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Patent application common mistakes and post filing support



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This content is for informational purposes only and is not legal advice. Please consult with appropriate sources for legal authority and guidance on these matters.

Notice

Objectives

- Patent basics
- Filing requirements
- Common mistakes
- Post-filing procedure
- Support and resources

Patent basics

What is a patent?

A property right:

- The right to **exclude others** from making, using, selling, offering for sale or importing the claimed invention
- Limited term
- Territorial: protection only in territory that granted patent; **NO world-wide patent**

Types of patents

- **Utility:** Any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof.
 - Provisional patent application
 - Non-provisional patent application
- **Design:** A new, original, and ornamental design for an article of manufacture.
- **Plant:** Any distinct and new variety of plant that is invented or discovered and asexually reproduced.

Provisional vs. nonprovisional

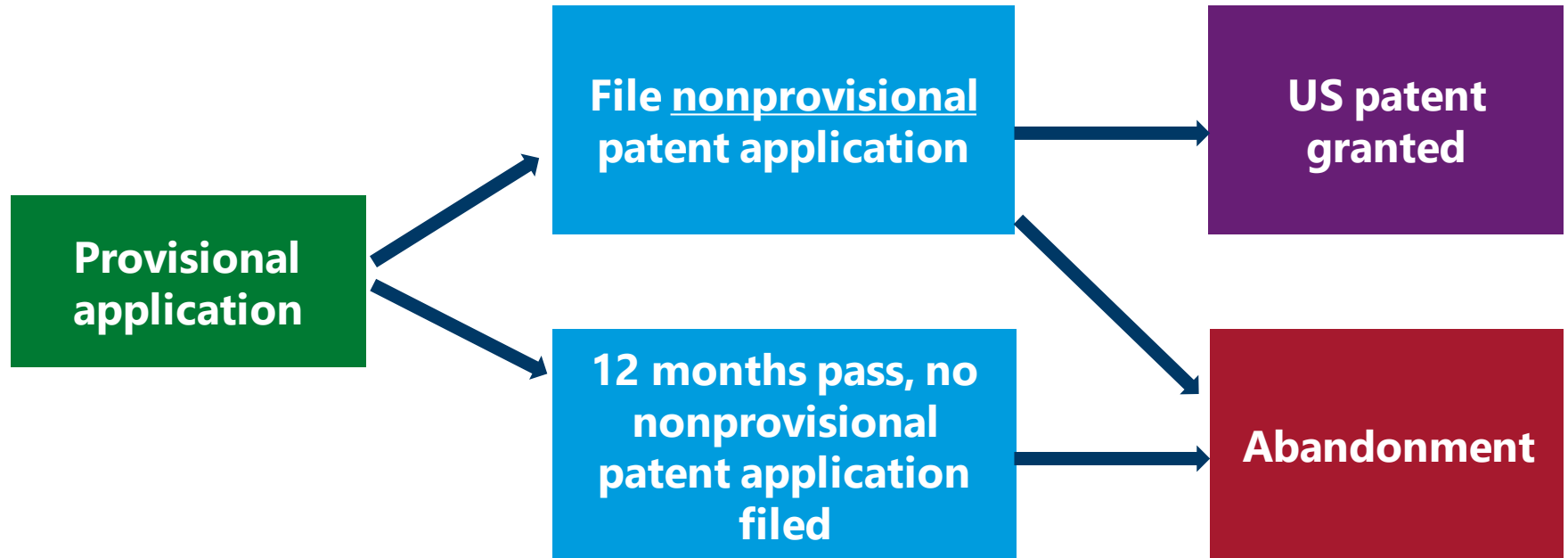
Provisional	Nonprovisional
• Not examined or published • One-year time limit • Available for utility and plant patent applications • Low-cost way to establish a US effective filing date (priority date) in a non-provisional patent application with few formalities	• Examined • Published 18 months from earliest filing date (unless a request for a non-publication is made at filing) • Can become a patent • Patent protection is set by the earliest filing date of the parent patent application

Benefits of provisional utility applications

- Gives inventor time to investigate market potential.
- Multiple provisional applications may be filed during the 1-year pendency of the first filed provisional to include improvements.
- Provides time to obtain counsel if desired.
- Patent term measured from filing date of subsequent **non-provisional** application.
- Allows use of term **patent pending**.



Utility patent applications



Anatomy of a patent publication

(19) United States	(43) Pub. No.: US 2020/0085571 A1
(12) Patent Application Publication	(43) Pub. Date: Mar. 19, 2020
Diedering et al.	
(54) REPOSITIONING WIRES AND METHODS FOR REPOSITIONING PROSTHETIC HEART VALVE DEVICES WITHIN A HEART CHAMBER AND RELATED SYSTEMS, DEVICES AND METHODS	
(71) Applicant: 4C MEDICAL TECHNOLOGIES, INC., Maple Grove, MN (US)	
(72) Inventors: Jason S. Diedering, Minneapolis, MN (US); Saravana B. Kumar, Minnetonka, MN (US)	
(21) Appl. No.: 16/568,903	
(22) Filed: Sep. 12, 2019	
Related U.S. Application Data	
(60) Provisional application No. 62/731,230, filed on Sep. 14, 2018.	

Publication Classification	
(51) Int. Cl.	
A61F 2/24	(2006.01)
A61F 2/90	(2006.01)
A61F 2/966	(2006.01)
(52) U.S. Cl.	
CPC	A61F 2/243 (2013.01); A61F 2/966 (2013.01); A61F 2/90 (2013.01)
(57) ABSTRACT	
The invention provides methods, devices and systems for delivering, positioning and/or repositioning an expandable prosthetic heart valve in a patient's heart chamber. At least one non-looped wire and looped wire pair is operatively connected with an expanded prosthetic heart valve that is collapsed within a delivery catheter lumen having its distal end positioned in the subject heart chamber. The collapsed prosthetic heart valve is translated through the delivery catheter lumen to and out of its distal end where the prosthetic heart valve expands to a working configuration. The wire(s) of the non-looped and looped wire pair may be manipulated by pulling proximally or pushing distally to position or reposition the expanded prosthetic stent into position, then released from connection with the positioned stent and withdrawn from the patient.	

