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PATENT ARCHITECT® TUTORIAL

Section 1 Historical Development

In a training mode it is very inefficient to review and edit a patent application in its entirety. It is also an inefficient procedure for conveying independent lessons to the trainees as the lessons are best retained if addressed one or two at a time. Accordingly, it is most efficient to break the training of patent preparation down into relatively short review steps. Each step is approved by the trainer or mentor before proceeding to the next step to prevent an error from being carried throughout an application. The trainer or mentor can monitor the preparation of a patent application in six (6) steps separated by time to complete the next step:

- Review and edit the picture claim to make sure every line of the drawings and/or every element and detail of the preferred embodiment of the invention is accounted for and is operational correct;
- Review and edit claim 1 to verify that the "characterized by" clause isolates the point of novelty from the prior art and supports an art-additive;
- Review and edit the reconciliation of the language of the broadest claim 1 with the language of the picture claim;
- Review and edit the dependent claims both in priority of dependence and in reconciliation of the language of the picture claim with the language of all of the dependent claims so that the picture claim ends up with all of the recitations of all of the other claims;
- Review and edit the DESCRIPTION OF THE PREFERRED EMBODIMENT along with checking the drawings;
- Review and edit the introductory sections of the application and the Abstract.
-

Patent applications are now drafted on a computer using a word processing program whereby changes are easily made and with cut and paste being very handy. In this mode, the application is prepared by the preparer in final, except maybe for formatting by an assistant. This is more efficient than writing or dictating for typing by an assistant because, like novelists, much of the time spent in drafting an application is thinking time, i.e., composing.

There are many editorial functions in preparing a patent application that can be tedious using well known word processing programs. For example; using find and replace in edit to attach a reference numeral to all instances of an element name, and to re-number when trying to keep the reference numerals in serial relationship in the order of introduction, re-ordering of claims by cut and paste, etc. Programs exist that are dedicated to patents but they merely check the patent or application after the drafting is completed. On the other hand, this PatentArchitect® program facilitates the drafting or building of a patent application. Therefore, to facilitate the training, I teamed up with a computer guru to invent a word processing program to be used as an adjunct to training in the steps outlined above, see U.S. Patent 7,890,851.

Section 2 Building a Patent Application in a Template

The first attribute of this computer word processing program to simplify the mechanical aspects in the preparation of the patent application is a template including all of the sections and form paragraphs used in the preparation of a patent application. The computer program facilitates steps in the training such as the option of copying the picture claim changing "said" to –the—into

the description section based upon the premise that the picture claim contains all of the language of the remaining claims. This word processing program automatically performs many steps including numbering of element names, checking for antecedents, re-numbering and copying the broad claims into the introductory sections. The program includes an embedded page break immediately before the heading CLAIMS in the computer program. This assures that the heading CLAIMS always begins a new page. In similar fashion, a page break is embedded in the template memory for separating the heading ABSTRACT OF THE DISCLOSURE from the remainder of the headings to isolated the Abstract to a single page separate from the remainder of the patent application. A footer can be inserted in the template for displaying an attorney docket number and/or client file number on every page of the application, preferably in the lower left or right hand corner so as to be unencumbered by attachments at the tops of the pages, e.g., staples, clasps, or the like. Some patent offices create a paper file, referred to as a file wrapper, and attach the application papers to the file wrapper at the top of the pages. In such a paper file, the attorney docket number is always clearly accessible to the examiner when placed at the bottom of the pages, as the examiner might need to quickly find the docket number in a telephone interview with the attorney.

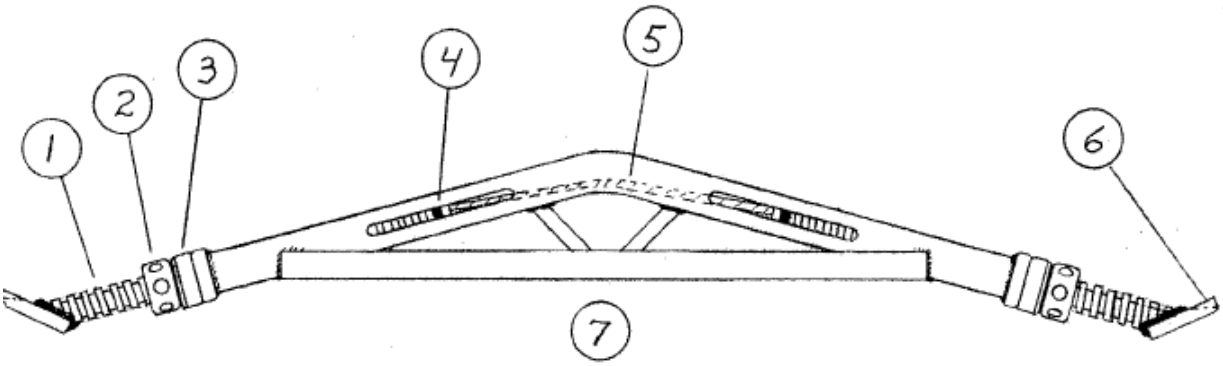
An exercise of preparing a patent application follows and shows in minute detail the steps in using patentarchitect.com. The program was developed as an integral part of a training program and is very effective for all levels of skill in patent preparation. In testing, the program, once mastered, can save at least ten percent (10%) of the total preparation time and significantly reduces errors.

Section 3 The Genesis of the Patent

Jim Griswold is an engineer and retired after selling his metal fabricating company. Guys like Jim retire but cannot stop doing something, One of Jim's projects was to dismantle and restore a 1929 Model A Ford. One of the attention getters in dismantling a Model A was the rear buggy-type spring that is sprung apart and attached at each end to the opposite ends of the axle housing so as to be bowed upwardly for attachment to and support of the vehicle body. As can be imagined, the spring has tremendous force and if one end is disconnected from the end of the axle, it can spring back with enough force to do great bodily injury.

Jim could not find a satisfactory spring spreader and so he developed one. He elected to apply for a patent on his spring spreader. The patent application was prepared under the broad methodology presented herein and that preparation is re-created herein as a tutorial using patentarchitect. The process was perfect because the prior art was seventy years old thereby to assure an accurate search, the claims clearly distinguished from that prior art, the examiner found no better prior art, and the entire application was focused throughout the claims, description and introductory sections whereby the examiner allowed the application on the first official action without amendment. Accordingly, the spring spreader patent is an excellent tool for illustrating the broad steps of the methodology and the mechanics attendant to the use of patentarchitect.com..

Section 4 The Inventor's Disclosure



FEATURES WHICH MAKE THIS MODEL "A" REAR SPRING SPREADER THE MOST ADVANCED SPREADER ON THE MARKET TODAY:

1 ACME THREADED RODS

A. Roughly half as many turns of the expansion nuts are required compared to machine threads.
B. Easier turning of the nuts because of less friction

2 UNIQUE EXPANSION NUTS

A. Can be turned with a round rod instead of a wrench
B. Rear axle housing and spring do not obstruct turning.
C. Turning rod is included with each spreader.

3 BALL THRUST BEARINGS further reduce friction for easier spreading.

4 SLOTS IN THE SPREADER FRAME AND HARDENED CROSS PINS THRU THE THREADED RODS.

A. Keep the claws oriented with the spreader frame.
B. Eliminates the aggravation of holding loose components in position while engaging the claws in the spring end curls and getting started..
C. Keeps the spreader frame upright above the differential.

5 UNIQUE SPRING keeps the threaded rods up against the spreader frame so they do not slip or drift downward.

6 HEAVY DUTY CLAWS

A. Side guides trap the spring end curls for added safety.
B. Unobstructed access for removal and installation of shackles.

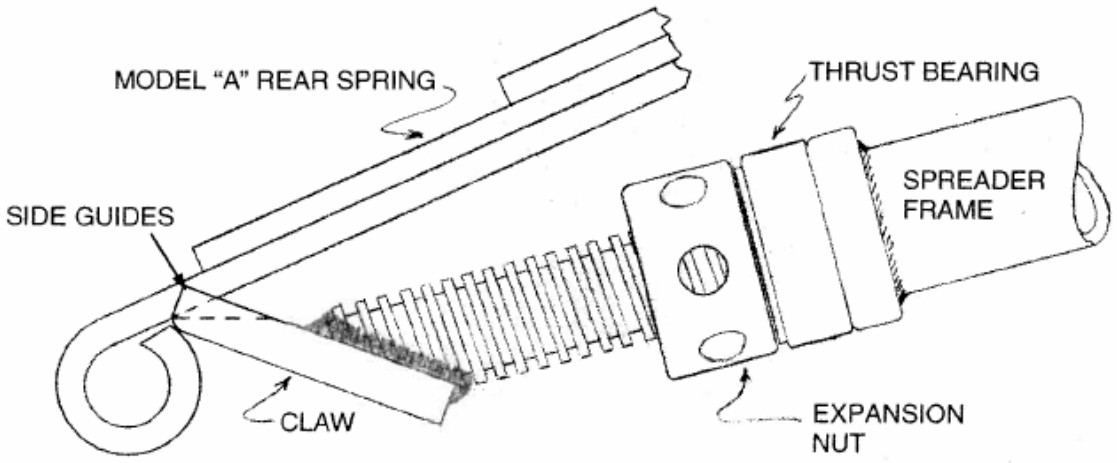
7 Eight Leaf Model "A" Rear Springs require approximately 1,600 lbs. of spreading force. Ten leaf springs required approximately 2,000 lbs. These spreaders have been tested at over 4000 lbs.

MODEL "A" REAR SPRING SPREADER

INSTRUCTIONS

- When used properly, this tool provides a safe and easy method of spreading Model "A" rear springs.
- Be sure the center bolt is holding all leaves tightly together before expansion or retraction with this tool.
- Support the car frame and body securely before removing shackles.
- Make sure spring is between side guides, as shown..
- Use the nut turning rod provided with the spreader. Do not use a screw driver or other device.
- Warning: Improper use could result In injury
- Any spring under tension can be very dangerous. Be Careful.

USE AT YOUR OWN RISK



Section 5 The Search Results and Patentability

A. The Prior Art and Isolation of New Elements

The spring spreader is classified by the USPTO in Class 254, Sub-Class 10.5 - IMPLEMENTS OR APPARATUS FOR APPLYING PUSHING OR PULLING FORCE / Metallic Spring Stretcher And/Or Compressor (e.g. Leaf, Helical, or Coil Springs). During searching it is noted that the pertinent patents found in this class and subclass were also cross referenced into Class 29, Sub-Class 039 - METAL WORKING / Tool Turret. Since the development of this particular product ended nearly seventy years ago, it is nearly certain that the best prior art will be found in these sub-classes. The most pertinent patents noted in the search are 1,755,088 to Vickrey, [1] 1,784,033 to Swanby,[2] and 1,808,625 to Barnhart.[3]

Since the negative guideline holds that the mere selection of elements from various prior art references and combining them together with no new function or unpredictable result is not patentable, we isolate all of the elements of the inventor's disclosure to be searched. The preferred embodiment includes;

- a V-shaped tubular frame including a cross beam and truss members
- a screw telescoping into each end of the tubular frame
- a nut threaded onto each screw and engaging the end of the tubular frame
- a bearing between each nut and the adjacent end of the tubular frame
- a collar between each nut and the adjacent end of the tubular frame
- cylindrical holes in the nuts for receiving a turning rod
- a pin extending transversely from the screw and movable along a slot in the tubular frame
- a claw plate extending from each screw at a forty degree angle for engaging the spring curls
- side guides on the claw plates for engaging the side edges of the leaf spring
- a tension spring interconnecting the inner ends of the screws via threaded connectors.

[1] U.S. Patent No. 1,755,088 (issued April 15, 1930).

[2] U.S. Patent No. 1,784,033 (issued Dec. 9, 1930).

[3] U.S. Patent No. 1,808,625 (issued June 2, 1931).

April 15, 1930. B. D. VICKREY 1,755,088

SPRING JACK

Filed Jan 25, 1929

Fig. 2.

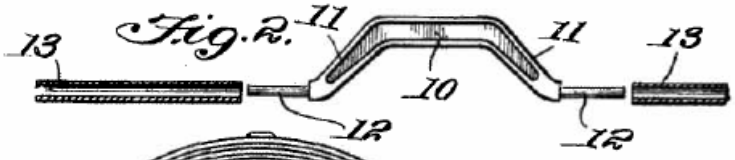


Fig. 1.

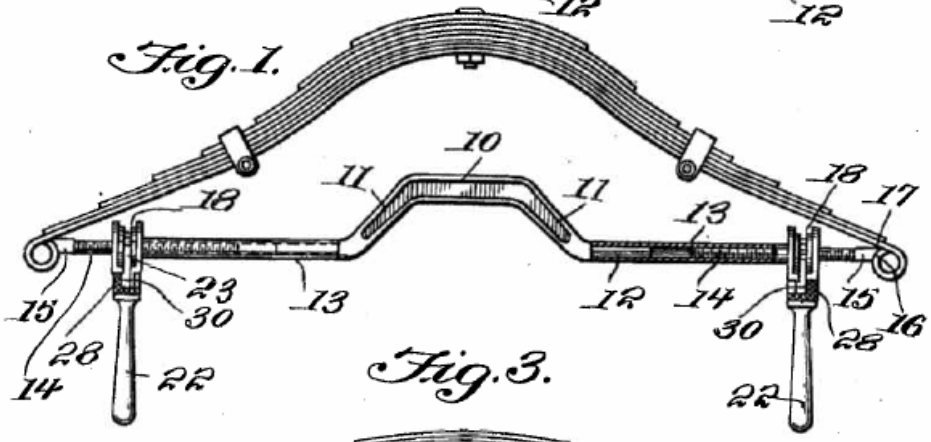


Fig. 3.

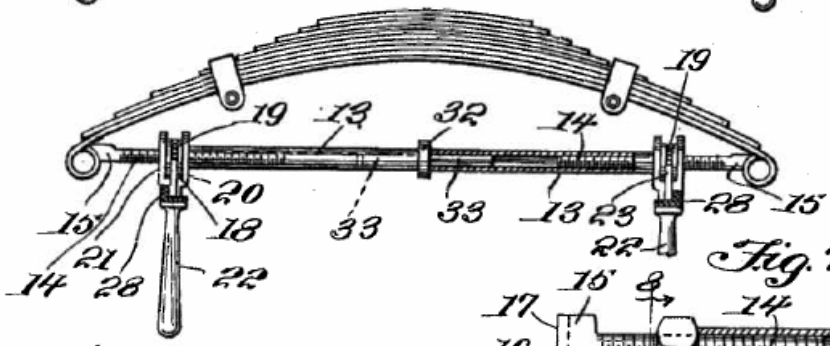


Fig. 7.

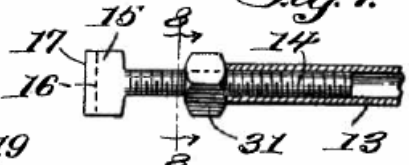


Fig. 4.

Fig. 5.

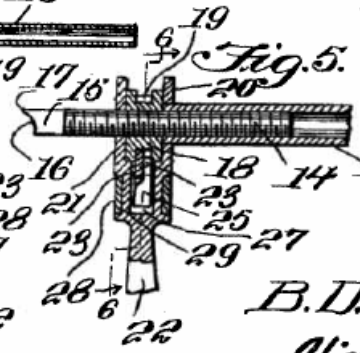


Fig. 8.

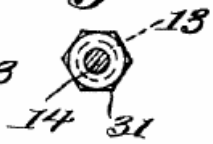


Fig. 6.

B. D. Vickrey
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: J. T. L. Wright

Dec. 9, 1930. G. E. SWANBY 1,784,033

AUTOMOBILE TOOL

Filed July 12, 1928

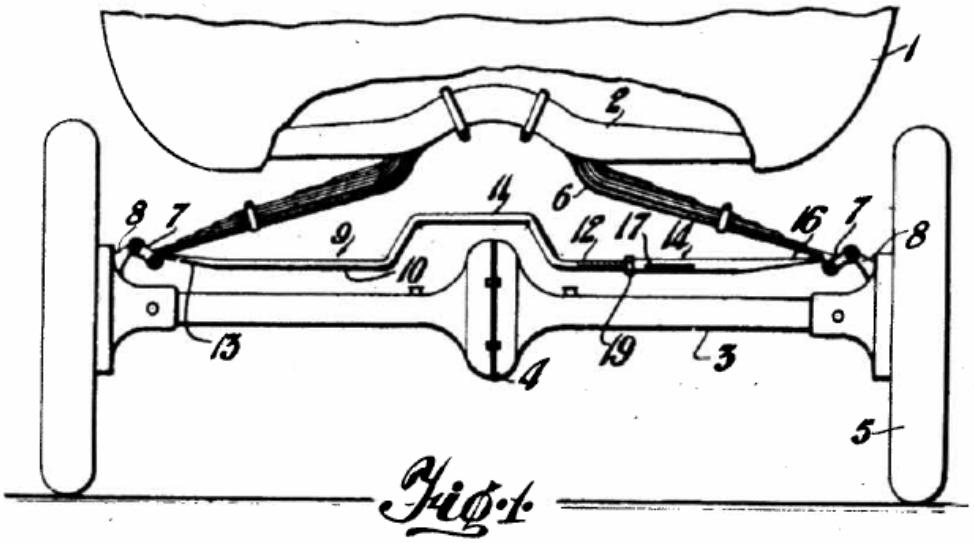


Fig. 1.

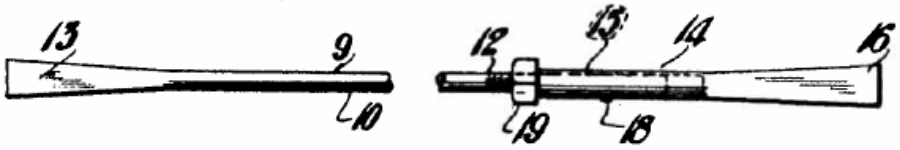


Fig. 2.

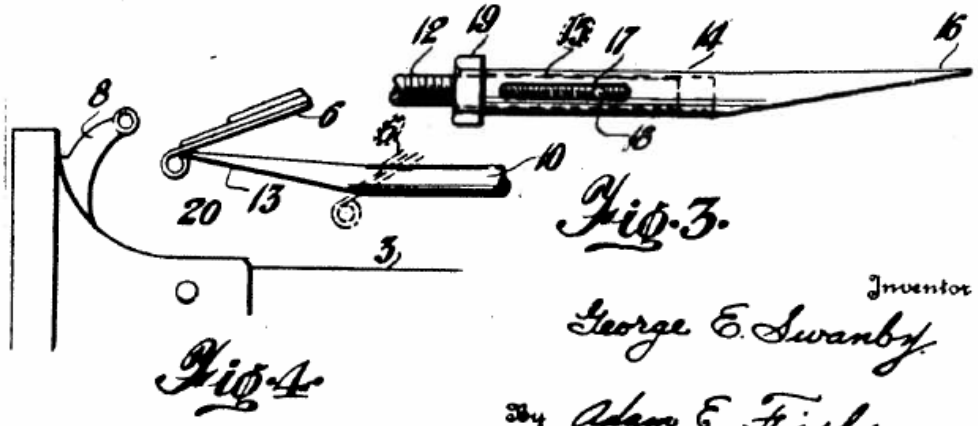


Fig. 3.

Fig. 4.

Inventor

George E. Swanby

By Adam E. Fisher

Attorney

June 2, 1931. R. D. BARNHART 1,808,625

SPRING SPREADER

Filed Oct. 23, 1929

Fig. 1.

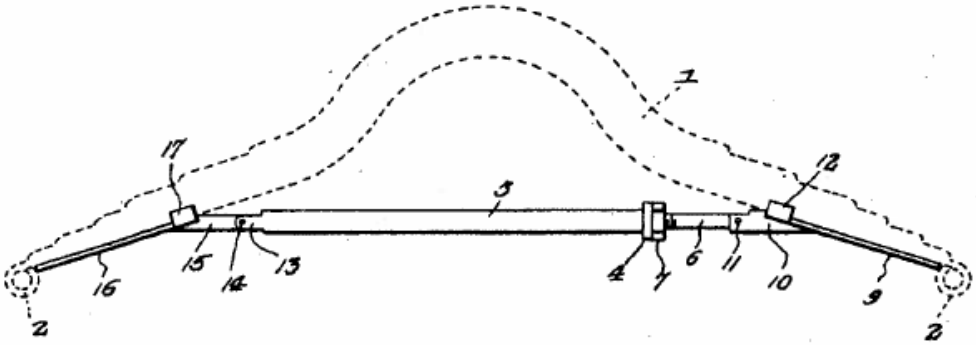
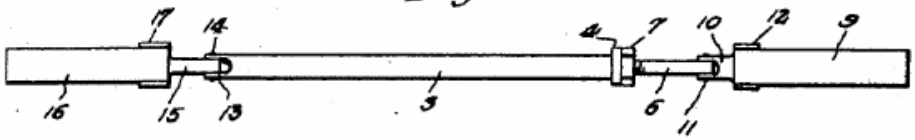


Fig. 2.



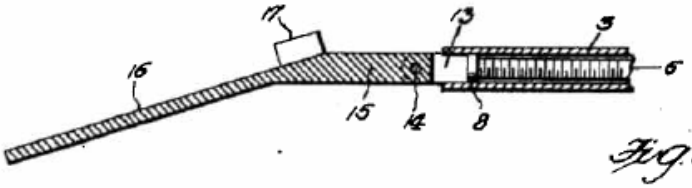
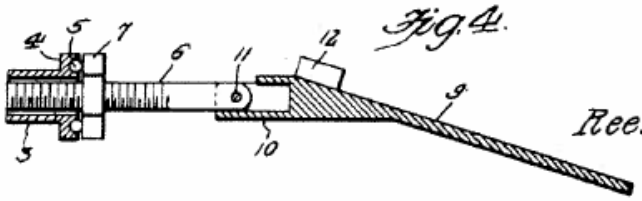


Fig. 3

Fig. 4.



Inventor

Reese D. Barnhart,

By Clarence O'Brien

Attorney

The most relevant disclosures of the prior art patents are discussed below.

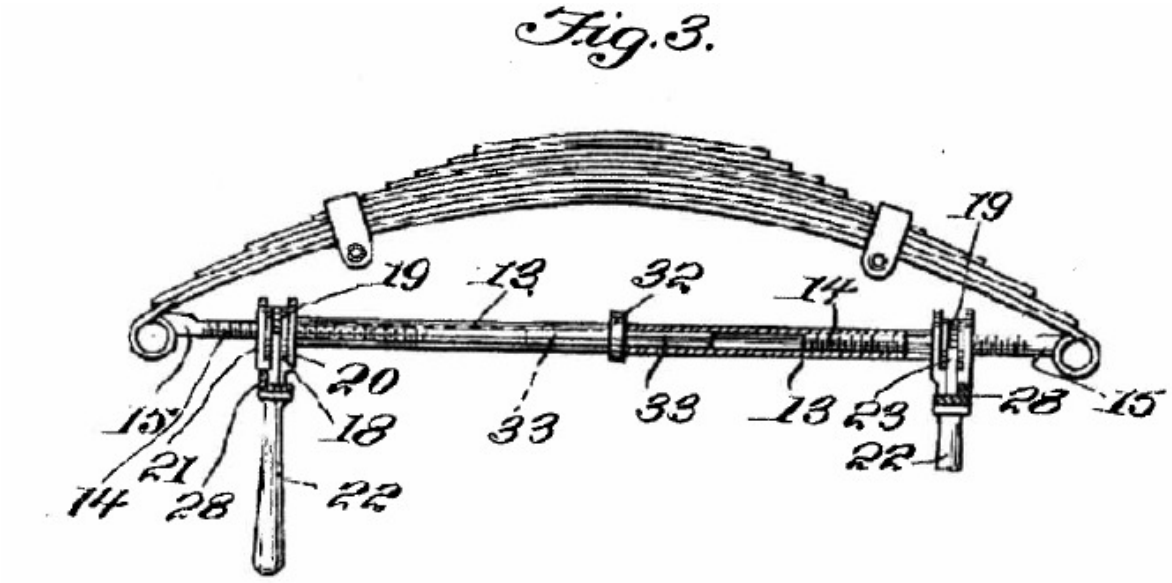


Figure 4 of the Vickrey '088 patent discloses screws (14) telescoping into the ends of a tubular frame (13) albeit the tubular frame is straight. This Vickrey '088 patent also discloses rods or handles (22) to engage and rotate the nuts via a ratcheting action which is the same function as inserting a rod into the holes in the nuts of the inventor's disclosure, a much simpler tool and manner of rotating the nuts.

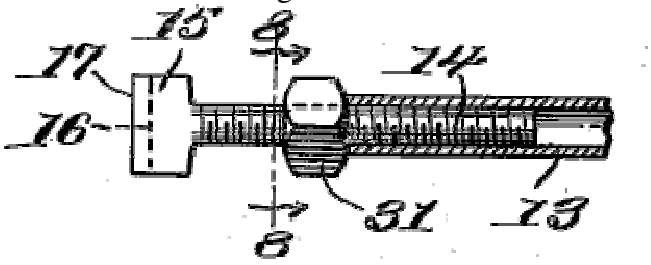


Figure 7 of the Vickrey '088 patent discloses a nut (31) threaded onto each screw (14) and engaging the end of the tubular frame (13). Also shown is a claw (15) for engaging the curl at the ends of the leaf spring.

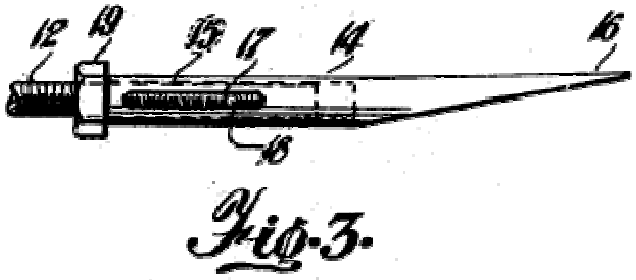


Fig. 3.

Figure 3 of the Swanby '033 patent discloses a pin extending transversely from the screw and movable along a slot in a tubular claw end instead of a slot in the tubular frame, i.e., a slot and pin to accomplish the same function.

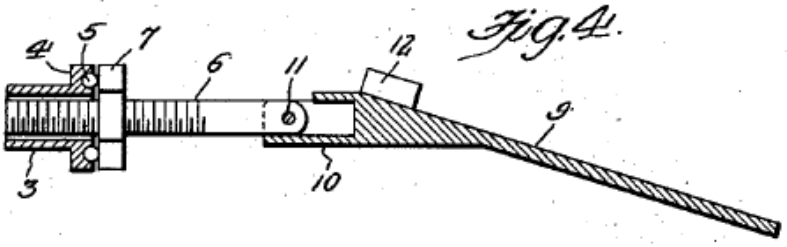


Fig. 4.

Figure 4 of the Barnhart '625 patent discloses a claw plate (9) extending from each screw (6) at an angle for engaging the spring curls. In addition, side guides (12) extend upwardly from the claw plate (9) for engaging the side edges of the leaf spring. A bearing (5) is disposed between each nut (7) and the adjacent end of the tubular frame (3).

This leaves for potential elements of novelty:

- the V-shape of the tubular frame and the cross beam and truss members
- the collar between each nut and the adjacent end of the tubular frame
- the cylindrical holes in the nuts for receiving a turning rod
- the forty degree angle of the a claw plate
- a tension spring interconnecting the inner ends of the screws via threaded connectors

B. Contents of a Search Report

The search was made in a digitally on the internet by element name, structure, function, and/or result, i.e., the digits. As set forth immediately above, the new elements not found in the search are isolated from the old elements performing identical functions. A search report to the client should begin with a summary paragraph clearly indicating whether or not the invention is patentable as some recipients will only read the summary, e.g., cc to a manager as distinguished from the inventor.

Description of the Invention

The report should restate the entirety of the invention to verify a correct understanding of each and every element or feature of the invention, i.e., to confirm the same understanding and interpretation of the invention between the inventor and the search report. The communication is facilitated by referring to a drawing or sketch with reference numbers in the description. As will be again emphasized in connection with the description of the prior art, it is most advantageous to use the same terminology to describe the invention as is used to describe like elements in the prior art, i.e., use consistent terms of art.

Search Results and Relevant Prior Art References

The next section should outline how the search was made and list the results of the search, usually by patent number and inventor name in chronological order. The list is followed by a description of the most pertinent prior art using the same terminology as in the description of the invention. The elements of the invention found in the prior art to perform the same function are described. The single prior art patent or publication showing the greatest number of elements is described first as a primary reference followed by secondary references showing additional elements to be old in performing an identical function or purpose as in the invention. This section will also list the elements NOT found in the prior art.

Analysis and Conclusion

After isolating the new elements and/or new result, the report should include a combination of the new elements and/or new result which potentially serve as a basis for patentability. The report does not strive to define the broadest scope of the invention but should include all of the new elements and/or new result because the scope of the invention will be developed in drafting the patent application, and, in fact, consumes the major effort and time in preparing a patent application. Stay in confident and safe territory in suggesting the scope of a combination of elements to be patentable. The report should state that the combination of elements is patentable and the only question will be the scope of the patent protection allowed by the USPTO. The report could end with:

Based upon the search results, we are of the opinion that the USPTO will grant a patent for your invention. The only issue will be the scope or breadth of the patent ultimately granted by the USPTO.

