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## How to conduct a preliminary U.S. patent search: A step by step strategy

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# Topics

- Benefits of conducting a thorough patent search
- Patentability
- Prior art
- Cooperative Patent Classification (CPC)
- Patent search strategy steps



# Search benefits for inventors

- Make a preliminary determination that your proposed invention is novel.
- Provide an Information Disclosure Statement of relevant documents in a patent applications as required.
- Prepare to discuss your ideas with a registered patent attorney or patent agent.

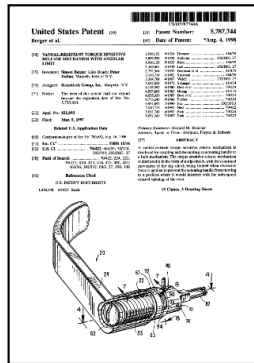


# Types of patents

## Utility

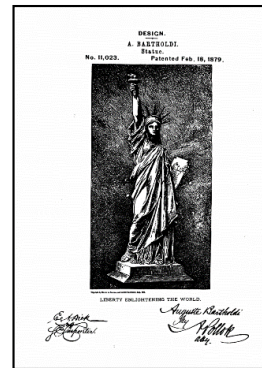
Protects how an invention works, functions, or is made for 20 years from filing date:

- Process
- Machine
- Article of manufacture
- Composition of matter



## Design

Protects the way a product or article of manufacture looks (the appearance) for 15 years from the date of grant.



## Plant

Protects newly invented strains of asexually reproducing flowering plants, fruit trees, and other hybrid plants for 20 years from filing date.



# Patentability

Inventions that may be patented:

- new
- useful
- non-obvious
- accompanied by a written description disclosing how to make and use the invention.

How do you know if an invention is new and non-obvious?



# Prior art

Prior art consists of information that describes an invention and is disclosed to the public including:

- U.S. patents and published patent applications
- Foreign patents and published patent applications
- Journal and magazine articles
- Books, manuals, and catalogs
- Websites and databases
- Conference proceedings
- Scientific papers





# Preliminary U.S. patent search

A preliminary U.S. patent search begins with a keyword search of granted U.S. patents and published applications (prior art). It is conducted to determine patentability of an invention.



# Keyword search pitfalls

- **Vague or inconsistent terminology:**
  - Toy and Process of Use (Patent US 2,415,012)
- **Obsolete names and terms:**
  - “LP”... “hi-fi”... “laser disc”...“floppy disc”
- **Different meanings in different fields:**
  - “mouse” the animal v. computer “mouse”
- **Synonyms:**
  - Rodent extermination device  
(US patent 5,185,953)



To avoid the pitfalls of keyword searching, and to conduct a more thorough preliminary patent search, a keyword search should be supplemented with a classification search.



# Search example

An improvement in umbrella design



Brainstorm terms describing your invention

## **STEP 1**

# Description of the invention

1. What is the **purpose** of the invention? Is it a utilitarian device or an ornamental design?
2. Is the invention a **process** – a way of making something or performing a function – or is it a product?
3. What is the invention **made of**? What is the physical composition or structure of the invention?
4. How is the invention **used**?
5. What are **keywords** and technical terms that describe the nature of the invention?



# Answering the questions

1. ...an umbrella that has a new rib design to eliminate the umbrella collapsing or inverting due to high winds
2. ...a product
3. ...framework with ribs, stretchers and a main frame, securing rings, mounting brackets, joint connectors, fabric connectors, fabric, linkage bar
4. ...used for protection against the elements
5. ...in addition to "umbrella,": parasol, sunshade, support assembly or apparatus, windproof, wind-resistant

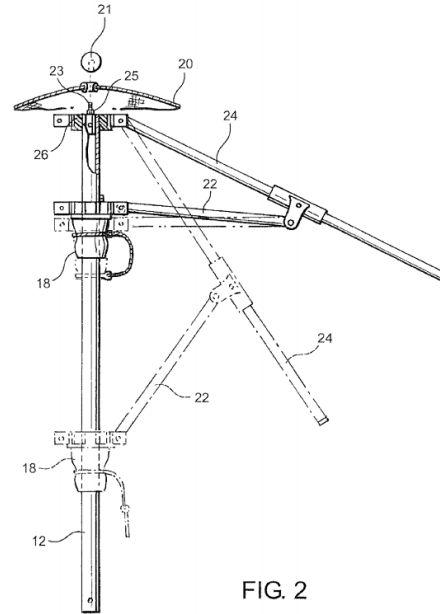


FIG. 2



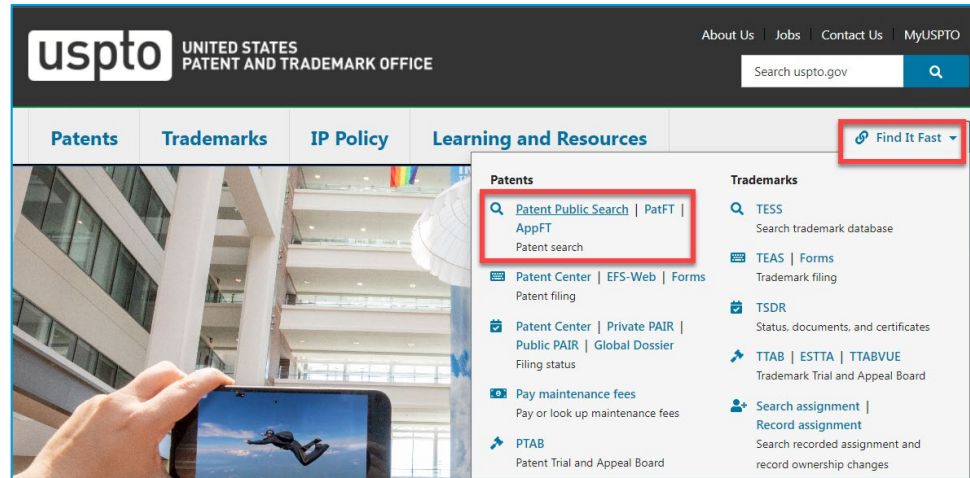
Conduct a keyword search using Patent  
Public Search

## **STEP 2**

# Access Patent Public Search database

The USPTO home page ([www.uspto.gov](http://www.uspto.gov)) has a “Find It Fast” menu.

Select the “Patent Public Search” link near the top of the menu.