REPOSITIONING WIRES AND METHODS FOR REPOSITIONING PROSTHETIC HEART VALVE DEVICES WITHIN A HEART CHAMBER AND RELATED SYSTEMS, DEVICES AND METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Ser. No. 62/731,230, filed Sep. 14, 2018 and entitled REPOSITIONING WIRES AND METHODS FOR REPOSITIONING PROSTHETIC HEART VALVE DEVICES WITHIN A HEART CHAMBER, the entire contents of which are incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

INCORPORATION BY REFERENCE

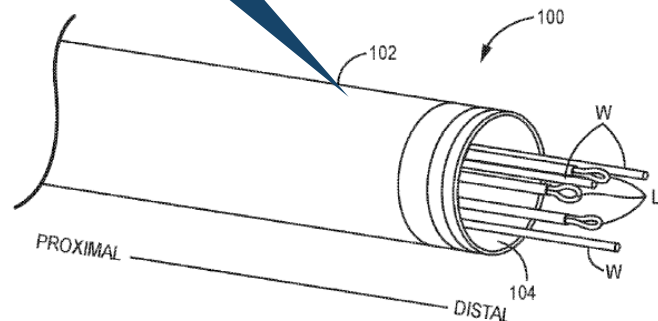
[0003] All references, including but not limited to publications, patent applications and patents mentioned in this specification are hereby incorporated by reference to the same extent and with the same effect as if each reference was specifically and individually indicated to be incorporated by reference.

FIELD OF THE INVENTION

[0004] The inventions described herein relate to delivery systems, devices and methods for delivering and/or positioning a cardiac valve.

BACKGROUND OF THE INVENTION

[0005] The human heart comprises four chambers and four heart valves that assist in the forward (antegrade) flow of blood through the heart. The chambers include the left atrium, left ventricle, right atrium and right ventricle. The four heart valves include the mitral valve, the tricuspid valve, the aortic valve and the pulmonary valve.



Often used sections

Almost always used

BRIEF SUMMARY OF THE INVENTION

[0015] The invention provides methods, devices and systems for delivering, positioning and/or repositioning an expandable prosthetic heart valve in a patient's heart chamber. At least one non-looped wire and looped wire pair is operatively connected with an expanded prosthetic heart valve frame that is collapsed within a delivery catheter lumen having its distal end positioned in the subject heart chamber. The collapsed prosthetic heart valve frame is translated through the delivery catheter lumen to and out of its distal end where the prosthetic heart valve expands to a working configuration. The wire(s) of the non-looped and looped wire pair may be manipulated by pulling proximally or pushing distally to position or reposition the expanded prosthetic stent into position, then released from connection with the positioned stent and withdrawn from the patient.

BRIEF DESCRIPTION OF THE SEVERAL
VIEWS OF THE DRAWINGS

[0016] FIG. 1 illustrates a perspective view of a distal end of one embodiment of the present invention;

[0017] FIG. 2 illustrates a perspective view of one embodiment of the present invention; and

[0018] FIG. 3 illustrates a side, cutaway view of a proximal end of one embodiment of the present invention.

DETAILED DESCRIPTION OF THE
INVENTION

[0019] Various embodiments of the present invention are disclosed in the Figures for providing percutaneous access to the valve of interest via one of at least the following known access routes: transapical; transfemoral; transatrial; and transseptal delivery techniques. Each of these access routes may be used for the embodiments disclosed herein.

Mar. 19, 2020

3

Claims

delivery
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Further,
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be com-

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individual
to each
proximal

end of a
g/release
of a pair
t, device
or both
pair P.
fixes the

from the stent frame 101 and withdrawn proximally through the delivery catheter lumen 104.

[0028] The description of the invention and its applications as set forth herein is illustrative and is not intended to limit the scope of the invention. Features of various embodiments may be combined with other embodiments within the contemplation of this invention. Variations and modifications of the embodiments disclosed herein are possible, and practical alternatives to and equivalents of the various elements of the embodiments would be understood to those of ordinary skill in the art upon study of this patent document. These and other variations and modifications of the embodiments disclosed herein may be made without departing from the scope and spirit of the invention.

We claim:

1. A system for delivering, positioning and/or repositioning a collapsible and expandable stent within a patient's heart chamber, comprising:

at least one non-looped wire and looped wire pair comprising a non-looped wire and a looped wire, wherein a distal end of the wire pair is operatively and releasably connected with at least one strut of the stent and proximal ends of each wire in the wire pair extends outside the patient; and

Filing requirements of a non-provisional utility patent application

Filing requirements

- A specification, including a description and at least one claim
- Drawings, when necessary for an understanding of the invention
- Inventor information including the legal name, residence, and mailing address of each inventor
- Oath or declaration or an application data sheet
- The prescribed filing, search, and examination fees



Check the filing receipt

APPLICATION NUMBER		FILING or 371(c) DATE	GRIP ART UNIT	FIL PIZ REC'D	ATTY DOCKET NO	TOT CLAIMS	IND CLAIMS
14/550,910		11/21/2014	1791	435		2	2

120070
George Pul
PO Box 60244
Las Vegas, NV 89160

CONFIRMATION NO. 8826
UPDATED FILING RECEIPT

0000000072682112

Date Mailed: 01/06/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)
George Pul, Las Vegas, NV;

Applicant(s)
George Pul, Las Vegas, NV;

Power of Attorney: None

Domestic Priority data as claimed by applicant
This appln claims benefit of 61/909,203 11/26/2013

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 12/08/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/550,910**

Projected Publication Date: 05/28/2015

Non-Publication Request: No

Early Publication Request: No
** MICRO ENTITY **

Inventor(s)

Applicant(s)