Please let us know if we have failed to appreciate or have misunderstood any aspect of your invention. We look forward to your comments and instructions to proceed to prepare and file a patent application.

C. Sample Search Report Letter

January, 2006

Re: Patentability Search Report for Spring Spreader Assembly

Dear Mr. Griswold:

Pursuant to your request, we conducted a prior art search pertaining to your invention of a "Spring Spreader" for use with the rear spring of a Model A Ford. Based on our understanding of your design and our search results, your design presents a number of new elements, overall structure, and new function to produce new results, all of which support the grant of a patent from the United States Patent and Trademark Office (USPTO).

Description of Invention

As we understand it your design as presented in Figure 1 below, it relates to a leaf spring spreader assembly for holding the rear springs in the extended position to disconnect the shackles, thus overcoming the tendency of the ends of the springs to snap or draw inward, which makes the changing or replacing the shackles very difficult, and even dangerous. The spring spreader assembly **7** presents a generally V-Shaped tubular frame **20** and a cross beam **22** with interconnecting truss members **24**. An acme threaded rod **1** extends in a telescoping relationship into each end of the tubular frame **20**. A unique expansion nut **2** is threaded onto each acme threaded rod **1** and reacts with the end of the tubular frame **20** for extending and retracting the acme threaded rods **1**. A ball thrust bearing **3** is disposed between each unique expansion nut **2** and a collar **26** disposed at the adjacent end of the tubular frame **20**. A plurality of cylindrical holes **28** are disposed in the unique expansion nuts **2** for receiving a turning rod to rotate the unique expansion nuts **2** to adjust the acme threaded rods **1**. A cross pin **4** extends transversely from the acme threaded rod **1** and is movable along a slot **30** in the tubular frame **20** to prevent rotation of the acme threaded rod **1**. A claw plate **6** extends from each acme threaded rod **1** at a 40° angle for engaging the curls at the end of a spring. A plurality of side guides are disposed on each claw plate **6** for engaging the side edges of the leaf spring. A coil spring **5** interconnects the inner ends of the acme threaded rods **1** via threaded connectors **32** for biasing the acme threaded rods **1** into the tubular frame **20** whereby the unique expansion nuts **2** engage the ball thrust bearings **3**.

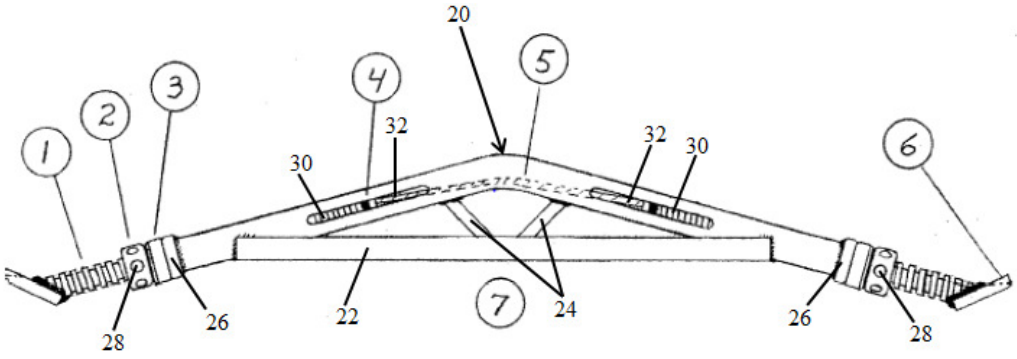


Figure 1: The Design of the Spring Spreader Assembly

Search Results and Relevant Prior Art Patents

We have conducted an electronic search in the LexisNexis TotalPatent Database for U.S., European, and Japanese patents and applications related to this invention. The electronic search included keyword searches and classification searches. The relevant prior art references are listed below in Table 1.

Table 1: List of Relevant References Uncovered Through Patentability Search

Patent No.	Pub. Date	Inventor	Patent No.	Pub. Date	Inventor
US 1,668,584	05/1928	Corey	US 1,881,050	10/1932	Grant
US 1,670,220	05/1928	Thweatt	US 1,898,121	02/1933	Gayne
US 1,755,088	04/1930	Vickrey	US 2,594,443	04/1952	Johnston
US 1,784,033	12/1930	Swanby	US 2,665,109	01/1954	Romby
US 1,803,750	05/1931	Droddy	US 5,087,019	02/1992	Peabody et al.
US 1,808,625	06/1931	Barnhart	US 5,172,889	12/1992	Post et al.
US 1,862,172	06/1932	Bennett	US 6,978,982	12/2005	Jin
US 1,872,579	08/1932	Hansen			

Of these uncovered references, US Patents US 1,755,088, US 1,808,625, and US 1,784,033 are identified to be the most relevant.

Description of Prior Art

As represented in Figures 2 and 3 below, U.S. Patent 1,755,088, to Vickrey (hereinafter referred to as the '088 patent) granted on January 25, 1929, discloses a spring "jack" (spreader) having a tubular frame **13** including a screw **14** being disposed in a telescoping relationship with each end of the tubular frame **13**. A nut **31** is threaded onto each screw **14** and engages the end of the tubular frame **13**. A claw **15** extends from each screw **14** for engaging curls at the end of a spring.

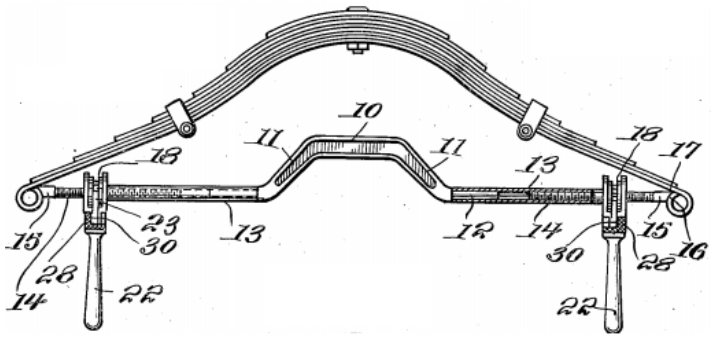


Figure 2: The Design of the Spring Jack Disclosed by the '088 Patent

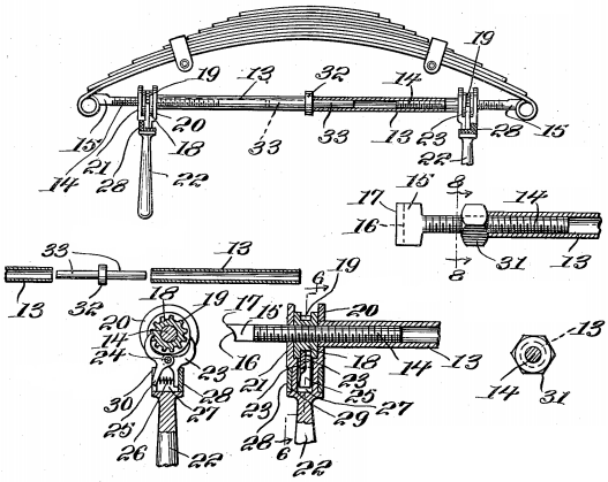


Figure 3: The Design of the Spring Jack Disclosed by the ’088 Patent

As represented in Figures 4 and 5 below, U.S. Patent 1,784,033, to Swanby (hereinafter referred to as the ’033 patent) granted on July 12, 1982, discloses “an automobile tool” (spring spreader) having a pin **18** extending radially from each of the screws **12** and into the slots **15** of the leg associated therewith to prevent rotation of the rod **12**, i.e., a slot and pin to accomplish the same function as in your design.

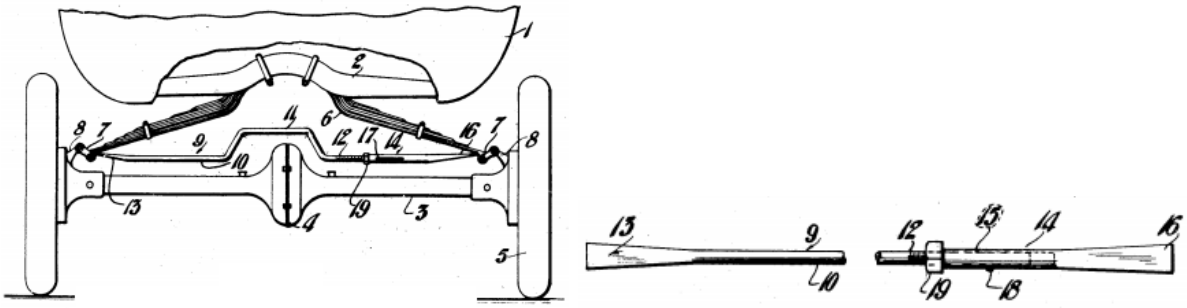


Figure 4: The Design of the Automobile Tool Disclosed by the ’033 Patent

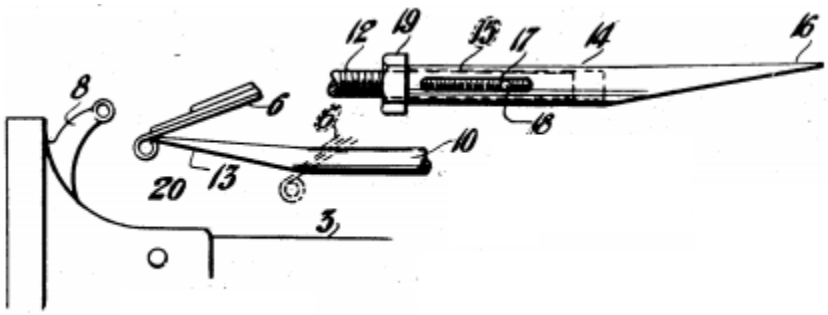


Figure 5: The Design of the Automobile Tool Disclosed by the ’033 Patent

As represented in Figures 6 and 7 below, U.S. Patent 1,808,625, to Barnhart (hereinafter referred to as the ’625 patent) granted on October 23, 1929, discloses a spring spreader having a

claw plate **9** extending from each screw **6** at an angle for engaging the spring curls. A plurality of side guides **12** extend upwardly from the claw plate **9** for engaging the side edges of the leaf spring. A bearing **5** is disposed between the nut **7** and an adjacent end of the tubular frame **3**.

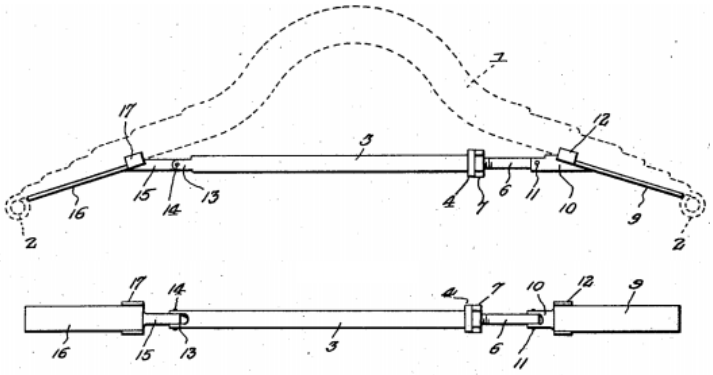


Figure 6: The Design of the Spring Spreader Disclosed by the ’625 Patent

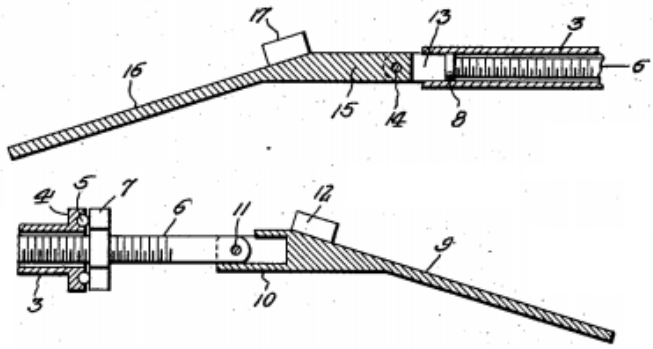


Figure 7: The Design of the Spring Spreader Disclosed by the ’625 Patent

As a general rule, a combination of old elements from the prior art with no change in their respective functions is not patentable. Accordingly, the elements of your combination found in the prior art to perform the same function as in your combination are listed below in Table 2.

Table 2: Elements in the Spring Spreader and Elements Found in the Prior Art

Elements in Spring Spreader	Elements Disclosed in the Prior Art
Tubular Frame **20**	Element **13** of the ’088 Patent
Acme Threaded Rod **1**	Element **14** of the ’088 Patent
Unique Expansion Nut **2**	Element **31** of the ’088 Patent
Ball Thrust Bearing **3**	Element **5** of the ’625 Patent
Claw Plate **6**	Element **9** of the ’625 Patent
Slots **30**	Element **15** of the ’033 Patent
Cross Pin **4**	Element **18** of the ’033 Patent

However, a combination of elements, all independently old or at least one new element, justifies the exclusive right of a patent and will be deemed a non-obvious inventive step. The new elements in your invention are listed below in Table 3.

Table 3: Elements in the Spring Spreader not disclosed in the Prior Art

Elements in Spring Spreader	Elements Disclosed in the Prior Art
Cross Beam **22**	Not Disclosed in the Prior Art
Truss Member **24**	Not Disclosed in the Prior Art
Collar **26**	Not Disclosed in the Prior Art
Cylindrical Holes **28**	Not Disclosed in the Prior Art
Coil Spring **5**	Not Disclosed in the Prior Art
Connector **32**	Not Disclosed in the Prior Art
40° Angle of the Claw Plate	Not Disclosed in the Prior Art

Scope Patentability of the Spring Spreader

The Spring Spreader assembly presents a combination of new elements and appears to be patentable. At a minimum a patent should result from claims including the following combination of elements:

1. A tubular frame **20** having a V-Shape and including a cross beam **22** and truss members **24** interconnecting the cross beam **22** and tubular frame **20**,

2. A collar **30** disposed between each unique expansion nut **2** and the adjacent end of the tubular frame **20**,

3. A plurality of cylindrical holes **28** disposed in the unique expansion nuts **2** for receiving a tuning rod to rotate the unique expansion nut **2**,

4. A claw plate **6** extending across each acme threaded rod **1** at an angle of 40° for engaging the spring curls, and

5. A coil spring **5** interconnecting the inner ends of the acme threaded rods **1** via threaded connectors **32**.

Summary

Based on our search results, we are of the opinion that the USPTO will grant a patent for your invention. The only issue will be the scope or breadth of the patent ultimately granted by the USPTO.

Please let us know if we have misunderstood or omitted any structure, element, function or result of your invention. If you should have any questions or concerns regarding this opinion,

please do not hesitate to contact us. We look forward to your instructions to proceed with the preparation of your patent application.

Very truly yours,

s\Hal

Harold W. Milton Jr.

Section 6 Initiating Drafting the Application with Patent Template

As alluded to above, a word processing program for preparing a patent application should be perfunctory in the repeatable and common sections of all patent applications.

Transition paragraphs are found at various junctures in a patent application and can be repeated in application after application. Immediately after the heading BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS the template memory should include such a transition paragraph. For example:

Other advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Figure 1 is ;

Figure 2 is ; and

Figure 3 is .

The word processing program should include an independent claim processor capable of duplicating and storing an independent claim under the heading SUMMARY OF THE INVENTION and for editing the duplicated independent claim into grammatically correct sentence structure. Such editing capability should include changing “said” to "the" and adding verbs whereby the SUMMARY OF THE INVENTION is exactly commensurate in scope to the independent claim. Most word processing programs will also automatically provide correct sentence structure, which can be manually changed.

The word processing program should also be capable of duplicating and storing all of the claims under the heading DETAILED DESCRIPTION OF THE INVENTION while searching for and replacing each occurrence of the word “said” in the duplicate set of claims copied under the heading DETAILED DESCRIPTION OF THE INVENTION with the word "the". Again, the duplicate set of claims would be edited into grammatically correct sentence structure.

The computer program should also include a reference numeral memory or template for storing successive even or odd reference numerals and a figure number, both in Arabic numbers. The highest number used to identify figures of the drawings will be entered into the figure number memory to prevent overlap of reference numerals and figure numbers. The first reference numerals assigned to the elements of the drawings should begin with the next number ending in zero above the highest number used to identify a figure of the drawings. As most applications have no more than ten (10) Figures of the drawings, the first reference numeral is usually **10**. The program should also store the element names in the order recited in the description and search and add the assigned reference numeral to the appropriate element name.

This will provide identifying reference numerals for the element names in the order of occurrence in the description. The reference number processor could also build a list of elements with reference numerals and automatically shift the reference numerals in the list of elements in the event an additional element is interleaved in the description. Sometimes it is appropriate to use letters to indicate an axis, dimension, or the like.

The content of the Abstract is accumulated by selecting and storing various Abstract sentences including the reference numerals from the DETAILED DESCRIPTION OF THE INVENTION and duplicating the Abstract sentences under the heading ABSTRACT OF THE DISCLOSURE. The Abstract should be for the benefit of those skilled in the art and searchers without the legalese of claim language and is most beneficial when specifically reciting the structure of the invention.

The program might automatically bracket each reference numeral within parentheses in the claims. In other words, the claims are written neither dependent upon nor reliant upon the reference numerals for clarity or interpretation; the reference numerals are included for convenience and efficiency. An important attribute of including the reference numerals in the claims and abstract is to facilitate accurate translation into other languages.

The MPEP 608.01(m) of the USPTO[4] states that reference numerals "may be used in the claims. . . The use of reference characters is to be considered as having no effect on the scope of the claims." Rule 29(7) of the EPO[5] states that "reference signs" (reference numerals) "shall preferably" be used in the claims. The EPO Rule also states that the reference numerals "shall not be construed as limiting the claim." It appears that a US Examiner could NOT require the use of reference numerals in the claims whereas an EPO Examiner could require the use of reference numerals in the claims.

The template memory will also contain a transition paragraph immediately before the page break preceding the heading CLAIMS to make it clear that not every nuance of the invention can be described in a patent application, that the invention is defined by the scope of the claims, and that the antecedent limitations preceding the "characterized by" clause are old and well known in the art and are to be interpreted to cover all equivalents, including those in the prior art. The transition paragraph should also make clear that the novelty is set forth in the "characterized by" clause and that it is to be understood that reference numerals in the claims are merely for convenience and are not to be in any way limiting. This paragraph would immediately precede the page break before the heading CLAIMS. For example:

> *Obviously, many modifications and variations of the present invention are possible in light of the above teachings. The invention may be practiced otherwise than as specifically described within the scope of the appended claims, wherein that which is prior art is antecedent to the novelty set forth in the "characterized by" clause. The novelty is meant to be particularly and distinctly recited in the "characterized by" clause whereas the antecedent recitations merely set forth the old and well-known combination in which the invention resides. These antecedent recitations*

[4] *See* Manual of Patent Examining Procedure § 608.01(m) (2008).

[5] *See* European Patent Convention Rule 29(7) (2000).

should be interpreted to cover any combination in which the inventive novelty exercises its utility. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.

A word processing program can be used over and over with each succeeding patent application. When the template program is retrieved from memory, it presents an information format for the title, attorney docket number, etc. The preparation of the patent application can begin by drafting the first claim under the CLAIMS heading.

Section 7 The Spring Spreader Patent

US007264225B1

(12) **United States Patent**
Griswold

(10) **Patent No.: US 7,264,225 B1**
(45) **Date of Patent: Sep. 4, 2007**

(54) **SPRING SPREADER AND METHOD OF FABRICATION AND ASSEMBLY**

(75) Inventor: **James L. Griswold**, 2692 Birchview, Kewadin, MI (US) 48648

(73) Assignee: **James L. Griswold**, Kewadin, MI (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.

(21) Appl. No.: **11/471,829**

(22) Filed: **Jun. 21, 2006**

(51) **Int. Cl.**
B23P 19/04 (2006.01)

(52) **U.S. Cl.** **254/10.5**; 29/227

(58) **Field of Classification Search** 254/10.5; 29/227, 211–218, 251, 252
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,668,584	A		5/1928	Corey
1,670,220	A		5/1928	Thweatt
1,755,088	A		4/1930	Vickrey
1,784,033	A		12/1930	Swanby
1,803,750	A		5/1931	Droddy
1,808,625	A		6/1931	Barnhart
1,862,172	A		6/1932	Bennett
1,872,579	A		8/1932	Hansen
1,881,050	A		10/1932	Grant
1,898,121	A		2/1933	Gayne
2,594,443	A		4/1952	Johnston
2,665,109	A		1/1954	Romby
5,087,019	A		2/1992	Peabody et al.
5,172,889	A	*	12/1992	Post et al. 254/10.5
6,978,982	B1	*	12/2005	Jin 254/10.5

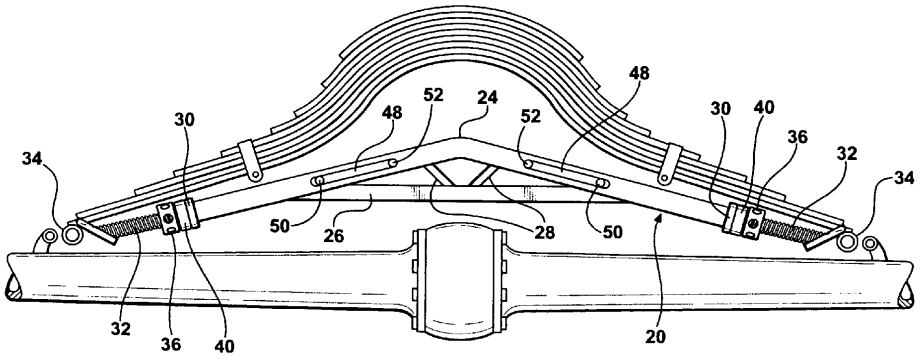
* cited by examiner

Primary Examiner—Lee D. Wilson
(74) *Attorney, Agent, or Firm*—Dickinson-Wright, PLLC

(57) **ABSTRACT**

A leaf spring spreader assembly comprising a tubular frame (**20**) having a V-shape with legs (**22**) extending in opposite directions from an apex (**24**) to a collar (**30**) welded to each of spaced ends with a screw (**32**) disposed in telescoping relationship with and extending axially out of each leg (**22**) to a plate (**42**) for engaging the end curl (**34**) of a leaf spring. A nut (**36**) has radial holes (**38**) for receiving a round rod to rotate the nut (**36**) for reacting with the collar (**30**) for moving the screw (**32**) relative to the frame. A bearing (**40**) is disposed about each screw (**32**) for transmitting thrust loads from and facilitating rotation of the nut (**36**). A tension spring (**52**) is pulled through the tubular frame (**20**) and connected to the second screw (**32**) and released to pull the inner ends of the screws (**32**) together to retain the nuts (**36**) in engagement with the bearings (**40**) to maintain the components together.

20 Claims, 3 Drawing Sheets



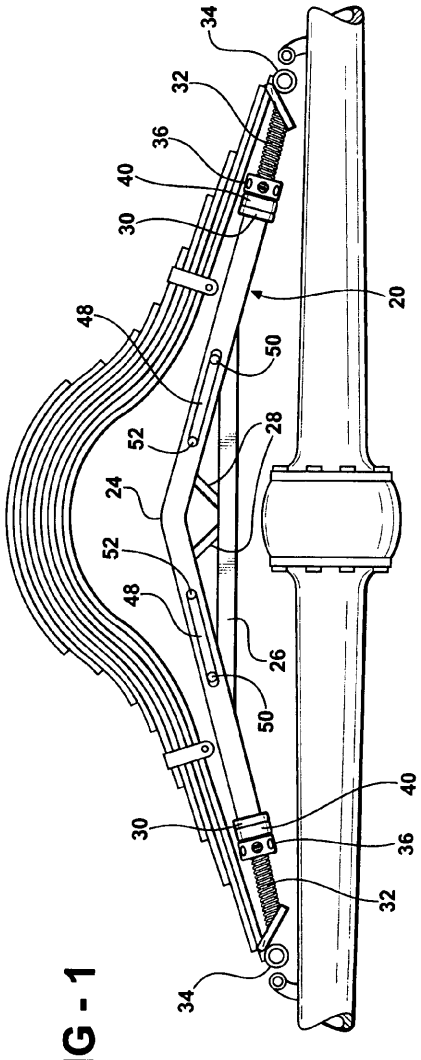

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FIG - 1

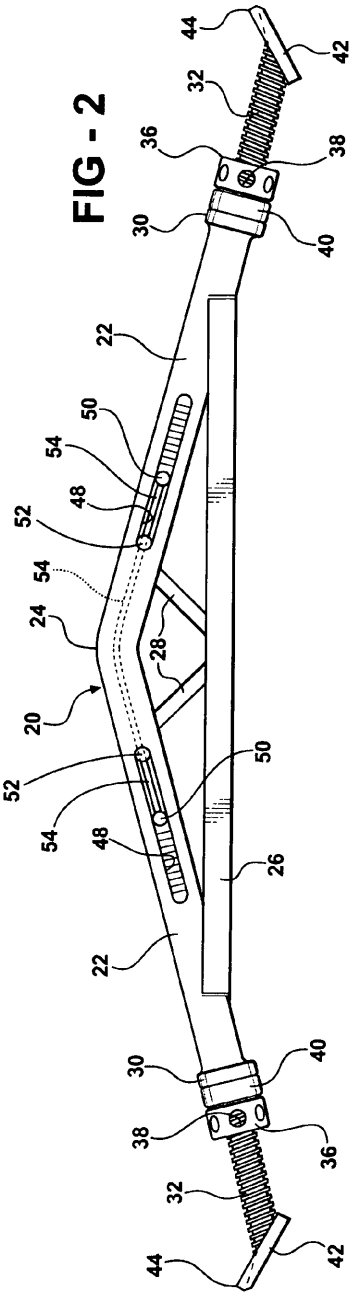
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FIG - 2

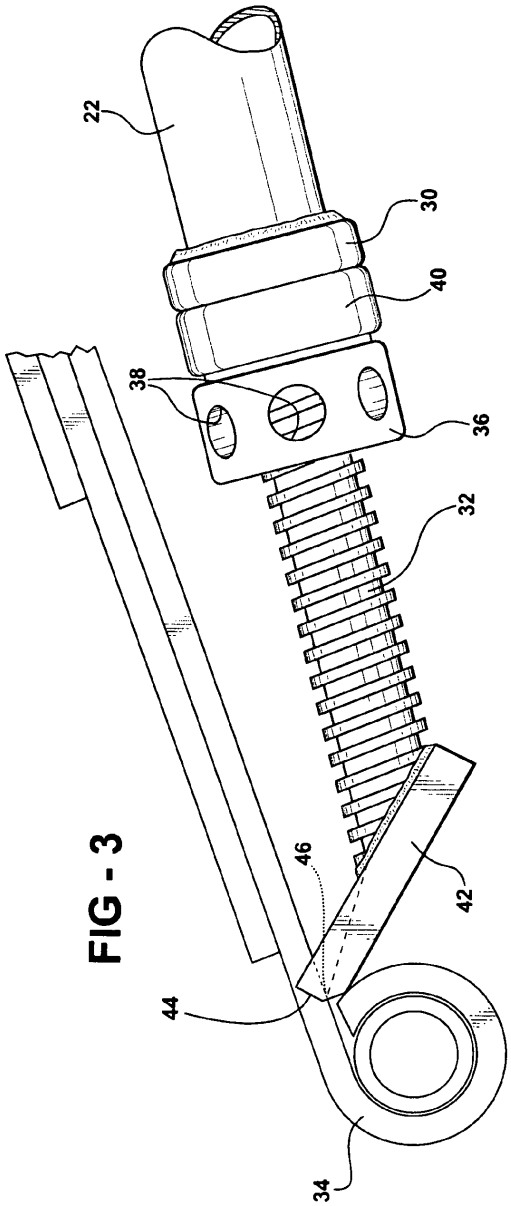


FIG - 3

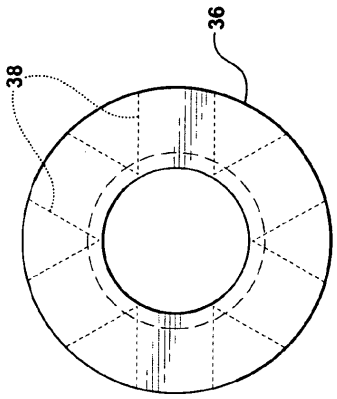


FIG - 5

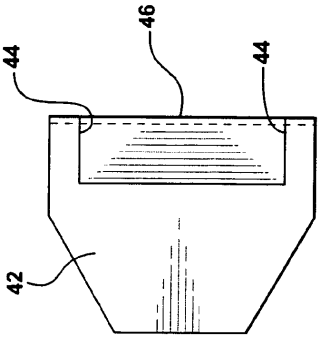


FIG - 4

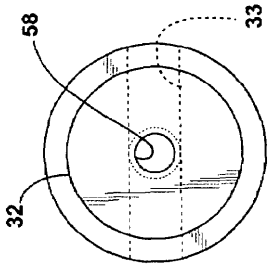


FIG - 7

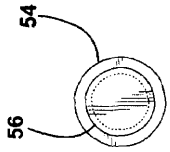


FIG - 9

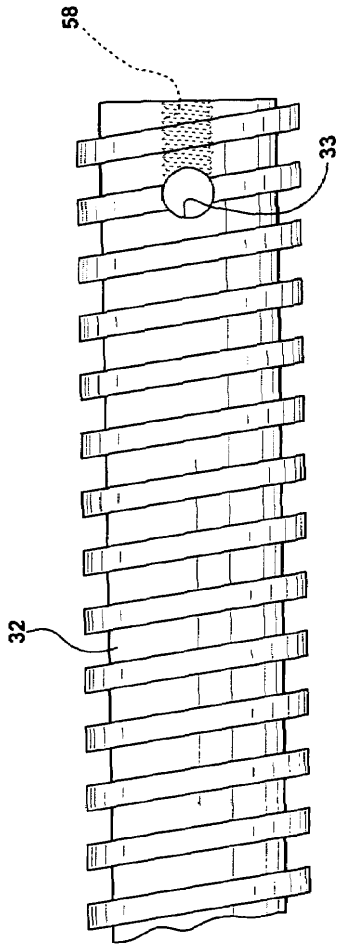


FIG - 6

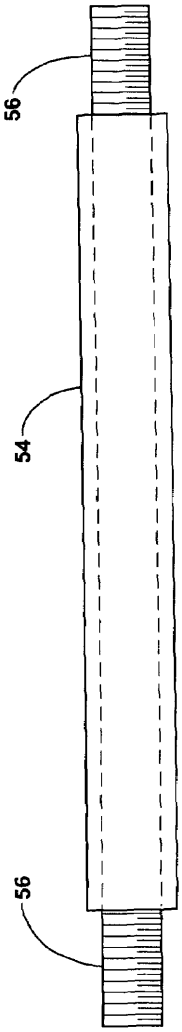


FIG - 8

SPRING SPREADER AND METHOD OF FABRICATION AND ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

A leaf spring spreader assembly useful for spreading a leaf spring of the type extending across the rear axle of an automobile and connected to a shackle at each end.

