patent Act, 1970 are discussed pertaining to inventions in the field of chemistry. To substantiate the entire process and criteria involved in patenting, a case study has been elaborated. This case study outlines drafting claims and comparison between present invention and prior arts. The utmost importance herein is to help new inventors in understanding novelty, inventive step and non patentable sections in the context of inventions in chemical process and products. The last section of the article highlights essential steps and approaches to be undertaken in order to overcome objections raised by a patent examiner. Thus, this article has wider implications for scientists and researchers working in the area of chemical synthesis as well as undertaking innovative works and wishing to secure their innovation.**

Index Terms: **Innovation, Inventive step, Novelty, Patentability, Process and Product.**

I. INTRODUCTION

The regime of Patent started in India as early as in 1856 by the introduction of the Act VI of 1856 on Protection of Inventions based on the British Patent Law of 1852. This Act was termed as -"Certain Exclusive Privileges Granted to Inventors of New Manufacturers for a period of 14 Years." This Act enabled George Alfred DePenning, a civil engineer and inventor based in Calcutta, to file a petition for grant of exclusive privileges for his invention-"An Efficient Punkah-Pulling Machine" on 3rd March 1856. This petition was the first to be filed under this Act, and was officially numbered as **No.1 of 1856.** This Act was amended just within 3 years of its enforcement and new Act was termed as **'**Act XV; Patent Monopolies Called Exclusive Privileges (Making, Selling and Using Inventions in India and Authorizing others to Do so for 14 Years from the Date of Filing Specification).' This Act was also amended successively in 1872, 1883, 1888, 1911, and 1972. The Act of 1972 is called as 'The Patents Act (Act 39 of 1970)' and came into force on 20th April 1972, is basic Act used till date with certain amendments done in 1999, 2002 and 2005. These amendments provide for product patents in chemicals, pharmaceuticals, food and agro-chemicals and bring in other necessary amendments in line with Trade Related Aspects of Intellectual Property Rights (TRIPS) (CGPDT 2019; CGPDTM 2008). The section 159 of the Patent Act, 1970 enables the Central Government to make rules for implementing the Act and regulating patent administration. Accordingly, the Patents Rules, 1972 were notified and brought into force on 20th April, 1972. These Rules were also amended from time to time till 20 May 2003 when new Patents Rules, 2003 were brought into force by replacing the 1972 rules. These rules were further amended by the Patents (Amendment) Rules, 2005, the Patents (Amendment) Rules, 2006 and the Patents (Amendment) Rules, 2019. The last amendments are made effective from 18th September, 2019. The Patent Act, 1970 empowered first and true inventors (or their assignee) to file Patent application for securing their rights in Indian Territory. A patentee will get monopoly for 20 years related to making or manufacturing, using, offering for sale, selling, importing, distributing, Licensing and preventing third party for these activities without authorization (CGPDT 2019; CGPDTM 2008). Here, we will explain all the possible ways to file patent application in India in detail.

II. FILING OF PATENT APPLICATION IN INDIA

The patent application can be filed either alone or jointly: (1) By any person claiming to be true and first inventor(s) or (2) By any person being the assignee of person claiming to be true and first inventor(s) (Proof of assignment has to be submitted along with the application) or (3) By the legal representative of any deceased person or assignee (CGPDT 2019).

It may be noted that date of first filing of the patent

application in any patent office across the world is also known as **priority date**.

At present, an applicant can file a patent application in India in three ways namely Ordinary application, conventional application and PCT National Phase Application within the time as discussed below:

A. Ordinary Application:

Any time, an applicant can file a patent application in prescribed format either online or directly submit to one of the Patent office namely Delhi Patent Office, Mumbai Patent Office, Kolkata Patent Office or Chennai Patent Office as per their jurisdiction. Ordinary Application can be of two types i.e. Provisional Application (without claim) and Complete Application (With claim). A person can file a patent application only based on his ideas as provisional application (at hypothetical stage or abstract stage) and can submit complete specification within 12 months from the date of provisional application.

B. Conventional Application:

An applicant can file a patent application in any conventional country within 12 months from the date of the first filing. Such applicant (Indian or others) can submit same application in prescribed format in any of the Patent Office of India either online or offline.