# Patent Public Search database

The screenshot displays the Patent Public Search database interface, divided into several main sections:

- Search History:** A table listing previous searches with columns for ID, Results, Query Name, Databases, and Actions. It shows five entries related to 'umbrella AND (wind ADJ...)' searches.
- Search:** A search bar containing the query: "1114900 | 1293513 | 1520289 | '7735498'.pn. OR ('8939163' | '8087420' | '2788792' | '2016/0227894' | '2012/0240969').urpn. AND (PGPB | USPT | USOC).dbnm." Below the search bar are 'Options', 'Clear', and 'Search' buttons.
- Search Results:** A section showing 'L5: 9 results found. Currently displaying all results. Filtered by Family ID (9 families)'. It includes a table with columns for 'Select', 'Res...', and 'X' (1-4), and a 'Hit Terms' box containing 'usoc', 'pgpb', 'uspt', and '1369996'.
- Document Viewer:** Displays a patent document for 'United States Patent Fitzgerald et al.' (Patent No. US 9,526,306 B2, Date of Patent: Dec. 27, 2016). It includes a barcode, a list of references (e.g., (11) UMBRELLA ASSEMBLY), and a technical drawing of an umbrella assembly.



# Hints for keyword searching

- Group (using "OR") together synonyms;
- Consider the use of technical engineering language rather than common everyday words, e.g., (car or automobile or auto or "land motor vehicle");
- Use quotes to group search phrases where words are adjacent ("image viewer").
- *Just remember the inherent limitations of keyword searching.*



# Enter a keyword search statement

In the Search panel, enter your search statement using relevant keywords identified in Step 1.

The screenshot shows a search interface with a search bar containing the statement: `umbrella AND ((wind ADJ resistant) OR windproof)`. The interface includes several configuration options:

- Default Operator:
- Highlights:
- Options:  Show Errors,  Plurals,  British Equivalents
- Databases panel:  Select all,  US-PGPUB,  USPAT,  USOCR

Buttons for 'Clear' and 'Search' are located at the bottom right of the search panel.



# Review the search results

As you select each document in the Search Results panel, it will appear in the Document Viewer panel.

If a document appears relevant, click on the corresponding box in the tag columns.

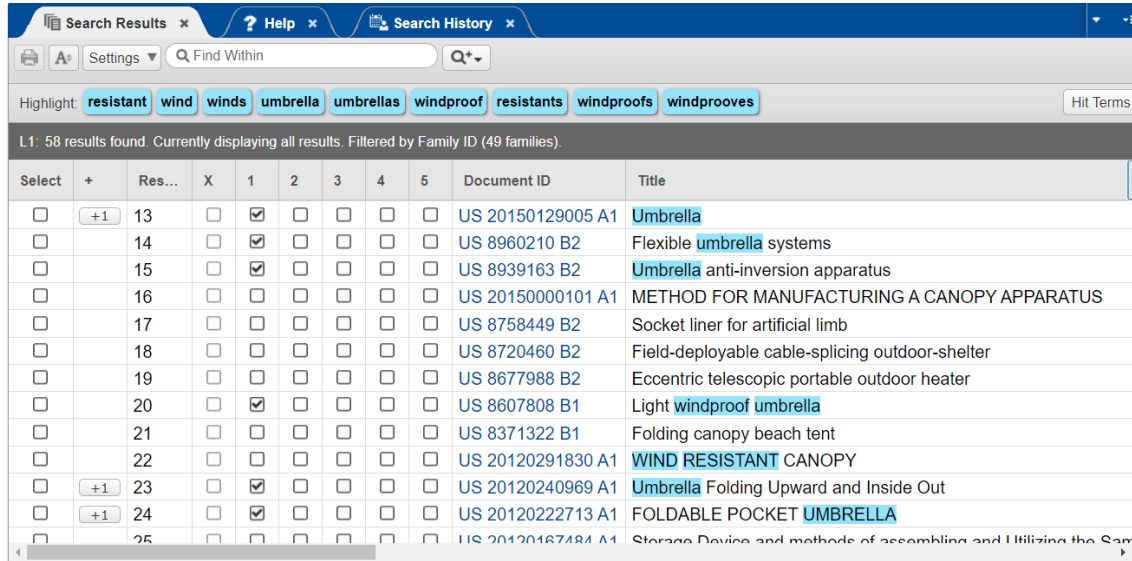
A check mark in Tag column 1 indicates that that document 4 has been tagged.

The image shows two side-by-side screenshots from a patent search application. The left screenshot displays the search results interface with the search query: umbrella AND ((wind ADJ resistant) OR windproof). The search results table shows 58 results found, filtered by Family ID (49 families). The table has columns for 'Select', 'Res...', 'X', and tag columns 1 through 5, followed by 'Document ID' and 'Date Publish...'. Document 4 (US 20190216188 A1) is selected, indicated by a checkmark in the '1' tag column. The right screenshot shows the Document Viewer for US 20190216188 A1, titled 'United States Patent Application Publication' by TRUONG et al., published on Jul. 18, 2019. The document includes a barcode, publication classification, applicant information (HEDGEHOG PRODUCTS INC.), inventors (Kevin Paul TRUONG), and an abstract describing a foldable umbrella with dynamic rib structure. A technical drawing of the umbrella mechanism is also visible at the bottom.

Select	+	Res...	X	1	2	3	4	5	Document ID	Date Publish...
<input type="checkbox"/>		1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20200100549 A1	2020-04-02
<input type="checkbox"/>		2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20200060366 A1	2020-02-27
<input type="checkbox"/>		3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20190218814 A1	2019-07-18
<input checked="" type="checkbox"/>		4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20190216188 A1	2019-07-18
<input type="checkbox"/>		5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20180368543 A1	2018-12-27
<input type="checkbox"/>		6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20180128005 A1	2018-05-10



# Tag documents for later review



The screenshot shows a search results page with a table of documents. The table has columns for selection, result number, and five numbered columns (1-5) for filtering. The 'Title' column contains document titles, some with highlighted terms like 'umbrella' or 'windproof'.

Select	+	Res...	X	1	2	3	4	5	Document ID	Title
<input type="checkbox"/>	+1	13	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20150129005 A1	Umbrella
<input type="checkbox"/>		14	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8960210 B2	Flexible umbrella systems
<input type="checkbox"/>		15	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8939163 B2	Umbrella anti-inversion apparatus
<input type="checkbox"/>		16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20150000101 A1	METHOD FOR MANUFACTURING A CANOPY APPARATUS
<input type="checkbox"/>		17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8758449 B2	Socket liner for artificial limb
<input type="checkbox"/>		18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8720460 B2	Field-deployable cable-splicing outdoor-shelter
<input type="checkbox"/>		19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8677988 B2	Eccentric telescopic portable outdoor heater
<input type="checkbox"/>		20	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8607808 B1	Light windproof umbrella
<input type="checkbox"/>		21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 8371322 B1	Folding canopy beach tent
<input type="checkbox"/>		22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20120291830 A1	WIND RESISTANT CANOPY
<input type="checkbox"/>	+1	23	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20120240969 A1	Umbrella Folding Upward and Inside Out
<input type="checkbox"/>	+1	24	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20120222713 A1	FOLDABLE POCKET UMBRELLA
<input type="checkbox"/>		25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	US 20120167484 A1	Storage Device and methods of assembling and Utilizing the Same

- In the Search Results panel, each document has several columns.
- Columns numbered 1-5 have open check boxes. A searcher can apply their own criteria to any column.
- For example, column 1 can be “to review in-depth later,” column 2 can be “similarity of structure,” etc.
- Tagging isn’t required, but it is a very useful feature for keeping track of relevant documents.



