

# 7-Step U.S. Patent Search Strategy Guide

## U.S. Patent Search Assistance at a PTRC

Patent and Trademark Resource Center (PTRC) library staff are available to provide training on U.S. patent search processes and research tools including PubWEST, PubEAST and the USPTO website's PatFT and AppFT patent publication databases. For the PTRC nearest you, check [www.uspto.gov/ptrc](http://www.uspto.gov/ptrc). For legal questions, contact an attorney or agent registered to practice before the USPTO at <https://oedci.uspto.gov>.

## U.S. Patent Prior Art Search vs. Comprehensive Prior Art Search

This guide provides a 7-step strategy for searching U.S. patents to locate and evaluate relevant U.S. patent publications prior art (earlier U.S. patents and U.S. published patent applications). A comprehensive prior art search would also include foreign patents and non-patent literature (newspapers, magazines, dissertations, conference proceedings, and websites). PTRC staff can also provide training on how to locate these additional resources.

## Search Preparation and Documentation

Plan on spending a few hours learning the search process and additional hours for searching and evaluating results. The length of search time depends on the complexity of the invention. Careful recording of the search process (databases used, date and time of search, classes searched, and patents/published patent applications retrieved) is important.

# 1

## STEP 1: Brainstorm Terms Describing the Invention

Begin by writing down a brief, accurate description of the invention. Avoid overly broad and generic terms such as “device,” “process” and “system.” Note important keywords and technical terms. Use the following questions to help identify keywords and concepts.

- What is the purpose of the invention? Is it a utilitarian device or an ornamental design?
- Is the invention a process – a way of making something or performing a function – or is it a product?
- What is the invention made of? What is the physical composition of the invention?
- How is the invention used?
- What are keywords and technical terms that describe the nature of the invention? Consult a technical dictionary or thesaurus to help find the appropriate terms. It may be helpful to order terms according to decreasing scope. For example:

Vehicle  Automobile  Air Bags

# 2

## STEP 2: Index to the U.S. Patent Classification (USPC) System

**Index to the United States Patent Classification (USPC) System**

Preface to the Index to the USPC  
Select the format and section (by letter) ...

Index in HTML    **A** B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
Index in PDF     A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

[www.uspto.gov/go/classification/uspcindex/indextouspc.htm](http://www.uspto.gov/go/classification/uspcindex/indextouspc.htm)

Use the html Index to the U.S. Patent Classification System (above) to look up relevant terms. The Index is an alphabetical listing of common terms with their linked USPC classifications (class/subclass numbers). Under “A” for “automobile”:

Automobile (See Land Vehicle; Motor Vehicle)	
Air bag passenger restraints .....	<b>280 / 728.1+</b>
Beds .....	5 / 118+
Cribs .....	5 / 94
Body crushers .....	100 / 901*
Carburetor see carburetor .....	261
Compound repair tools .....	7 / 100+

Click on the subclass 728.1 to go to Class Schedule (Step 3)

If terms are not found in the Index:

- Scan or search the class titles and descriptions in the Manual of Classification (<http://www.uspto.gov/web/patents/classification/selectnumwithtitle.htm>) to determine where the invention might fit in the U.S. Patent Classification System.
- Run a keyword search in the patent databases (see below) and scan the retrieved patents and published patent applications for relevant USPC classifications.

# 3

## STEP 3: U.S. Patent Class Schedule in the Manual of Classification

**Class 280 LAND VEHICLES**

<b>A</b>	<b>P</b>	727	· Attachment
<b>A</b>	<b>P</b>	728.1	.. Inflatable passenger restraint or confinement (e.g., air bag) or attachment
<b>A</b>	<b>P</b>	728.2	... With specific mounting feature
<b>A</b>	<b>P</b>	728.3	... Deployment door
<b>A</b>	<b>P</b>	729	... Plural compartment confinement (e.g., "bag within a bag")
<b>A</b>	<b>P</b>	730.1	... Inflated confinement specially positioned relative to occupant or conforming to the body shape of occupant
<b>A</b>	<b>P</b>	730.2	.... Mounted in vehicle and positioned laterally of occupant

Click on the linked class/subclass you found in Step 2’s Index to U.S. Patent Classification (e.g. class “280/728.1”) to locate the classifications in the USPC Class Schedules of the Manual of Classification to verify their relevancy (see example above).