Domestic priority

Fee status



Fees

- Filing fees paid in full (surcharge if submitted after filing date)
 - Non-electronic filing fee for applications submitted in hard copy (mailed or hand-carried to the USPTO)
 - Excess claims fees
 - Application size fees
 - Fees for large sequence listing submitted/transferred
 - Other fees as applicable
- Fees paid according to the entity status established at the time of payment



Micro entity status

Reduces **most** patent fees by 75%

Gross income – use form SB/15A to certify:

1. The applicant qualifies as a small entity.
2. No inventor and no other applicant (if any) has been named as an inventor on more than 4 previously filed U.S. nonprovisional patent applications.
3. No inventor and no other applicant (if any), in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income exceeding 3 times the median household income most recently reported by the U.S. Census Bureau.
4. No inventor and no other applicant (if any) has assigned, granted, or conveyed (and is not under obligation to do so) a license or other ownership interest in the application concerned to an entity that, in the calendar year preceding the calendar year in which the applicable fee is being paid, had a gross income exceeding 3 times the median household income most recently reported by the U.S. Census Bureau.



Helpful hints – micro entity

- Be sure to properly sign the form.
- Identifying information:
 - First named inventor is a single name that will be the same on every micro-entity certification form submitted in an application.
 - Title listed should match that in the ADS or specification.
 - If filed before an application number is assigned, the application must be identified with **both** the first named inventor AND the correct title of invention.
 - Leave the application number section BLANK if no application number has been assigned.
- Each applicant must submit a separate form.



Surcharge

A surcharge (in addition to any other fees due) will be assessed for:

- Late submission of the basic filing, search or examination fee
- Late submission of inventor's oath
- Filing an application that does not contain at least one claim on filing
- Submission of an application filed by reference to a previously filed application



Office of Patent Application Processing (OPAP)

- Performs an initial review of the application papers for completeness and compliance with procedural requirements, including inspection of drawings to see if they can be effectively scanned and adequately reproduced.
 - This is a separate standard from what the patent examiner will subsequently review during examination.
- If deficiencies are found, OPAP will send an official notice of the deficiencies and set forth a time period for response to avoid abandonment.
- Once the application is accepted as complete by OPAP, it will be assigned for examination.



SAMPLE Notice to File Missing Parts

		UNITED STATES PATENT AND TRADEMARK OFFICE	
		UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address: COMMISSIONER FOR PATENTS P.O. Box 1450 Alexandria, Virginia 22313-1450 www.uspto.gov	
APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE

CONFIRMATION NO. .
FORMALITIES LETTER

Mail date




Date Mailed: 01/28/2015

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

Response period

FILED UNDER 37 CFR 1.53(b)
Filing Date Granted

Items Required To Avoid Abandonment

An application number and filing date have been recorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

Common filing mistakes

Common mistakes

- Specification format
- Drawing format
- Application data sheet (Form PTO/AIA/14)
- Signature requirements
- Micro entity certification (Form PTO/SB/15A)

Specification page format

- The specification, including the abstract and claims, must be written in English and have lines that are 1.5 or double-spaced in a single column of text.
- Must be written on only one side in portrait orientation.
- Must be 8.5 by 11 inches with all margins of at least $\frac{3}{4}$ inches except for a left side margin of at least 1 inch.
- Must be clearly typewritten in non-script font (e.g., Arial, Times New Roman, or Courier, preferably with 12 size font), without shading, on white paper.
- The application pages must be numbered consecutively (centrally located above or below the text) starting with page one.
- Drawing figures should not be contained within the specification.

Specification sections

- Title of the Invention (short and specific)
- Most common applicable sections:
 - Background of the Invention (e.g., state of the art before your invention)
 - Brief Summary of the Invention
 - Brief Description of the Drawings (list of all figures by number with brief statement of what the figure depicts)
 - Detailed Description of the Invention
- Claims (on a separate sheet)
- Abstract (less than 150 words, one paragraph, on separate sheet)

How to file a substitute specification

Three required parts of the submission:

1. Marked-up copy with proper markings showing all the changes relative to the immediate prior version of the specification of record.
2. Clean copy (without markings).
3. Signed statement that the substitute specification contains no new matter.

The **ENTIRE** specification is required for the marked-up and clean copies, not just the amended portion.



Marked up vs. clean copy

Marked up copy:

- A version that shows ALL changes to the most recent specification **of record** with markings.
- Additions of text are underlined.
- Deletions of text are shown by ~~strike-through~~, except double brackets may be used to indicate deletion of [[five]] or [[fewer]] characters.

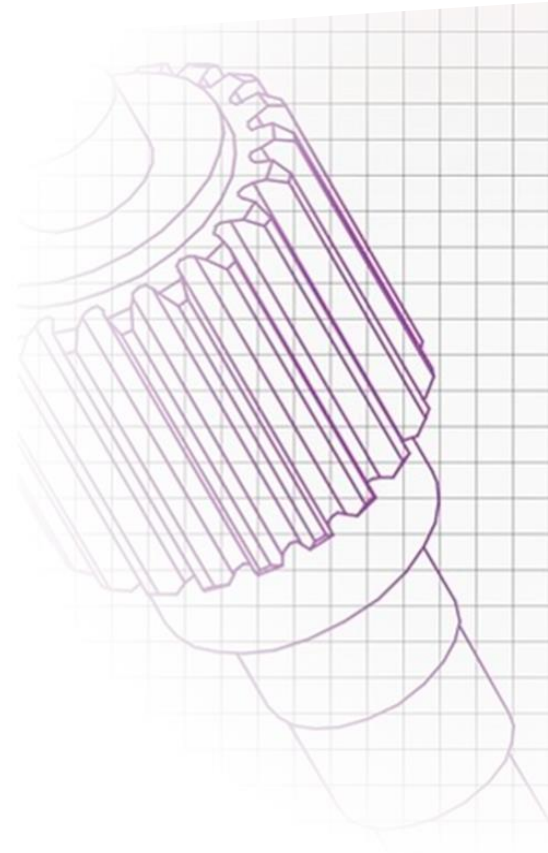
Clean copy:

- A version that includes ALL changes to the most recent specification of record without markings.