2. Description of the Prior Art

The spring spreaders of the type to which the subject invention pertains, spread the rear leaf spring of the bowed suspension type extended longitudinally of the rear axle housing for removal from and attachment to the shackles. One such spreader is illustrated in U.S. Pat. No. 1,755,088 to Vickrey wherein a frame includes legs extending in opposite directions to spaced tubular ends with threaded screws having inner ends disposed in telescoping relationship with the tubular ends of the frame legs and extending axially in opposite directions out of the tubular ends of the legs for engaging the end curls of a leaf spring. A nut threadedly engages each of the screws and reacts with the tubular ends of the frame for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut. This patent and the U.S. Pat. No. 1,784,033 to Swanby and U.S. Pat. No. 1,808,625 to Barnhart disclose an upwardly offset central section between the tubular ends of the frame for accommodating the differential housing. In addition, the Barnhart patent shows the additional feature of a bearing between the nut and the frame and ears for engaging the sides of the leaf spring. Swanby shows a pin and slot arrangement to prevent rotation of the screws relative to the frame.

However, the prior art spreaders usually utilize components especially manufactured for use only in a specific spreader assembly. Since such spreader assemblies are manufactured and sold in very small quantities, such especially made components can cause the price to be unacceptable. In addition, some of the prior art assemblies include loose components that are often difficult to orient and retain together while manipulating the assembly into position for spreading a leaf spring. Often the screws have machine threads requiring an exhaustive number of turns for each increment of axial screw movement as well as special or dedicated wrenches to rotate the nuts. Such wrenches are often very awkward to use to rotate the nut due to the limited space under the spring and above the axle housing.

SUMMARY OF THE INVENTION AND ADVANTAGES

The invention provides such a spring spreader assembly including a tension spring interconnecting the inner ends of the screws to retain the nuts in engagement with the spaced ends of the legs and to allow the screws to be pulled axially along into and out of the legs.

The invention also provides a method of fabricating such a leaf spring spreader assembly characterized by the steps of attaching a first screw to a first end of a tension spring and a second screw to a second end of a tension spring, connecting the first end of the tension spring to the inner end of a first of the screws, attaching a first end of a string to the second end of the tension spring, attaching a weight to the second end of the string, dropping the weight through the tubular frame, inserting the first screw into a first leg of the tubular frame to retain the nut thereon in engagement with the end of the first leg, pulling the string and the second end of the tension spring out of the second leg, gripping the second end of the tension spring to hold the second end of the tension spring out of the second leg, removing the string from the second end of the tension spring, attaching the second end of the tension spring to the second screw, and inserting the second screw into the second leg of the tubular frame to retain the nut thereon in engagement with the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of the tension spring.

Therefore, the subject invention is efficiently fabricated by welding and assembly of readily available or commodity components such as pipe, screws, bearings, tension springs, and the like. After fabricating a tubular frame having legs extending in opposite directions to spaced ends, the screws are inserted into telescoping relationship with the legs with the nuts on the screws for reacting with the respective ends of the legs. During this novel fabrication and assembly, a tension spring interconnects the inner ends of the screws and is released to retain the nuts in engagement with the ends of the legs.

Accordingly, the subject invention provides a leaf spring spreader fabricated from off-the-shelf or commodity components that are easily assembled and operated to spread a leaf spring.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. **1** is a front elevation view showing the spring spreader assembly of the subject invention in position on a leaf spring of an automotive vehicle;

FIG. **2** is a front elevation view showing the spring spreader assembly of the subject invention;

FIG. **3** is an enlarged fragmentary view of one end of the spring spreader engaging the sides and end curl of a leaf spring;

FIG. **4** is a top view of a plate defining a claw end of the screws;

FIG. **5** is a side view of a nut;

FIG. **6** is a fragmentary side view of the inner end of the screw utilized in the subject invention;

FIG. **7** is an end view of FIG. **6**;

FIG. **8** is a side view of the tension spring with integral male threaded connectors on each end; and

FIG. **9** is an end view of FIG. **8**.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the Figures, wherein like numerals indicate corresponding parts throughout the several views, a leaf spring spreader assembly constructed in accordance with the subject invention is shown in FIGS. **1** and **2**.

The spring spreader assembly is fabricated from a pipe bent into a tubular frame **20** generally indicated and having a V-shape with legs **22** extending in opposite directions from an apex **24** to spaced ends. A cross beam **26** extends across the V-shape and interconnects the legs **22** for stabilizing the legs **22**, the cross beam **26** having a right angled cross section with each end thereof cradling one of the legs **22** of the frame. In other words, the cross beam **26** is an angle iron welded to the underside of the tubular legs **22** of the frame.

In addition, truss members **28** diverge from one another under the apex **24** and interconnect the cross beam **26** and the legs **22**, the truss members **28** being almost perpendicular to the respective legs **22**.

A collar **30** is welded to each of the spaced ends of the legs **22**. A screw **32** having acme threads about a longitudinal axis has an inner end disposed in telescoping relationship with and extends axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring. A nut **36** threadedly engages each of the screws **32** and reacts with the collar **30** at each spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36**. Each of the nuts **36** has a plurality of circumferentially spaced cylindrical holes **38** extending radially for receiving a shaft-tool for rotating the nuts **36**. The shaft-tool may comprise a simple round rod for insertion into successive holes **38** for rotating the nuts **36**. The acme threads threadedly interconnecting the screws **32** and the nuts **36** provide easier rotation of the nuts **36** as compared to machine threads and fewer turns are required for the same linear movement of the screws **32** relative to the frame.

For transmitting thrust loads and reducing friction, a bearing **40** is disposed about each screw **32** to engage each of the collars **30** for transmitting thrust loads from, and facilitating rotation of the nut **36** associated therewith. The diameter of the screw **32** is slightly less, i.e., a slip fit, than the internal diameter of the tubular legs **22**.

A plate **42** is secured by welding to the claw end of each screw **32** and is disposed at an angle of forty degrees relative to the axis of the screw **32** associated therewith and extends above the screw **32**. Each of the plates **42** has a chisel edge **46** between in the upper-outer corners **44** to define a guide for engaging the side edges and the end curl **34** of the leaf spring.

The legs **22** each have a slot **48** through the near wall extending axially along the screw **32** associated therewith and a pin **50** extends radially from each of the screws **32** and into the slot **48** of the leg **22** associated therewith for sliding movement along the slots **48** as the screws **32** move axially relative to the legs **22**. The slot **48** and pin **50** mechanism maintains the plates **42** at the claw ends oriented relative to the frame and to maintain the frame upright above the differential while being placed in position and thereafter rotating the nuts **36**. A hole **38** is provided through the far wall of each leg **22** at one end of the slot **48** for access to drive the pin **50** out of screw **32** for disassembly.

A threaded hole **38** is provided in each of the inner ends of the screws **32** and threadedly engages each end of a tension spring **52** which insures that the nuts **36** and bearings **40** are always up against the spaced ends of the legs **22** and allow the screws **32** to be pulled axially along and out of the legs **22**. One of the screws **32** may be fully inserted and the tension spring **52** extended out the opposite tubular end sufficiently to attach to the other threaded hole **38** whereby both screws **32** are pulled into the tubular frame **20**. The tension spring **52** has sufficient elasticity to be pulled out of one end of one of the legs **22** for attachment to the threaded hole **38** on the other screw **32** and yet retract both screws **32** into the respective legs **22**. In the preferred embodiment, the tension spring **52** comprises a bungee chord, or the like, but any suitable device may be employed.

As alluded to above, the subject invention also includes a method of fabricating a leaf spring spreader assembly comprising the steps of bending a pipe into a tubular frame **20** having a V-shape with legs **22** extending in opposite directions from an apex **24** to spaced ends, welding a cross beam **26** extending across the V-shape and interconnecting the legs **22** for stabilizing the legs **22**, and welding truss members **28** to the cross beam **26** and the legs **22** to diverge from one another. The fabrication continues by welding a collar **30** to each of the spaced ends of the legs **22**, and forming a slot **48** through the near wall extending axially along each of the legs **22**.

A plate **42** is welded to a claw end of each of the screws **32** at an angle of forty degrees relative to the axis of the screw **32** associated therewith so as to extend above the screw **32** to form a chisel edge **46** between upper-outer corners **44**.

The assembly includes threadedly engaging a nut **36** on each of two screws **32** disposing a bearing **40** about each screw **32** for engaging each of the collars **30**.

A male threaded end is formed to each of opposite ends of a tension spring **52** and a first of the threaded ends is connected by threads to the inner end of a first of the screws **32**. Surgical tubing of pure latex has found to be an excellent tension spring **52**. An adapter is attached to a first end of a string and is threadedly attached to the second end of the spring. The assembly continues by attaching a weight to the second end of the string and dropping the weight through the tubular frame **20**, starting at the open end of the first leg **22**. The pulling of the second end of the tension spring **52** out of the second leg **22**, requires the inserting of the first screw **32** into a first leg **22** of the tubular frame **20** to retain the nut **36** and bearing **40** thereon in engagement with the collar **30** at the end of the first leg **22**.

By gripping the second end of the tension spring **52** with a tool to hold the second end of the tension spring **52** out of the second leg **22**, the adapter and spring are removed from the second end of the tension spring **52**. The second end of the spring is then threadedly connected to the inner end of the second screw **32**. A tension spring **54** is pulled through the tubular frame **20** and connected to the second screw **32** and released to pull the inner ends of the screws **32** together to retain the nuts **36** in engagement with the bearings **40** to maintain the components together. The final step includes securing a pin **50** to each of the screws **32** to extend radially from and into the slot **48** of the surrounding leg **22** for sliding movement along the slot **48** as the screws **32** move axially relative to the legs **22**.

Accordingly, the invention provides a method of fabricating a leaf spring spreader assembly of the type including a tubular frame **20** having legs **22** extending in opposite directions to spaced ends, a screw **32** having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring, and a nut **36** threadedly engaging each of the screws **32** and reacting with the spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36**. The method includes the steps of connecting the first end of a tension spring **52** to a first screw **32**, attaching the first end of a string to the second end of the tension spring **52**, attaching a weight to the second end of the string, and dropping the weight through the first end of the tubular frame **20** through and beyond the second end of the tubular frame **20**.

This naturally leads to inserting the first screw **32** into the first end of the tubular frame **20**, pulling and holding the string and second end of the male threaded end and second end of the tension spring **52** beyond the second end of the tubular frame **20**, gripping the second end of the tension

spring **52** to hold it beyond the second end of the tubular frame **20**, and removing the string from the second end of the tension spring **52**.

The fabrication continues by connecting the second end of the tension spring **52** to the second screw **32**, releasing the gripping and holding of the tension spring **52** out beyond the second end of the tubular frame **20**, and allowing the second screw **32** to insert into the second end of the tubular frame **20** with the inner ends of both screws **32** biased toward the apex **24** of the tubular frame **20** by the tension spring **52**.

More specifically, the method proceeds by engaging a nut **36** to a first screw **32** and screwing the nut **36** to the claw end of the first screw **32**, disposing a collar **30** on each of the spaced ends of the legs **22**, sliding a bearing **40** over the screw **32** and into contact with the nut **36**, threadedly connecting the first end of a tension spring **52** to the threaded hole **38** of a first screw **32**, inserting the first screw **32** into the first end of the tubular frame **20** with the bearing **40** in contact with the first end of the tubular frame **20** and the associated collar **30**, engaging a nut **36** to a second screw **32** and screwing the nut **36** to the claw end of the second screw **32**, sliding a bearing **40** over the second screw **32** and into contact with the nut **36**, and threadedly connecting the second end of the tension spring **52** to the threaded hole **38** of the second screw **32**.

For alignment purposes, the method may include rotating each screw **32** to an orientation within the tubular frame **20** to align a cross hole **38** in each screw **32** with a slot **48** in each leg **22**, and inserting a pin **50** through each slot **48** into aligned cross hole **38** of each screw **32** with the pin **50** extending outside the slot **48** in the associated leg **22** of the tubular frame **20**.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings and may be practiced otherwise than as specifically described while within the scope of the appended claims. That which is prior art in the claims precedes the novelty set forth in the "characterized by" clause. The novelty is meant to be particularly and distinctly recited in the "characterized by" clause whereas the antecedent recitations merely set forth the old and well-known combination in which the invention resides. These antecedent recitations should be interpreted to cover any combination in which the inventive novelty exercises its utility. The use of the word "said" in the apparatus claims refers to an antecedent that is a positive recitation meant to be included in the coverage of the claims whereas the word "the" precedes a word not meant to be included in the coverage of the claims. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.

ELEMENT LIST

Element Symbol	Element Name
20	tubular frame
22	legs
24	apex
26	cross beam
28	truss members
30	collar
32	screw
34	curl
36	nut
38	holes
40	bearing
42	plate

-continued

ELEMENT LIST

Element Symbol	Element Name
44	corner
46	chisel edge
48	slots
50	pin
52	tension spring
54	connector

What is claimed is:

1. A leaf spring spreader assembly comprising;

a tubular frame (**20**) having legs (**22**) extending in opposite directions to spaced ends,

a screw (**32**) having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs (**22**) to a claw end for engaging the end curls (**34**) of a leaf spring,

a nut (**36**) threadedly engaging each of said screws (**32**) and reacting with said spaced end of each of said legs (**22**) for moving the associated screw (**32**) into and out of said leg (**22**) associated therewith in response to rotation of said nut (**36**), and

characterized by a tension spring (**52**) interconnecting said inner ends of said screws (**32**) to retain said nuts (**36**) in engagement with said spaced ends of said legs (**22**) and to allow said screws (**32**) to be pulled axially along in and out of said legs (**22**).

2. An assembly as set forth in claim **1** including threaded holes (**38**) disposed at each of said inner ends of said screws (**32**), said tension spring (**52**) with male threaded ends removable from and interconnecting said threaded holes (**38**) of said screws (**32**).

3. An assembly as set forth in claim **1** wherein said tubular frame (**20**) defines a V-shape with said legs (**22**) extending along respective axes in opposite directions from an apex (**24**) to said spaced ends.

4. An assembly as set forth in claim **3** including a cross beam (**26**) extending across said V-shape and interconnecting said legs (**22**) for stabilizing said legs (**22**).

5. An assembly as set forth in claim **4** wherein said cross beam (**26**) has a right angled cross section with each end thereof cradling one of said legs (**22**) of said frame.

6. An assembly as set forth in claim **5** including truss members (**28**) diverging from one another and interconnecting said cross beam (**26**) and said legs (**22**).

7. An assembly as set forth in claim **1** wherein each of said nuts (**36**) includes holes (**38**) extending radially for receiving a shaft-tool for rotating said nuts (**36**).

8. An assembly as set forth in claim **1** including a plate (**42**) secured to each of said claw ends and disposed at an angle relative to said axis of said screw (**32**) associated therewith and extending above said screw (**32**) between upper-outer corners (**44**).

9. An assembly as set forth in claim **8** wherein each of said plates (**42**) defines a chisel edge (**46**) between said upper-outer corners (**44**) to define a guide for engaging the side edges of the end curl (**34**) of the leaf spring.

10. An assembly as set forth in claim **1** including a collar (**30**) welded to each of said spaced ends of said legs (**22**), a bearing (**40**) disposed about each screw (**32**) and engaging

each of said collars (**30**) for transmitting thrust loads from and facilitating rotation of said nut (**36**) associated therewith.

11. An assembly as set forth in claim **1** wherein each of said legs (**22**) includes a slot (**48**) extending axially along the screw (**32**) associated therewith, and including a pin (**50**) extending radially from one side of a cross hole (**38**) said screw (**32**) and into said slot (**48**) of said leg (**22**) associated therewith for sliding movement along said slot (**48**) as said screw (**32**) moves axially relative to said leg (**22**).

12. A leaf spring spreader assembly comprising;

a tubular frame (**20**) having legs (**22**) extending in opposite directions to spaced ends,

a screw (**32**) having acme threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs (**22**) to a claw end for engaging the end curl (**34**) of a leaf spring,

a nut (**36**) threadedly engaging each of said screws (**32**) and reacting with said spaced end of each of said legs (**22**) for moving the associated screw (**32**) into and out of said leg (**22**) associated therewith in response to rotation of said nut (**36**),

a bearing (**40**) disposed about said screw (**32**) and engaging each of said spaced ends for transmitting thrust loads from and facilitating rotation of said nut (**36**) associated therewith,

a plate (**42**) secured to each of said claw ends and disposed at an angle relative to said axis of said screw (**32**) associated therewith and extending above said screw (**32**) associated therewith to an upper-outer corner (**44**),

each of said legs (**22**) having a slot (**48**) extending along its axis,

a pin (**50**) extending radially from each of said screws (**32**) and into said slot (**48**) of said leg (**22**) associated therewith for sliding movement along said slot (**48**) as said screw (**32**) moves axially relative to said leg (**22**), and characterized by

said tubular frame (**20**) having a V-shape with said legs (**22**) extending from an apex (**24**),

a cross beam (**26**) extending across said V-shape and interconnecting said legs (**22**) for stabilizing said legs (**22**),

said cross beam (**26**) having right angled cross section with each end thereof cradling one of said legs (**22**) of said frame,

truss members (**28**) diverging from one another and interconnecting said cross beam (**26**) and said legs (**22**),

a collar **30**) welded to each of said spaced ends of said legs (**22**),

each of said bearings (**40**) engaging one of said collars (**30**) for transmitting the thrust loads,

each of said screws (**32**) having acme threads about said longitudinal axis thereof,

each of said nuts (**36**) reacting with said collar (**30**) at said spaced end of each of said legs (**22**),

each of said nuts (**36**) having cylindrical holes (**38**) extending radially for receiving a shaft-tool for rotating said nuts (**36**),

said angle of said plate (**42**) relative to said axis being forty degrees,

each of said plates (**42**) having a chisel edge between said upper-outer corners (**44**) to define a guide for engaging the side edges of the end curl (**34**) of the leaf spring,

a threaded hole (**38**) disposed at each of said inner ends of said screws (**32**), and

a tension spring (**54**) with male threaded ends interconnecting said threaded holes (**38**) of said screws (**32**) to retain said nuts (**36**) in engagement with said bearings (**40**) at said spaced ends of said legs (**22**) and to allow said screws (**32**) to be moved axially along into and out of said legs (**22**).

13. A method of fabricating a leaf spring spreader assembly of the type including a tubular frame (**20**) having legs (**22**) extending in opposite directions to spaced ends, a screw (**32**) having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs (**22**) to a claw end for engaging the end curl (**34**) of a leaf spring, and a nut (**36**) threadedly engaging each of the screws (**32**) and reacting with the spaced end of each of the legs (**22**) for moving the associated screw (**32**) into and out of the leg (**22**) associated therewith in response to rotation of the nut (**36**), and characterized by the steps of;

connecting the first end of a tension spring (**52**) to a first screw (**32**),

attaching the first end of a string to the second end of the tension spring (**52**),

attaching a weight to the second end of the string,

dropping the weight through the first end of the tubular frame (**20**) through and beyond the second end of the tubular frame (**20**),

inserting the first screw (**32**) into the first end of the tubular frame (**20**),

pulling and holding the string and second end of the male threaded end and second end of the tension spring (**52**) beyond the second end of the tubular frame (**20**),

gripping the second end of the tension spring (**52**) to hold it beyond the second end of the tubular frame (**20**),

removing the string from the second end of the tension spring (**52**),

connecting the second end of the tension spring (**52**) to the second screw (**32**),

releasing the gripping and holding of the tension spring (**52**) out beyond the second end of the tubular frame (**20**), and

allowing the second screw (**32**) to insert into the second end of the tubular frame (**20**) with the inner ends of both screws (**32**) biased toward the apex (**24**) of the tubular frame (**20**) by the tension spring (**52**).

14. A method as set forth in claim **13** including engaging a nut (**36**) to a first screw (**32**) and screwing the nut (**36**) to the claw end of the first screw (**32**),

disposing a collar (**30**) on each of the spaced ends of the legs (**22**),

sliding a bearing (**40**) over the screw (**32**) and into contact with the nut (**36**),

threadedly connecting the first end of a tension spring (**52**) to the threaded hole (**38**) of a first screw (**32**),

inserting the first screw (**32**) into the first end of the tubular frame (**20**) with the bearing (**40**) in contact with the first end of the tubular frame (**20**) and the associated collar (**30**),

engaging a nut (**36**) to a second screw (**32**) and screwing the nut (**36**) to the claw end of the second screw (**32**),

sliding a bearing (**40**) over the second screw (**32**) and into contact with the nut (**36**), and

threadedly connecting the second end of the tension spring (**52**) to the threaded hole (**38**) of the second screw (**32**).

15. A method as set forth in claim 14 including rotating each screw (32) to an orientation within the tubular frame (20) to align a cross hole (38) in each screw (32) with a slot (48) in each leg (22), and

inserting a pin (50) through each slot (48) into aligned cross hole (38) of each screw (32) with the pin (50) extending outside the slot (48) in the associated leg (22) of the tubular frame (20).

16. A method as set forth in claim 13 including bending a pipe into the tubular frame (20) having a V-shape with legs (22) extending in opposite directions from an apex (24) to spaced ends.

17. A method as set forth in claim 16 including the step of welding a cross beam (26) extending across the V-shape and interconnecting the legs (22) for stabilizing the legs (22).

18. A method as set forth in claim 16 including the step of welding each collar (30) to the spaced ends of the legs (22).

19. A method as set forth in claim 16 including the step of welding a plate (42) to a claw end of each of the screws (32) at an angle of forty degrees relative to the axis of the screw (32) associated therewith so as to extend above the screw (32) welded thereto with a chisel edge (46) between upper-outer corners (44).

20. A method of fabricating a leaf spring spreader assembly comprising the steps of;

bending a pipe into a tubular frame (20) having a V-shape with legs (22) extending in opposite directions from an apex (24) to spaced ends,

welding a cross beam (26) extending across the V-shape and interconnecting the legs (22) for stabilizing the legs (22),

welding truss members (28) to the cross beam (26) and the legs (22) to diverge from one another,

welding a collar (30) to each of the spaced ends of the legs (22),

producing a slot (48) extending axially along each of said legs (22),

threadedly engaging a nut (36) on each of two screws (32) each having acme threads about a longitudinal axis,

disposing a bearing (40) about each screw (32) for engaging each of the collars (30),

welding a plate (42) to a claw end of each of the screws (32) at an angle of forty degrees relative to the axis of the screw (32) associated therewith so as to extend above the screw (32) welded thereto and having a chisel edge (46) between upper-outer corners (44),

attaching the first end of a tension spring (52) to the inner end of a first of the screws (32),

attaching an adapter to a first end of a string,

attaching the adapter to the second end of spring,

attaching a weight to the second end of the string,

dropping the weight through the tubular frame (20),

inserting the first screw (32) into a first leg (22) of the tubular frame (20) to retain the nut (36) thereon in engagement with the bearings (40) thereon and in engagement with the collar (30) at the end of the first leg (22),

pulling the second end of the tension spring (52) out of the second leg (22),

gripping the first end of the tension spring (52) to hold the first end of the tension spring (52) out of the second leg (22),

removing the adapter and string from the first end of the tension spring (52),

attaching the second end of the tension spring (52) to the second screw (32),

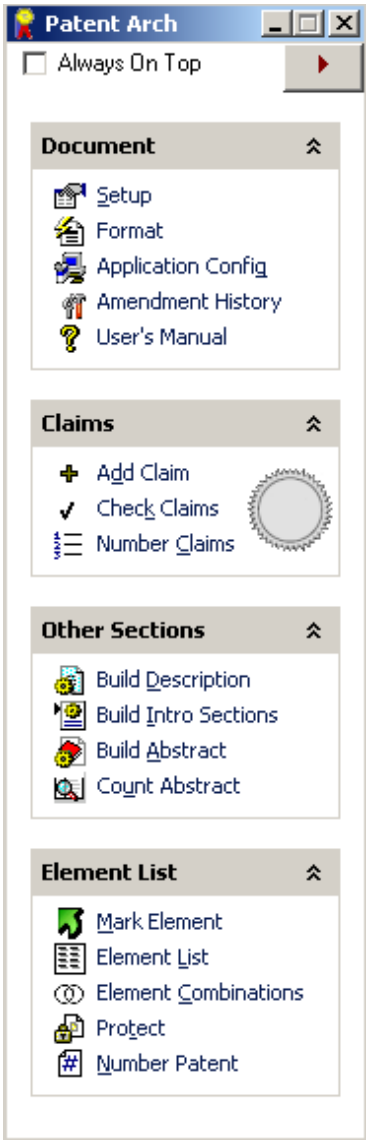
inserting the second screw (32) into the second leg (22) of the tubular frame (20) to retain the nut (36) thereon in engagement with the bearing (40) thereon in engagement with the collar (30) at the end of the second leg (22) whereby the screws (32) may be pulled axially along into and out of the legs (22) against the biasing of the tension spring (52), and

securing a pin (50) into a cross hole (38) in each of the screws (32) to extend radially from and into the slot (48) of the surrounding leg (22) for sliding movement along the slot (48) as the screws (32) move axially relative to the legs (22).

* * * * *

Section 8 Initial Choices in the Application to be made in Patent Template

A. Claims



The *Claims* buttons are used to add or modify the claims of a patent application. To fully take advantage of Patent Architect's features, the claims should be written before any other section of the patent application. Patent Architect® builds the introduction, description, and summary sections using the claims. For more information, see **Creating Claims**, **Checking Claims**, and **Numbering Claims**.

B. Other Sections

The *Other Sections* buttons are used to add the description, summary, and abstract sections to the patent application. Patent Architect® builds the description and summary sections by presenting the substance of the claims in paragraph form while replacing the word "said" with the word "the." For more information, see **Building the Description**, **Build Intro Sections**, and **Building the Abstract**.

C. Element List

The *Element List* buttons provide options for marking elements within the patent application. For more information, see **Mark Elements** or **Elements List**..

D. Document

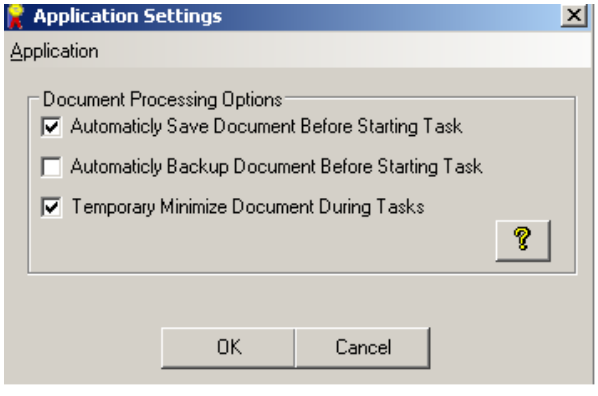
After opening Patent Architect® by clicking on the symbol, the Toolbar appears. The initial choices for the application document are made from the listings under "Document."

The *Amendment History* will be used for preparing a response to a patent office action by providing the amendment format with a copy of the claims as pending.

The *User's Manual* repeats the information presented here.