Scan the entire class schedule for Class 280, starting with the initial classification and paying attention to the mainline sub-classes and indented subclasses, which are called “dot-indent.” There may be subclasses below 280/728.1 that might be more specific to your invention.

(Note: USPC Class schedules are arranged in outline format. Subclass numbers do not always appear in sequential order.)

## 4

### STEP 4: U.S. Patent Classification Definitions

Click on the subclass number (e.g. “728.1”) to read its USPC subclass definition to establish the scope of the relevant classifications (see example below) and ensure you have the most relevant class/subclass. The definitions include important search notes and suggestions for further searching. The U.S. Patent Classification Definitions are also available from the Classification search page: [www.uspto.gov/go/classification](http://www.uspto.gov/go/classification)

**728.1** **Inflatable passenger restraint or confinement (e.g., air bag) or attachment:**  
This subclass is indented under subclass 727. Devices wherein the attachment comprises a bag designed to inflate upon impact of the vehicle with an external object and thereby confine a vehicle occupant in a protective environment made up of a confinement bag and a vehicle seat.

(1) Note. A passenger restraining device of the inflatable type is provided for only in this class (280).

SEE OR SEARCH THIS CLASS, SUBCLASS:

**801.1** for safety belts, per se.

## 5

### STEP 5: Retrieve and Review Issued Patents and Published Patent Applications Using the USPC Classification(s) Identified

Once the relevant USPC classification(s) have been identified, use these USPC classifications to retrieve and review all the U.S. patents and published patent applications currently assigned to that class/subclass (e.g. “280/728.1”). Issued patents and published applications can be searched and viewed using USPC classifications in any of the following databases at a PTRC:

- PubWEST: US Patents Full-Text and US Pre-Grant Publication databases
- PubEAST: US Patents Full-Text and US Pre-Grant Publication databases
- USPTO website: Issued Patents (PatFT) and Published Applications (AppFT) databases

(12) **United States Patent**  
Lee

(10) Patent No.: **US 8,500,160 B2**  
(45) Date of Patent: **Aug. 6, 2013**

(54) **KNEE AIRBAG APPARATUS**

(75) Inventor: **Jung Su Lee, Gyeonggi-do (KR)**

(73) Assignee: **Hyundai Mobis Co., Ltd, Yongin-si, Gyeonggi-do (KR)**

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 347 days.

(21) Appl. No.: **12/911,270**

(22) Filed: **Oct. 25, 2010**

(65) **Prior Publication Data**  
US 2012/0007345 A1 Jan. 12, 2012

(30) **Foreign Application Priority Data**  
Jul. 9, 2010 (KR) ..... 10-2010-0066333

(51) **Int. Cl.**  
**B60R 21/16** (2006.01)

(52) **U.S. Cl.**  
USPC ..... **280/730.1; 280/728.1; 280/743.1; 280/743.2**

(58) **Field of Classification Search**  
USPC ..... 280/730.1, 743.1, 743.2, 728.1  
See application file for complete search history.

(56) **References Cited**

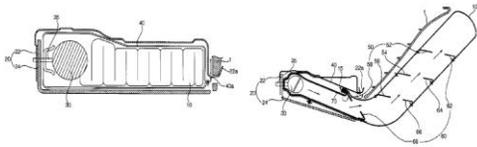
U.S. PATENT DOCUMENTS  
7,766,374 B2 \* 8/2010 Abele et al. .... 280/730.1  
8,096,578 B2 \* 1/2012 Wigdor et al. .... 280/732  
8,118,335 B2 \* 2/2012 Jansen et al. .... 280/730.1

FOREIGN PATENT DOCUMENTS  
JP 2003-306116 10/2003  
JP 2004-210092 A 7/2004  
JP 2004-314763 A 11/2004  
JP 2008-286785 12/2008  
\* cited by examiner

**Primary Examiner** — Eric Culbreth  
(74) **Attorney, Agent, or Firm** — Sherr & Jiang, P.L.L.C.

(57) **ABSTRACT**  
Provided is a knee airbag apparatus including an airbag cushion that develops upward without sagging downward to protect the passenger's knee.