Drawings

Required if necessary to understand the subject matter to be patented.

- A drawing necessary to understand the invention cannot be introduced after the filing date.



Drawing requirements

- Black and white drawings; lines; numbers heavy enough to permit adequate reproduction
- Use reference characters (in specification and drawings; numerals preferred)
- Each figure labeled in English (e.g., FIG. 1) with a corresponding description in the Brief Description of the Figures
- Little or no text; no non-English labeling or text
- White, non-graph, 8.5 by 11 paper, with margins of at least $\frac{3}{4}$ inch and a left margin of at least 1 inch
- Free of erasures, copy marks, overwriting, interlineations, folds, and alterations
- Sheets of drawings should be numbered: In the top-center of each sheet, the number should be shown by two Arabic numerals placed on either side of an oblique line, with the first being the sheet number and the second being the total number of sheets of drawings, with no other marking.

Common mistakes found during OPAP drawing review

- Line quality too light to be reproduced
- Missing lead lines
- Excessive text or text not in English
- Paper format (e.g., margins and paper size)
- Incorrectly labeled figures
- Photographs that are illegible after scanning
- Color drawings without a petition
- Figures described in the Brief Description of the Drawings do not correspond to a separately-labeled drawing figure. For example:
 - Fig 1 described in the specification should not be labeled as Fig 1a
 - Fig 1a-f described in the specification should not be labeled as Fig 1

How to make amendments to the drawings

- Each sheet **must be labeled** "Replacement Sheet" or "New Sheet" as applicable in the top margin.
- Marked up copy is optional unless required by the examiner.
 - Must be labeled "Annotated Sheet" if submitted.

Application Data Sheet (ADS)

An ADS is **required** to:

- Identify applicants who are not inventors.
- Set inventorship when an inventors oath is NOT being submitted until later in the prosecution.
- Set inventorship where there are joint inventors and each joint inventor is executing a declaration that ONLY names that inventor and not all inventors.
- Make benefit claims under 37 CFR 1.78 and foreign priority claims under 37 CFR 1.55.



Common mistakes found in the ADS

- Signature
 - Every ADS must be signed by either a registered patent practitioner or the applicant.
 - When a named applicant in the “Applicant Information” section is a juristic entity (e.g., a company), the ADS must be signed by a registered patent practitioner.
 - An unsigned ADS will be treated only as a transmittal letter (37 CFR 1.76) with limited information being made of record from it.
- Domestic benefit
 - If an applicant wishes to claim the benefit of an earlier-filed U.S. application (e.g., a provisional application), the claim must be made in the “Domestic Benefit/National Stage Information” section of an ADS.

Common mistakes found in the ADS (cont.)

- File by reference
 - In an overwhelming majority of filed applications, the “Filing by Reference” section of the ADS should be left BLANK. Overcoming a mistake in completing this section can be particularly costly and time consuming.
- Typographical errors
 - Applicants should be sure to carefully check each entry in the ADS for typographical errors. Errors in the spelling of names, prior application numbers, addresses, etc. are not always easy to fix and can cost applicants money, time, and additional paperwork.

Updating the ADS

- All changes to the ADS must be properly marked up.
- Information may be corrected or updated by filing a ***corrected*** ADS that contains all sections of the form or only the sections of the form containing changed or updated information.
- Changes must be shown by underlining for insertions and ~~strike-through~~ or [brackets] for deletions.
- Each section containing changes or updated information must contain **all** of the information already of record with the changes shown by markings.
- If the ADS is submitted after the submission of the application, even if it is the first submission of an ADS, any information being added or deleted relative to the information of record must be indicated by markings.

Example: correcting a benefit claim

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Expired	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	<u>Claims benefit of provisional</u>	<u>61973005</u>	<u>2014-03-31</u>
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

This correction rectifies a situation in which the as-filed ADS did not make a benefit claim (or the benefit claim was not properly presented). The underlining shows the benefit claim is being added. The underlining is relative to the information of record shown on the filing receipt.

Documents must be properly signed

- If you are working with a registered practitioner, the practitioner may sign documents, even if you have not appointed him or her to have power of attorney.
- If you are not working with a registered practitioner and there is no applicant named on an application data sheet (ADS), all inventors must sign each document/submission.
- If you are not working with a registered practitioner and there is no applicant named on an ADS, all inventors may appoint one or more of the inventors to prosecute the application on everyone's behalf:
 - Each inventor must sign the form, even the one being appointed.
 - PTO/AIA/81 may be used.



Signature requirement

- Handwritten
- S-signature
 - Name between two single forward slashes
 - Must be accompanied by printed/typed name of signer and be easily identifiable
- Graphic representation
 - For electronically submitted correspondence
 - Graphic representation of handwritten signature or S-signature
- Multiple inventors: ALL inventors must sign UNLESS a power of attorney has been granted to one or more of the joint inventors.