C. PCT National Phase Application:

An applicant either files an application to International Bureau (IB, Geneva) directly or in any receiving office (RO) freshly or within 12 months of the first filing date. In such case, applicant has to choose and submit the patent application to Indian Patent office within 31 months from the date of first filing.

III. Requirement with Patent Application

A Patent application must be filed in prescribed format either online or offline (CGPDT 2019; CGPDTM 2008). The most required form, which should be submitted with application are given below:

1. *Form 1:* This is the most important form to file a patent application in India. Form 1 should be filed very carefully and required information must be disclosed honestly otherwise it will create problems in future for applicant. In form 1, nationality and address of inventors must be disclosed. A declaration given in this form must be signed by all the inventors with full name and date, if assignment is not made.
2. *Form 2*: This form is known as the heart of the Patent application as it contains complete specification (or provisional as case may be) which includes title, abstract, background art, examples and claim. At any stage during proceeding or even after grant the complete specification can be amended by the way of correction or explanations only, so before submitting, needs to be very carefully checked.
3. *Form 3*: This form is related to the information of filing of the same or similar patent application in foreign countries. This is also a compulsory form must be submitted either with the patent application or within six months of the filing date in India.
4. *Form 5*: This is required with all type of applications except ordinary application filed with complete specification.
5. *Form 13*: To make any correction, so, not required for every application.
6. *Form 18*: Must for every application, without this examination cannot be carried out. Importantly, this form can be filed by applicant or someone else interested in the examination of said patent application.
7. *Form 26*: If applicant appoints a patent agent for filing and other formalities related to his/her application then only this form is required. This form can be submitted either with filing of the application or within 3 months of the filing of the application in India.

IV. Examination of Patent Application

Indian Patent office does not examine any filed application until unless a request is made on form 18 (or 18A for expedite examination) with prescribed fee either with the application at the time of filing or within 48 months of the first filing date (Priority Date) of the application. If request for examination is not filed within prescribed time, then, application is considered as deemed to be withdrawn (CGPDT 2019; CGPDTM 2008).

If a patent application is filed and a request is made for examination, then, a patent examiner is appointed to examine that application. Examiner will search prior arts (related document already published or available in public domain) for the purpose of anticipation of the invention claimed in the patent application. Examiners are generally provided with searching engines in addition to publically available searching platforms/engines such as Google Patents, INPASS, Espacenet, PubMed, USPTO and many more. Once search for prior art is completed, examiner will compare the invention or claim of the patent application under examination with the prior art, and if, no document discloses the invention and claim as made in patent application, an intimation for grant will be sent to the applicant. On compliance of the entire requirement as communicated by the office, a Patent will be granted to the applicant. But, if prior art discloses information related to the invention and claim of the patent application, then, examiner will prepare a report on novelty, inventive step and industrial applicability as well as on prohibited sections 3 and 4 of the Patent Act, 1970. To understand comprehensively the entire examination process, let us acquaint ourselves with certain terms and phrases going to be useful further discussed (CGPDT 2019; CGPDTM 2008). These are given below with possible definition and explanations.

1. *Invention:* A new product or process involving an inventive step and capable of industrial application (See section 2(1)(j)).

2. *Patentable subject matter:* Any article, apparatus or machinery or its component or any ,substance whether living or non living, product , pharmaceutical product or any composition of matter, pharmaceutical products or

Any process, manner or art of manufacturing other then essential biological process.

A Patentable invention must relate to a Process or Product or both, should be new (Novel), must involves an inventive step and be Capable of industrial application, it must not fall under Section 3 and 4 of the Patent Act, 1970 (CGPDTM 2008).

3. *Novelty:* Novelty or new means that invention claimed must not be (1) Published in India or elsewhere (2) In prior public knowledge or prior public use with in India and (3) Claimed before in any specification in India.

4. *Inventive step:* Inventive step means a feature of an invention that involves technical advancement as compared to the existing knowledge or have economic significance or both and makes the invention not obvious to a person skilled in the art.

5.*Industrial applicability:* Industrial application means invention is capable of being made or used in any kind of industry.

6. *What is not Patentable:* Inventions falling within the scope of Section (3) and (4) of Patents Act, 1970 (CGPDT 2019; CGPDTM 2008).

Here, two subsections 3(d) and 3(e) of section 3 is important for chemical compounds and processes, so only these sub-sections are discussed below-

Section 3(d): The mere discovery of a new form of a known substance (includes derivatives and aggregates, polymorphs etc) which does not result in the enhancement of the known efficacy of that substance.