**21 Claims, 4 Drawing Sheets**



Front Page of U.S. Patent

**Results of Search in US Patent Collection db for: CCL/"280/728.1": 727 patents.**  
**Hits 1 through 50 out of 727**

Refine Search CCL/"280/728.1"

PAT. NO.	Title
1 8,642,489	Airbag fabric and airbag
2 8,641,080	Air bag container
3 8,636,300	Attachment bracket and fastening device for fastening an airbag to a vehicle structure
4 8,608,846	Liquid silicone rubber coating composition, curtain airbag, and its production method
5 8,594,894	Method for protecting a vehicle occupant in a vehicle seat of a vehicle
6 8,544,881	Vehicle occupant restraint system and method of restraining a vehicle occupant
7 8,541,321	Copolymerized polyether polyamide resin
8 8,536,260	Resin composition for seamless air bag covers, and seamless air bag covers or seamless instrument panels with air bag covers, made by using the composition
9 8,523,220	Structure mounted airbag assemblies and associated systems and methods
10 8,500,160	Knee airbag apparatus

Search Results

First review the front page of each publication, paying special note to the abstract and representative drawing. For publications that appear relevant, then review the complete claims, specifications and drawings which appear in later pages. Remember the claims constitute the boundaries of legal property rights given to the patent holder. Save or download copies of the most relevant U.S. patents.

**6**

**STEP 6: Find Relevant CPCs (Cooperative Patent Classifications) Using Statistical Mapping from USPC to CPC; Retrieve and Review U.S. Patent Documents**

On the Classification Search Page ([www.uspto.gov/go/classification](http://www.uspto.gov/go/classification)) apply the relevant U.S. Patent Classification(s) you found in Step 4 (e.g., "280/728.1") to the Statistical Mapping from USPC to CPC feature to find the five most relevant CPC classifications. (Three will be listed; click on "more" to see the other two CPC classifications).

**Access Classification Information by Symbol**

Select Classification System:  CPC  USPC

Enter Classification symbol:  /   
e.g., 482/1 or D14/314

Select output format:  HTML  PDF

Select Content:  
 Schedule  
 Definitions  
 **Statistical Mapping from USPC to CPC**  
 USPC to IPC Concordance  
 USPC to LOCARNO (for Designs)

<a href="#">280/721</a>	<a href="#">B 60R 21/23</a>	<a href="#">B 60R 21/16</a>	<a href="#">B 60R 20/21/16</a>	<a href="#">more...</a>
<a href="#">280/728.1</a>	<a href="#">B 60R 21/2171</a>	<a href="#">B 60R 21/237</a>	<a href="#">B 60R 21/235</a>	<a href="#">more...</a>
<a href="#">280/728.2</a>	<a href="#">B 60R 21/2174</a>	<a href="#">B 60R 21/247</a>	<a href="#">B 60R 21/245</a>	<a href="#">more...</a>

Click on the Subclass Main Group/Subgroup number in one of the five CPC classifications (e.g. “21/2171” for B60R 21/2171). Scan the entire CPC class schedule, starting with the initial classification B60R and pay attention to the mainline sub-classes and indented subclasses, the “dot-indent.” As you scroll up and down the class schedule you find the most relevant CPC subclass for your invention, B60R 21/16.