# Toggle full-text view to display view

Document Viewer x

Highlight: umbrella windproof

Light Windproof Umbrella

DOCUMENT ID	DATE PUBLISHED
US 8607808 B1	2013-12-17

**INVENTOR INFORMATION**

NAME	CITY	STATE	ZIP CODE	COUNTRY
You; Ching-Chuan	Taipei	N/A	N/A	TW

**APPLICATION NO** 13/537083  
**DATE FILED** 2012-06-29

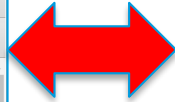
**US CLASS CURRENT:**  
135/29, 135/25.33, 135/27, 135/32

**CPC CURRENT**

TYPE	CPC	DATE
CPCI	A 45 B 25/22	2013-01-01
CPCA	A 45 B 2019/001	2013-01-01

**Abstract**

A light windproof umbrella is provided with a center post including a top ferrule, an upper grommet, an intermediate sliding ring, and a sliding runner under the sliding ring; ribs each having one end pivotably secured to the grommet and the other end being open, main joints each formed at a portion of the rib proximate to the other end of the rib; auxiliary joints each formed at a portion of the rib between the main joint and the grommet; stretchers each having one end pivotably secured to the sliding ring and the other end movably secured to the rib; struts each having one end pivotably secured to the sliding runner and the other end pivotably secured to the auxiliary joint; a lower canopy; and an upper canopy in a partial covering relationship to the lower canopy.



Document Viewer x

Page 1 of 11

(12) **United States Patent**  
You

(10) Patent No.: US 8,607,808 B1  
(45) Date of Patent: Dec. 17, 2013

(54) LIGHT WINDPROOF UMBRELLA

(76) Inventor: Ching-Chuan You, Taipei (TW)

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

(21) Appl. No.: 13/537,083

(22) Filed: Jun. 29, 2012

(51) Int. Cl. A45B 25/22 (2006:01)

(52) U.S. Cl. 135/29, 135/25.33, 135/27, 135/32 USPC

(58) Field of Classification Search USPC 135/15.1, 27, 29-32, 33.2, 33.7, 25.33 See application file for complete search history.

(56) References Cited U.S. PATENT DOCUMENTS

1,309,996 A *	3/1921	Woochold	135:27
1,743,043 A *	1/1930	McLain	135:27
2,522,645 A *	9/1950	Senna	135:27
5,372,155 A *	11/1994	You	135:29
6,167,894 B1 *	1/2001	Lin	135:15.1
6,216,712 B1 *	4/2001	Lin et al.	135:31

\* cited by examiner

Primary Examiner—Winnie Yip

(57) **ABSTRACT**

A light windproof umbrella is provided with a center post including a top ferrule, an upper grommet, an intermediate sliding ring, and a sliding runner under the sliding ring; ribs each having one end pivotably secured to the grommet and the other end being open, main joints each formed at a portion of the rib proximate to the other end of the rib; auxiliary joints each formed at a portion of the rib between the main joint and the grommet; stretchers each having one end pivotably secured to the sliding ring and the other end movably secured to the rib; struts each having one end pivotably secured to the sliding runner and the other end pivotably secured to the auxiliary joint; a lower canopy; and an upper canopy in a partial covering relationship to the lower canopy.

1 Claim, 7 Drawing Sheets



# Review front page information

Patent number  
Date of patent

(10) **Patent No.:** US 10,743,627 B2  
(45) **Date of Patent:** \*Aug. 18, 2020

Title

(54) **UMBRELLA HAVING AN ANTI-INVERSION MECHANISM**

Applicant

(71) Applicant: **Shedrain Corporation**, Portland, OR (US)

Inventor

(72) Inventors: **David Haythornthwaite**, Fujian Province (CN); **Andrew Haythornthwaite**, Fujian Province (CN)

Assignee

(73) Assignee: **SHELDRAIN CORPORATION**, Portland, OR (US)



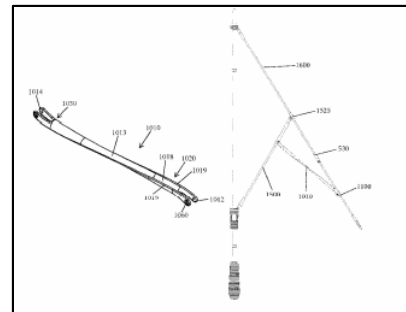
# Review front page, continued

## Abstract

(57)                      **ABSTRACT**

An umbrella has a plurality of ribs attached to a runner by main struts. The umbrella has an anti-inversion mechanism formed of a plurality of anti-inversion struts. Each anti-inversion strut is pivotally coupled to one respective main strut and is pivotally connected to a floating joint member that is freely movable along a length of one respective rib. The anti-inversion mechanism also includes a stop that is fixedly attached to the rib and restricts the degree of travel of the floating joint member along the rib and is positioned to prevent the respective rib from inverting in response to an applied force.