Section 3(e): A substance obtained by a mere admixture resulting only in the aggregation of the properties of the components thereof or a process for producing such substances.

7. *Section (4):* Inventions falling within the scope of Sec. (1) of Sub section 20 of Atomic Energy Act, 1962. For Example: Inventions relating to Compounds of Uranium, Beryllium, Thorium, Plutonium, Radium, Graphite, Lithium and more as notified by Central Govt. from time to time.

V. A CASE STUDY ON PATENTABILITY

Now, suppose an applicant wants to file a patent application for his invention, then, he has to prepare complete specification including title, abstract, back-ground work, examples for his invention and claims. The claim part is most important since, a patent is granted only for the claims. The claim or claims of a complete specification shall relate to a single invention or a group of inventions linked so as to form a single inventive concept, shall be clear and succinct and shall be fairly based on the matter disclosed in the specification (CGPDT 2019; CGPDTM 2008). For the purpose of discussion, we have chosen a published work (Tiwari and Nath 2018). Here, we will only show the title (hypothetical) example and claims for understanding the patentability concept. The claims may be drafted as shown below:

Title: β-Pyrazine-Fused meso-Tetraphenyldiporphyrins and process for preparing same (Tiwari and Nath 2018).

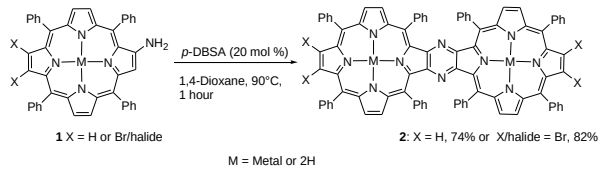

Figure 1

We Claim:

1. A compound of formula 2 and the process for making this from a compound of formula 1 using an acid or an oxidant.
2. A compound of formula 2 as claimed in claim 1, where M is alkali metal, alkaline metal, transition metal, actinide, lanthenide, or a metal taken from periodic table or 2H and X is halide.
3. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is hydrogen or halide
4. A compound of formula 2 as claimed in claim 1, where M is nickel and X is hydrogen
5. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is halide
6. A compound of formula 2 as claimed in claim 1, where M is Nickel and X is halide
7. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an acid where acid is a strong acid or weak acid or any kind of acid such as Bronsted Acid and Lewis acid in 1-100 mol% at temperature 0-200˚C in oxygenated solvent preferably 1,4-dioxane.
8. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an acid where HCl, H2SO4, HNO3, p-DBSA, p-PTSA.
9. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an oxidant.
10. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an oxidant such as DDQ, AgPF6 etc.

VI. SEARCH AND ANTICIPATION BY PATENT EXAMINER

Suppose, the examiner, at the time of examination, is getting following documents (named as D1-D3) on prior art search for the anticipation of the invention of the present application.

D1: M. Akita, S. Hiroto and H. Shinokubo. Oxidative annulation of *β*-aminoporphyrins into pyrazine-fused diporphyrins. *Angew. Chem., Int. Ed.*, 2012, 51, 2894-2897, which discloses compound 2 and process for

making this as shown below (Akita et al. 2012).

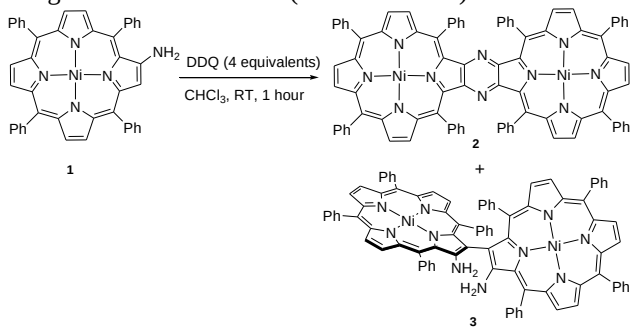

Figure 2

D2: F. Mandoj, S. Nardis, R. Pudi, L. Lvova, F. R. Fronczek, K. M. Smith, L. Prodi, D. Genovese and R. Paolesse. *β*-Pyrazino-fused tetrarylporphyrins. *Dyes Pigm.*, 2013, 99, 136-143, which discloses compounds 5-6 and process for making these as shown below (Mandoj et al. 2013).