CPC	COOPERATIVE PATENT CLASSIFICATION
<input type="checkbox"/> <a href="#">B60R</a>	VEHICLES, VEHICLE FITTINGS, OR VEHICLE PARTS, NOT OTHERWISE PROVIDED FOR
<input type="checkbox"/> <a href="#">B60R 21/00</a>	Arrangements or fittings on vehicles for protecting or preventing injuries to occupants or pedestrians in case of accidents or other traffic risks( safety belts or body harnesses in vehicles B60R 22/00 ; devices, apparatus or methods for life-saving in general A62B ; safety devices for propulsion unit control specially adapted for, or arranged in, vehicles B60K 28/00 ; seats constructed to protect the occupant from the effect of abnormal g-forces, e.g. crash or safety seats, B60N 2/42 ; energy-absorbing arrangements for hand wheels for steering vehicles B62D 1/11 ; energy-absorbing arrangements for vehicle steering columns B60 1/19 ; arrangements in aircraft B64D 25/00 )
 <input type="checkbox"/> <a href="#">B60R 21/16</a>	.. Inflation occupant restraints or confinements designed to inflate upon impact or impending impact, e.g. air bags( { protective garments with automatically inflatable shock-absorbing means A41D 13/018 ; } connection of valves to inflatable elastic bodies B60C 29/00 )
B60R 21/164	... {combined with vehicle venting means for reducing or avoiding the passenger compartment overpressure during inflation}
B60R 21/18	... the inflatable member formed as a belt or harness or combined with a belt or harness arrangement
<input type="checkbox"/> <a href="#">B60R 21/20</a>	... Arrangements for storing inflatable members in their non-use or deflated condition ; Arrangement or mounting of air bag modules or components
B60R 21/201	.... Packaging straps or envelopes for inflatable members
<input type="checkbox"/> <a href="#">B60R 21/203</a>	.... in steering wheels or steering columns
B60R 21/2032	..... {the inflator or inflatable member not being rotatable with the steering wheel; Arrangements using the steering column or steering wheel rim for storing, supplying or evacuating the inflation gas or for storing the inflatable member}
<input type="checkbox"/> <a href="#">B60R 21/2035</a>	..... {using modules containing inflator, bag and cover attachable to the steering wheel as a complete sub-unit( steering wheel covers with tear lines B60R 21/21656 ; assembling of modules B60R 21/217 )}
B60R 21/2037	..... {the module or a major component thereof being yieldably mounted, e.g. for actuating the horn switch or for protecting the driver in a non-deployment situation( horn switches integrated in steering wheel covers with tear lines B60R 21/21658 )}

Click on the underlined link for B60R 21/16 to view the CPC class definition to establish its scope (see example below). The definitions include important search notes and suggestions for further searching. This will help ensure that you have selected the most relevant CPC classification for your search.

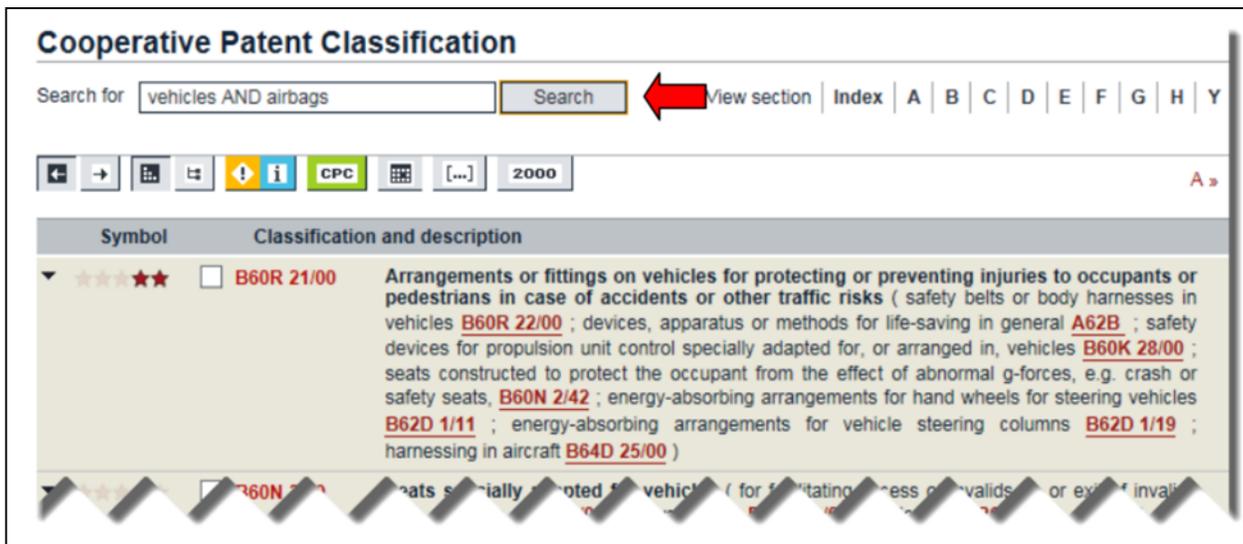
<b>B60R 21/16</b>
<b>Inflation occupant restraints or confinements designed to inflate upon impact or impending impact, e.g. air bags ([N: protective garments with automatically inflatable shock-absorbing means A41D 13/018;] connection of valves to inflatable elastic bodies B60C 29/00 )</b>
<b>Definition statement</b>
<i>This subclass/group covers:</i>
<i>The group covers:</i>
Inflation occupant restraints or confinements designed to inflate upon impact or impending impact, e.g. air bags.
From the subgroup B60R 21/20 to the subgroup B60R 21/2176 subject-matter related to the storage of the inflatable member.
From the subgroup B60R 21/23 to the subgroup B60R 21/239 the inflatable member as such.
From the subgroup B60R 21/26 to the subgroup B60R 21/33 subject-matter related to the inflation fluid source of the inflatable member.