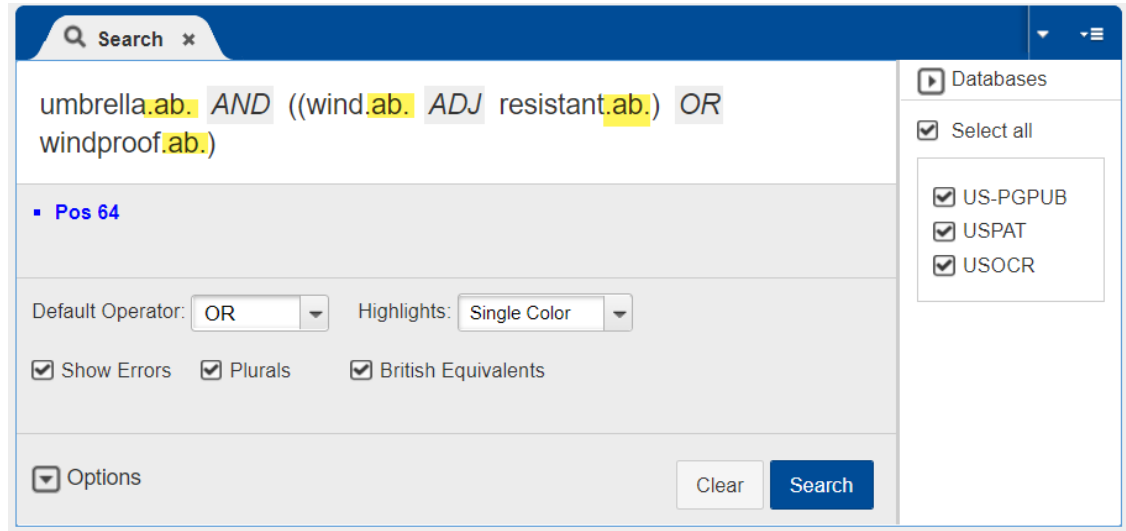
## Representative drawing





# More focused search results

- If you are finding that a large number of search results are irrelevant, you can make changes to your search statement.
- One way to have more focused search results is to use searchable indices (field codes) to restrict the keywords to certain fields in the documents.
- In this example we have restricted the earlier terms to the abstracts of the documents by using the ".ab." field label.



The screenshot shows a search interface with a search bar containing the query: `umbrella.ab. AND ((wind.ab. ADJ resistant.ab.) OR windproof.ab.)`. The terms `umbrella.ab.`, `wind.ab.`, `resistant.ab.`, and `windproof.ab.` are highlighted in yellow. Below the search bar, there are several options: **Pos 64**, **Default Operator:** OR, **Highlights:** Single Color,  Show Errors,  Plurals,  British Equivalents,  Options, **Clear**, and **Search**. On the right side, there is a **Databases** section with  Select all,  US-PGPUB,  USPAT, and  USOCR.



# Accessing tagged documents

- Having tagged all of the documents of interest, view the list in the Tagged Documents panel.
- If using the Quick Search form, you will need to open up the Tagged Documents panel by selecting it in the Gadgets toolbar.
- If using the Advanced Search form, the Tagged Documents panel is open by default.

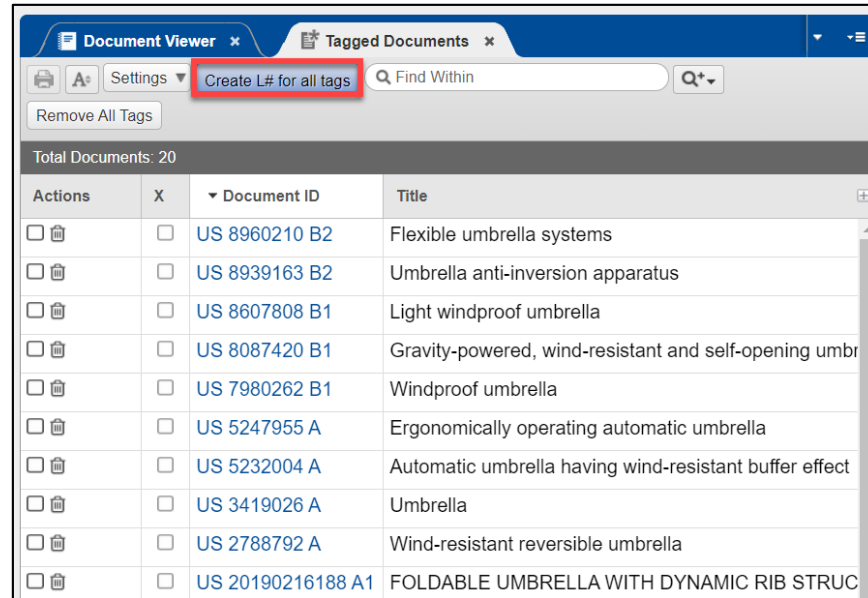


Gadget toolbar—Tagged Documents icon highlighted in red



# Tagged documents panel

By clicking on the "Create L set number for all tags" button, you can create a separate L set number of the tagged documents.



Document Viewer x Tagged Documents x

Settings Create L# for all tags Find Within Q\*

Remove All Tags

Total Documents: 20

Actions	X	Document ID	Title
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 8960210 B2</a>	Flexible umbrella systems
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 8939163 B2</a>	Umbrella anti-inversion apparatus
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 8607808 B1</a>	Light windproof umbrella
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 8087420 B1</a>	Gravity-powered, wind-resistant and self-opening umbr
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 7980262 B1</a>	Windproof umbrella
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 5247955 A</a>	Ergonomically operating automatic umbrella
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 5232004 A</a>	Automatic umbrella having wind-resistant buffer effect
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 3419026 A</a>	Umbrella
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 2788792 A</a>	Wind-resistant reversible umbrella
<input type="checkbox"/>	<input type="checkbox"/>	<a href="#">US 20190216188 A1</a>	FOLDABLE UMBRELLA WITH DYNAMIC RIB STRUC



Conduct an in-depth review of the  
selected documents

## **STEP 3**

# Conduct in-depth review

- With this newly created L set number of selected documents, you can more carefully review those documents you have flagged/selected.
- Those patents you find irrelevant to your invention, you can discard.
- But those patents you find similar to your own invention will warrant even closer examination.



# Review the tagged documents

You can drag the Tagged Documents view to a panel facing the Document Viewer for a side by side display.

As you review each document in detail, you can select ones you want to keep using the Actions column choice of a check box.

The screenshot displays two side-by-side windows from a patent database application. The left window, titled 'Tagged Documents', shows a list of 20 documents. The right window, titled 'Document Viewer', shows the details of a specific patent document.

Actions	Document ID	Title
<input checked="" type="checkbox"/>	US 8960210 B2	Flexible umbrella systems
<input type="checkbox"/>	US 8939163 B2	Umbrella anti-inversion apparatus
<input checked="" type="checkbox"/>	US 8607808 B1	Light windproof umbrella
<input type="checkbox"/>	US 8087420 B1	Gravity-powered, wind-resistant and self-opening umbrella
<input checked="" type="checkbox"/>	US 7980262 B1	Windproof umbrella
<input type="checkbox"/>	US 5247955 A	Ergonomically operating automatic umbrella
<input type="checkbox"/>	US 5232004 A	Automatic umbrella having wind-resistant buffer effect
<input type="checkbox"/>	US 3419026 A	Umbrella
<input type="checkbox"/>	US 2788792 A	Wind-resistant reversible umbrella
<input type="checkbox"/>	US 20190216188 A1	FOLDABLE UMBRELLA WITH DYNAMIC RIB STRUCTURE
<input type="checkbox"/>	US 20180128005 A1	WIND-RESISTANT PORTABLE SHADE SHELTER
<input type="checkbox"/>	US 20160227894 A1	UMBRELLA HAVING AN ANTI-INVERSION MECHANISM
<input type="checkbox"/>	US 20150129005 A1	Umbrella
<input type="checkbox"/>	US 20120240969 A1	Umbrella Folding Upward and Inside Out
<input type="checkbox"/>	US 20120222713 A1	FOLDABLE POCKET UMBRELLA
<input type="checkbox"/>	US 20110108074 A1	Windproof umbrella
<input type="checkbox"/>	US 20110030751 A1	Windproof Sunshade

The right window shows the details of a patent document. The title is 'United States Patent' and the patent number is 'US 7,980,262 B1'. The date of patent is 'Jul. 19, 2011'. The document includes an abstract, a list of references cited, and a drawing of an umbrella structure.