Sample S-Signatures

I. S-SIGNATURE EXAMPLES, 37 CFR 1.4(d)(2) effective September 21, 2004

A. BY INVENTORS, AFFIANTS (e.g., §§ 1.131 & 1.132), ASSIGNEES AND PRACTITIONERS SIGNING AS INVENTORS

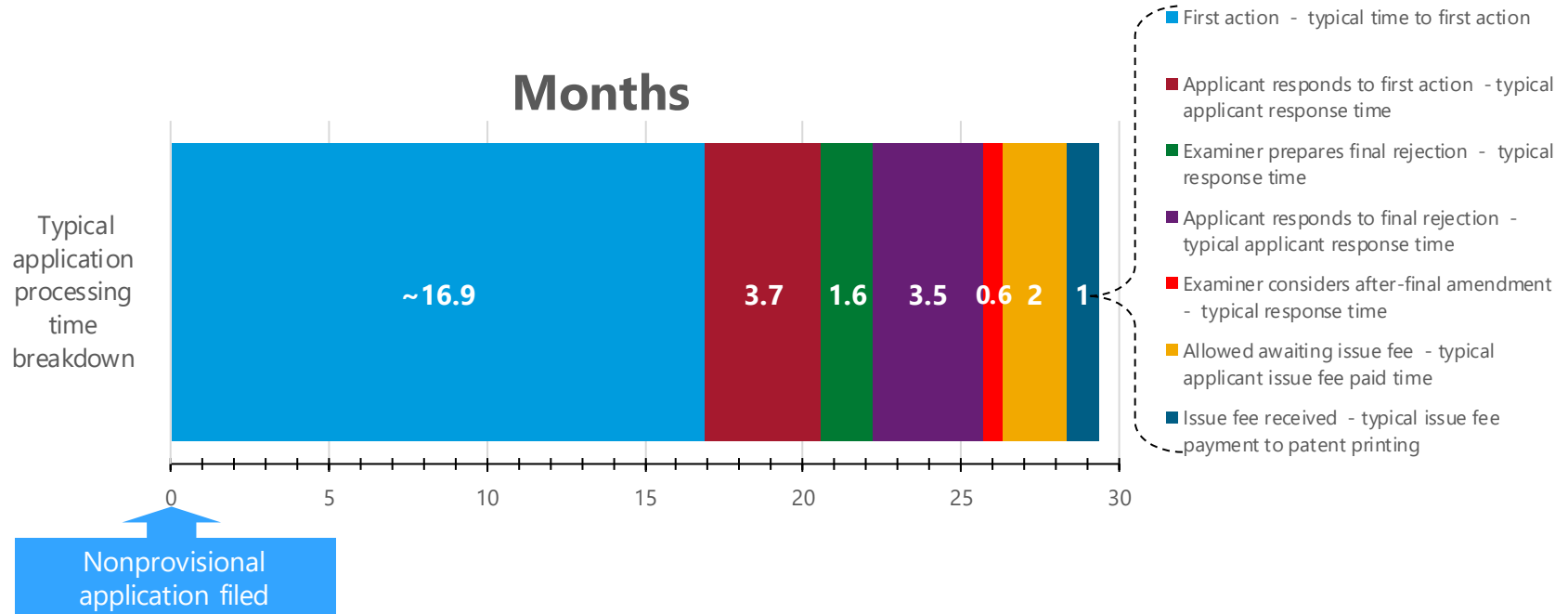
	<u>SIGNATURE TYPE</u>	<u>SIGNATURE</u>	<u>TREATMENT</u>	<u>PREFERRED</u>
1.	S-Signature within forward slashes, name below	<u>/John T. Smith/</u> John T. Smith	Proper Signature Treat as signed, § 1.4(d)(2).	✓
2.	S-Signature with spaces within forward slashes, name below	<u>/ John T. Smith /</u> John T. Smith	Proper Signature Treat as signed, § 1.4(d)(2).	
3.	S-Signature within forward slashes, name below but no line under the S-Signature	<u>/John T. Smith/</u> John T. Smith	Proper Signature Treat as signed, § 1.4(d)(2), as a line is not required, although it is recommended.	
4.	Script font S-Signature within slashes, name below	<u>/John T. Smith/</u> John T. Smith	Proper Signature Treat as signed, § 1.4(d)(2).	
5.	Name above, S-Signature within slashes, below	John T. Smith <u>/John T. Smith/</u>	Proper Signature Treat as signed, § 1.4(d)(2).	
6.	S-Signature within slashes, name on right side	/John T. Smith/ John T. Smith	Proper Signature Treat as signed, § 1.4(d)(2).	