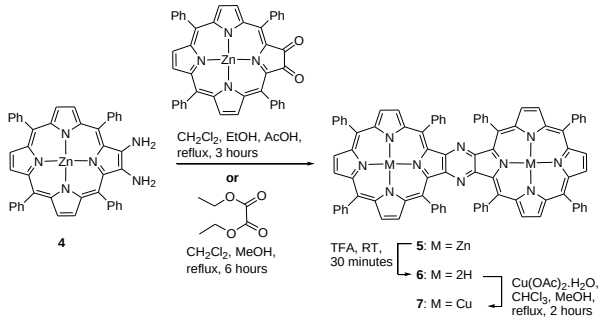

Figure 3

D3: T. Bruhn, F. Witterauf, D. C. G. Götz, C. T. Grimmer, M. Würtemberger, U. Radius and G. Bringmann. C,C- and N,C-coupled dimers of 2-aminotetraphenylporphyrins: Regiocontrolled synthesis, spectroscopic properties and quantum-chemical calculations. *Chem. Eur. J.*, 2014, 20, 3998-4006, which discloses compound 2 and process for making this as shown below (Bruhn et al. 2014).

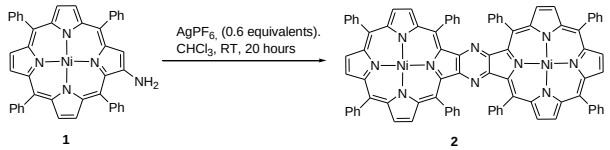

Figure 4

VII. Analysis of the Present Invention in View of the Prior Art Documents D1-D3.

A. *Anticipation of novelty in view of D1-D3:*

It may be noted that a combination of documents is not allowed to anticipate invention of a claim. A document will be only considered as novelty destroying document for any claim if it discloses complete subject matter of that claim either **implicit** (when it is implied but not directly stated) or **explicit** (when it is directly stated and leaves no room for uncertainty).

1) *In view of D1:*

Present invention is: (a) Compound of formula 2, where X = H, or Halide/Br (Claim1-6) and (b) Process uses acid or oxidant (Claim1, 7-10)

D1 is disclosing: (a) Compound of formula 2, M = Ni and X = H and (b) Process uses DDQ which is an oxidant.

Conclusion with respect to D1:

a. (1)For compound 2, where M = Ni, and X = H, novelty is not acknowledged.
(2) For compound 2, where M = other then Ni and X = halide or Br, novelty can be acknowledged.

b. (1) Process using oxidant is not novel
(2) Process using acid is novel.

Allowability of claims over D1: Claim 1-3 and 5 (Partially allowed), Claim 4, 9 and 10 (not allowed) and Claim (6-8 allowed).

2) In view of D2:

D2 is disclosing: (a) Compound of formula 5-6 that is M = Zn, 2H and Cu in compound of formula 2 with X =H

Conclusion with respect to D2:

Compound of formula 2 with X =H and Metal is anticipated by this

Allowability of claims over D2: Claim 1-3 and 5 (Partially allowed), Claim 4 (not allowed) and Claim (6-10 allowed).

3) In view of D3:

D3 is disclosing: (a) Compound of formula 2, M = Ni and X = H and (b) Process uses AgPF6 which is an oxidant.

Present invention	Prior Art Document	Conclusion	Claim allowed
a. Compound of formula 2, where X = H, or Halide/Br b. Process uses acid or oxidant	D1 a. Compound of formula 2, M = Ni and X = H b. Process uses DDQ which is an oxidant	a. (1)For compound 2, where M = Ni, and X = H, novelty is not acknowledged. (2) For compound 2, where M = other than Ni and X = halide or Br, novelty can be acknowledged. b. (1) Process using oxidant is not novel (2) Process using acid is novel.	a. Claim 1-3 and 5 (Partially allowed) b. Claim 4, 9 and 10 Not allowed c. Claim 6-8 allowed.
	D2 a. Disclosing compound of formula 5-6 that is M = Zn, 2H and Cu in compound of formula 2 with X =H b. Process is totally different	Compound of formula 2 with X =H and Metal is anticipated by this	d. Claim 1-3 and 5 (Partially allowed i.e for X = Halide only) e. Claim 4 Not allowed a. Claim 6-10 allowed

	D3 a. Compound of formula 2, M = Ni and X = H b. Process uses $AgPF_6$ which is an oxidant	a. (1)For compound 2, where M = Ni, and X = H, novelty is not acknowledged. (2) For compound 2, where M = other than Ni and X = halide or Br, novelty can be acknowledged. b. (1) Process using oxidant is not novel (2) Process using acid is novel.	a. Claim 1-3 and 5 (Partially allowed) b. Claim 4, 9 and 10 Not allowed c. Claim 6-8 allowed

Figure 5

Conclusion with respect to D3:

(1)For compound 2, where M = Ni, and X = H, novelty is not acknowledged.