# Review drawing sheet(s)

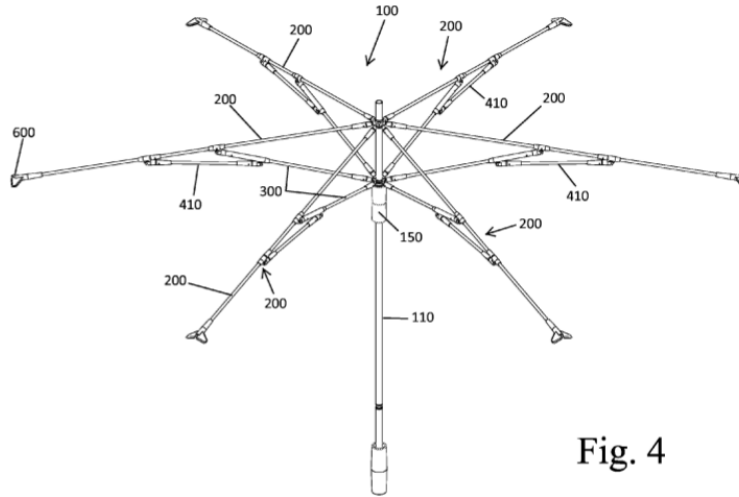


Fig. 4



# Review specification

May include:

- Field of invention
- Background
- Summary
- Brief description of the drawings
- Detailed description of the preferred embodiments.

US 10,743,627 B2

**1**  
**UMBRELLA HAVING AN ANTI-INVERSION MECHANISM**

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority and is a divisional of U.S. patent application Ser. No. 15/409,088, filed Jan. 18, 2017, which claims priority and is a continuation-in-part of U.S. patent application Ser. No. 14/614,906, filed Feb. 5, 2015, and claims priority to U.S. Patent Application Ser. No. 62/423,708, filed Nov. 17, 2016 and U.S. Patent Application Ser. No. 62/377,042, filed Aug. 19, 2016, each of which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

The present invention relates to umbrellas and more particularly, relates to an umbrella that is designed to resist inversion in adverse conditions including strong winds, etc.

BACKGROUND

As is well known, an umbrella is a device that protects the user from the elements and in particular from liquid and frozen precipitation or even the sun, etc. A traditional umbrella has the following parts: a pole, a canopy, ribs, a runner, springs and a ferrule. A pole is the metal or wooden shaft that runs between the umbrella's handle at the bottom (or the base stand in the case of a patio model) and the canopy at the top. The canopy is the fabric part of the umbrella that catches the rain, the wind and the sun. The ribs are what give an umbrella its structure and shape. Outer ribs hold up the canopy and inner ribs (sometimes called stretchers) act as supports and connect the outer ribs to the umbrella pole. A runner slides up and down the pole while connected to the ribs/stretchers, and is responsible for the opening and closing of the canopy. Many umbrella designs include a top spring to hold the runner up when the canopy is open, a bottom spring to hold the runner down when the canopy is closed, and sometimes a center ball spring to extend the pole length in telescopic models. Strictly ornamental, the finial (also called the ferrule) is found on the very top of the umbrella, above the canopy.

Umbrella ribs function as a folding construction supporting the umbrella canopy fabric. Under normal operating conditions, the forces acting on the umbrella canopy fabric increase toward peak values when the canopy becomes fully deployed and when wind gusts tend to overturn the canopy. These forces are transmitted from the canopy to the canopy ribs, and can act on the ribs in opposite directions depending on the direction of the wind. The ribs thus have to be strong enough to withstand forces which can act on them from any one of the two main opposite directions.

The above construction is the most common one for an umbrella and the canopy assumes a downward convex shape. One significant problem with such design arises when there is a strong wind or sudden gust which exerts a force against the inner surface of the canopy causing the canopy to invert from its normal position to an upturned position to an upward convex position.

Umbrellas addressing the problems of wind gusts have been proposed with one solution being the placement of apertures located within the canopy which allow for the air to flow through the canopy reducing the total force experienced by the canopy. However, the apertures are not large enough to provide a sufficient airflow to greatly reduce the

**2**

force and in most circumstances, the canopy still inverts. Another solution to this has been to add strings that connect from the umbrella strut to the tip area. However, this solution also suffers from a deficiency in that these strings can become loose over time or get cut or tangle, etc., during use.

It is therefore the object of the present invention to provide a windproof umbrella that acts so as to prevent the inversion of the umbrella in strong wind.

SUMMARY

According to one exemplary embodiment of the present invention, an umbrella includes an elongated shaft having a first end and an opposite second end and a runner slidably disposed about the elongated shaft and movable along a length of the shaft. The umbrella has a plurality of ribs that are attached to the runner by a plurality of main struts that move between open and closed positions in which in the open position, the ribs are in an open, extended position and in the closed position, the ribs are in a closed, collapsed position.

In accordance with the present invention, the umbrella has an anti-inversion mechanism formed of a plurality of anti-inversion struts. Each anti-inversion strut is pivotally coupled to one respective main strut and is pivotally connected to a floating joint member that is freely movable along a length of the rib. The anti-inversion mechanism also includes a stop that is fixedly attached to the rib and restricts the degree of travel of the floating joint member along the rib and is positioned to prevent the respective rib from inverting in response to an applied force.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIG. 1 is a side elevation view of an umbrella, of a manual type, including a shaft and an umbrella rib assembly in accordance with the present invention and being shown in a fully opened position, with only a single rib assembly being shown, for sake of illustration purposes only.

FIG. 2 is a side elevation view of the umbrella rib assembly of FIG. 1 shown in a half open position.

FIG. 3 is a side elevation view of the umbrella rib assembly of FIG. 1 shown in a closed position.

FIG. 4 is a perspective view of an umbrella having a plurality of rib assemblies of FIG. 1 being shown in a fully open position.