E. Application Settings

The first action is to click on "Application Configuration" in the Document division of the tool bar and Application Settings window will appear to provide three different options for the document: Save, Backup and Temporarily Minimize.



1) Automatically Save Document Before Starting Task

Checking this box saves the document automatically before Patent Architect® makes any changes to the application, i.e. renumbering the document.

2) Automatically Backup Document Before Starting Task

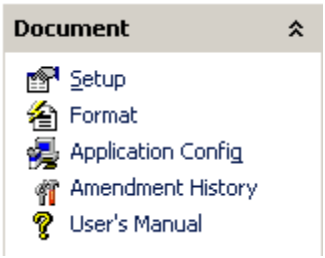
Checking this box allows the file to be backed up in the same directory as the original file prior to Patent Architect® making any changes to the application. The file is saved with a _pbk following its filename. For example, backing up a file named Document1.doc will create a new file named Document1_pbk.doc.

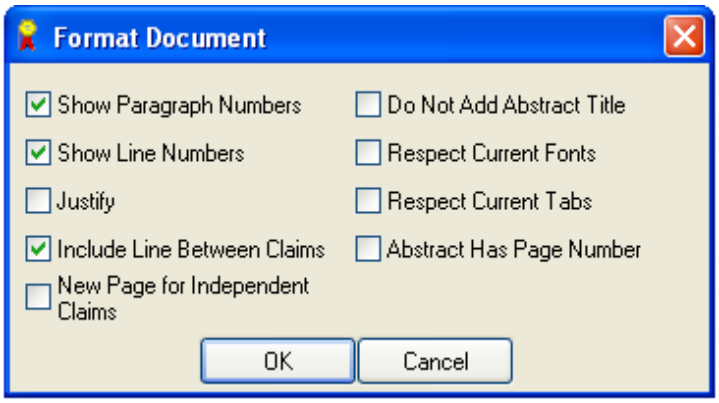
3) Temporarily Minimize Document During Tasks

Checking this box automatically minimizes Microsoft Word when Patent Architect® is performing a time consuming operation. This speeds up the process significantly.

F. Formatting

After the selections have been made in the *Application Settings* window, the icon labeled "Format" should be clicked on in the Document division of the Patent Architect® toolbar and the "Format Document" window will open to setup the layout of the patent application.





The *Show Paragraph Numbers* option successively numbers the paragraphs in brackets at the beginning of each paragraph in the application.

The *Show Line Numbers* option shows the line numbers for every fifth line on each page of the application.

The *Justify* option justifies the text on each page of the application.

The *Include Line Between* Claims option inserts an empty line between claims.

The *New Page for* Independent *Claims* option starts each independent claim at the top of a new page in the application.

The *Do Not Add Abstract* Title option omits the title on the Abstract page.

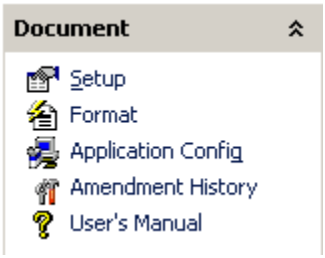
The *Respect Current Fonts* option preserves the default fonts throughout the document.

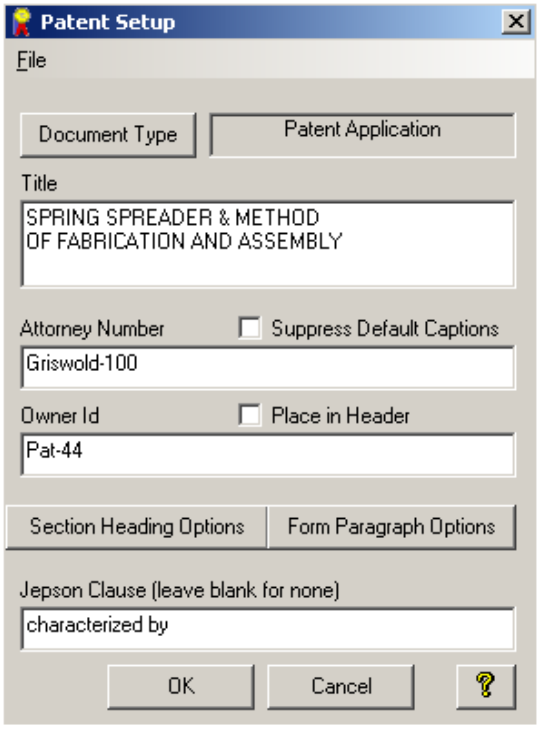
The *Respect Current Tabs* option preserves the default tabs throughout the document.

The *Abstract Has Page Number* option places a page number on the Abstract of the Disclosure page.

G. Setting Up the Spring Spreader Patent Application

After the selections have been made in the *Format Document* window, the icon labeled "Setup" should be clicked on and the "Patent Setup window" will open.





1) Title

The *Title* data line is presented in the *Patent Setup* window for inserting the title of the invention. The title can be inserted at the beginning and, optionally, on the Abstract page of the application.

2) Attorney Number

The *Attorney Number* data line is presented in the *Patent Setup* window for inserting a docket number for the file used by the patent preparer, i.e., a law firm docketing system number, into the footer of the document. In this case the docketing system logs files by client name and file number for that client, e.g., the client is Griswold and it is this client's one hundredth (100) file. A *Suppress Default Captions* option is presented for omitting the *Attorney Number* and *Owner ID* from the header and footer of the document.

3) Owner ID

The *Owner ID* data line is presented in the *Patent Setup* window for inserting a file number used by the patent owner to be displayed in the footer of the document as a default. The owner ID is the file identification assigned and used by the client for the client's filing system and in this case it is pat (for Patent) file number forty four (44). The *Owner ID* can be placed in the header by checking the *Place in Header* option. The *Owner ID* can also be left blank if so desired.

In response to the above entry the following will appear in the footer and on every page:

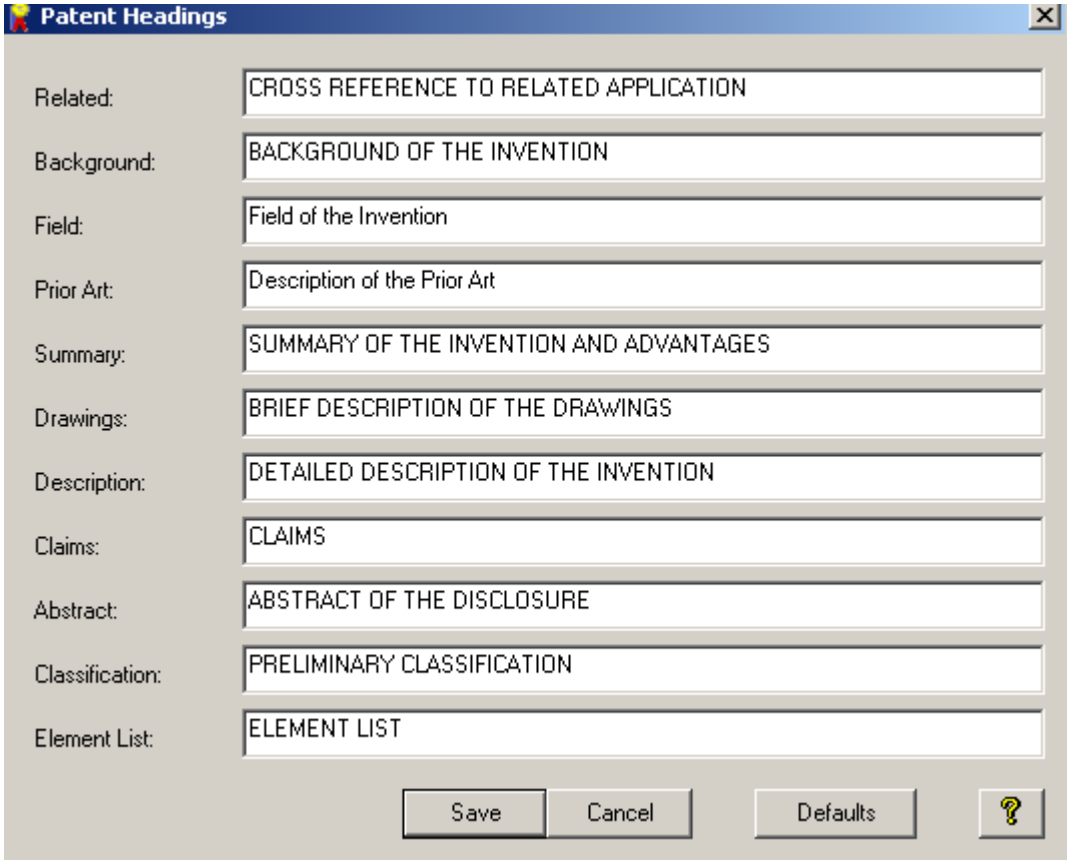
Owner Id: Pat-44

Attorney Number: Griswold-100

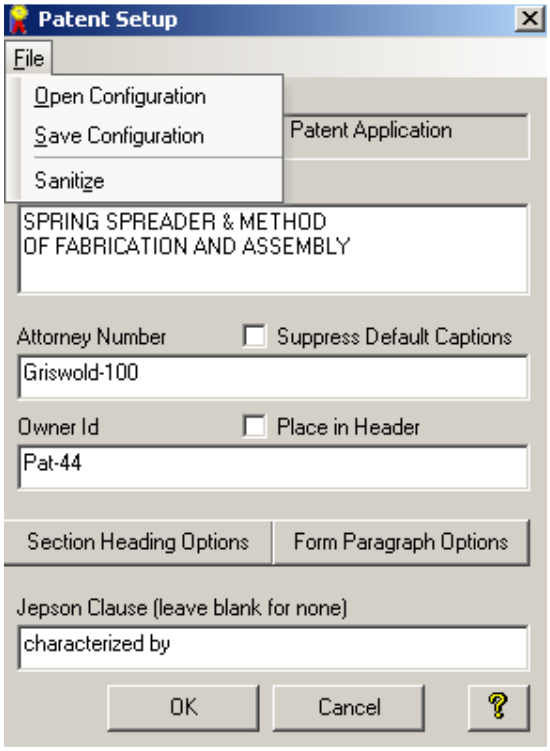
4) Patent Section Heading Options

The *Section Heading Options* button on the *Patent Setup* window presents a *Patent Headings* window. This window presents multiple heading data lines. A default heading for insertion into the application is provided in each heading data line but may be edited. In other words, the default heading in each data line may be edited and changed before being inserted into the patent application. The headings used may be the headings suggested by the United States Patent and Trademark Office (USPTO), or by any other patent office around the world.

The *Defaults* button allows the original default headings to be restored.



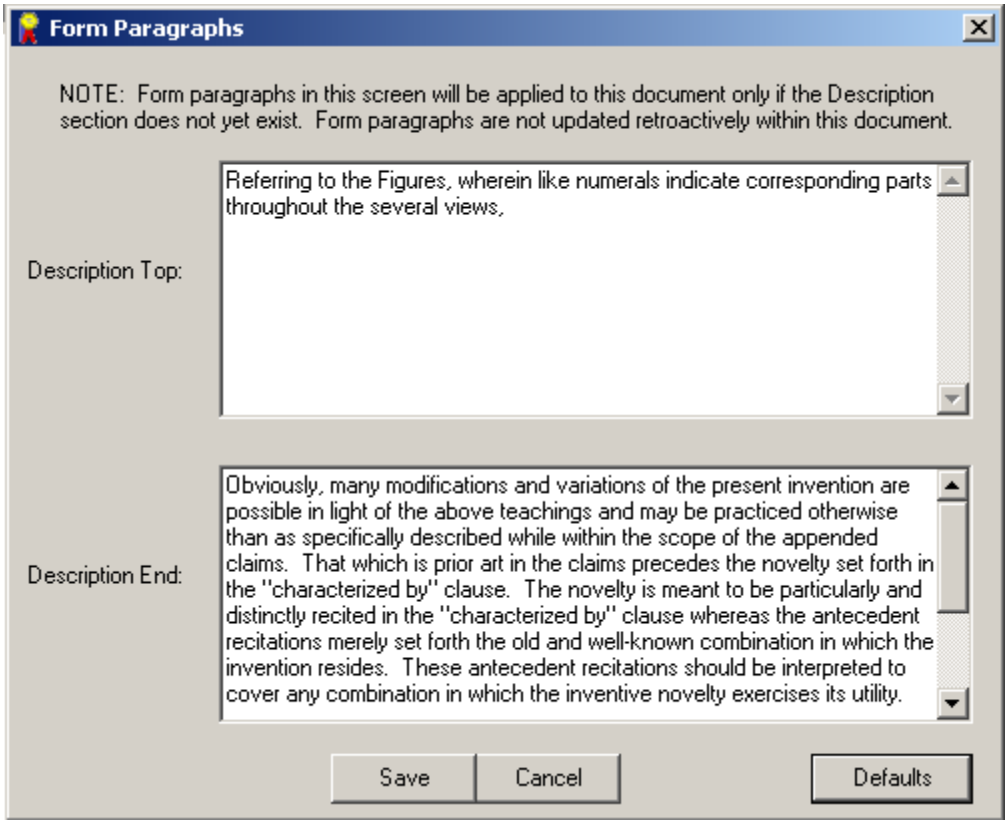
5) Save and Open Configurations



To apply the headings as seen in the data lines, click the save button. This will apply the headings to the current patent application only. However, a set of headings can be saved for future use. This is implemented by clicking the *Save Configuration* option under the *File* menu on the *Patent Setup* window. These configurations can then easily be loaded by clicking the *Open Configuration* option directly above the *Save Configuration* option. This is particularly useful if different clients prefer different headings in their patent applications, and the section headings can also be changed to meet the requirements of any particular country.

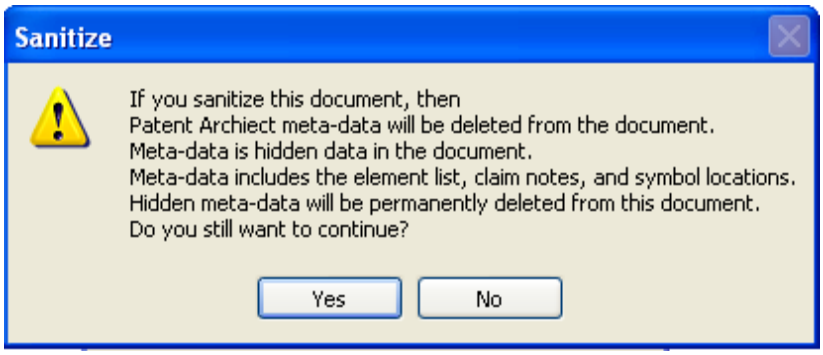
6) Form Paragraph Options

Clicking on the *Form Paragraph Options* button on the *Patent Setup* window will bring up the *Form Paragraphs* window. The omnibus form paragraph is found at the end of the Detailed Description of the Invention section and is meant to provide disclaimers and explanations for the style of the patent application. Patent Architect® automatically presents a default omnibus form paragraph upon building the Description section of the patent application. However, this default paragraph can be edited, and upon clicking the *Save* button, the new paragraph will be inserted in its place when the Detailed Description of the Invention section is drafted.



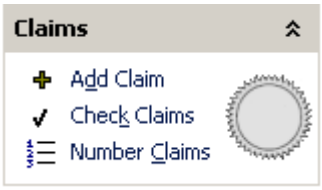
7) Sanitize Document

Meta-data is hidden information attached to all documents containing potentially sensitive information. Often it is in the patent drafter's best interests to remove meta-data from a document before sending it out. Patent Architect® allows the user to easily remove an application's meta-data by clicking on the *Sanitize* option under the *File* menu on the *Patent Setup* window. This will display a *Sanitize* window, asking for confirmation before deleting the application's meta-data.



Section 9 Drafting the Claims

A. Initial Add Claim

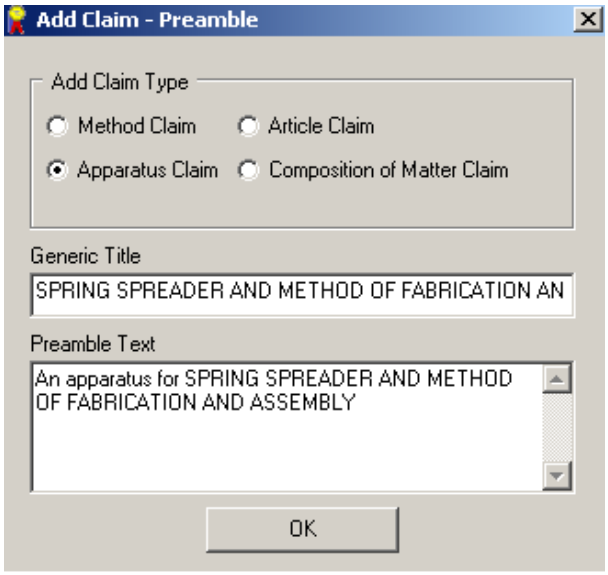


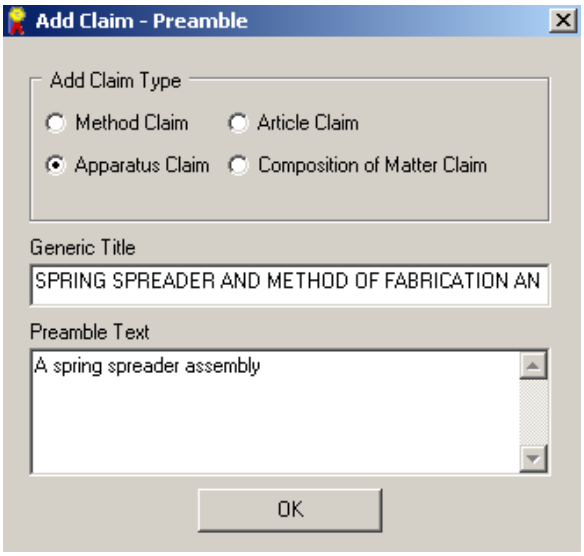
A claim can be added to a patent application by clicking the *Add Claim* button in the Claims division of the Patent Architect® tool bar. For the first claim, it is recommended that a picture claim including all of the elements of the invention as well as the functional interactions of the elements, be drafted. Also, the use of a "characterized by" clause in the picture claim is suggested to allow Patent Architect® to distinguish the invention's novelty from the prior art.

The "characterized by" clause triggers Patent Architect® to automatically divide the broad claim and place the invention's prior art in the *Description of the Prior Art* section and the novelty in the *Summary of the Invention* section, as explained in more detail in Section 3.8 and 3.9, respectively.[6] These sections can be built using a claim without a "characterized by" clause by overriding the errors which will pop up. However, Patent Architect® will then be unable to distinguish the novelty from the prior art and will place the entirety of the selected claim in both the *Description of the Prior Art* and the *Summary of the Invention* sections. The "characterized by" clause also triggers Patent Architect® to automatically sub-divide the picture claim in preparation for drafting the dependent claims by placing the novelty sub-paragraphs before the prior art paragraphs.

In response to clicking on the Add Claim the first Add Claim-Preamble window appears with the title automatically presented as the preamble, which is not satisfactory and is therefore edited as shown in the second window after editing.

[6] *See infra* Chapter III.





Upon clicking on OK after editing the preamble as shown on the right, the initial structure of the application will appear.

SPRING SPREADER AND METHOD OF FABRICATION AND ASSEMBLY

CLAIMS

1. A spring spreader assembly comprising:

(word picture of prior art)

and characterized by,

(word picture of novelty).

B. Drafting the Picture Apparatus Claim

The goal of Patent Architect® is to increase efficiency and accuracy by reducing the time to prepare an application while avoiding common errors in the basic patent structure. The program does not replace the mental tension that must be applied to reach the art-additive. Patent Architect® allows the patent preparer to concentrate on concept by facilitating mechanics. In order to do this, the program uses "characterized by" and "said" in the claims as program keys, or triggers, which may be removed after the application is finished. More specifically, "characterized by" is used to build the introductory sections of the application and "said is used to check the claims for antecedent basis for each element following "said."

The elements of the preferred embodiment have been identified as:

- a V-shaped tubular frame including a cross beam and truss members
- a screw telescoping into each end of the tubular frame
- a nut threaded onto each screw and engaging the end of the tubular frame
- a bearing between each nut and the adjacent end of the tubular frame
- a collar between each nut and the adjacent end of the tubular frame
- cylindrical tool holes in the nuts for receiving a turning rod
- a pin extending transversely from the screw and movable along a slot in the tubular frame
- a claw plate extending from each screw at a forty degree angle for engaging the spring curls
- side guides on the claw plates for engaging the side edges of the leaf spring
- a tension spring interconnecting the inner ends of the screws via threaded connectors

And of those the search reveled the following to be novel:

- the V-shape of the tubular frame and the cross beam and truss members
- the collar between each nut and the adjacent end of the tubular frame
- the cylindrical tool holes in the nuts for receiving a turning rod
- the forty degree angle of the a claw plate
- a tension spring interconnecting the inner ends of the screws via threaded connectors

Accordingly, the picture claim is drafted with the old elements preceding and the new elements following the "characterized by" clause. The result includes every element and accounts for every line in the drawings in the inventor's disclosure and looks like this.

SPRING SPREADER AND METHOD OF FABRICATION AND ASSEMBLY

CLAIMS

1. A leaf spring spreader assembly comprising;

a tubular frame having legs extending in opposite directions

to spaced ends,

a screw having a longitudinal axis and an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs to a claw end for engaging the end curl of a leaf spring,

a nut threadedly engaging each of said screws and reacting with said spaced end of each of said legs for moving the associated screw into and out of said leg associated therewith in response to rotation of said nut,

a bearing disposed about said screw and engaging each of said spaced ends for transmitting thrust loads from and facilitating rotation of said nut associated therewith,

a plate secured to each of said claw ends and disposed at an angle relative to said axis of said screw associated therewith and extending above said screw associated therewith to an upper-outer corner,

each of said legs having a slot extending along its axis,

a pin extending radially from each of said screws and into said slot of said leg associated therewith for sliding movement along said slot as said screw moves axially relative to said leg,

and characterized by,

said tubular frame having a V-shape with said legs extending along respective as in opposite directions from an apex to said spaced ends,

a cross beam extending across said V-shape and interconnecting said legs for stabilizing said legs,

said cross beam having a right angled cross section with each end thereof cradling one of said legs of said frame,

truss members diverging from one another and interconnecting said cross beam and said legs,

a collar welded to each of said spaced ends of said legs,

each of said bearings engaging one of said collars for transmitting the thrust loads,

each of said nuts reacting with said collar through said bearing at said spaced end of each of said legs,

each of said nuts having cylindrical tool holes extending radially for receiving a shaft-tool for rotating said nuts,

said angle of said plate relative to said axis being forty degrees,

each of said plates having a chisel edge between said upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring,

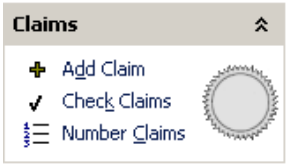
a threaded hole disposed at each of said inner ends of said screws, and

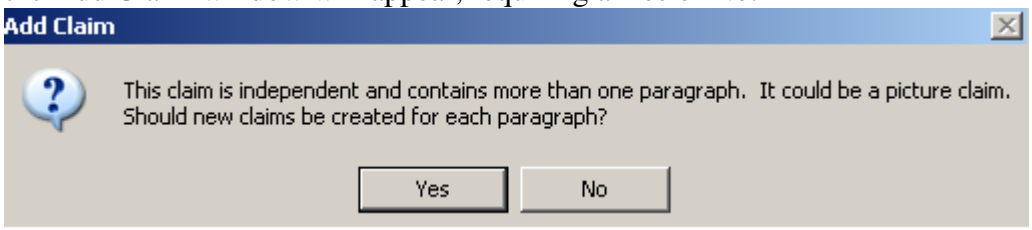
a tension spring with male threaded ends interconnecting said threaded holes of said screws to retain said nuts in engagement with said bearings at said spaced ends of said legs

and to allow said screws to be moved axially along into and out of said legs.

C. Breaking up the Picture Apparatus Claim

The limitations in the picture claim are used to draft the broad claim and the dependent claims. A mechanical step is performed by Patent Architect® by selecting Add Claim to divide the picture claim into sub-paragraphs for editing and the Add Claim window will appear, requiring a Yes or No.

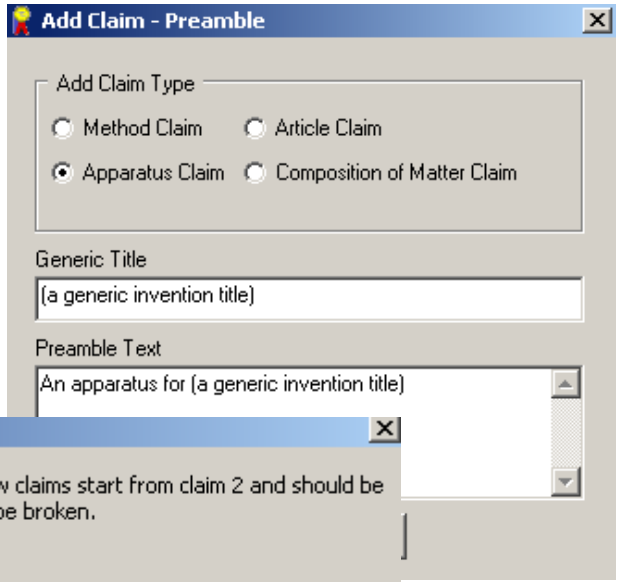




This should be "Yes" to duplicate the picture claim with each of the sub-paragraphs in the picture claim forming one dependent claim but with the novelty sub-paragraphs following the "characterized by" clause being serially arranged as the first dependent claim numbers.

After clicking "Yes" the next window will present the preamble selection/verification. Upon selecting the type of claim, the preamble should be edited to recite that which is to precede the "as set forth in claim" in each dependent claim. This selection can also be edited as was done here to change "apparatus" to –assembly-, which is not illustrated in this preamble window.

Upon the OK of the preamble window, the claim order and status window opens.



The claims in application now appear with claim 1 being the picture claims and claims 2-20 being the picture sub-divided into one dependent claim for each sub-paragraph of the picture claim, ready for editing and rearrangement.

SPRING SPREADER AND METHOD OF FABRICATION AND ASSEMBLY

CLAIMS

1. A leaf spring spreader assembly comprising;

a tubular frame having legs extending in opposite directions to spaced ends,

a screw having acme threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs to a claw end for engaging the end curl of a leaf spring,

a nut threadedly engaging each of said screws and reacting with said spaced end of each of said legs for moving the associated screw into and out of said leg associated therewith in response to rotation of said nut,

a bearing disposed about said screw and engaging each of said spaced ends for transmitting thrust loads from and facilitating rotation of said nut associated therewith,

a plate secured to each of said claw ends and disposed at an angle relative to said axis of said screw associated therewith and extending above said screw associated therewith to an upper-outer corner,

each of said legs having a slot extending along its axis,

a pin extending radially from each of said screws and into said slot of said leg associated therewith for sliding movement

along said slot as said screw moves axially relative to said leg, and characterized by,

said tubular frame having a V-shape with said legs extending along respective as in opposite directions from an apex to said spaced ends,

a cross beam extending across said V-shape and interconnecting said legs for stabilizing said legs,

said cross beam having a right angled cross section with each end thereof cradling one of said legs of said frame,

truss members diverging from one another and interconnecting said cross beam and said legs,

a collar welded to each of said spaced ends of said legs,

each of said bearings engaging one of said collars for transmitting the thrust loads,

each of said nuts reacting with said collar through said bearing at said spaced end of each of said legs,

each of said nuts having cylindrical tool holes extending radially for receiving a shaft-tool for rotating said nuts,

said angle of said plate relative to said axis being forty degrees,

each of said plates having a chisel edge between said upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring,

a threaded hole disposed at each of said inner ends of said screws, and

a tension spring with male threaded ends interconnecting said threaded holes of said screws to retain said nuts in engagement with said bearings at said spaced ends of said legs and to allow said screws to be moved axially along into and out of said legs.

2. An assembly characterized by said tubular frame having a V-shape with said legs extending along respective as in opposite directions from an apex to said spaced ends.

3. An assembly as set forth in claim 2 including a cross beam extending across said V-shape and interconnecting said legs for stabilizing said legs.

4. An assembly as set forth in claim 3 including said cross beam having a right angled cross section with each end thereof cradling one of said legs of said frame.

5. An assembly as set forth in claim 4 including truss members diverging from one another and interconnecting said cross beam and said legs.

6. An assembly as set forth in claim 5 including a collar welded to each of said spaced ends of said legs.

7. An assembly as set forth in claim 6 including each of said bearings engaging one of said collars for transmitting the thrust loads.

8. An assembly as set forth in claim 7 including each of said nuts reacting with said collar through said bearing at said spaced end of each of said legs.

9. An assembly as set forth in claim 8 including each of said nuts having cylindrical tool holes extending radially for receiving a shaft-tool for rotating said nuts.

10. An assembly as set forth in claim 9 including said angle of said plate relative to said axis being forty degrees.

11. An assembly as set forth in claim 10 including each of said plates having a chisel edge between said upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring.