(2) For compound 2, where M = other then Ni and X = halide or Br, novelty can be acknowledged.

(1) Process using oxidant is not novel

(2) Process using acid is novel.

Allowability of claims over D3: Claim 1-3 and 5 (Partially allowed), Claim 4, 9 and 10 (not allowed) and Claim (6-8 allowed).

The discussion regarding novelty of the claims of the present invention over prior art documents D1-D3 is summarized in Figure 5 for convenience to assist in better understanding.

Thus, the subject matter of claims 1-5 (partially) and 9-10 is not novel, over the cited prior art documents D1, D2 and D3. Hence, these claims are not patentable u/s 2(1)(j) of the Patent Act, 1970.

B. Inventive step analysis:

It may be noted that for assessing inventive step; combination of documents is allowed provided that the teaching of the documents either disclose the information explicitly or provide motivation to a person skilled in art to do so.

1) *Obvious subject matter over D1-D3:*

If a person starts with compound of formula 2 of either D1 or D2 and uses information of D2 which discloses other metal derivatives (such as Zn, 2H, Cu) of compound of formula 2, a person skill in art (That is a person working on synthesis of compounds and its metal complexes) can easily motivated (By D2) to prepare other metal complexes of compound of formula 2 (of D1 or D3). Therefore, compound of formula 2 where M = is any metal and X = H is not inventive and obvious over documents D1-D3.

2) Non-obvious (inventive) subject matter

However, none of the cited document disclosed or suggested to prepare halide compound of formula 2 (X = Halide/Br) as disclosed in present invention, therefore, these compounds may be inventive over cited documents D1-D3.

3. Similarly, D1 and D3 discloses that compound of formula 2 can be prepared from compound of formula 1 using oxidant only, therefore, the process of claim 1 (partially, using oxidant), 9 and 10 (using oxidant) is not inventive, however, process of claim 1(partially, using acid), 7 and 8 (using p-DBSA) is found inventive over documents D1-D3.

Hence, the subject matter of claims 1-5 (partially) is not patentable u/s 2(1)(ja) of the Patent act, 1970.

C. Non patentability assessment:

Analysis regarding non patentability of the subject matters of claims falling within the scope of section 3(d) and 4 of the Patent Act, 1970 is given below:

1) *Section 3(d)*

Document D1-D3 disclosing the compound of formula 2 with M = 2H (Free base), Ni, Cu and Zn, and X = H, therefore any metal complex of compound 2 (i.e. M = Mg, Co, Fe, alkali, alkaline, transition metal, actinide and lanthenide etc) is not patentable under section 3(d) of the Patent Act.

Further, compound of formula 2 with X = Halide/Br cannot be obtained by halogenations/bromination of compound of formula 2 with X =H, therefore, these compounds cannot be considered as derivative of known compound 2 with X =H. Hence, compounds of claim 1-5 (with X =H) is not patentable u/s 3(d) of the Patent Act, 1970.

2) Section 4

Claim 2 claiming transition metals, lanthenide and actinides, therefore, this claim is not patentable u/s 4 of the Patent Act, 1970 as among these metals many are radioactive and fall within the scope of Sec. (1) of Sub section 20 of Atomic Energy Act, 1962.

Sufficiency of disclosure u/s section 10(4) of the Patent Act, 1970: Examiner can also raised objection on claims 1-10 regarding sufficiency of disclosure as the scheme shown for making the compound of formula 2 from formula 1 is only disclosing X = Br and acid as p-DBSA.

VIII. Actions required after receiving examination report from the Patent Office:

After receiving the examination report, the applicant is required to comply the entire objection raised by examiner in First Examination report (FER) within 6 months from the date of issue of the examination report. Failing which, the application will be considered as deemed to be withdrawn.