FIG. 5 is a perspective view of the umbrella of FIG. 4 being shown in a fully closed position.

FIG. 6 is an enlarged cross-sectional view of a portion of the rib assembly of FIG. 1 showing the anti-inversion feature of the present invention.

FIG. 7A is a perspective view of a strut to rib joint of the rib assembly of FIG. 1.

FIG. 7B is a side elevation view of the strut to rib joint of FIG. 7A.

FIG. 7C is a top plan view of the strut to rib joint of FIG. 7A.

FIG. 7D is an end view of the strut to rib joint of FIG. 7A.

FIG. 8A is a perspective view of a floating joint of the rib assembly of FIG. 1.

FIG. 8B is a side elevation view of the floating joint of FIG. 8A.

FIG. 8C is a top plan view of the floating joint of FIG. 8A.

FIG. 8D is an end view of the floating joint of FIG. 8A.





# Review claims

- Provide legal boundaries of intellectual property.
- Define the invention and what aspects are legally enforceable.
- Located at the end of the patent document.

What is claimed is:

1. An umbrella comprising:

an elongated shaft having a first end and an opposite second end;

a runner slidably disposed about the elongated shaft and movable along a length of the shaft; and

a plurality of ribs that are attached to the runner by a plurality of main struts that move between open and closed positions in which in the open position, the ribs are in an open, extended position and in the closed position, the ribs are in a closed, collapsed position;

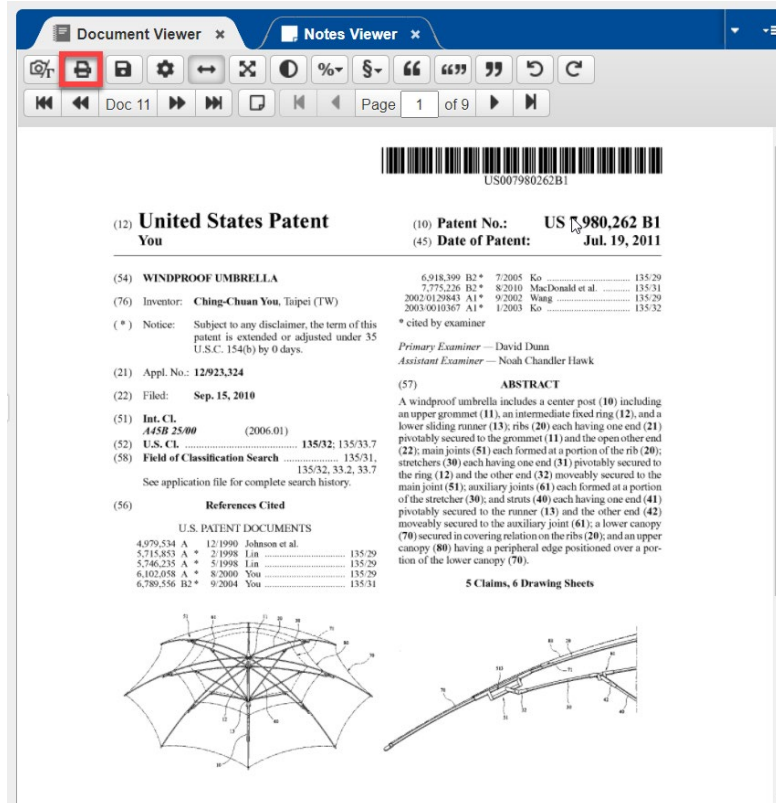
an anti-inversion mechanism comprising a plurality of anti-inversion struts, wherein each anti-inversion strut is pivotally coupled to one respective main strut and is also pivotally connected to one respective;

wherein the anti-inversion strut has a first end portion including a U-shaped first section defined by a first floor and a pair first side walls, wherein the U-shaped first section is open only in a first direction, and a second end portion including a U-shaped second section defined by a second floor and a pair of second side



# Printing individual documents

In Document Viewer panel, select the print icon to print all pages of a document.



The screenshot shows a Document Viewer window with a toolbar at the top. The print icon, represented by a printer symbol, is highlighted with a red box. Below the toolbar, the document content is displayed, including a barcode, patent information, and technical drawings of a windproof umbrella.

Document Viewer x Notes Viewer x

Doc 11 Page 1 of 9

US007980262B1

(12) **United States Patent**  
You

(10) Patent No.: US 7,980,262 B1  
(45) Date of Patent: Jul. 19, 2011

(54) **WINDPROOF UMBRELLA**

(76) Inventor: Ching-Chuan You, Taipei (TW)

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

(21) Appl. No.: 12/923,324  
(22) Filed: Sep. 15, 2010

(51) Int. Cl. (2006.01) A45B 25/00  
(52) U.S. Cl. 135/32, 135/33.7  
(58) Field of Classification Search 135/31, 135/32, 33.2, 33.7  
See application file for complete search history.

(56) **References Cited**

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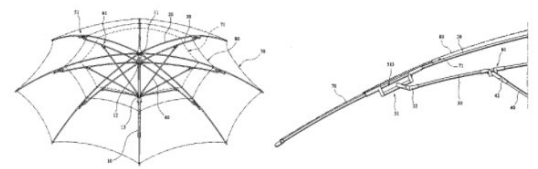
\* cited by examiner

Primary Examiner — David Dunn  
Assistant Examiner — Noah Chandler Hawk

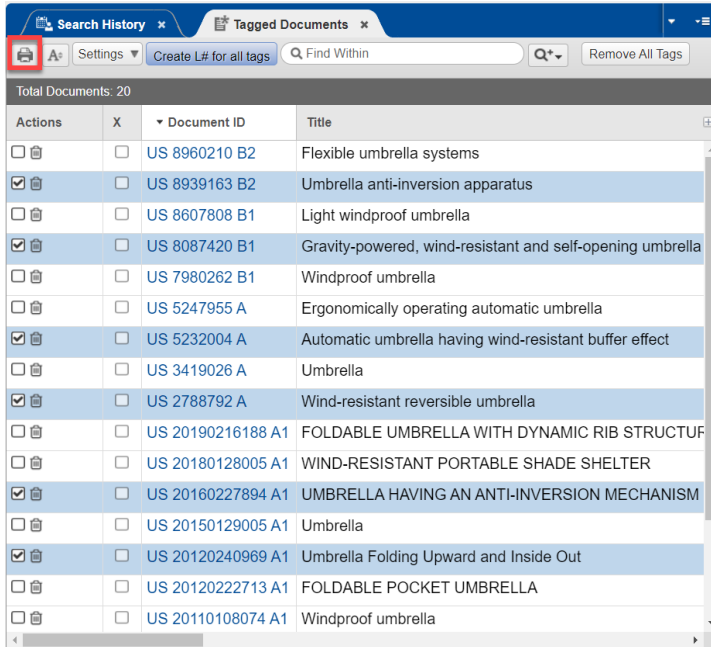
(57) **ABSTRACT**

A windproof umbrella includes a center post (10) including an upper grommet (11), an intermediate fixed ring (12), and a lower sliding runner (13); ribs (20) each having one end (21) pivotally secured to the grommet (11) and the open other end (22); main joints (51) each formed at a portion of the rib (20); stretchers (30) each having one end (31) pivotally secured to the ring (12) and the other end (32) movably secured to the main joint (51); auxiliary joints (61) each formed at a portion of the stretcher (30); and struts (40) each having one end (41) pivotally secured to the runner (13) and the other end (42) movably secured to the auxiliary joint (61); a lower canopy (70) secured in covering relation on the ribs (20); and an upper canopy (80) having a peripheral edge positioned over a portion of the lower canopy (70).