12. An assembly as set forth in claim 11 including a threaded hole disposed at each of said inner ends of said screws,

13. An assembly as set forth in claim 12 including a tension spring with male threaded ends interconnecting said threaded holes of said screws to retain said nuts in engagement with said bearings at said spaced ends of said legs and to allow said screws to be moved axially along into and out of said legs.

14. An assembly as set forth in claim 13 including a tubular frame having legs extending along respective as in opposite directions from an apex to spaced ends.

15. An assembly as set forth in claim 14 including a screw having acme threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs to a claw end for engaging the end curl of a leaf spring.

16. An assembly as set forth in claim 15 including a nut threadedly engaging each of said screws and reacting with said spaced end of each of said legs for moving the associated screw into and out of said leg associated therewith in response to rotation of said nut.

17. An assembly as set forth in claim 16 including a bearing disposed about said screw and engaging each of said spaced ends for transmitting thrust loads from and facilitating rotation of said nut associated therewith.

18. An assembly as set forth in claim 17 including a plate secured to each of said claw ends and disposed at an angle relative to said axis of said screw associated therewith and extending above said screw associated therewith to an upper-outer corner.

19. An assembly as set forth in claim 19 including each of said legs having a slot extending along its axis.

20. An assembly as set forth in claim 19 including a pin extending radially from each of said screws and into said slot of said leg associated therewith for sliding movement along said slot as said screw moves axially relative to said leg.

D. Drafting the Broad Apparatus Claim

Now starts the most difficult part of drafting a patent application, the drafting of the broadest claim. However, the mental process is facilitated by the proposed dependent claims from the break-up of the picture claim. The first step is to identify the most important novel limitation over the prior art and the non-obvious inventive step which supports an art-additive.

The potential elements of novelty are the V-shape of the tubular frame and the cross beam and truss members, the collar between each nut and the adjacent end of the tubular frame, the cylindrical tool holes in the nuts for receiving a turning rod, the forty degree angle of the a claw plate, and a tension spring interconnecting the inner ends of the screws via threaded connectors. As each of these elements is analyzed for necessity in fabrication and operation of the spring spreader, it appears that the tension spring is most important for fabrication and for operation. This leads to a discussion with the inventor who relates that the assembly is fabricated from "off-the-shelf" components, i.e., pipe that is bent into a V-shape, readily available bearings, readily available acme screws, etc. The inventor related the importance of the ease of fabrication by sliding the screws into the opposite ends of the tubular frame and retained therein by the tension spring with the nuts urged against the bearings and the collars. It becomes clear that the single most important novelty is the tension spring inside the frame for biasing the nuts into a force relationship with the ends of the tubular frame. In drafting the broad independent apparatus claim, only that prior art necessary to support the novelty in the "characterized by" clause should be recited. Accordingly, the preamble of claim 2 will be edited to conform with the preamble of the picture claim and to cut and paste the tension spring limitation of claim 14 into this initial broad claim 2.

2. A leaf spring spreader assembly comprising;

characterized by a tension spring with male threaded ends interconnecting said threaded holes of said screws to retain said nuts in engagement with said bearings at said spaced ends of said

legs and to allow said screws to be moved axially along into and out of said legs.

The cut and paste continues by inserting before "characterized by" only those limitations necessary to support the "tension spring." The limitations deleted (used) will be in [brackets] and the limitations added will be underlined. Those limitations that are not deleted (used) are saved at the end of the claims for reconsideration and re-introduction into dependent claims, if appropriate.

The elements required to support the "tension spring" are the "tubular frame," "screws" and "nuts." Therefore, sub-paragraphs numbered 15, 16 and 17 in the breakup of the picture claim are cut and pasted into this new independent broad claim 2.

2. A leaf spring spreader assembly comprising;

a tubular frame having legs extending in opposite directions to spaced ends,

a screw having [acme] threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of said spaced end of each of said legs to a claw end for engaging the end curl of a leaf spring,

a nut threadedly engaging each of said screws and reacting with said spaced end of each of said legs for moving the associated screw into and out of said leg associated therewith in response to rotation of said nut, and

characterized by a tension spring [with male threaded ends] interconnecting said [threaded holes] inner ends of said screws to retain said nuts in engagement with [said bearings at] said spaced ends of said legs and to allow said screws to be moved axially along into and out of said legs.

N.B. It often occurs that after the picture claim is drafted and the broadest claim is drafted it is discovered that the broad claim requires broader language than in the picture claim. This requires a reconciliation of the picture claim language to conform to the broad claim. An example here is in the recitation in the original picture claim:-- a tubular frame having a V-shape with legs extending along respective axes in opposite directions from an apex to spaced ends--. In the reconciliation, the V-shape and apex were separated into two separate phrases. It is also discovered that the picture claim should have been edited to include the "inner ends" of the screws so that the "inner ends" need not be added to the broad claim as above. Accordingly, "at said inner ends of" should have been inserted after "interconnecting said threaded holes" in the picture claim whereby every word recited in the broadest claim and the dependent claims are also recited verbatim in the picture claim.

E. Drafting Dependent Apparatus Claims

The first dependent claim is drafted upon completing the broad claim. The dependent claims should progressively further define the novelty following characterized by of the broad claim. Each dependent claim should be dependent from the lowest claim number having the antecedents required for that dependent claim. The first dependent claim pursues the connection of the "tension spring" to the screws per the threaded holes of subparagraphs 13 and 14 in the breakup of the picture claim.

3. An assembly as set forth in claim 2 including

a threaded hole disposed at each of said inner ends of said screws,.said tension spring with male threaded ends <u>removable from and</u> interconnecting said threaded holes of said screws.

The next dependent claim shifts to the shape of the frame and does not need the limitations of the first dependent claim for antecedent basis and is therefore made dependent directly upon the broad independent claim 2. Accordingly, the next dependent claim extracts the "V-shape" from subparagraph 2 of the breakup of the picture claim.

4. An assembly as set forth in claim 2 wherein said tubular frame [having] <u>defines</u> a V-shape with said legs extending along respective as in opposite directions from an apex to said spaced ends.

The specific structure of the frame is pursued and perfected in successive dependent claims from subparagraphs 3-5 of the picture claim breakup.

5. An assembly as set forth in claim 4 including a cross beam extending across said V-shape and interconnecting said legs for stabilizing said legs.

6. An assembly as set forth in claim 5 wherein said cross beam has[ving] a right angled cross section with each end thereof cradling one of said legs of said frame.

7. An assembly as set forth in claim 6 including truss members diverging from one another and interconnecting said cross beam and said legs.

The next dependent claim also depends from the broadest independent claim as it adds the holes in the nuts from subparagraph 10 of the picture claim breakup and does require the specifics of the frame for antecedents.

8. An assembly as set forth in claim 2 wherein each of said nuts [having] includes [cylindrical] tool holes extending radially for receiving a shaft-tool for rotating said nuts.

Now to successively perfect the claws and in a parallel fashion do the same with the collars and the pin/slots, each group being dependent upon the broadest claim and respectively taken from subparagraphs 19 and 12, 6 and 18, 20 and 21 of the breakup of the picture claim.

9. An assembly as set forth in claim 2 including a plate secured to each of said claw ends and disposed at an angle relative to said axis of said screw associated therewith and extending above said screw associated therewith to an upper-outer corner.

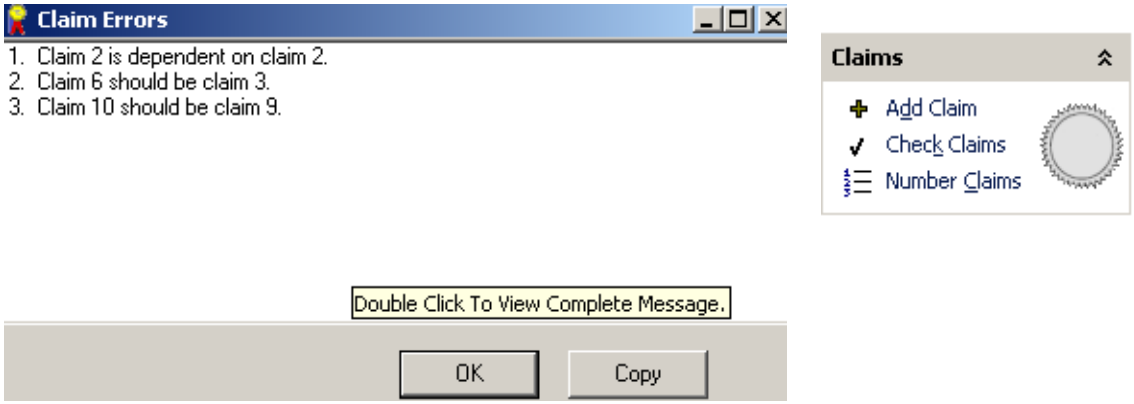
10. An assembly as set forth in claim 9 wherein each of said plates [having] defines a chisel edge between said upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring.

11. An assembly as set forth in claim 2 including a collar welded to each of said spaced ends of said legs, a bearing disposed about [said] each screw and engaging each of said collars at said spaced ends for transmitting thrust loads from and facilitating rotation of said nut associated therewith.

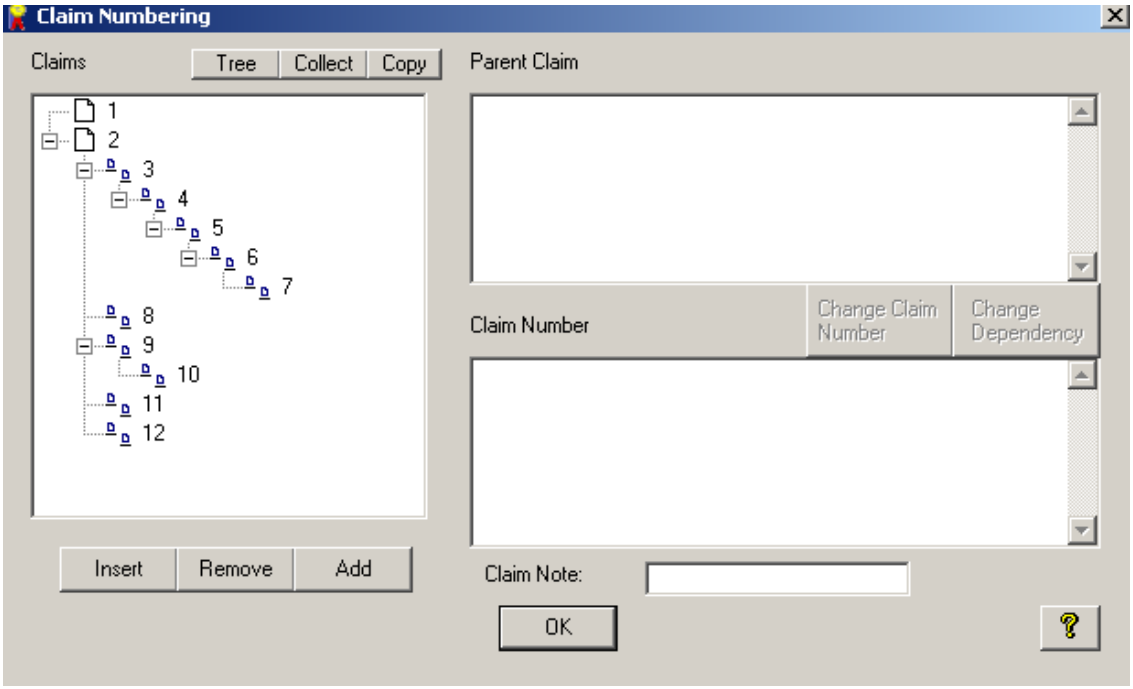
12. An assembly as set forth in claim 2 wherein [including] each of said legs [having] includes a slot extending axially along the screw associated therewith [its axis], and including a pin extending radially from each of said screws and into said slot of said leg associated therewith for sliding movement along said slot as said screw moves axially relative to said leg.

F. Changing the Order of the Apparatus Claims

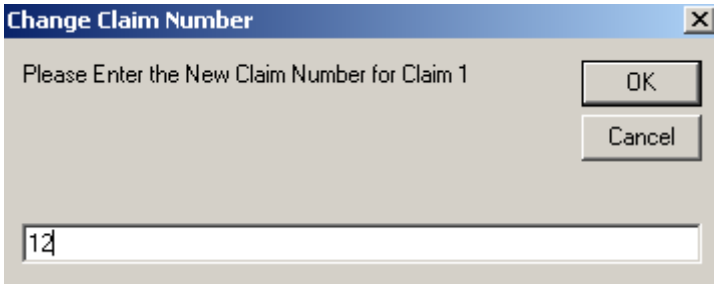
There are no cogent reasons to add further dependent claims just to add back in the edited out deletions*: acme, threaded holes, cylindrical.* However, the picture claim remains as claim 1 and the broadest claim is claim 2 whereas it is desirable for the picture claim to be last, i.e., claim 12 with claims 2-12 changed to claims 1-11. Accordingly, that is accomplished by clicking on **Number Claims** in the Claims box of the Tool Bar, whereupon the Claims Errors box will appear.



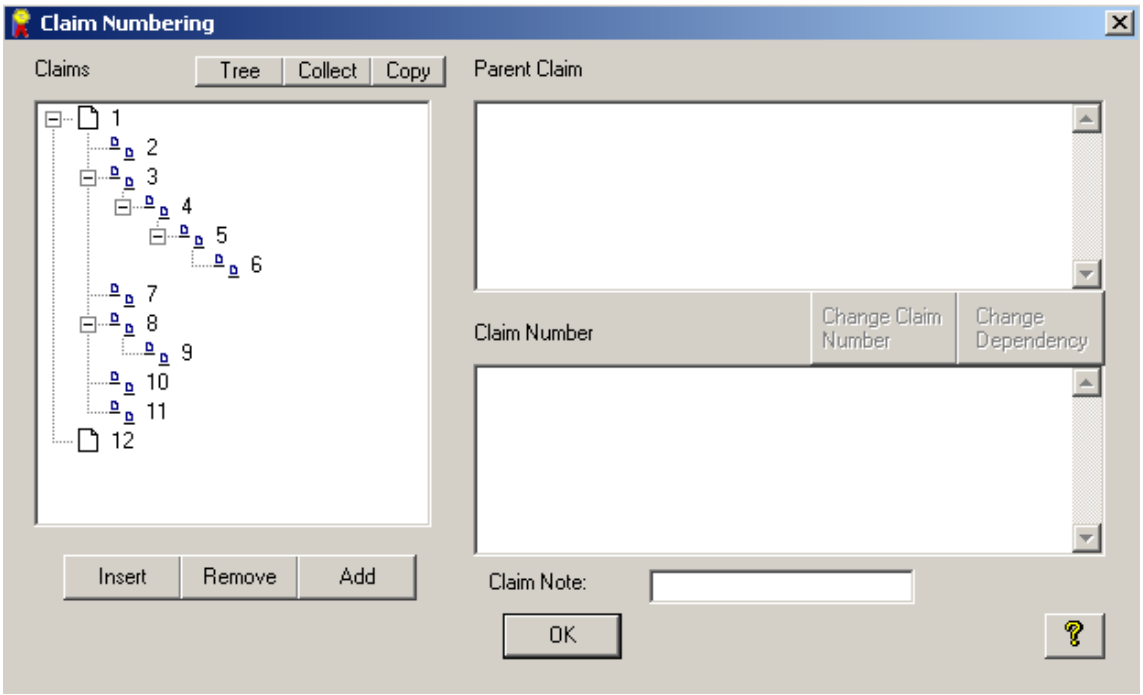
Although the errors have been corrected in the above claims, this window appeared because of typographical errors in the claims such as no periods following certain claim numbers. If the Claim Errors window appears, the claims must be edited carefully. Claim Errors will identify words that are used both as an adjective to identify and to recite structure, one of the uses must be changed. For example, in the recitation- *a straight section extending in a straight path*—the second straight must be changed to *–rectilinear path*—to avoid confusion or ambiguity. After correcting the errors and clicking Number Claims again, the claim numbering window appears showing the picture claim as claim number 1.



To re-order the claims, claim 1 is clicked upon and highlighted to produce the Change Claim Number window in which the new number for picture claim 1 is inserted.

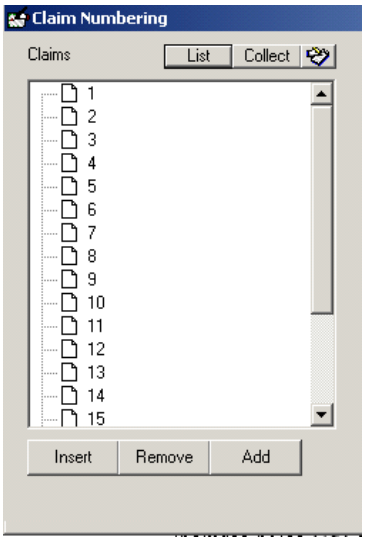


Upon clicking OK, a new Claim Numbering window appears showing the claims re-ordered with claim 1 being the broad independent claim and the picture claim being the last claim 12. However, in order to conserve space the edited and re-ordered claims are not repeated here but will appear in the actual patent 7,264,225 as reproduced above in Section 7.

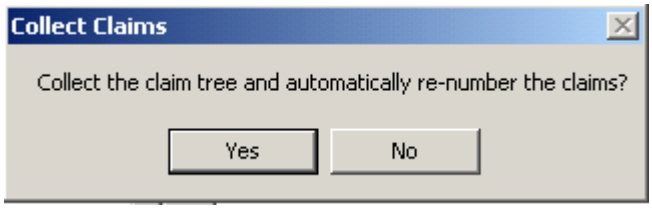


G. Claim View

The claim numbers can be displayed by selecting one of two options. By selecting the *Tree* button, the claim numbers will be displayed based on their dependency, as seen on the left side of the above window. By selecting the *Tree* button again, a *List* will be generated.



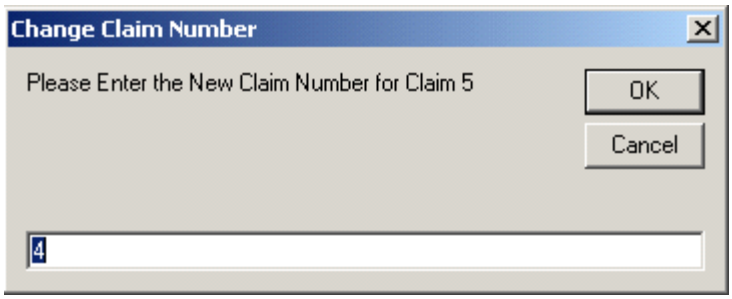
By selecting the *Collect* button at the top of the window, the claims will be renumbered with the dependent claims being placed as close as possible to their parent claims. As a double check, since this is such a significant reorganization of the claims, a *Collect Claims* decision box will appear to affirm or reject the decision to collect and reorder the claims.



A *Claim Number* text window is presented within the *Claim Numbering* window and adjacent the list of claims presented therein. By highlighting a claim number, the text of the highlighted claim is displayed in the lower text window. The text of its parent claim is displayed in the upper text window. If an independent claim is highlighted, the upper text window is left blank.

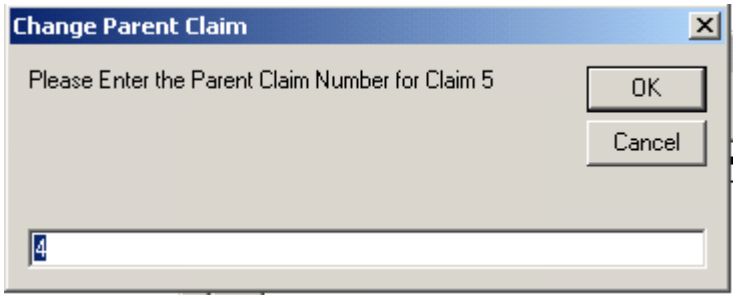
H. Changing Claim Numbers

A claim number can be changed manually by highlighting the desired *Claim Number* and clicking on the *Change Claim Number* button on the *Claim Numbering* window. A window will then appear. A new claim number can be placed in the corresponding data line. Accordingly, all of the claims are renumbered to accommodate the change. For example, if Claim 5 is renumbered to become Claim 2, then Patent Architect® will automatically change Claim 3 to Claim 4. Patent Architect® will ensure that the claims' dependency will be preserved during the automatic renumbering process.



I. Changing Dependency

A claim's dependency can be changed by highlighting the desired claim and clicking the *Change Dependency* button on the *Claim Numbering* window. A *Change Parent Claim* window will then appear. The number of the new parent claim can be placed in the corresponding data line. Accordingly, all of the claims are renumbered to accommodate the change in the dependency.

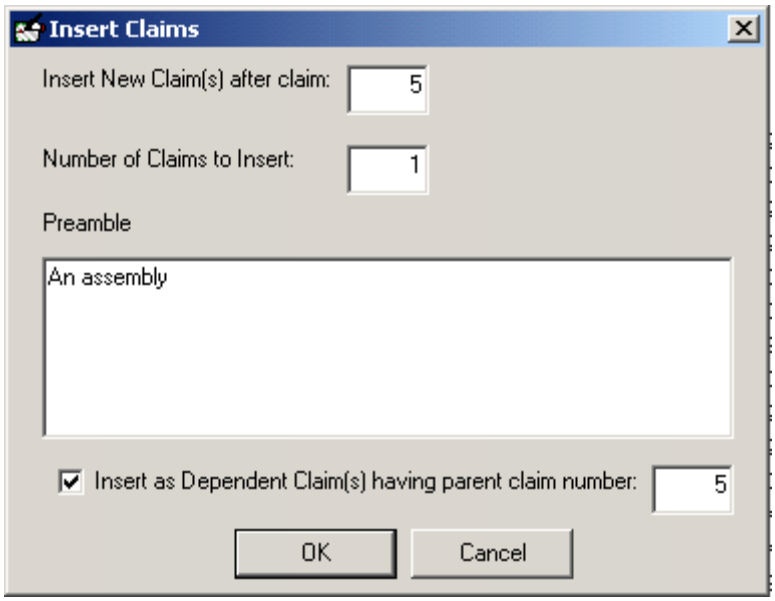


J. Adding an Independent Claim

An independent claim can be added to the application from the *Claim Numbering* window by clicking the *Add* button. The new independent claim will be added following the last existing claim.

K. Inserting and Removing Dependent Claims

The *Insert* option, found in the lower left corner of the *Claim Numbering* window, is used to insert a claim dependent upon the claim number highlighted in the *Claim Numbering* window. By clicking on the *Insert* button, an *Insert Claim* window is presented.



An *Insert New Claim after claim* data line is presented in the *Insert Claims* window for inserting the number of the claim preceding the first claim to be inserted. The numerical amount of claims to be added is inserted in the *Number of Claims to Insert* data line. A *Preamble* window is presented in the *Insert Claims* window for displaying and editing the preamble of the first claim to be inserted.

L. Drafting a Picture Method Claim

Attention should be given to classes of claims to be included in the drafting of every application. In so doing it is recognized that this invention includes a method of fabricating such a spring spreader assembly. Again, the first step in drafting the method claims is to draft a picture method claim. But the inventor's disclosure does not describe how the assembly is fabricated, which leads to a conversation with the inventor to ascertain the steps in fabricating and assembling the assembly. The picture method claim follows the actual steps employed by the inventor to fabricate the assembly.

13. A method of fabricating a leaf spring spreader assembly comprising the steps of;

bending a pipe into a tubular frame having a V-shape with legs extending in opposite directions from an apex to spaced ends,

welding a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs,

welding truss members to the cross beam and the legs to diverge from one another,

welding a collar to each of the spaced ends of the legs,

producing a slot extending axially along each of the legs,

threadedly engaging a nut on each of two screws and screwing the nuts to the claw ends of the respective screws,

disposing a bearing about each screw for engaging each of the collars,

welding a plate to a claw end of each of the screws at an angle of forty degrees relative to the axis of the screw associated therewith so as to extend above the screw welded thereto and having a chisel edge between upper-outer corners,

attaching the first end of a tension spring to the inner end of a first of the screws,

attaching an adapter to a first end of a string,

attaching the adapter to the second end of the spring,

attaching a weight to the second end of the string,

dropping the weight through the tubular frame,

inserting the first screw into a first leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon and in engagement with the associated collar at the end of the first leg of the tubular frame,

pulling the second end of the tension spring out of the second leg,

gripping the second end of the tension spring to hold it beyond the second end of the second leg at the second end of the tubular frame,

removing the string from the second end of the tension spring,

attaching the adapter at the second end of the tension spring to the second screw,

inserting the second screw into the second leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon in engagement with the collar at the end of the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of the tension spring, and

securing a pin into a cross hole in each of the screws to extend radially from and into the slot of the surrounding leg for sliding movement along the slot as the screws move axially relative to the legs.

M. Breaking up the Picture Method Claim

The cursor is placed on claim 13 and Add Claim is clicked whereby the window will appear asking if the claim should be sub-divided into subparagraphs and in response to OK, a window will appear stating that the sub-paragraphs have been numbered 14-34. It should be noted that picture claim 13 does not include a characterized by clause so that the sub-paragraphs serially recite the limitations in the order recited in claim 13.

14. A method for comprising the steps of.

15. A method for as set forth in claim 13 including bending a pipe into a tubular frame having a V-shape with legs extending in opposite directions from an apex to spaced ends.

16. A method for as set forth in claim 14 including welding a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs.

17. A method for as set forth in claim 15 including welding truss members to the cross beam and the legs to diverge from one another.

18. A method for as set forth in claim 16 including welding a collar to each of the spaced ends of the legs.

19. A method for as set forth in claim 17 including producing a slot extending axially along each of said legs.

20. A method for as set forth in claim 18 including threadedly engaging a nut on each of two screws and screwing the nuts to the claw ends of the respective screws,

21. A method for as set forth in claim 19 including disposing a bearing about each screw for engaging each of the collars.

22. A method for as set forth in claim 20 including welding a plate to a claw end of each of the screws at an angle of forty degrees relative to the axis of the screw associated therewith so as

to extend above the screw welded thereto and having a chisel edge between upper-outer corners.

23. A method for as set forth in claim 21 including attaching the first end of a tension spring to the inner end of a first of the screws.

24. A method for as set forth in claim 22 including attaching an adapter to a first end of a string.

25. A method for as set forth in claim 23 including attaching the adapter to the second end of spring.

26. A method for as set forth in claim 24 including attaching a weight to the second end of the string.

27. A method for as set forth in claim 25 including dropping the weight through the tubular frame.

28. A method for as set forth in claim 26 including inserting the first screw into a first leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon and in engagement with the associated collar on the first leg at the first end of the tubular frame,

29. A method for as set forth in claim 27 including pulling the second end of the tension spring out of the second leg.

30. A method for as set forth in claim 28 gripping the second end of the tension spring to hold it beyond the second end of the second leg at the second end of the tubular frame,

31. A method for as set forth in claim 29 including removing the adapter and string from the first end of the tension spring.

32. A method for as set forth in claim 30 including attaching the second end of the tension spring to the second screw.

33. A method for as set forth in claim 31 including inserting the second screw into the second leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon in engagement with the collar at the end of the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of the tension spring,.

34. A method for as set forth in claim 32 including securing a pin into a cross hole in each of the screws to extend radially from and into the slot of the surrounding leg for sliding movement along the slot as the screws move axially relative to the legs.

N. Drafting the Broad Method Claim

In mentally addressing the broadest recitation of the method, it is recognized that the elements of the assembly may be formed by diverse entities at different locations and brought together for assembly. Therefore, the broadest expression of the method should only include the steps in assembling the elements and not the individual forming of the elements, i.e., assembly occurs regardless of where the elements are formed. A method claim should rely upon an action step and avoid reliance upon structure. Therefore, to the extent structure is used in the method, that structure should be recited in the preamble. Accordingly the action steps of sub-paragraphs 22, 25-32 are cut, pasted and edited into a draft broad method claim under the first sub-paragraph number 14.

14. A method for comprising the steps of;

attaching the first end of a tension spring to [the inner end of] a first of the screws[.],

attaching a first end of a string to the second end of the tension spring,

attaching a weight to the second end of the string[.],

dropping the weight through the first end of the tubular frame through and beyond the second end of the tubular frame[.],

inserting the first screw into a first [leg] end of the tubular frame [to retain the nut thereon in engagement with the bearing thereon and in engagement with the associated collar at the end of the first leg of the tubular frame],

pulling the second end of the tension spring beyond [out of] the second end of the tubular frame [leg.],

gripping the second end of the tension spring to hold it beyond the [second end of the second leg at the] second end of the tubular frame,

removing the [adapter and] string from the [first] second end of the tension spring[.],

attaching the second end of the tension spring to the second screw[.],

releasing the gripping and holding of the tension spring out beyond the second end of the tubular frame, and

allowing [inserting] the second screw to insert into the second [leg] end of the tubular frame [to retain the nut thereon in engagement with the bearing thereon in engagement with the collar at the end of the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of] with the inner ends of both screws biased into the tubular frame by the tension spring.

Now that the steps of the claim have been drafted it is necessary to draft a preamble to include the structure used in the steps of assembly. The preamble will read:

14. A method [for comprising] of fabricating a leaf spring spreader assembly of the type including a tubular frame having legs extending in opposite directions to spaced ends, a screw having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring, and a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut, and characterized by the steps of;

O. Drafting the Dependent Method Claims

The first dependent method claim will complete the assembly of the components already recited in the broad independent method claim. The remaining sub-paragraphs from the break-up of the picture method claim are cut, pasted and edited into a series of dependent claims.