Now, what can an applicant do in the above case? The applicant will amend the claim in such a way that subject matter will not fall within the scope of prior art documents D1-D3 as shown below in mark-up copy (This copy is essentially to be submitted under rule 14 of the

Patent Rules, 2019).

A. The amended claims may be like this

We Claim

1. A compound of formula 2 and the process for making this from a compound of formula 1 using an acid, where X is halide.
2. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is halide
3. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is halide
4. A compound of formula 2 as claimed in claim 1, where M is Nickel and X is halide
5. A compound of formula 2 as claimed in claim 1, where M is Nickel and X is Br.
6. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1, where X is halide using an acid where acid is a strong acid or weak acid or Brønsted Acid or Lewis acid in 1-100 mol% at temperature 0-200˚C in oxygenated solvent preferably 1,4-dioxane.
7. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an acid where acid is p-DBSA, M is nickel and X is Br.
8. A process as claimed in claim 1 for preparing the compound as claimed in claim 5 at 90˚C in 1,4-Dioxane and using p-DBSA (10-30 mol%).

B. Mark-up copy

1. A compound of formula 2 and the process for making this from a compound of formula 1 using an acid ~~or an oxidant~~ where X is halide.
2. A compound of formula 2 as claimed in c~~laim 1, where M is alkali metal, alkaline metal, transition metal, actinide, lan~~then~~ide, or a metal taken from periodic table or 2H and X is halide.~~
3. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is ~~hydrogen or~~ halide
4. A compound of formula 2 as claimed in claim 1, where M is nickel and X is ~~hydrogen~~
5. A compound of formula 2 as claimed in claim 1, where M is Nickel, Zinc, Copper, Magnesium, Iron, Cobalt, or 2H and X is halide
~~5.~~6. A compound of formula 2 as claimed in claim 1, where M is Nickel and X is Br.
~~6.~~7. A compound of formula 2 as claimed in claim 1, where M is Nickel and X is halide
~~7.~~8. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an acid where acid is a strong acid or weak acid or ~~any kind of acid such as~~ Bronsted Acid ~~and~~ or Lewis acid in 1-100 mol% at temperature 0-200˚C in oxygenated solvent preferably 1,4-dioxane.
~~8.~~9. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an acid where acid is ~~HCl, H2SO4, HNO3,~~ p-DBSA, ~~p PTSA~~ M is nickel and X is Br.
~~9.~~10. A process as claimed in claim 1 for pr~~eparing compound of formula 2 from formula 1 using an oxidant~~.
11. A process as claimed in claim 1 for preparing compound of formula 2 from formula 1 using an oxidant such as DDQ, AgPF6 etc.
~~10.~~12. A process as claimed in claim 1 for preparing the compound as claimed in claim 5 at 90˚C in 1,4-Dioxane and using p-DBSA (10-30 mol%).

After amendment, these claims and other documents should be submitted to Patent office either online or offline for further examination. If no further objection is found then, a patent may be granted subject to satisfaction of the controller as described in Patent Act, 1970.

IX. Some Relevant Information:

1. Applicant can also send the application and other communication to the Patent office by registered/speed post (not courier), but remember that the date of receiving such document by the office is consider as the date of submission.
2. Applicant can come himself or send his representative to the patent office for submitting any relevant document.
3. However, patent agent are required to submit application and other communication through online mode only as required by the Patent Rules, 2019, and if controller required the original copy of these documents, then, patent agents are required to furnish these documents within 15 days of such communication.
4. Fee for a natural person is very nominal and it is as low as Rs 1600 only (For 30 pages and 10 claims) for filing of a patent application and Rs 4000 only for requesting examination within 48 months of the first filing date (Priority date). Thus, just in Rs 5600 only a patent can be obtained for an invention if other credentials are found in order.
5. Before grant of patent, any person can oppose the grant of patent by filling Pre-Grant Opposition in prescribed form on the ground as given in section 25(1) of the Patent Act, 1970.
6. A patent application can be filled within 12 months from the date of publication of the work in a research paper.

Conclusion

In this article, a brief history and evolution of patenting system in India has been outlined. Consequently in the article filing procedures and basic requirements related to filing of the patent application are also elaborated. Further, to substantiate understanding of patentability of a chemical process and

products, a very concise and precise case study has been also presented. The article will guide and enable inventors to assess patentability of their inventions as well as motivate them to secure their inventions by patenting.

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