https://www.uspto.gov/sites/default/files/documents/sigexamples_alt_text.pdf



Post filing procedure

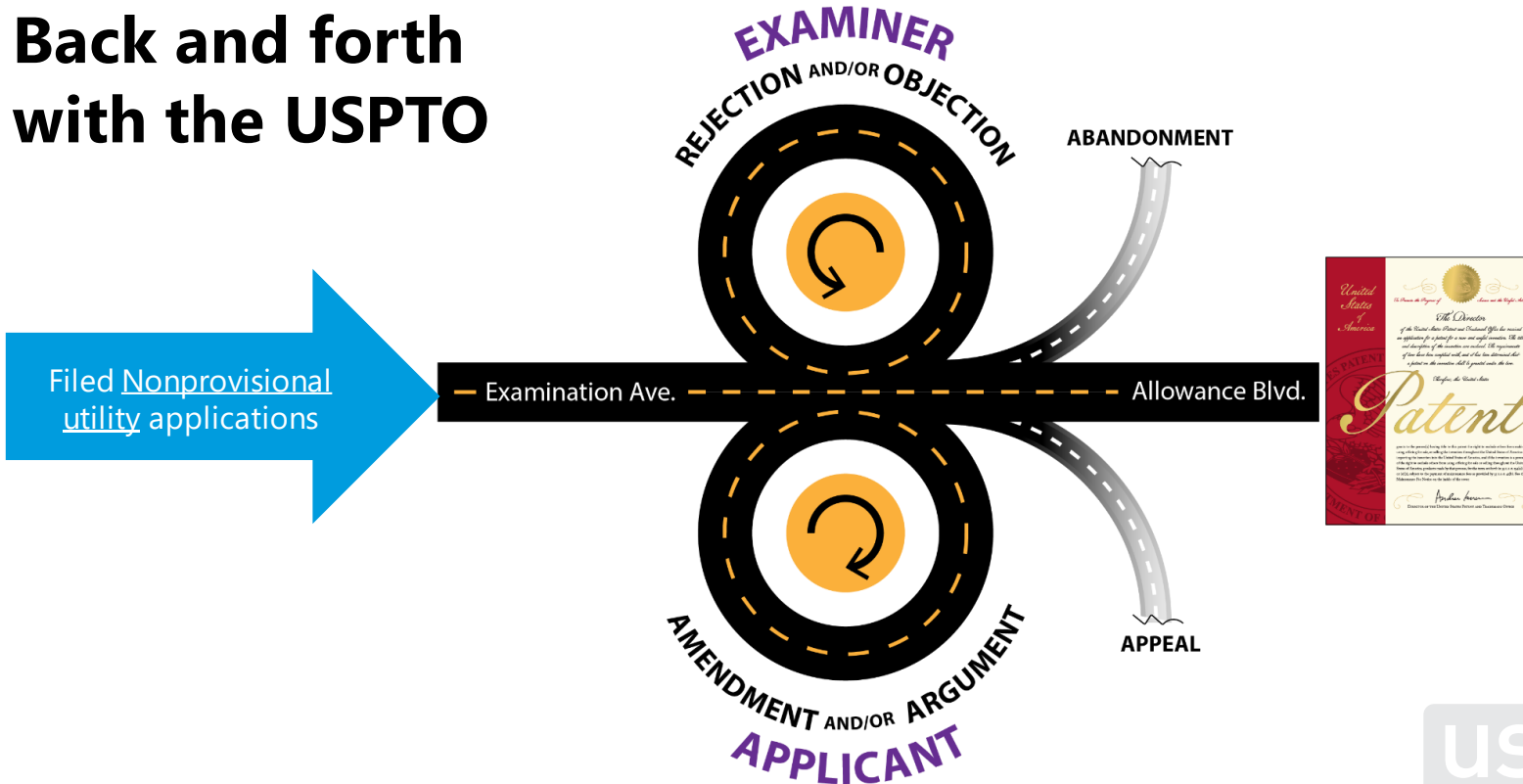
Typical processing timeline



*Based on FY 2021 data

The patent application roadmap

Back and forth with the USPTO



An office action sets forth the basis for any objections, rejections, and allowability.

[illegible]

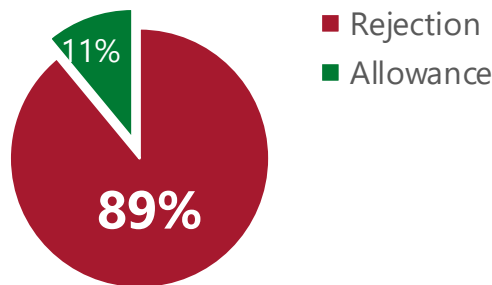
What does a rejection mean?

- Rejections are a normal part of the process.
- They help define what is patentable.
- Rejections often occur due to existing prior art.
 - The examiner must have a basis to believe someone else may have come up with what you invented before you.
- Rejections can often be overcome.

Receive a rejection? Don't give up!

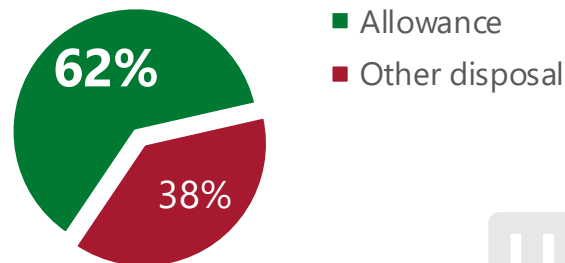
Fact: In FY 2021, 89% of original filings received a first office action containing a rejection.

FY 2021 first actions



Fact: In FY 2021, 62% of examiner disposals were allowances.

FY 2021 percentage allowed



Role of the USPTO examiner

- Read and understand the application
- Search for prior art
- Evaluate the specification and claim(s)
- Respond by office action(s) describing findings
- Hold interviews, as requested



Role of the applicant

- File a complete application
- Disclose all known prior art
- In response to examiner office actions:
 - Explain your position, and/or
 - Make good faith changes to the application



After-final practice

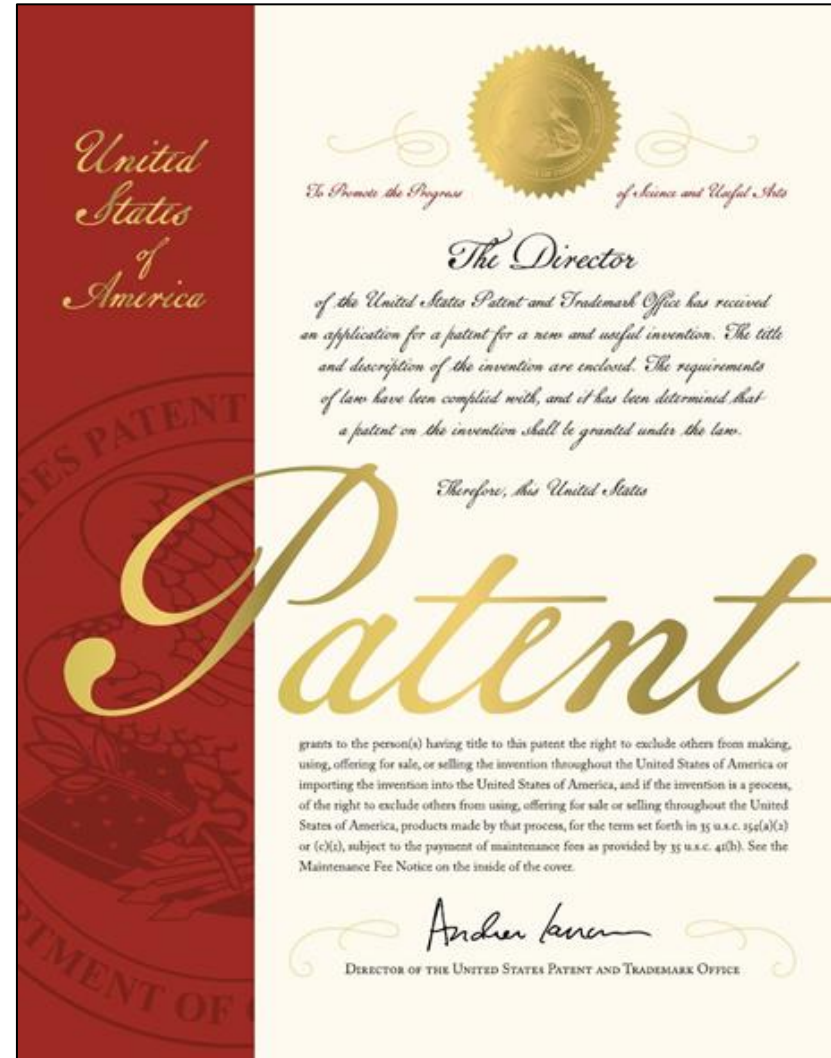
Even if you receive a final rejection, don't panic.
If you still disagree, you may still have options:

- Request for Continued Examination (RCE)
- Appeal
- After-final response

Allowances

A notice of allowance indicates all objections and rejections have been overcome and your application is ready for issuance.