15. A method as set forth in claim 14 including;

Threadedly engaging a nut to a first [each of two] screw[s] and screwing the nut[s] to the claw end[s] of the first [respective] screw[s],

[including welding] disposing a collar [to] on each of the spaced ends of the legs,

[disposing] sliding a bearing about the first screw and into contact with the nut for engaging [each of] the collar[s],

threadedly attaching the first end of [a] the tension spring to a threaded hole (38) in the inner end of [a] the first [of the] screw[s],

inserting the first screw into a first end [leg] of the tubular frame [to retain the nut thereon in engagement] with the bearing[s thereon and] in engagement with the associated collar on the first leg at the first end of the tubular frame,

engaging a nut to a second [each of two] screw[s] and screwing the nut[s] to the claw end[s] of the second [respective] screw[s],

[disposing] sliding a bearing about [each] the second screw and into contact with the nut for engaging [each of] the second collar, and

threadedly attaching the second end of the tension spring to a threaded hole (38) in the inner end of the second screw.

Now the dependent claims turn back to the forming steps with each claim dependent upon the highest numbered claim having the requisite antecedents.

16. A method as set forth in claim 15 including

rotating each screw to an orientation within the tubular frame to align a cross hole in each screw with a slot in each leg, and

inserting [securing] a pin through each slot into [a] the aligned cross hole [in] of each [of the] screw[s to] with the pin extending radially from [and into] the slot of the surrounding leg of the tubular frame for sliding movement along the slot as the screws move axially relative to the legs.

17. A method as set forth in claim 14 including bending a pipe into [a] the tubular frame having a V-shape with legs extending in opposite directions from an apex to spaced ends.

18. A method as set forth in claim 17 including welding a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs.

19. A method as set forth in claim 14 including welding [a] each collar to one [each] of the spaced ends of the legs.

20. A method as set forth in claim 15 including

welding a plate to [a] the claw end of each of the screws at an angle of forty degrees relative to the axis of the screw associated therewith so as to extend above the screw welded thereto [and having] with a chisel edge between upper-outer corners.

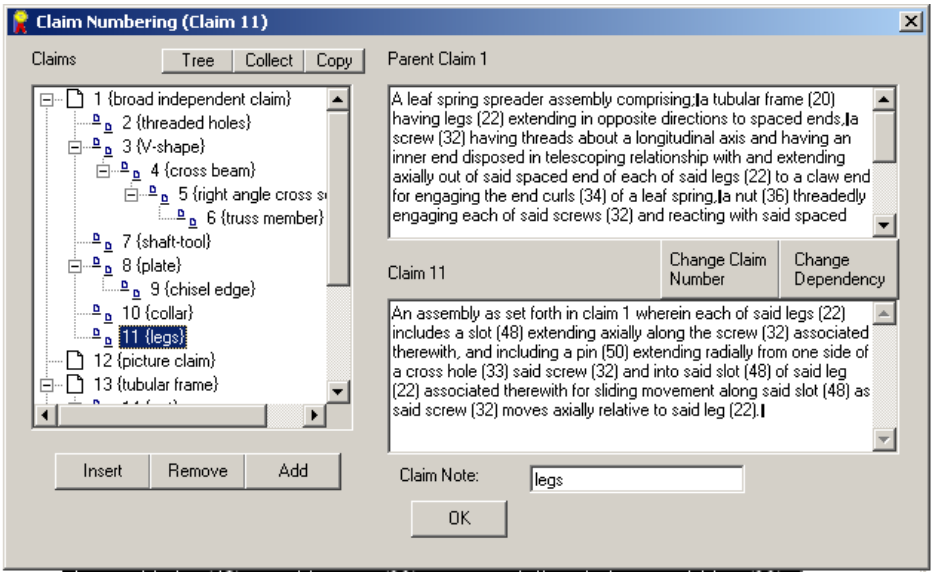
To re-order the claims, picture method claim 13 is clicked upon to produce the Change Claim Number window in which the new number 20 for picture method claim 13 is inserted. Upon clicking OK, a new Claim Numbering window appears showing the claims re-ordered with claim 13 being the broad independent method claim and the method picture claim being the last claim 20. However, in order to conserve space the edited and re-ordered claims are not repeated here but will appear in the actual patent 7,264,225 as reproduced above.

P. Removing Claims

Next to the *Insert* option is a *Remove* option used for removing a preexisting claim. By selecting the *Remove* option, the highlighted claim is removed from the patent application.

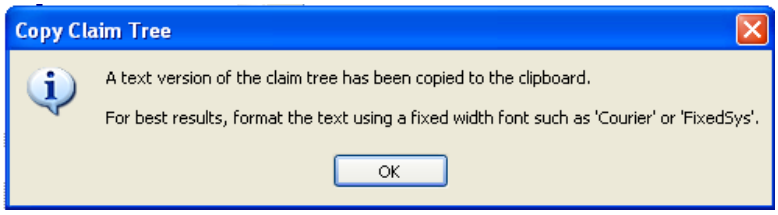
Q. Claim Notes

Claim notes are a useful tool for reminding the user of the subject of each claim. A claim note is added by highlighting the desired claim and entering a note in the *Claim Note* data line found at the lower-right corner of the *Claim Numbering* window.



R. Copy Option for Claim Tree

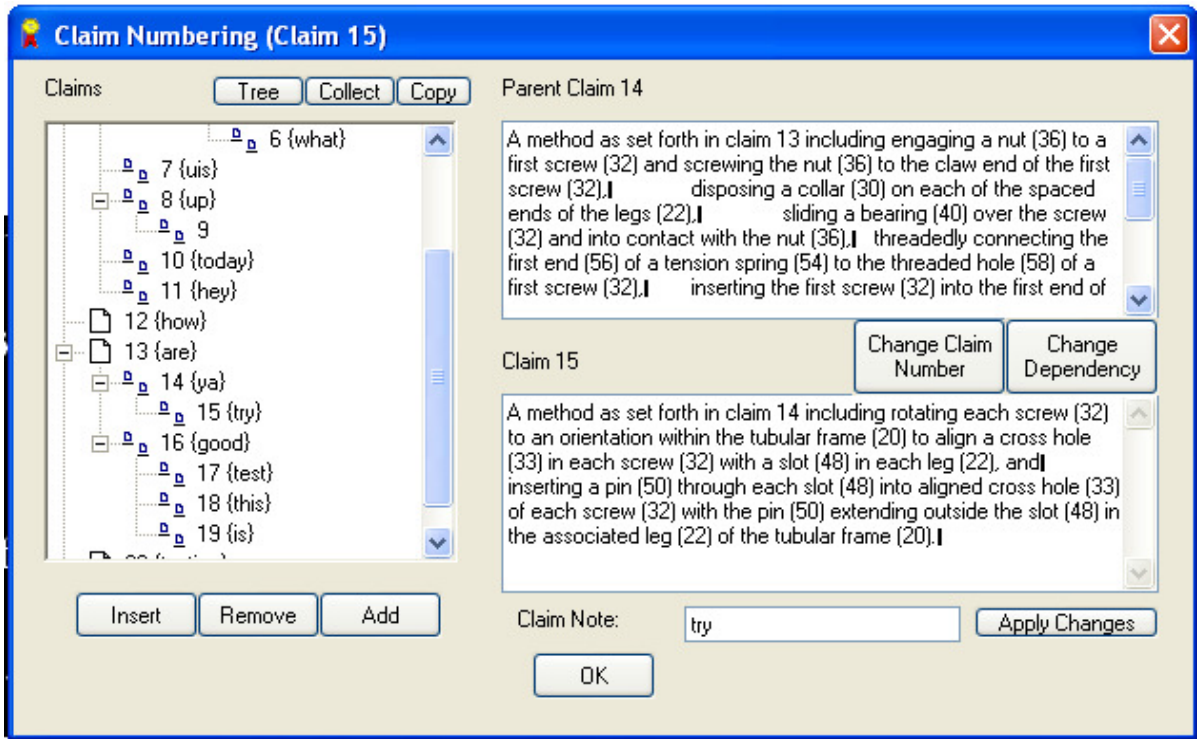
The *Copy* button on the top left of the *Claim Numbering* window allows for a copy of the claim tree as seen on the left side of the window to be copied to the clipboard and inserted into another document for review. If claim notes have been used, a window will be displayed, giving the option to include the notes in the claim tree. The following window will appear and to show the *Copy Claim Tree* window and suggests the appropriate fonts to view the claim tree properly.



Regardless of the view of the claims at the point of copying, i.e. tree view or list view, the claims and notes will always be copied in the tree view.

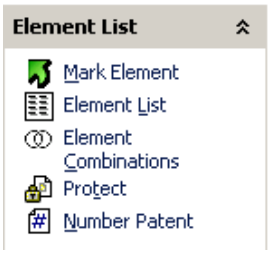
S. Modifying the Claims

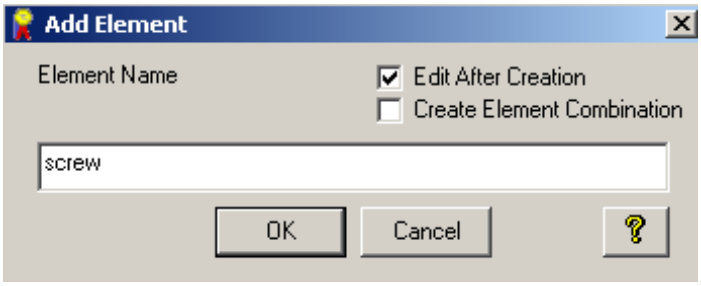
The claims can be modified in the Claim Numbering data block by manually editing the claim in the lower-right data lock. *Apply Changes* must then be clicked for the changes to take effect.



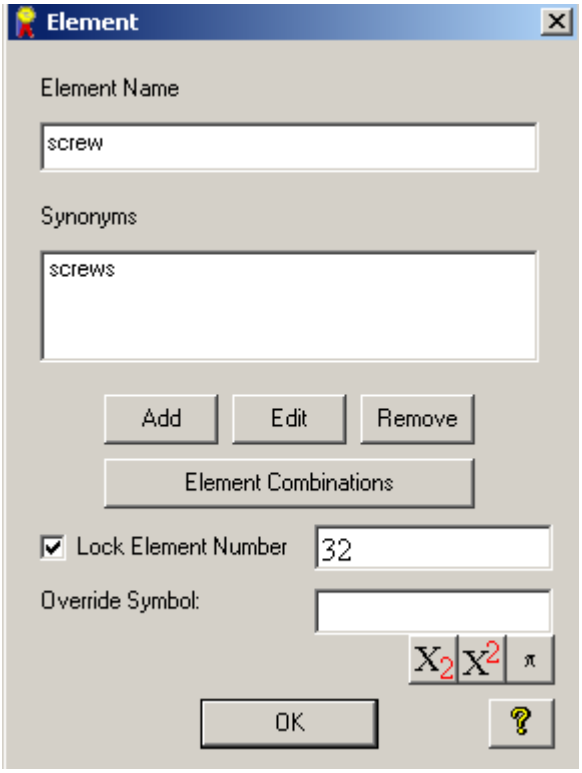
Section 10 Numbering the Elements

In the Patent Architect® Tool Bar there is an Element List box.





Reference numerals are assigned to element names throughout the patent to link and render consistent the claims, description and drawings. To assign reference numerals to the element names, the element name in is highlighted and then the Mark Element is clicked to produce the Add Element box.

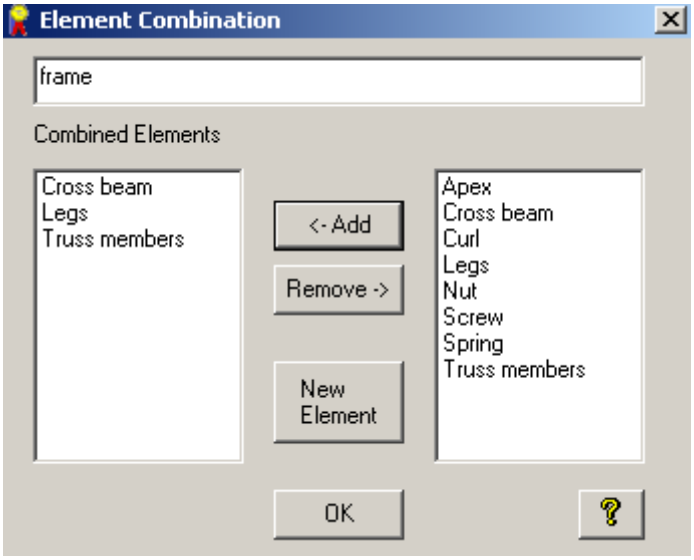


The Edit After Creation box can be clicked to add alternative names or synonyms to which the reference numeral will be applied throughout the application. The plural of the element name will automatically be included as a synonym. There are plural synonyms which are not automatic and must be added, e.g., teeth for tooth, feet for foot, geese for goose, etc.

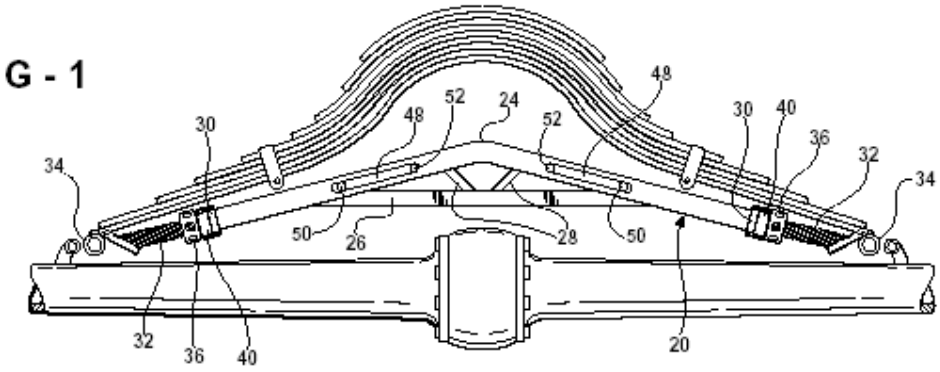
Assuming an axis is to be marked as an element but it is desired to use a letter or symbol to identify the axis, the Lock Element Number box may be clicked to override the reference number by inserting the letter or symbol in the Override Symbol box. This may be done manually with a subscript or superscript applied in the event the same letter is used

for two as, one subscript one and the other subscript two. Alternatively the Greek symbol box may be clicked to produce the Insert Greek Letter window from which a variety of letters and symbols may be selected. Clicking the X_2 or X^2 buttons adds text as either a subscript or a superscript respectively. An example of the usefulness of this feature is any patent which has more than one diameter; using Patent Architect®, the diameters can be labeled D_1, D_2, etc.

The Create Element Combination box can be clicked to attach a plurality of reference numerals to an element name that includes sub-elements. For example, assume that "frame" had not been marked as an element until after the sub-elements cross beam, legs and truss members of the frame have been marked. In the Element Combination box the sub-elements may be added from the element list as shown below in which case the reference numerals assigned to the sub-elements cross beam, legs and truss members will all be attached to every occurrence of the element "frame."



Even though the elements are assigned reference numerals when the claims are finished, the reference numerals will be re-assigned to the elements in numerical order of first recitation in the description section of the application upon clicking on Number Patent in the Element List box. When the teaching methodology includes checking and editing by the tutor at specific steps in the preparation, it is most convenient and efficient for the elements to be numbered in the claims when the claims are finished to facilitate review by the tutor.



While reading the claims or the description of the patent, the reader can quickly reference the drawings to gain a better understanding of the invention. Numerals in the claims facilitate translations and are required in some jurisdictions.

1. A leaf spring spreader assembly comprising;

a tubular frame **(20)** having a V-shape with legs **(22)** extending in opposite directions from an apex **(24)** to spaced ends,

a cross beam **(26)** extending across said V-shape and interconnecting said legs **(22)** for stabilizing said legs **(22)**,

said cross beam **(26)** having right angled cross section with each end thereof cradling one of said legs **(22)** of said frame,

truss members **(28)** diverging from one another and interconnecting said cross beam **(26)** and said legs **(22)**,

Elements should only be marked from the claims because Patent Architect® will run a check later to make sure that each element found in the claims also appears in the description. An element is marked by highlighting the word or words and clicking the *Mark Element* button under the *Element List* division of the tool bar.

Section 11 Check Claims

Before using the claims as a basis for drafting the description, it is good procedure to check the claims for errors. Claims can be checked for content by clicking on the *Check Claims* button under the *Claims* division of the tool bar. This action checks each of the drafted claims for a preamble, and it checks each of the independent claims for a "characterized by" clause. Patent Architect® will also target every element following the word "said" and search for antecedent basis in its parent claims. If no errors are found, the *Claim Errors* window will not appear. By clicking *Copy*, the errors in the window will be copied to the clipboard and, in turn,

pasted into another word processing file to be referred to after the box has been closed. Click the *OK* button to continue editing and building the patent application.

Once an element is introduced by 'said', Patent Architect® will assume that it will be introduced by 'said' again throughout the claim hierarchy. This may display create warnings that the patent draftsman does not want changed. For example, if claim 1 reads:

1. An invention comprising a red part and a green part,

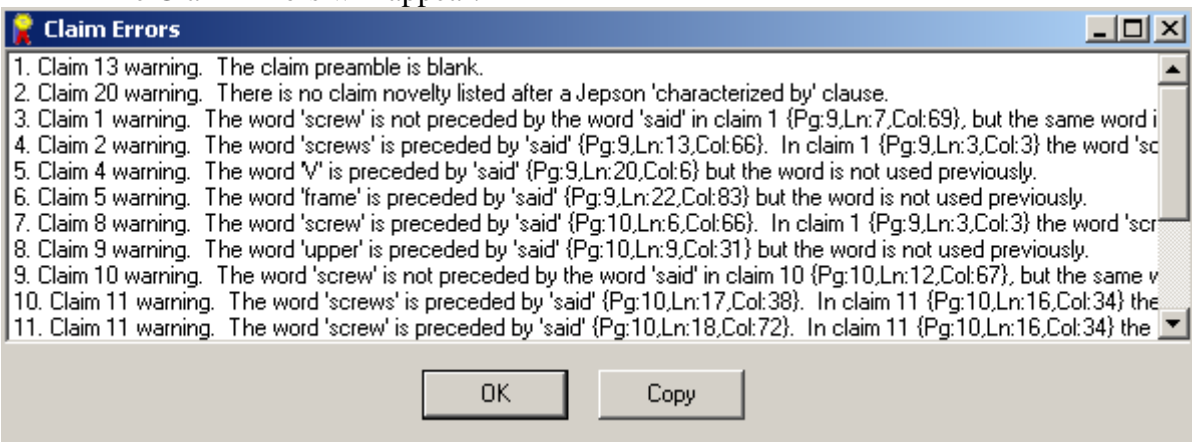
said green part having a first element,

said red and green parts including . . . .

Patent Architect® will display a warning because the third recitation "green part" is not immediately introduced by 'said'. This warning can be ignored, or it can be avoided by changing the third line of the claim to read "said red part and said green part including . . . ."

These warnings do not have to be followed and can be ignored without affecting Patent Architect's performance; they are merely meant to alert the draftsman to potential mistakes he may have made in drafting the claims.

The Claim Errors will appear.



These claim errors may be read and OK clicked to proceed or Copy may be clicked to copy the errors to the clipboard wherefrom they may be retrieved and printed for reading while reading the associated claim to either accept or fix the error.

Claim Errors 8/6/2008 8:27:52 AM

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1. Claim 13 warning. The claim preamble is blank.

2. Claim 20 warning. There is no claim novelty listed after a Jepson 'characterized by' clause.

3. Claim 1 warning. The word 'screw' is not preceded by the word 'said' in claim 1 {Pg:9,Ln:7,Col:69}, but the same word is preceded by 'said' in claim 1 {Pg:9,Ln:6,Col:46}. In summary, 'screw' is recited inconsistently, first using 'said', and later without 'said'.

4. Claim 2 warning. The word 'screws' is preceded by 'said' {Pg:9,Ln:13,Col:66}. In claim 1 {Pg:9,Ln:3,Col:3} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:7,Col:69} the word 'screw' was used without being introduced by 'said'. In summary, 'screws' may be recited inconsistently, first without using 'said', and then later using 'said'.

5. Claim 4 warning. The word 'V' is preceded by 'said' {Pg:9,Ln:20,Col:6} but the word is not used previously.

6. Claim 5 warning. The word 'frame' is preceded by 'said' {Pg:9,Ln:22,Col:83} but the word is not used previously.

7. Claim 8 warning. The word 'screw' is preceded by 'said' {Pg:10,Ln:6,Col:66}. In claim 1 {Pg:9,Ln:3,Col:3} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:7,Col:69} the word 'screw' was used without being introduced by 'said'. In summary, 'screw' may be recited inconsistently, first without using 'said', and then later using 'said'.

8. Claim 9 warning. The word 'upper' is preceded by 'said' {Pg:10,Ln:9,Col:31} but the word is not used previously.

9. Claim 10 warning. The word 'screw' is not preceded by the word 'said' in claim 10 {Pg:10,Ln:12,Col:67}, but the same word is preceded by 'said' in claim 1 {Pg:9,Ln:6,Col:46}. In summary, 'screw' is recited inconsistently, first using 'said', and later without 'said'.

10. Claim 11 warning. The word 'screws' is preceded by 'said' {Pg:10,Ln:17,Col:38}. In claim 11 {Pg:10,Ln:16,Col:34} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:3,Col:3} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:7,Col:69} the word 'screw' was used without being introduced by 'said'. In summary, 'screws' may be recited inconsistently, first without using 'said', and then later using 'said'.

11. Claim 11 warning. The word 'screw' is preceded by 'said' {Pg:10,Ln:18,Col:72}. In claim 11 {Pg:10,Ln:16,Col:34} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:3,Col:3} the word 'screw' was used without being introduced by 'said'. In claim 1 {Pg:9,Ln:7,Col:69} the word 'screw' was used without being introduced by 'said'. In summary, 'screw' may be recited inconsistently, first without using 'said', and then later using 'said'.

12. Claim 11 warning. The word 'screw' is not preceded by the word 'said' in claim 11 {Pg:10,Ln:16,Col:34}, but the same word is preceded by 'said' in claim 1 {Pg:9,Ln:6,Col:46}. In summary, 'screw' is recited inconsistently, first using 'said', and later without 'said'.

13. Claim 12 warning. The word 'screw' is preceded by 'said' {Pg:11,Ln:7,Col:36}. In claim 12 {Pg:11,Ln:1,Col:3} the word 'screw' was used without being introduced by 'said'. In claim 12 {Pg:11,Ln:5,Col:64} the word 'screw' was used without being introduced by 'said'. In summary, 'screw' may be recited inconsistently, first without using 'said', and then later using 'said'.

14. Claim 12 warning. The word 'V' is preceded by 'said' {Pg:11,Ln:19,Col:41} but the word is not used previously.

15. Claim 12 warning. The word 'frame' is preceded by 'said' {Pg:11,Ln:22,Col:40} but the word is not used previously.

16. Claim 12 warning. The word 'upper' is preceded by 'said' {Pg:12,Ln:11,Col:65} but the word is not used previously.

17. Claim 12 warning. The word 'screw' is not preceded by the word 'said' in claim 12 {Pg:11,Ln:5,Col:64}, but the same word is preceded by 'said' in claim 12 {Pg:11,Ln:4,Col:45}. In summary, 'screw' is recited inconsistently, first using 'said', and later without 'said'.

18. Claim 12 warning. The word 'axis' is not preceded by the word 'said' in claim 12 {Pg:11,Ln:13,Col:63}, but the same word is preceded by 'said' in claim 12 {Pg:11,Ln:11,Col:6}. In summary, 'axis' is recited inconsistently, first using 'said', and later without 'said'.

Item 1**.** The error for independent method claim 13 because it recites "and characterized by the steps of" and Patent Architect® keys off comprising or including followed by characterized by. The recitation without comprising or including is intended and presents no problem at this juncture, but as related below in Section 12.13(A), it does present a problem in using claim 13 in the introductory sections of the application. Therefore, at that later juncture Claim 13 will be amended to recite "said method comprising and characterized by the steps." By placing the "characterized by" after the comprising, Patent Architect® assumes there are recitations of old elements after comprising and before the characterized by and recitations of new elements after the characterized by.

Item 2**.** The combination of all of the steps in method picture claim 20 are new and therefore the claim includes no characterized by clause. This was intentional and no action is required.

Item 3. Claim 1 uses the term "associated screw" without using "said screw" after "screw" is positively recited in the claim. To avoid this, "associated screw" should have been – the associated one of said screws--..

Items 4 & 7. These suggested errors in claims 2 and 8 stem from first introducing "screw" in the singular and then referring to the plural "screws" without introducing –a plurality of screws--. This would have been avoided by first reciting –a plurality of screws each having . ".

Items 9, 10, 11, 12, 13 & 17. These suggested errors in claims 10, 11 and 12 are of a like kind to those of Items 3, 4 & 7 in that claim 10 uses "each screw" and claim 11 uses "the screw associated therewith" and claim 12 recites "the associated screw." This would have been avoided by always reciting – each of said screws—instead of using the singular "screw."

Items 5 & 14. When Patent Architect® reads "said V-shape" in claims 4 and 12 it only reads the "V" and therefore finds no antecedent for "V-shape" with the hyphen. In other words, only the first word of two hyphenated words is checked for antecedent basis. This would have been avoided by leaving out the hyphen (-).

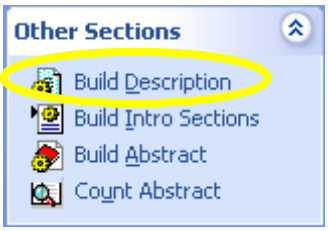
Items 6 & 15. Claims 5 and 12 recite "said frame" whereas the antecedent is "tubular frame." This should have been corrected to add the adjective "tubular" but because it appears in the patent without tubular, it is not changed in this tutorial. But it does illustrate how antecedents are checked.

Items 8 & 16. Claims 9 and 12 recite "said upper-outer corners" and the errors occurs when reading hyphenated words as only the first word is checked for antecedent basis. The major error here was to infer structure with the adjectives "upper-outer." The claim should have positively recited --a plate secured to each of said claw ends and having corners spaced upwardly and outwardly of the associated one of said claw ends and disposed at an angle . . . and extending above the associated one of said screws between said [~~upper-outer~~] corners.--

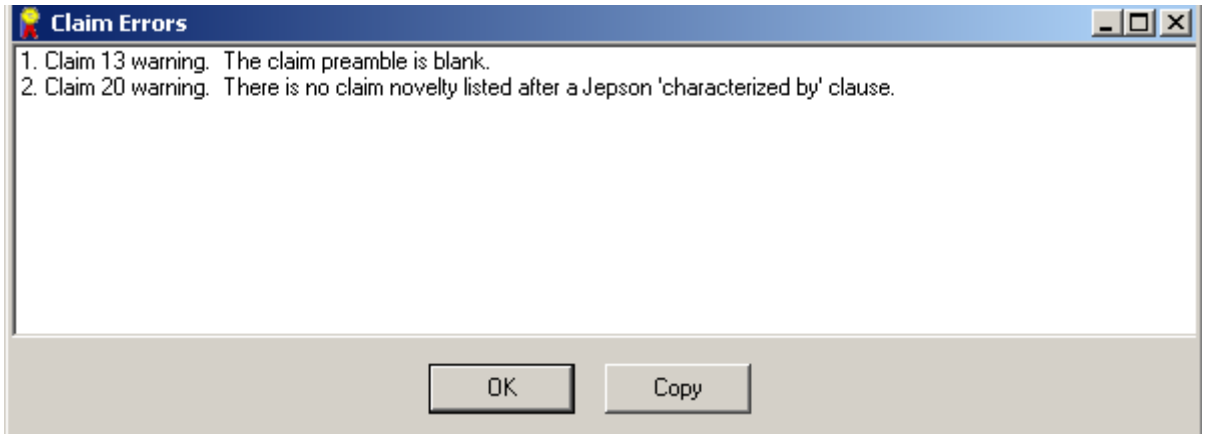
Item 18. This error occurred because the word “axis” is used in two completely different structures, i.e., screw axis and leg axis. Claim 12 recites "a screw having acme threads about a longitudinal axis . . .," and later in the claim recites "each of said legs having a slot extending along its axis, . . ." The error cannot be avoided by using –screw axis—nor –leg axis—because each would result in the use of a word both as structure, i.e., screw and leg, and as an adjective to identify each respective axis. The error could have been avoided using “axis” only in one context as the longitudinal axis of the screw and simply recite “each of said legs having a slot extending therealong[its axis]. Again, these changes are not made in this tutorial so as to conform with the patent but it does illustrate how patent architect detects the use of one word for two different purposes.