5 Claims, 6 Drawing Sheets



# Printing a list of documents



List of Selected Tagged Documents

#	Doc ID	Date Published	Title	Image Pages
1	US-20110030751-A1	2011-02-10	Windproof Sunshade	6
2	US-8939163-B2	2015-01-27	Umbrella anti-inversion apparatus	9
3	US-8087420-B1	2012-01-03	Gravity-powered, wind-resistant and self-opening umbrella system	11
4	US-5232004-A	1993-08-03	Automatic umbrella having wind-resistant buffer effect	10
5	US-2788792-A	1957-04-16	Wind-resistant reversible umbrella	5
6	US-20180128005-A1	2018-05-10	WIND-RESISTANT PORTABLE SHADE SHELTER	46
7	US-20160227894-A1	2016-08-11	UMBRELLA HAVING AN ANTI-INVERSION MECHANISM	24
8	US-20120240969-A1	2012-09-27	Umbrella Folding Upward and Inside Out	36



Select the print icon (in red above) in the Tagged Documents panel once you have selected one or more documents.

Expand the search to patent publications  
with relevant CPC classifications

## **STEP 4**

# Classification

- In general, a classification system is an arrangement of hierarchical categories used to organize “things” by their characteristics and relationships.
- Classification systems are very useful for sorting and searching large collections of information.
- Patent examiners are required to study a patent application and apply the appropriate Cooperative Patent Classification(s), so that searchers can retrieve other patent documents with similar inventions to the one disclosed in that application.



# U.S. Patent Classification and Cooperative Patent Classification

- In 2013, Cooperative Patent Classification (CPC), co-developed with the European Patent Office (EPO), replaced U.S. Patent Classification (USPC) for the classification of U.S. utility patents.
- USPC remains in use for U.S. design patents and plant patents.



# What this means for searchers

- Compare the most relevant patents and published applications you found.
- Copy the CPC classifications. Are some common to many or all documents in your search results?
- You find that the CPC classification **A45 B25/22** shows up frequently. Look it up in the CPC classification schema using the Classification Resources page:  
<https://www.uspto.gov/web/patents/classification/> .



# Use the Classification Symbol Lookup tool

Enter  
Classification  
Symbol:  
**"A45 B25/22"**

### Classification Symbol Lookup

Select Classification System:  CPC  USPC

Enter Classification symbol:

Select Content: 

- Scheme
- Definitions
- CPC to IPC Concordance

Select output format:  HTML  PDF





# Scan the scheme

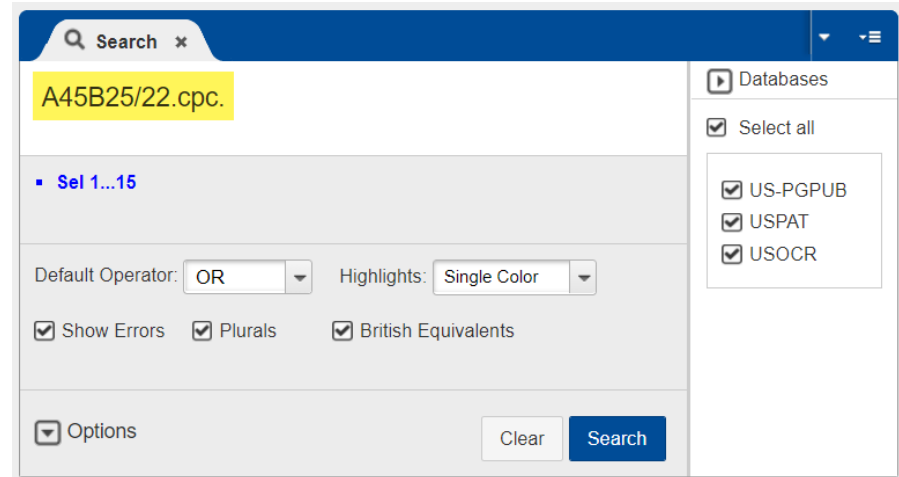
- **A45B 25/22** seems to be the best match for our invention.
- You can scan the scheme for class-subclass **A45B** up and down the page to see if there are additional relevant classifications for a wind-resistant design for an umbrella.
- Click on the “**D**” icon to review a definition for that classification title.

<b>D</b>	-	A45B 25/16	. Automatic openers, e.g. frames with spring mechanisms {(A45B 25/143 takes precedence)}
<b>D</b>		A45B 25/165	. . {with fluid or electric actuators}
<b>D</b>	-	A45B 25/18	. Covers (detachable A45B 15/00); Means for fastening same
		A45B 2025/183	. . {Covers with filtering or screening means for avoiding undesired radiation}
		A45B 2025/186	. . {Umbrellas with two or more covers}
<b>D</b>		A45B 25/20	. . Windows in covers
<b>D</b>		A45B 25/22	. Devices for increasing the resistance of umbrellas to wind
<b>D</b>	-	A45B 25/24	. Protective coverings for umbrellas when closed



# Retrieve documents using the CPC classification(s) identified

- Enter a search query with the CPC classification(s) you found most relevant.
- Eliminate the space in the middle of the CPC classification in your search statement.
- Use the field label **.cpc.**



Review cited references

## **STEP 5**

# Cited (backward) references

The front page of a patent will have a section of cited references provided by the applicant and/or the patent examiner (latter indicated by an asterisk).