Once the relevant CPC classification(s) has been identified, retrieve and review all the U.S. patents and U.S. published patent applications for every classification. This review will verify that the Cooperative Patent Classification(s) you found is relevant to your invention. Issued patents and published applications can be searched and viewed using CPC classifications in any of the following databases at a PTRC: PubWEST, PubEAST or PatFT/AppFT on USPTO website.

# 7

## STEP 7: Conduct a Classification Search of CPC Class Schemes on the EPO's Espacenet Website to Find Additional CPC Classifications, if Needed.

If you find the patent documents resulting from the CPC classifications identified in Step 6 are not as relevant to your invention as you expected (or if you wish to confirm the relevance of your CPC classifications from Step 6), you may be able to find additional CPC classifications by conducting a search of the entire CPC class schemes. This is a feature of the European Patent Office's Espacenet Worldwide database. Go to <http://worldwide.espacenet.com/classification>. In the Search box, enter terms to describe your invention. You can use up to 10 terms. You can use the "AND" operator to require that all the terms appear in the result. For example, the terms "vehicle and air bags" could be used to focus on 2 important aspects of the invention. If you get zero results, substitute synonyms for your terms.



Clicking on any CPC classification in the search results will provide an expanded view of the classification listed. Once you find a CPC classification relevant to your invention, you can then use that CPC classification to search U.S. patents and published applications in any of the following databases at a PTRC: PubWEST, PubEAST or PatFT/AppFT on USPTO website. (If you want to expand your search to include foreign patent publications in your prior art search, you can also use these CPC classification(s) to search on the Espacenet Worldwide database for those countries that use CPC in their patent classification.) PTRC staff can show you how to most effectively search each of these databases using CPC.

## Notes on Patent Classification:

- The use of Cooperative Patent Classification (CPC) to classify U.S. patent publications is currently being phased in at the USPTO.
- U.S. Patent Classification (USPC) remains available for searching all U.S. patents from 1790 to current in U.S. patent document databases. USPC will no longer be used to classify newly issued U.S. utility patents starting in 2015, but it will remain searchable for the pre-2015 utility patent backfile.
- U.S. utility patents from 1790 to 2012 are in the process of being retroactively classified in CPC (in addition to USPC) on USPTO patent document databases.
- U.S. design patents and plant patents will not be classified in CPC, only USPC.
- Since there is not a direct one to one concordance between USPC classifications and CPC classifications, the use of the Statistical Mapping tool described in Step 6 can be helpful.

## Business Planning & Marketing

PTRC libraries can provide additional resources detailing the business planning process, licensing, and marketing of inventions. Also beware of fraudulent invention promotion firms – see [www.uspto.gov/inventors/scam\\_prevention/index.jsp](http://www.uspto.gov/inventors/scam_prevention/index.jsp)

## Where to Get Help

There are helpful trained library staff at Patent and Trademark Resource Centers who can answer your patent searching questions. Go to [www.uspto.gov/ptrc](http://www.uspto.gov/ptrc) to see a directory of the nationwide PTRCs with contact information.

Disclaimer: The information contained in this guide is not intended as a substitute for professional legal advice. Use it as a general guide for conducting a U.S. patent publication prior art search. The USPTO recommends that inventors consult a registered patent agent or attorney prior to filing a patent application.



Patent and Trademark Resource Center Program  
United States Patent and Trademark Office  
United States Department of Commerce  
MDE 2C18, P. O. Box 1450, Alexandria, Virginia 22313  
[www.uspto.gov/ptrc](http://www.uspto.gov/ptrc)

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