Section 12 Building the Description Section

A. Selecting the Claims to be Copied into the Description Section

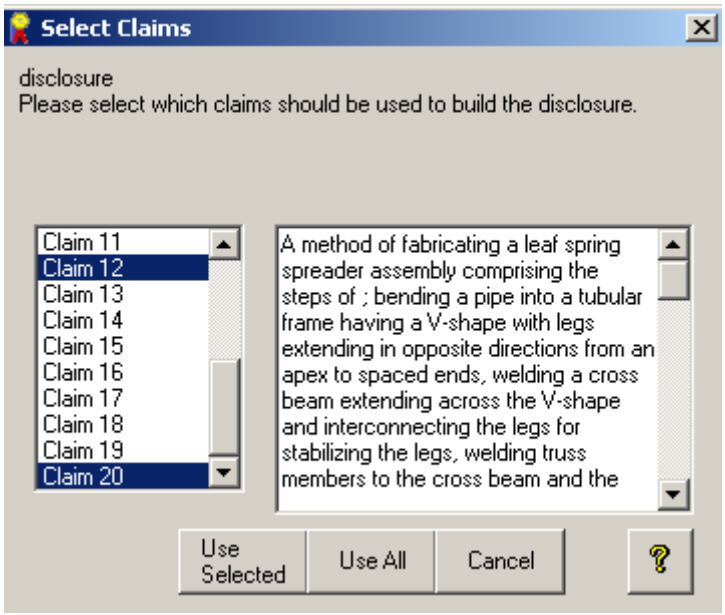


The description section of the patent application repeats verbatim and embellishes on the subject matter of the claims, describing the embodiments of the invention in an easy to read format. Patent Architect® is unique in that it automatically builds the description by repeating the subject matter already written in the claims. This ensures that all of the subject matter of the claims is included in the description section of the application. Patent Architect® will replace the word "said" with the word "the" while copying the selected claims into the description section. In order to start the description, the Build Description is clicked in the Other Sections box whereupon the claim errors box will appear.



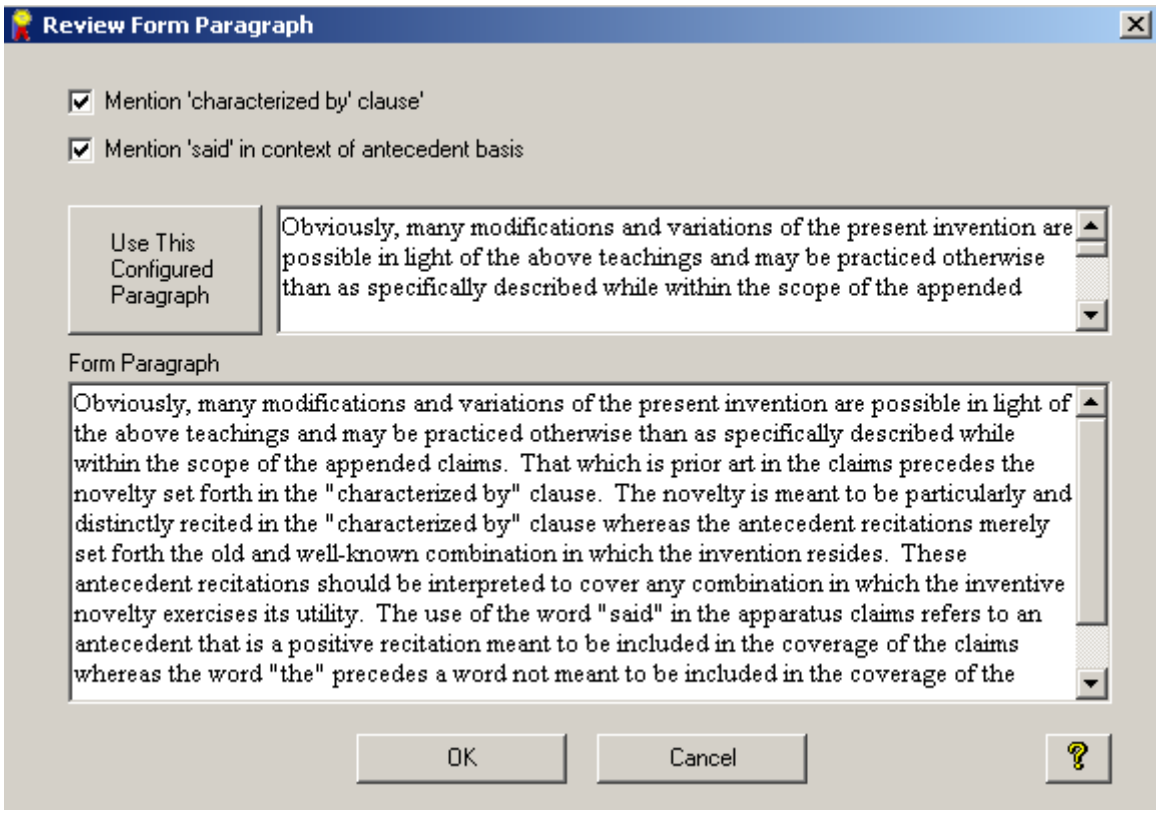
As discussed above, the warning for claim 13 occurs even though the claim does have a preamble because the preamble does not in include the word "comprising" or "including." The

warning for independent claim 20 occurs because the picture method claim does not include "characterized by." These are purposeful deviations and the OK is clicked whereupon the Select Claims box appears. The Select Claims box allows a choice of the claims to be copied into the description for editing. If the picture claims 12 and 20 were drafted and edited to include every phrase used in each and every one of the remaining claims, the picture claims are selected for being copied into the description of the preferred embodiment section of the application. Once claims 12 and 20 are selected for copying into the description section the Review Form Paragraph box will appear for editing the omnibus paragraph at the end of the description. Alternative form paragraphs may be substituted or the default paragraph may be edited. For example, if the reference numerals are not to be used in the claims, the sentence relating thereto may be deleted. The same applies to the characterized by sentence in the event it is not used in the claims.



In the *Select Claims* window, one or more or all of the claims may be selected for use in the description. By clicking the *Use Selected* or *Use All* buttons, the chosen claims will show up in sub-paragraph form under the "DETAILED DESCRIPTION OF THE INVENTION" title on the patent application (unless the default title has been changed). The *Cancel* button aborts the process and returns to the document.

The description section must be manually edited in order to improve its readability and to add embellishments.



Once the Review Form Paragraph box is OK'd, claims 12 and 20 will be inserted into the description section with the word "said." changed to "the."

DETAILED DESCRIPTION OF THE INVENTION

Referring to the Figures, wherein like numerals indicate corresponding parts throughout the several views, a leaf spring spreader assembly,

a tubular frame having legs extending along respective as in opposite directions from an apex to spaced ends,

a screw having acme threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring,

a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut,

a bearing disposed about the screw and engaging each of the spaced ends for transmitting thrust loads from and facilitating rotation of the nut associated therewith,

a plate secured to each of the claw ends and disposed at an angle relative to the axis of the screw associated therewith and extending above the screw associated therewith to an upper-outer corner,

each of the legs having a slot extending along its axis,

a pin extending radially from each of the screws and into the slot of the leg associated therewith for sliding movement along the slot as the screw moves axially relative to the leg, and characterized by,

the tubular frame having a V-shape with the legs extending from an apex,

a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs,

the cross beam having a right angled cross section with each end thereof cradling one of the legs of the frame,

truss members diverging from one another and interconnecting the cross beam and the legs,

a collar welded to each of the spaced ends of the legs,

each of the bearings engaging one of the collars for transmitting the thrust loads,

each of the nuts reacting with the collar through said bearing at the spaced end of each of the legs,

each of the nuts having cylindrical tool holes extending radially for receiving a shaft-tool for rotating the nuts,

the angle of the plate relative to the axis being forty degrees,

each of the plates having a chisel edge between the upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring,

a threaded hole disposed at each of the inner ends of the screws, and

a tension spring with male threaded ends interconnecting the threaded holes of the screws to retain the nuts in engagement with the bearings at the spaced ends of the legs and to allow the screws to be moved axially along into and out of the legs.

A method of fabricating a leaf spring spreader assembly comprising the steps of,

bending a pipe into a tubular frame having a V-shape with legs extending in opposite directions from an apex to spaced ends,

welding a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs,

welding truss members to the cross beam and the legs to diverge from one another,

welding a collar to each of the spaced ends of the legs,

producing a slot extending axially along each of the legs,

threadedly engaging a nut on each of two screws each having acme threads about a longitudinal axis,

disposing a bearing about each screw for engaging each of the collars,

welding a plate to a claw end of each of the screws at an angle of forty degrees relative to the axis of the screw associated therewith so as to extend above the screw welded thereto and having a chisel edge between upper-outer corners,

attaching the first end of a tension spring to the inner end of a first of the screws,

attaching an adapter to a first end of a string,

attaching the adapter to the second end of the spring,

attaching a weight to the second end of the string,

dropping the weight through the tubular frame,

inserting the first screw into a first leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon and in engagement with the collar at the end of the first leg,

pulling the second end of the tension spring out of the second leg,

gripping the second end of the tension spring to hold it beyond the second leg at the second end of the tubular frame,

attaching the second end of the tension spring to the second screw,

inserting the second screw into the second leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon in engagement with the collar at the end of the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of the tension spring, and

securing a pin into a cross hole in each of the screws to extend radially from and into the slot of the surrounding leg for sliding movement along the slot as the screws move axially relative to the legs.

Obviously, many modifications and variations of the present invention are possible in light of the above teachings and may be practiced otherwise than as specifically described while within the scope of the appended claims. That which is prior art in the claims precedes the novelty set forth in the "characterized by" clause. The novelty is meant to be particularly and distinctly recited in the "characterized by" clause whereas the antecedent recitations merely set forth the old and well-known combination in which the invention resides. These antecedent recitations should be interpreted to cover any combination in which the inventive novelty exercises its utility. The use of the word "said" in the apparatus claims refers to an antecedent that is a positive recitation meant to be included in the coverage of the claims whereas the word "the" precedes a word not meant to be included in the coverage of the claims. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.

B. Editing and Drafting the Description Section

The description section is edited with new words underlined, moved phrases in *italics* and in italic brackets in the position from which moved. The change of commas to periods is not indicated, nor are changes between upper and lower cases. When the term "generally shown" is used the reference numeral with have an arrowhead in the drawing and will be in space and will point to a combination of elements whereby the "generally shown" will be broken down into further description. When the term "generally indicated" is used the reference numeral will also have an arrowhead but the arrowhead will be touching a sub-combination of elements to be further described. The generally indicated is typically used for a plurality of sub-combinations in an overall combination under the generally shown arrowhead.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the Figures, wherein like numerals indicate corresponding parts throughout the several views, a leaf spring spreader assembly constructed in accordance with the subject invention is shown in FIGS. 1 and 2.~~,~~

NOTE: Since the entire figure shows the assembly there is no need to employ a reference numeral with the "generally shown" to indicate the entire assembly. When an element or sub-combination is first described it is usually good form to completely and specifically describe the sub-combination by extracting further limitations recited further down in the claims. That procedure will be followed as this editing proceeds.

The spring spreader assembly is fabricated from a pipe bent into a tubular frame generally indicated and *having a V-shape with legs extending along respective as in opposite directions from an apex to spaced ends*. A *cross beam* [extending] extends *across the V-shape and interconnect*s [ing] *the legs for stabilizing the legs*, *the cross beam having a right angled cross section with each end thereof cradling one of the legs of the frame.* In other words, the cross beam is an angle iron welded to the underside of the tubular legs of the frame. In addition, *truss members diverg*e [ing] *from one another* under the apex *and interconnect* [ting] *the cross beam and the legs,* the truss members being almost perpendicular to the respective legs.

NOTE: Whenever possible it is good form to provide alternative descriptions of elements and/or relationship between elements. Since the frame has been described it is logical to add to the frame.

A collar is welded to each of the spaced ends of the legs. A screw having acme threads about a longitudinal axis [and having] has an inner end disposed in telescoping relationship with and extends [ing] axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring. A nut threadedly engages [ing] each of the screws and reacts [ing] with the collar at each spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to

rotation of the nut. Each of the nuts has [having] a plurality of circumferentially spaced cylindrical tool holes extending radially for receiving a shaft-tool for rotating the nuts. The shaft-tool may comprise a simple round rod for insertion into successive tool holes for rotating the nuts. The acme threads threadedly interconnecting the screws and the nuts provide easier rotation of the nuts as compared to machine threads and fewer turns are required for the same linear movement of the screws relative to the frame.

NOTE: The inventor provided the reason for employing the acme threads and it is important to include reasons for specifics in the description, however, it is often appropriate to include such reasons under the Advantages section of the application when the reasons are more commensurate with the broad claims as distinguished from this specific recitation of the particular threads.

It is very important to remember elements that have not been recited in the claims and to differentiate terms used to describe more than one element. As will become clearer hereinafter, the cylindrical holes in the nuts were marked as an element when the elements were marked in the claims but it did not occur then that there are two additional sets of holes to be described and which must have different reference numerals. Accordingly, the holes in the nuts, the cross holes in the screws and the threaded holes in the ends of the screws all had the same reference numeral applied. To correct this, various holes were differentiated by adjectives which are included in the element name, i.e., tool hoes, threaded holes and cross holes. This was not discovered until the drawings were finalized and the reference numerals applied so the cross holes were given the intermediate number 33 which is locked to the element. When an element not recited in the claims copied into the description but shown in the drawings and which is added to the description, it must be remembered that it must be marked as an element to receive a reference numeral, e.g., the connector or adapter 54 as recited below.

For transmitting thrust loads and reducing friction, a bearing is disposed about [the] each screw [and] to engage [ing] each of the collars at the spaced ends for transmitting thrust loads from, and facilitating rotation of the nut associated therewith. Each of the nuts reacts [ing] with the collar through the bearing at the spaced end of each of the legs. The diameter of the screw is slightly less, i.e., a slip fit, than the internal diameter of the tubular legs.

A plate is secured by welding to [each of] the claw end [s] of each screw and is disposed at an angle of forty degrees relative to the axis of the screw associated therewith and extends [ing] above the screw associated therewith to an upper-outer corner. Each of the plates has [ving] a chisel edge between the upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring.

The legs each [of the legs] have [ing] a slot through the near wall extending axially along the screw associated therewith [its axis] and a pin extends [ing] radially from each of the screws and into the slot of the leg associated therewith for sliding movement along the slot as the screw moves axially relative to the leg. The slot and pin mechanism maintains the plates at the claw ends oriented relative to the frame and to maintain the frame upright above the differential while being placed in position and thereafter rotating the nuts. A cross hole is provided through the far wall of each leg at one end of the slot for access to drive the pin out of the screw for disassembly.

A threaded hole is disposed at each of the inner ends of the screws and threadedly engages each end of a tension spring with male threaded ends interconnecting the threaded holes of the screws to retain the nuts in engagement with the bearings at the spaced ends of the leg. [and to] The tension spring insures that the nuts and bearings are always up against the collars at the spaced ends of the legs and allow the screws to be pulled axially along and into and out of the legs. An adapter is threaded via adapter-threads into each of the threaded holes for threaded attachment to the ends of the tension spring. One of the screws may be fully inserted and the tension spring extended out the opposite tubular end sufficiently to attach to the other adapter in the other threaded hole whereby both screws are pulled into the tubular frame. The

tension spring has sufficient elasticity to be pulled out of one end of one of the legs for attachment to the threaded hole on the other screw and yet retract both screws into the respective legs. In the preferred embodiment, the tension spring comprises a bungee cord, or the like, but any suitable device may be employed.

NOTE: As addressed above, the adapter must be marked as an element to receive a reference numeral to be applied to the drawings.

*[*a screw having acme threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring,*]*

*[*a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut,*]*

*[*a bearing disposed about the screw and engaging each of the spaced ends for transmitting thrust loads from and facilitating rotation of the nut associated therewith,*]*

*[*a plate secured to each of the claw ends and disposed at an angle relative to the axis of the screw associated therewith and extending above the screw associated therewith to an upper-outer corner,*]*

*[*each of the legs having a slot extending along its axis,*]*

*[*a pin extending radially from each of the screws and into the slot of the leg associated therewith for sliding movement along the slot as the screw moves axially relative to the leg,*]* and characterized by,

the tubular frame having *[*a V-shape with the legs extending from an apex*]*,

*[*a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs,*]*

*[*the cross beam having a right angled cross section with each end thereof cradling one of the legs of the frame,*]*

truss members diverging from one another and interconnecting the cross beam and the legs,*]*

*[*a collar welded to each of the spaced ends of the legs, *]*

each of the bearings engaging one of the collars *[*for transmitting the thrust loads*]*,

*[*each of the nuts reacting with the collar through said bearing at the spaced end of each of the legs,*]*

*[*each of the nuts having cylindrical tool holes extending radially for receiving a shaft-tool for rotating the nuts,*]*

the angle of the plate relative to the axis being *[*forty degrees*]*,

*[*each of the plates having a chisel edge between the upper-outer corners to define a guide for engaging the side edges of the end curl of the leaf spring,]

*[*a threaded hole disposed at each of the inner ends of the screws,*]* and

*[*a tension spring with male threaded ends interconnecting the threaded holes of the screws to retain the nuts in engagement with the bearings at the spaced ends of the legs and to allow the screws to be moved axially along into and out of the legs*]*.

NOTE: During the actual editing, the subparagraphs of the claim will be cut and moved into the text. In other words, the subparagraphs in the italic brackets *[ ]* would have been cut so that it is easy to identify that which is left over. Either that which is left over is already covered in the edited text or must be added. The same editing procedures are used in editing the picture

method claim into the text forming the description section except that the sub-paragraphs are cut and pasted leaving uncut phrases in italic brackets *[ ]*.

As alluded to above, the subject invention also includes a method of fabricating a leaf spring spreader assembly comprising the steps of bending a pipe into a tubular frame having a V-shape with legs extending in opposite directions from an apex to spaced ends, welding a cross beam extending across the V-shape and interconnecting the legs for stabilizing the legs, and welding truss members to the cross beam and the legs to diverge from one another. The fabrication continues by welding a collar to each of the spaced ends of the legs, and producing a slot through the near wall extending axially along each of the legs.

[welding] A plate is welded to a claw end of each of the screws at an angle of forty degrees relative to the axis of the screw associated therewith so as to extend above the screw welded thereto [and having] to form a chisel edge between upper-outer corners.

The assembly includes threadedly engaging a nut on each of two screws and screwing the nuts to the claw ends of the respective screws and disposing a bearing about each screw for engaging each of the collars.

A male threaded end is formed on each of opposite ends of a tension spring and a first of the thusly threaded ends is connected by threads [attaching the first end of a tension spring] to the inner end of a first of the screws. Surgical tubing of pure latex has been found to be an excellent tension spring. [attaching] An adapter is attached to a first end of a string and is attached [ing the adapter] to the second end of the spring. The assembly continues by attaching a weight to the second end of the string and dropping

the weight through the tubular frame, starting at the open end of the first leg. The pulling of the second end of the tension spring out of the second leg[,] requires the inserting of the first screw into a first leg of the tubular frame to retain the nut [thereon in engagement with the] and bearing thereon [and] in engagement with the collar at the end of the first leg of the tubular frame.

By gripping the second end of the tension spring with a tool to hold [it beyond] the second end of the tension spring out of the second leg, the adapter at [attaching] the second end of the tension spring is then threadedly connected to the inner end of [to] the second screw. Accordingly, the tension spring is pulled through the tubular frame and connected via the adapter to the second screw and released to pull the inner ends of the screws together to retain the nuts in engagement with the bearings to maintain the components together. The first screw is already in the tubular frame and [inserting] the second screw is inserted into the second leg of the tubular frame to retain the nut thereon in engagement with the bearing thereon in engagement with the collar at the end of the second leg whereby the screws may be pulled axially along into and out of the legs against the biasing of the tension spring. [, and] The final step includes securing a pin into a cross hole in each of the screws to extend radially from and into the slot of the surrounding leg for sliding movement along the slot as the screws move axially relative to the legs.

NOTE: At this point every recitation in the claims has been accounted for in the description section except for the preamble to the broad independent method claim 13. This preamble recites the elements employed in the steps of the method of assembly and the elements have already been recited in the description, however, the drafter decided to repeat the preamble and steps as recited in claim 13. To accomplish this, claim 13 is copied without using Patent Architect® into the description and edited.

Accordingly, the invention provides a method of fabricating a leaf spring spreader assembly of the type including a tubular frame having legs extending in opposite directions to spaced ends, a screw having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring, and a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut. [and characterized by] The method includes the steps of attaching the first end of a tension spring to a first of the screws, attaching a first end of a string to the second end of the tension spring, attaching a weight to the second end of the string, and dropping the weight through the first end of the tubular frame through and beyond the second end of the tubular frame.

This naturally leads to inserting the first screw into a first end of the tubular frame, pulling and holding the string and the second end of the tension spring beyond the second end of the tubular frame, gripping the second end of the tension spring to hold it beyond and out of the second leg at the second end of the tubular frame, and removing the string from the second end of the tension spring.

The fabrication continues by attaching the second end of the tension spring to the second screw, releasing the gripping and holding of the tension spring out beyond the second end of the tubular frame, and allowing the second screw to insert into the second end of the tubular frame with the inner ends of both screws biased toward the apex of [into] the tubular frame by the tension spring.

NOTE: In addition to reciting the broad independent method claim 13, it was deemed prudent to also recite the first two dependent method claims 14 and 15 in the description.

More specifically, the method proceeds by engaging a nut to a first screw and screwing [a] the nut to the claw end of the first screw, disposing a collar on each of the spaced ends of the legs, sliding a bearing [about] over the first screw and into contact with the nut for engaging the collar, threadedly attaching the first end of the tension spring to a threaded hole in the inner end of the first screw, inserting the first screw into a first end of the tubular frame with the bearing in engagement with the collar at the first end of the first leg of the tubular frame, engaging a nut to a second screw and screwing [a] the second nut to the claw end of the second screw, sliding a bearing about the second screw and into contact with the nut for engaging the second collar, and threadedly attaching the second end of the tension spring to a threaded hole in the inner end of the second screw.

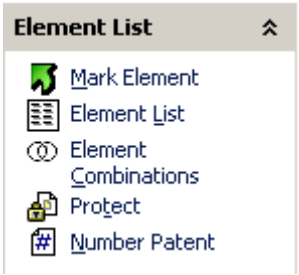
For alignment purposes, the method may include rotating each screw to an orientation with in the tubular frame to align a cross hole in each screw with a slot in each leg, and inserting a pin through each slot into the aligned cross hole of each screw with the pin extending radially from and outside the slot [of] in the associated and surrounding leg of the tubular frame for sliding movement along the slot as the screws move axially relative to the legs.

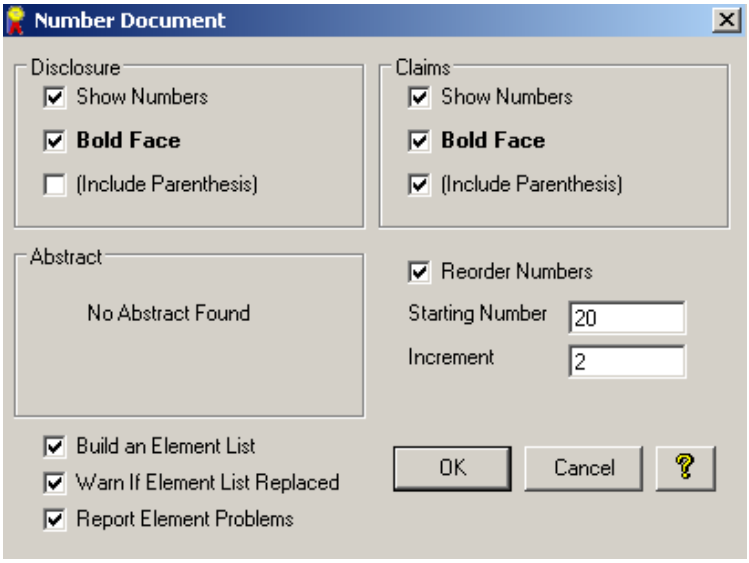
Obviously, many modifications and variations of the present invention are possible in light of the above teachings and may be practiced otherwise than as specifically described while within the scope of the appended claims. That which is

prior art in the claims precedes the novelty set forth in the "characterized by" clause. The novelty is meant to be particularly and distinctly recited in the "characterized by" clause whereas the antecedent recitations merely set forth the old and well-known combination in which the invention resides. These antecedent recitations should be interpreted to cover any combination in which the inventive novelty exercises its utility. The use of the word "said" in the apparatus claims refers to an antecedent that is a positive recitation meant to be included in the coverage of the claims whereas the word "the" precedes a word not meant to be included in the coverage of the claims. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.

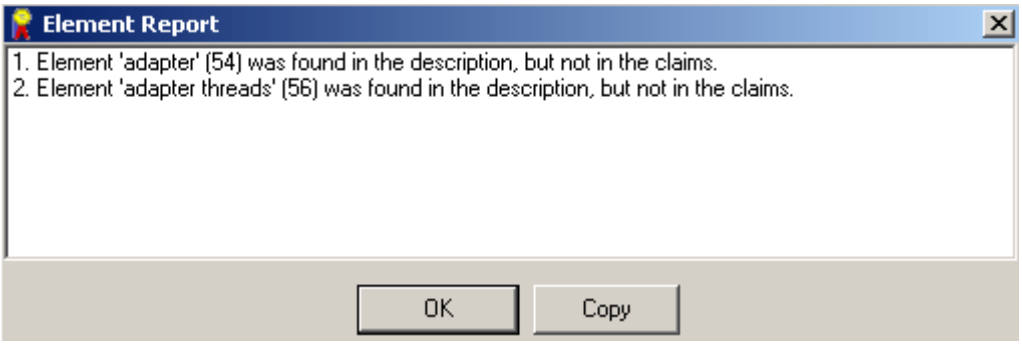
Section 13 Re-Numbering the Elements

Although the elements were marked and assigned reference numerals in the claims and during the drafting of the description, it is appropriate here to apply reference numerals to the description and claims sections so that the reference numerals actually appear. To proceed, the Number Patent will be clicked in the Element List Box whereupon the Number Document box will appear to provide options for application of the reference numerals.





By checking the Reorder Numbers, the re-numbering will disregard the previous order of reference numeral assignment, e.g., the element numbers applied in the claims, and will renumber the elements in the order first recited in the description section, except that any reference numeral locked to an element name when assigned will not be re-numbered, e.g., cross hole 33. By clicking the Show Numbers, the element numbers will appear next to each recitation of the element in the Disclosure and Claims as selected for each. By clicking **Bold Face**, the reference numerals will be shown in bold just as they appear in a printed U.S. Patent. If shown in the claims, the reference numerals should be in Parenthesis by clicking same under Claims. It is suggested that all of the Element options should be clicked. The Element Report box will appear with any apparent errors and the one reported is that the adapter marked as an element and given a reference numeral 54 was recited in the claims. This is intentional and it is OK.



The MPEP 608.01(m)[7] of the USPTO states that reference numerals "may be used in the claims. The use of reference characters is to be considered as having no effect on the scope of the claims."

Rule 29(7) of the EPO[8] states that 'reference signs' (reference numerals) "…shall preferably" be used in the claims. The EPO Rule also states that the reference numerals "…shall not be construed as limiting the claim."

It appears that a US Examiner could NOT require the use of reference numerals in the claims whereas and EPO Examiner could require the use of reference numerals in the claims. Patent Architect® allows for the draftsman to include or exclude the reference numerals at his/her discretion.

A. Formatting Options

A *Bold Face* option is presented under each heading as well as an *Include Parenthesis* option. By selecting one or both of these options, the selected formatting will apply to the element numerals in bold and/or parentheses in the *Abstract, Description,* and/or *Claims* sections.

B. Reorder Numbers

[7] *See* source cited *supra* note 261.

[8] *See* source cited *supra* note 262.

A *Reorder Numbers* option is presented on the *Number Patent* window for electing to assign reference numerals to elements in the order of being first recited in the description section of the application. If the *Reorder Numbers* box is not checked, the elements will be ordered according to the order in which they were added.

C. Starting Number

A *Starting Number* data line is presented on the *Number Patent* window for selecting the lowest reference numeral to be used in numbering the elements in the application. By default, it presents a default starting reference numeral of twenty. It is preferable to start the reference numerals at the next numeral ending in a zero following the last Figure number figure. For instance, if there are 21 figures in an application, the starting number should be "30."

D. Reference Numeral Increments

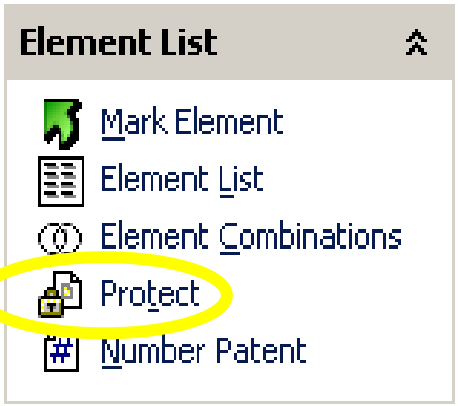
An *Increment* data line is presented for selecting the number of numerals to be omitted between reference numerals. The default integer in the line is two. Even though Patent Architect® facilitates the use of consecutive reference numerals, it remains good practice to use only odd or only even reference numerals in the preparation so that an intermediate or interleaving reference numeral may be added after the application has been filed in a Patent Office.