In FY 2021, 62% of examiner disposals were allowances.



Anatomy of a patent

(12) **United States Patent**
Diedering et al.

(10) **Patent No.:** US 11,000,000 B2
(45) **Date of Patent:** May 11, 2021

Issue date

(54) **REPOSITIONING WIRES AND METHODS FOR REPOSITIONING PROSTHETIC HEART VALVE DEVICES WITHIN A HEART CHAMBER AND RELATED SYSTEMS, DEVICES AND METHODS**

(58) **Field of Classification Search**
CPC A61F 2/95; A61F 2002/9505; A61F 2002/9511; A61F 2002/9665; A61B 2017/00623
See application file for complete search history.

Prior art

US pre-grant publication date

(71) Applicant: **4C MEDICAL TECHNOLOGIES, INC.**, Maple Grove, MN (US)

(56) **References Cited**
U.S. PATENT DOCUMENTS

(72) Inventors: **Jason S. Diedering**, Minneapolis, MN (US); **Saravana B. Kumar**, Minnetonka, MN (US)

4,878,906 A * 11/1989 Lindemann A61F 2/91 623/3.18
5,843,090 A 12/1998 Schuetz
2006/0184226 A1 8/2006 Austin
(Continued)

(22) Filed: Sep. 12, 2019

(65) **Prior Publication Data**
US 2020/0085571 A1 Mar. 19, 2020

(73) Assignee: **4C Medical Technologies, Inc.**, Maple Grove, MN (US)

*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

OTHER PUBLICATIONS

International Search Report and Written Opinion, dated Nov. 15, 2019, for PCT Application No. PCT/US2019/050978, filed Sep. 13, 2019.

Primary Examiner — Todd J Scherbel
Attorney, Agent, or Firm — Barnes & Thornburg LLP; Jeffrey R. Stone

Related U.S. Application Data
(60) Provisional application No. 62/731,230, filed on Sep. 14, 2018.

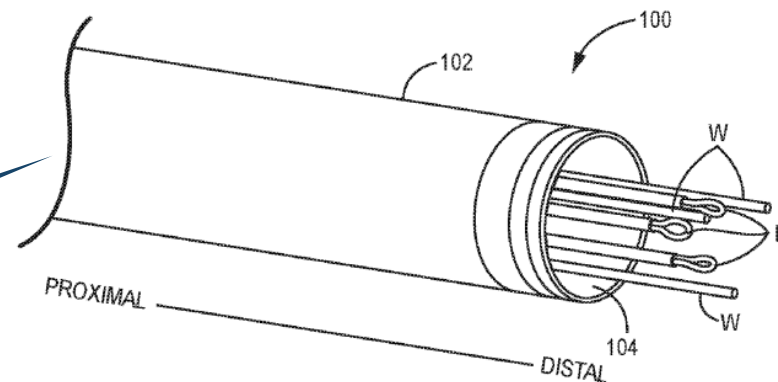
(51) **Int. Cl.**
A61F 2/24 (2006.01)
A61F 2/90 (2013.01)
A61F 2/966 (2013.01)

(52) **U.S. Cl.**
CPC *A61F 2/243* (2013.01); *A61F 2/90* (2013.01); *A61F 2/966* (2013.01)

(57) **ABSTRACT**
The invention provides methods, devices and systems for delivering, positioning and/or repositioning an expandable prosthetic heart valve in a patient's heart chamber. At least one non-looped wire and looped wire pair is operatively connected with an expanded prosthetic heart valve that is collapsed within a delivery catheter lumen having its distal end positioned in the subject heart chamber. The collapsed prosthetic heart valve is translated through the delivery catheter lumen to and out of its distal end where the prosthetic heart valve expands to a working configuration. The wire(s) of the non-looped and looped wire pair may be manipulated by pulling proximally or pushing distally to position or reposition the expanded prosthetic stent into position, then released from connection with the positioned stent and withdrawn from the patient.

11 Claims, 2 Drawing Sheets

Drawing



"Inventive Entity"