<b>(12) United States Patent</b>		(10) <b>Patent No.:</b> <b>US 9,027,580 B2</b>
<b>Di Cesare</b>		(45) <b>Date of Patent:</b> <b>May 12, 2015</b>
<p>(54) <b>RIB STRUCTURE OF UMBRELLAS</b></p> <p>(76) Inventor: <b>John David Di Cesare, Saitama (JP)</b></p> <p>(* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 468 days.</p> <p>(21) Appl. No.: <b>13/006,208</b></p> <p>(22) Filed: <b>Nov. 29, 2011</b></p> <p>(65) <b>Prior Publication Data</b> US 2012/0298159 A1 Nov. 29, 2012</p> <p>(90) <b>Foreign Application Priority Data</b> Dec. 2, 2010 (JP) ..... 2010-007884</p> <p>(51) <b>Int. Cl.</b> <i>A45B 11/00</i> (2006.01) <i>A45B 25/02</i> (2006.01) <i>A45B 25/18</i> (2006.01) <i>A45B 25/06</i> (2006.01) <i>A45B 25/10</i> (2006.01) <i>A45B 25/22</i> (2006.01)</p> <p>(52) <b>U.S. Cl.</b> CPC ..... <i>A45B 11/00</i> (2013.01); <i>A45B 25/02</i> (2013.01); <i>A45B 25/06</i> (2013.01); <i>A45B 25/10</i> (2013.01); <i>A45B 25/18</i> (2013.01); <i>A45B 25/22</i> (2013.01); <i>A45B 20/1005</i> (2013.01)</p> <p>(58) <b>Field of Classification Search</b> CPC .. <i>A45B 23/00</i>; <i>A45B 20/1005</i>; <i>A45B 17/00</i>; <i>A45B 11/00</i> USPC ..... 135/15.1, 20.1 See application file for complete search history.</p>		
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<i>Primary Examiner</i> — David R Dunn		
<i>Assistant Examiner</i> — Danielle Jackson		
(74) <i>Attorney, Agent, or Firm</i> — Lucas & Mercanti, LLP		
<b>(57) ABSTRACT</b>		
In order to provide a rib structure of an umbrella, which has superior appearance without receiving unnecessary structural pressure and can contribute to the development of the industry by motivating consumers to buy, this invention features the rib structure of an umbrella which is formed with multiple ribs wherein the length of specific ribs is different from the length of other specific ribs, cloth is stretched onto the above mentioned ribs thereby changing forms of the umbrella and when the above mentioned cloth is put between the above mentioned ribs and adjacent ribs, the cloth does not expand and contract in the direction of the length of said ribs, but is expandable and contractible in any direction with the exception of the direction of the length of said ribs.		
<b>11 Claims, 31 Drawing Sheets</b>		



# Forward references

- If a patent or published patent application after its publication date is cited in a newer U.S. patent publication, it also may be highly relevant.
- Patent Public Search can run a search of both the backward and forward citations (if any) of U.S. patent documents results (but not foreign patent documents cited). Use the double quotation mark button in the menu bar in the Document Viewer panel:



Broadening your search

## **STEP 6**

# Additional search options

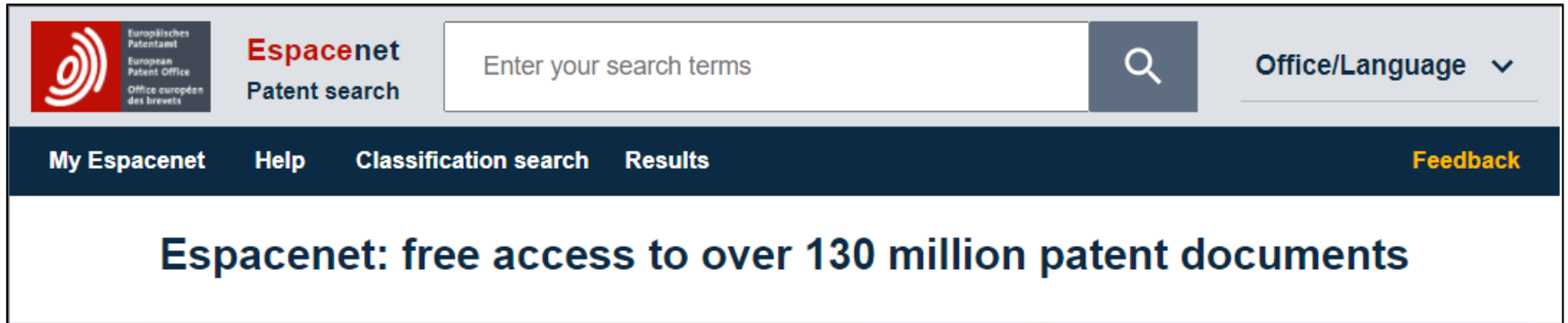
Having completed what you believe to be a thorough search of preliminary U.S. patents and U.S. published patent applications in which you did not find patent publications that disclosed what you hope to protect in your own patent application...

You have options to broaden your search – based on available time, money and resources.



# Foreign patent search

Worldwide.Espacenet.com



The screenshot displays the top section of the Espacenet website. On the left is the logo for the European Patent Office (EPO), with text in German, English, and French. Next to it is the 'Espacenet Patent search' logo. A search bar contains the placeholder text 'Enter your search terms' and a magnifying glass icon. To the right of the search bar is a dropdown menu labeled 'Office/Language'. Below these elements is a dark blue navigation bar with links for 'My Espacenet', 'Help', 'Classification search', 'Results', and 'Feedback'. A large white banner below the navigation bar contains the text: 'Espacenet: free access to over 130 million patent documents'.





# Non-patent literature searching

- Inventions can be publicly disclosed in a variety of non-patent publications, too, such as:

Books / Journal Articles / Websites / Technical Catalogs / Conference Proceedings

- Depending on the databases available for public use at your PTRC, a PTRC library staff member can show how to search these for non-patent literature also.



# Consider a registered patent attorney/agent

- Having done your preliminary research, you are better prepared to discuss your invention's viability with an attorney.
- The attorney won't have to spend time (and money) covering patenting basics, if you've used your library research time wisely.
- The patent attorney/agent may choose to conduct his/her own patentability search.



# REVIEW

# The multi-step patent search strategy

1. Brainstorm terms describing your invention.
2. Conduct a keyword search using Patent Public Search.
3. Conduct an in-depth review of the selected documents.
4. Expand the search to publications with relevant CPC classifications
5. Review cited references.
6. Broaden your search with foreign patents, non-patent literature and/or a patent professional's search.



# Additional resources

- Narrated CBT of the multi-step patentability search strategy:

<https://www.uspto.gov/video/cbt/prelim-patent-search/index.html>

- Inventors Search Assistant:

<https://developer.uspto.gov/inventor-search/#/search/publication/intro>



# Questions?

Tom Turner

Librarian

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- [www.uspto.gov/ptrc](http://www.uspto.gov/ptrc)
- [tom.turner@uspto.gov](mailto:tom.turner@uspto.gov)