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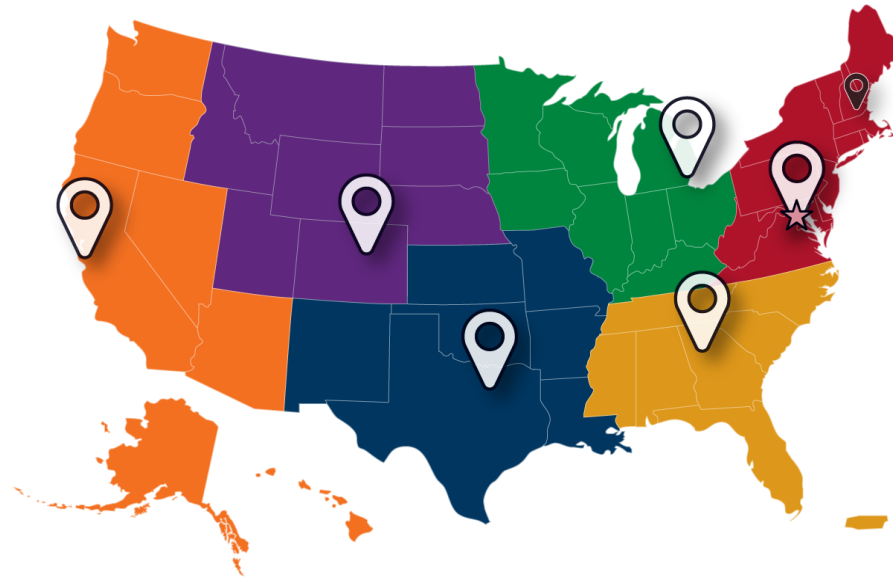
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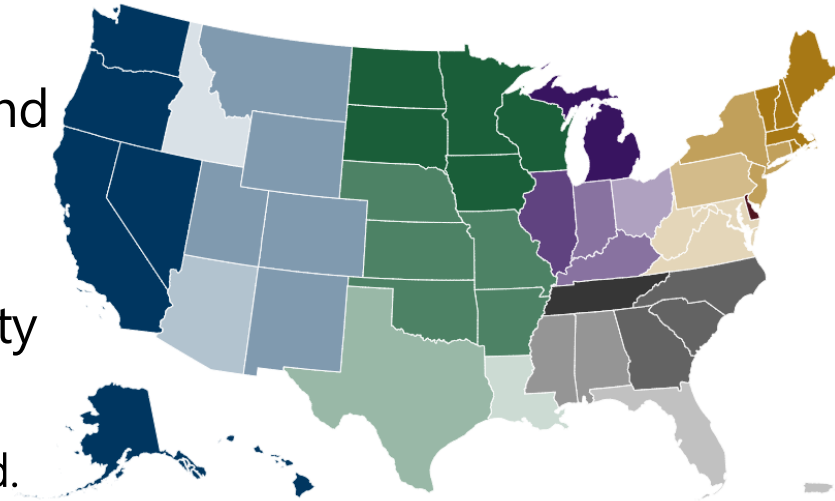
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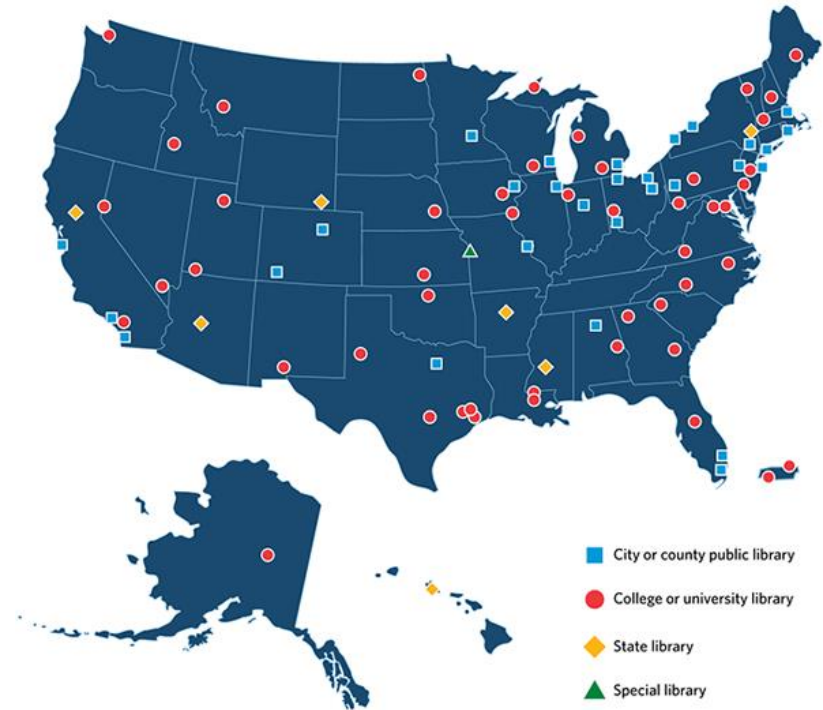


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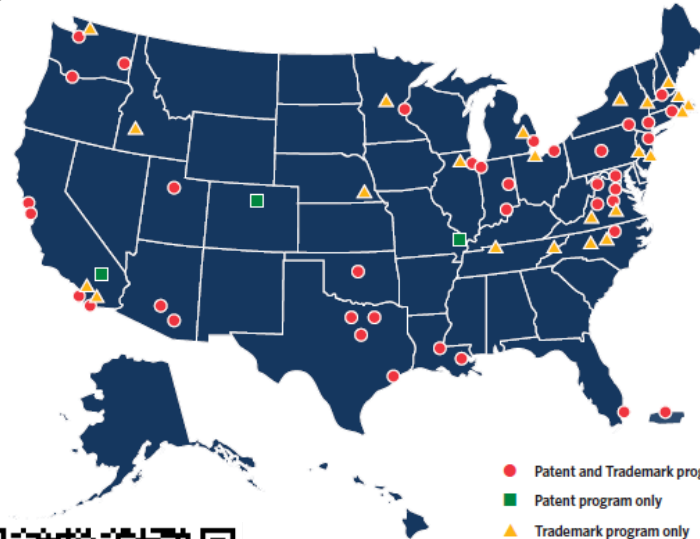
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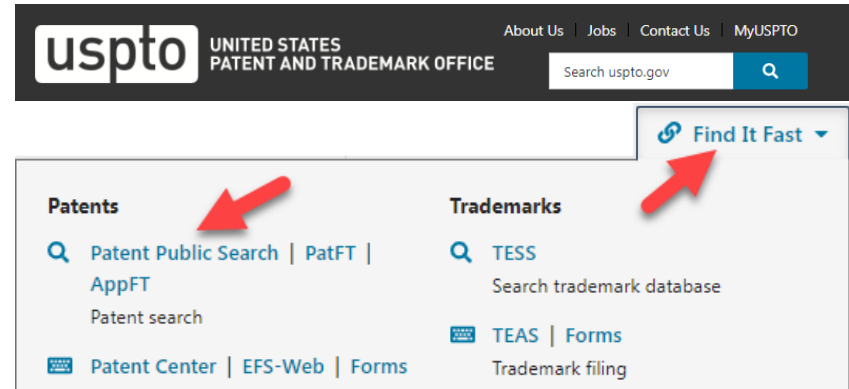
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