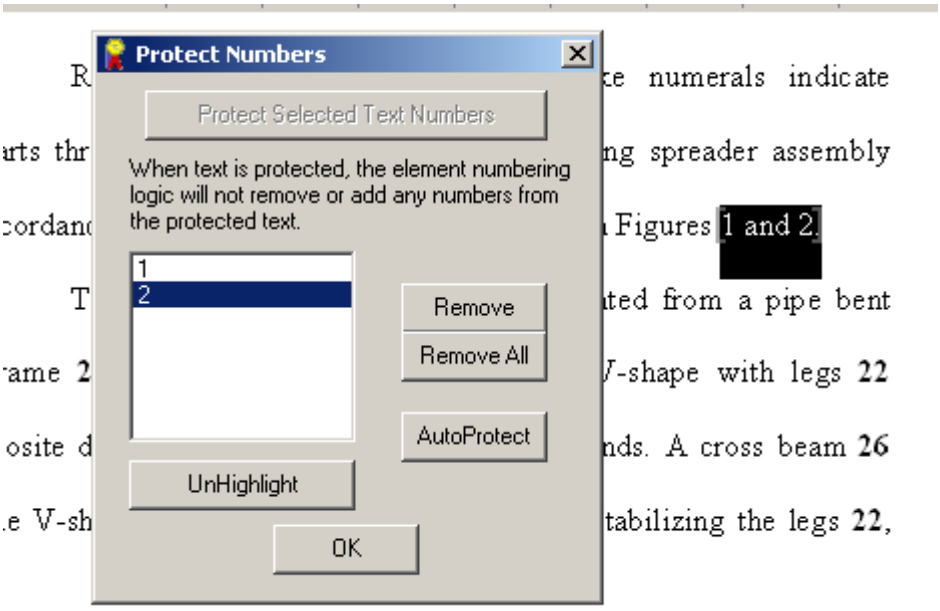
Section 14 Protecting Numbers & Text From Change

When Patent Architect® renumbers a patent application, sometimes the numbers or formulas within a limitation of a claim undesirably are changed to account for the renumbering.

A. Protect in Element List Window

This can be prevented by using the *Protect* function found under the *Element List* division of the Patent Architect® toolbar. To use this feature, highlight the text that you do not want to be tampered with and click the *Protect* button on the toolbar. This will present the *Protect Numbers* window below.





Clicking the *Protect Selected Text Numbers* button will protect the highlighted text from all changes Patent Architect® will try to make to it while numbering the document. A number will be displayed in the data box to represent this protection. For example, if a ratio of 5 to 2 is cited in the text, highlight "ratio of 5 to 2" and click on the *Protect Selected Text Numbers* button to prevent "ratio of 5 to 2" from being changed during any numbering step.

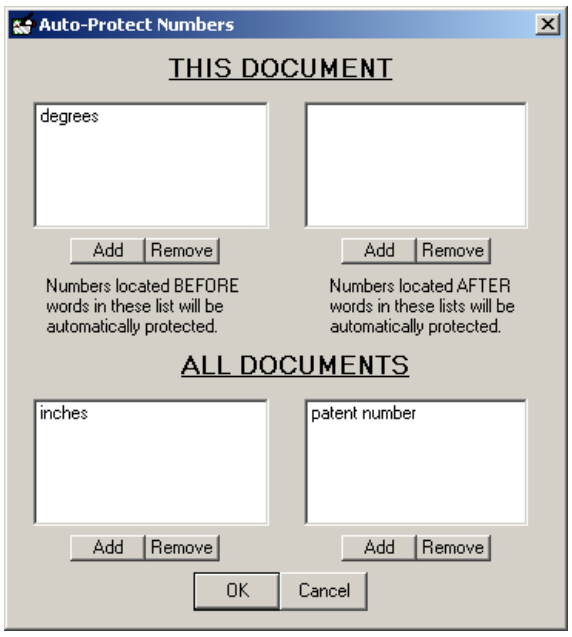
Previously protected text can be viewed by clicking one of the numbers in the *Protect Numbers* window. The text associated with this number will then be highlighted.

B. Highlight/UnHighlight Protected Text

Clicking on the *Highlight* button will highlight all of the text throughout the document that has been manually highlighted. Likewise, clicking *UnHighlight* will remove all of the highlighted text from the protected text.

A. Auto Protect

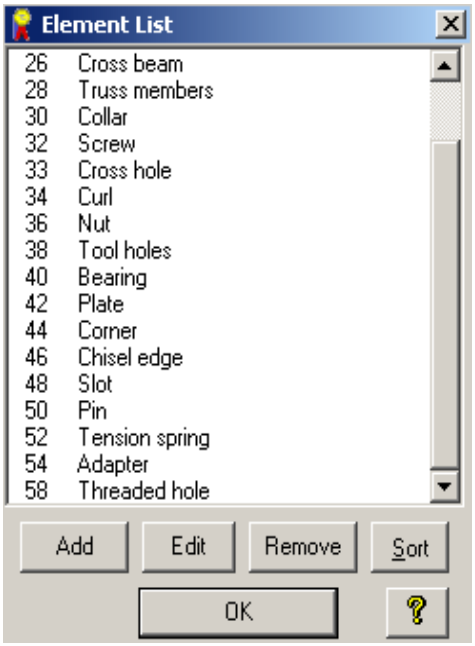
In certain cases, such as when using units of measure, there will be many numbers which should not change when renumbering the claims. The *Auto Protect* function is used to protect all numbers which appear directly before or after a specified word. Clicking on the *Auto Protect* button will present the *Auto-Protect Numbers* window.



Adding words or phrases to the data boxes on the left will protect all numbers located before the entered word or phrase. For example, adding the word "degrees" to either of the data boxes on the left will protect the text "100 degrees Celsius" from changing during a renumbering step.

Adding words or phrases to the data boxes to the right will protect numbers which appear after the entered word or phrase. For example, adding the phrase "patent number' to either of the data boxes on the right will protect the text "US patent number 7,000,000" from changing during a numbering step.

Adding words or phrases to the data boxes at the top of the *Auto-Protect Numbers* window will apply the desired rule to only the application currently in use. Adding words or phrases to the data boxes on the bottom of the *Auto-Protect Numbers* window will apply the desired rule to every application until the rule is removed.



The Element List is checked for review but showing only the last numbers, i.e., not elements 20-24.

Clicking on *Sort* will alternate between listing the elements in numerical and alphabetical order. The elements in the *Element List* window can be edited by highlighting the desired element and clicking *Edit*.

The resulting description section with the reference numerals is repeated here but without the claims or the omnibus paragraph.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the Figures, wherein like numerals indicate corresponding parts throughout the several views, a leaf spring spreader assembly constructed in accordance with the subject invention is shown in FIGS. 1 and 2.

The spring spreader assembly is fabricated from a pipe bent into a tubular frame **20** generally indicated and having a V-shape with legs **22** extending along respective as in opposite directions from an apex **24** to spaced ends. A cross beam **26** extends across the V-shape and interconnects the legs **22** for stabilizing the legs **22**, the cross beam **26** having a right angled cross section with each end thereof cradling one of the legs **22** of the frame. In other words, the cross beam **26** is an angle iron welded to the underside of the tubular legs **22** of the frame. In addition, truss members **28** diverge from one another under the apex **24** and interconnect the cross beam **26** and the legs **22**, the truss members **28** being almost perpendicular to the respective legs **22**.

A collar **30** is welded to each of the spaced ends of the legs **22**. A screw **32** having acme threads about a longitudinal axis has an inner end disposed in telescoping relationship with and extends axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring. A nut **36** threadedly engages each of the screws **32** and reacts with the collar **30** at each spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36**. Each of the nuts **36** has a plurality of circumferentially spaced cylindrical tool holes **38** extending radially for receiving a shaft-tool for rotating the nuts **36**. The shaft-tool may comprise a simple round rod for insertion into successive tool holes **38** for rotating the nuts **36**. The acme threads threadedly interconnecting the screws **32** and the nuts **36** provide easier rotation of the

nuts **36** as compared to machine threads and fewer turns are required for the same linear movement of the screws **32** relative to the frame.

For transmitting thrust loads and reducing friction, a bearing **40** is disposed about each screw **32** to engage each of the collars **30** at the spaced ends for transmitting thrust loads from, and facilitating rotation of the nut **36** associated therewith. Each of the nuts **36** reacts with the collar **30** through the bearing **40** at the spaced end of each of the legs **22**. The diameter of the screw **32** is slightly less, i.e., a slip fit, than the internal diameter of the tubular legs **22**.

A plate **42** is secured by welding to the claw end of each screw **32** and is disposed at an angle of forty degrees relative to the axis of the screw **32** associated therewith and extends above the screw **32** associated therewith to an upper-outer corner **44**. Each of the plates **42** has a chisel edge **46** between the upper-outer corners **44** to define a guide for engaging the side edges of the end curl **34** of the leaf spring.

The legs **22** each have a slot **48** through the near wall extending axially along the screw **32** associated therewith and a pin **50** extends radially from each of the screws **32** and into the slot **48** of the leg **22** associated therewith for sliding movement along the slot **48** as the screw **32** moves axially relative to the leg **22**. The slot **48** and pin **50** mechanism maintains the plates **42** at the claw ends oriented relative to the frame and to maintain the frame upright above the differential while being placed in position and thereafter rotating the nuts **36**. A cross hole **33** is provided through the far wall of each leg **22** at one end of the slot **48** for access to drive the pin **50** out of the screw **32** for disassembly.

A threaded hole **58** is disposed at each of the inner ends of the screws **32** and threadedly engages each end of a tension spring **52** with male threaded ends interconnecting the threaded holes **58** of the screws **32** to retain the nuts **36** in engagement with the bearings **40** at the spaced ends of the leg **22**. The tension spring **52** insures that the nuts **36** and bearings **40** are always up against the collars **30** at the spaced ends of the legs **22** and allow the screws **32** to be pulled axially along and into and out of the legs **22**. An adapter **54** is threaded into each of the threaded holes **58** for threaded attachment to the ends of the tension spring **52.** One of the screws **32** may be fully inserted and the tension spring **52** extended out the opposite tubular end sufficiently to attach to the other adapter **54** in the other threaded hole **58** whereby both screws **32** are pulled into the tubular frame **20**. The tension spring **52** has sufficient elasticity to be pulled out of one end of one of the legs **22** for attachment to the threaded hole **58** on the other screw **32** and yet retract both screws **32** into the respective legs **22**. In the preferred embodiment, the tension spring **52** comprises a bungee cord, or the like, but any suitable device may be employed.

As alluded to above, the subject invention also includes a method of fabricating a leaf spring spreader assembly comprising the steps of bending a pipe into a tubular frame **20** having a V-shape with legs **22** extending in opposite directions from an apex **24** to spaced ends, welding a cross beam **26** extending across the V-shape and interconnecting the legs **22** for stabilizing the legs **22**, and welding truss members **28** to the cross beam **26** and the legs **22** to diverge from one another. The fabrication continues by welding a collar **30** to each of the spaced ends of the legs **22,** and producing a slot **48** through the near wall extending axially along each of the legs **22**.

A plate **42** is welded to a claw end of each of the screws **32** at an angle of forty degrees relative to the axis of the screw **32** associated therewith so as to extend above the screw **32** welded thereto to form a chisel edge **46** between upper-outer corners **44**.

The assembly includes threadedly engaging a nut **36** on each of two screws **32** each having acme threads about a longitudinal axis and disposing a bearing **40** about each screw **32** for engaging each of the collars **30**.

A male threaded end is formed on each of opposite ends of a tension spring **52** and a first of the thusly threaded ends is connected by threads to the inner end of a first of the screws **32**. Surgical tubing of pure latex has been found to be an excellent tension spring **52**. An adapter **54** is attached to a first end of a string and is attached to the second end of the spring. The assembly continues by attaching a weight to the second end of the string and dropping the weight through the tubular frame **20**, starting at the open end of the first leg **22**. The pulling of the second end of the tension spring **52** out of the second leg **22**, requires inserting the first screw **32** into a first leg **22** of the tubular frame **20** to retain the nut **36** and bearing **40** thereon in engagement with the collar **30** at the end of the first leg **22**.

By gripping the second end of the tension spring **52** with a tool to hold the second end of the tension spring **52** out of the second leg **22**, the adapter **54** at the second end of the tension spring **52** is then threadedly connected to the inner end of the second screw **32**. Accordingly, the tension spring **52** is pulled through the tubular frame **20** and connected via the adapter **54** to the second screw **32** and released to pull the inner ends of the screws **32** together to retain the nuts **36** in engagement with the bearings **40** to maintain the components together. The first screw **32** is already in the

tubular frame **20** and the second screw **32** is inserted into the second leg **22** of the tubular frame **20** to retain the nut **36** thereon in engagement with the bearing **40** thereon in engagement with the collar **30** at the end of the second leg **22** whereby the screws **32** may be pulled axially along into and out of the legs **22** against the biasing of the tension spring **52**. The final step includes securing a pin **50** into a cross hole **33** in each of the screws **32** to extend radially from and into the slot **48** of the surrounding leg **22** for sliding movement along the slot **48** as the screws **32** move axially relative to the legs **22**.

Accordingly, the invention provides a method of fabricating a leaf spring spreader assembly of the type including a tubular frame **20** having legs **22** extending in opposite directions to spaced ends, a screw **32** having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring, and a nut **36** threadedly engaging each of the screws **32** and reacting with the spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36**. The method includes the steps of attaching the first end of a tension spring **52** to a first of the screws **32**, attaching a first end of a string to the second end of the tension spring **52**, attaching a weight to the second end of the string, and dropping the weight through the first end of the tubular frame **20** through and beyond the second end of the tubular frame **20**.

This naturally leads to inserting the first screw **32** into the first end of the tubular frame **20,** pulling and holding the string and the second end of the tension spring **52** beyond the second end of the tubular frame **20**, gripping the second end of the tension

spring **52** to hold it beyond and out of the second end of the second leg **22** of the tubular frame **20**, and removing the string from the second end of the tension spring **52**.

The fabrication continues by attaching the second end of the tension spring **52** to the second screw **32**, releasing the gripping and holding of the tension spring **52** out beyond the second end of the tubular frame **20**, and allowing the second screw **32** to insert into the second end of the tubular frame **20** with the inner ends of both screws **32** biased toward the apex **24** of the tubular frame **20** by the tension spring **52**.

More specifically, the method proceeds by engaging a nut **36** to a first screw **32** and screwing the nut **36** to the claw end of the first screw **32**, disposing a collar **30** on each of the spaced ends of the legs **22**, sliding a bearing **40** over the first screw **32** and into contact with the nut **36** for engaging the collar **30**, threadedly attaching the first end of the tension spring **52** to a threaded hole **58** in the inner end of the first screw **32**, inserting the first screw **32** into the first end of the tubular frame **20** with the bearing **40** in engagement with the collar **30** at the first end of the first leg **22** of the tubular frame **20**, engaging a nut **36** to a second screw **32** and screwing the second nut **36** to the claw end of the second screw **32,** sliding a bearing **40** about the second screw **32** and into contact with the nut **36** for engaging the second collar **30**, and threadedly attaching the second end of the tension spring **52** to a threaded hole **58** in the inner end of the second screw **32**.

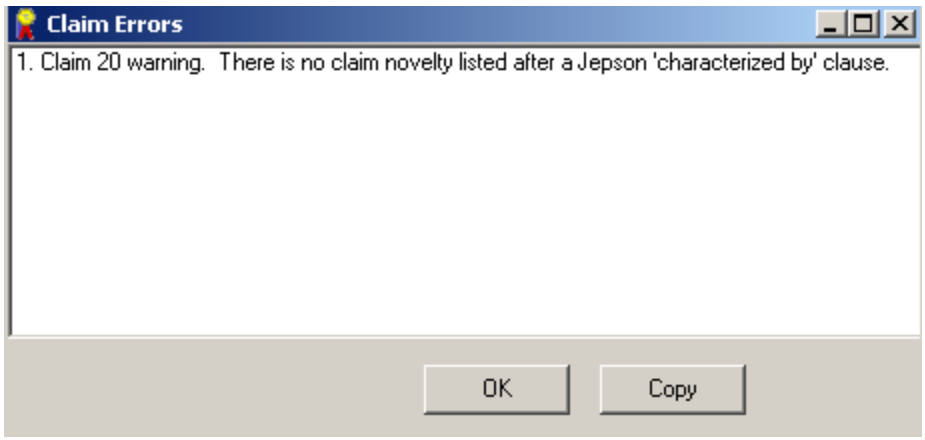
For alignment purposes, the method may include rotating each screw **32** to an orientation within the tubular frame **20** to align a cross hole **33** in each screw **32** with a slot **48** in each leg **22**, and inserting a pin **50** through each slot **48** into the aligned cross hole **33** of each screw **32** with the pin **50** extending radially from and outside the slot **48**

in the associated and surrounding leg **22** of the tubular frame **20** for sliding movement along the slot **48** as the screws **32** move axially relative to the legs **22**.

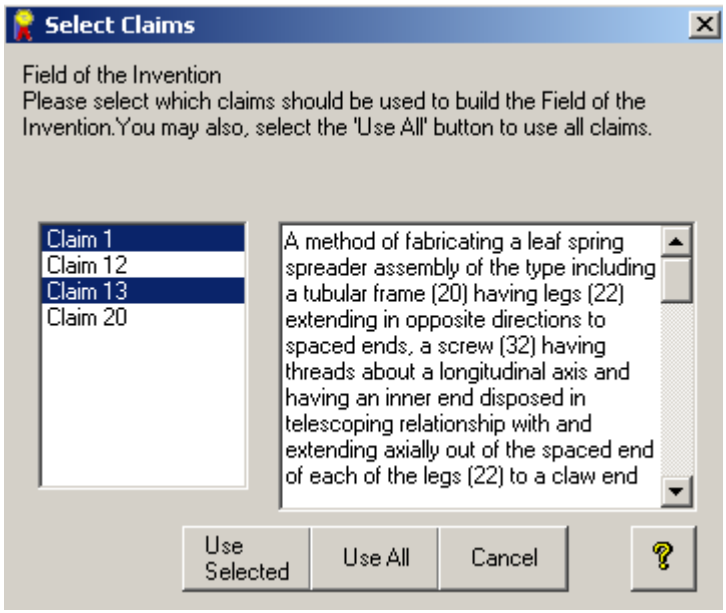
Section 15 Building the Introductory Sections

A. Selecting the Claims to be Used

By clicking the Build Intro Sections in the Other Sections box, the Field of the Invention, the Description of the Prior Art, the Summary of the Invention, the Advantages of the Invention and Brief Description of the Drawing will be initiated. The Claim Errors box will appear again showing that Claim 13 has no preamble and claim 20 has no characterized by clause. This error for independent method claim 13 because it recites "characterized by the steps" and Patent Architect® keys off comprising followed by characterized by. Therefore, Claim 13 is amended to recite –said method comprising and characterized by the steps--. After the change and clicking the Build Intro Sections the Claim Errors box appears again but only with the Claim 20 error and OK is clicked to produce the Select Claims box for the Intro Sections.



The Intro Sections are based upon the broadest claim and in this application there are two broad claims, apparatus claim 1 and method claim 13, which are selected by highlighting. If Cancel is selected the Intro Sections will be drafted from scratch. The recitations following the characterized by clauses will be inserted into the Summary section and the recitations preceding the characterized by clauses will be inserted into the Prior art section. After clicking on Use Selected the Intro Sections of the application will appear as follows for editing.



CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of application serial number _____ filed _____.

BACKGROUND OF THE INVENTION

1. Field of the Invention

A leaf spring spreader assembly

A method of fabricating a leaf spring spreader assembly of the type including a tubular frame having legs extending in opposite directions to spaced ends, a screw having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring, and a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut, the method

a tubular frame having legs extending in opposite directions to spaced ends,

a screw having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring,

a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut, and

and

SUMMARY OF THE INVENTION AND ADVANTAGES

The invention provides for a tension spring interconnecting the inner ends of the screws to retain the nuts in engagement with the spaced ends of the legs and to allow the screws to be moved axially along into and out of the legs.

The invention provides for comprising the steps of,

attaching the first end of a tension spring to a first of the screws,

attaching a first end of a string to the second end of the tension spring,

attaching a weight to the second end of the string,

dropping the weight through the first end of the tubular frame through and beyond the second end of the tubular frame,

inserting the first screw into a first end of the tubular frame,

pulling the second end of the tension spring beyond the second end of the tubular frame,

gripping the second end of the tension spring to hold the second end of the tension spring out of the second end of the tubular frame,

removing the string from the second end of the tension spring,

attaching the second end of the tension spring to the second screw,

releasing the gripping and holding of the tension spring out beyond the second end of the tubular frame, and

allowing the second screw to insert into the second end of the tubular frame with the inner ends of both screws biased into the tubular frame by the tension spring. comprising the steps of,

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Figure 1 is .

B. Editing and Building the Intro Sections

The first editing is to delete the Related Application because there is no previous application from which this application can claim priority to an earlier filing date. That which Pat Arch inserted into the Intro Sections will appear in italics and that which is added is <u>underlined</u> and that which is deleted is in brackets [ ].

[CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of application serial number _____ filed _____.]

BACKGROUND OF THE INVENTION

1. Field of the Invention

A leaf spring spreader assembly useful for spreading a leaf spring of the type extending across the rear axle of an automobile and connected to a shackle at each end.

NOTE: Since the preamble to method claim 13 is recited in the claim before comprising, Pat Arch senses it as a preamble and places it in the Field of Invention. Since all of the elements set forth in the preamble of claim 13 are otherwise recited in claim 1 reproduced in the Intro Sections, this recitation of the claim 13 preamble may be deleted, except for the words in italics which are used below in the Summary section.

A *method of fabricating* a leaf spring spreader assembly [of the type including a tubular frame having legs extending in opposite directions to spaced ends, a screw having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs to a claw end for engaging the end curl of a leaf spring, and a nut threadedly engaging each of the screws and reacting with the spaced end of each of the legs for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut, the method]

NOTE: The description of the prior art integrates the prior art elements recited before the characterized by clause with the actual prior art patents showing such elements, using the same phraseology used in the claims.

2. Description of the Prior Art

The spring spreaders of the type to which the subject invention pertains, spread the rear leaf spring of the bowed suspension type extended longitudinally of the rear axle housing for removal from and attachment to the shackles. One such spreader is illustrated in U.S. Pat. No. 1,755,088 to Vickrey wherein a [tubular] frame [having] includes legs extending in opposite directions to spaced tubular ends with threaded [a] screws [having threads about a longitudinal axis and] having [an] inner ends disposed in telescoping relationship with [and extending axially out of] the [spaced] tubular ends of [each of] the frame legs and extending axially in opposite directions out of the tubular ends of the legs [to a claw end] for engaging the end curls of a leaf spring. A nut threadedly engages [ing] each of the screws and reacts [ing] with the tubular ends of the frame [spaced end of each of the legs] for moving the associated screw into and out of the leg associated therewith in response to rotation of the nut. [, and] This patent and the U.S. Pat. No. 1,784,033 to Swanby and U.S. Pat. No. 1,808,625 to Barnhart disclose an upwardly offset central section between the tubular ends of the frame for accommodating the differential housing. In addition, the Barnhart patent shows the additional feature of a bearing between the nut and the frame and ears for engaging the sides of the leaf spring. Swanby shows a pin and slot arrangement to prevent rotation of the screws relative to the frame.

NOTE: It is to be noted that in addition to the prior art elements recited in claim 1, additional elements that are also in the prior art are pointed out, i.e., the bearings, ears, pin and slot arrangement.

However, the prior art spreaders usually utilize components especially manufactured for use only in a specific spreader assembly. Since such spreader

assemblies are manufactured and sold in very small quantities, such specially made components can cause the price to be unacceptable. In addition, some of the prior art assemblies include loose components that are often difficult to orient and retain together while manipulating the assembly into position for spreading a leaf spring. Often the screws have machine threads requiring an exhaustive number of turns for each increment of axial screw movement as well as special or dedicated wrenches to rotate the nuts. Such wrenches are often very awkward to use to rotate the nut due to the limited space under the spring and above the axle housing.

NOTE: That which follows the characterized clause of claims 1 and 13 is reproduced in the Summary section, which is edited below. It is to be noted that since the prior art is recited above, the Summary may start of by referring to the previously described assembly as "such" a spring spreader assembly followed by reciting the novelty set forth in the characterized by clause. Since the application, in total or in part, may be used to interpret the scope of the invention, the Summary of the invention should be exactly the scope of the broadest claims.

SUMMARY OF THE INVENTION AND ADVANTAGES

The invention provides [for] such a spring spreader assembly including a tension spring [with male threaded ends] interconnecting the inner ends of the screws to retain the nuts in engagement with the spaced ends of the legs and to allow the screws to be [moved] pulled axially along into and out of the legs.

The invention also provides a method of fabricating such a leaf spring spreader assembly [for comprising and] characterized by the steps of attaching the first end of a tension spring to a first of the screws, attaching a first end of a string to the second end of the tension spring, attaching a weight to the second end of the string, dropping the weight through [the first end of the tubular frame through and beyond the second end of]

the tubular frame, inserting the first screw into a first end of the tubular frame, pulling the second end of the tension spring [beyond] out of the second end of the tubular frame, gripping the second end of the tension spring to hold the second end of the tension spring out of the second end of the tubular frame, removing the string from the second end of the tension spring, attaching the second end of the tension spring to the second screw, releasing the gripping and holding of the tension spring out beyond the second end of the tubular frame, and allowing the second screw to insert into the second end of the tubular frame with the inner ends of both screws biased into the tubular frame by the tension spring [comprising the steps of] whereby the screws may be pulled axially into and out of the tubular frame against the biasing of the tension spring.

Therefore, the subject invention is efficiently fabricated by welding and assembly of readily available or commodity components such as pipe, screws, bearings, tension springs, and the like. After fabricating a tubular frame having legs extending in opposite directions to spaced ends, the screws are inserted into telescoping relationship with the legs with the nuts on the screws for reacting with the respective ends of the legs. During this novel fabrication and assembly, a tension spring interconnects the inner ends of the screws and is released to retain the nuts in engagement with the ends of the legs.

Accordingly, the subject invention provides a leaf spring spreader fabricated from off-the-shelf or commodity components that are easily assembled and operated to spread a leaf spring.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages of the present invention will be readily appreciated, as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[*Figure 1*] FIG. **1** is a front elevation view showing the spring spreader assembly of the subject invention in position on a leaf spring of an automotive vehicle;

FIG. **2** is a front elevation view showing the spring spreader assembly of the subject invention;

FIG. **3** is an enlarged fragmentary view of one end of the spring spreader engaging the sides and end curl of a leaf spring;

FIG. **4** is a top view of a plate defining a claw end of the screws;

FIG. **5** is a side view of a nut;

FIG. **6** is a fragmentary side view of the inner end of the screw utilized in the subject invention;

FIG. **7** is an end view of FIG. **6**;

FIG. **8** is a side view of the tension spring with integral male threaded connectors on each end; and

FIG. **9** is an end view of FIG. **8**.

C. Building an Abstract of the Disclosure

The Abstract is initiated by clicking on Build Abstract in the Other Sections box whereupon the following title will appear. In addition, the "Preliminary Classification' will appear in the event the proper classification is known. In this application, the classification appears to be Class 254, Sub-class 10.5

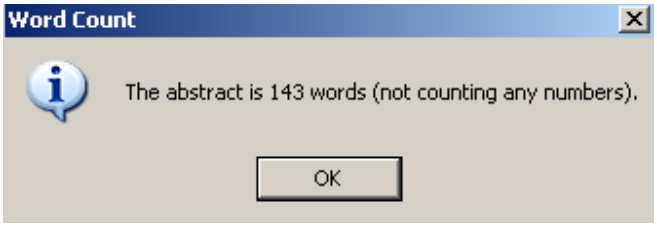
ABSTRACT OF THE DISCLOSURE

<Type Abstract Here>

***PRELIMINARY CLASSIFICATION Class* 254, Sub-class 10.5**

The Abstract is for a searcher or reviewer of the patent to quickly determine that which is specifically described in the application. The object of the Abstract is for one knowing the art being addressed in the application but is looking for the specific newly presented elements. An Abstract is somewhat a work of art in that key phrases are copied from the Description section and pasted and edited in the Abstract with the object of maximizing the specifics into the one hundred and fifty word limitation of the Abstract.

A leaf spring spreader assembly comprising a tubular frame having a V-shape with legs extending along respective aces in opposite directions from an apex to [spaced ends] a collar [is] welded to each of [the] spaced ends [of the legs] with a screw [having acme threads about a longitudinal axis has an inner end] disposed in telescoping relationship with and extends [ing] axially out of [the spaced end of] each [of the] leg[s] to a [claw end] plate for engaging the end curl of a leaf spring. A [each of the] nut[s] has radial [a plurality of circumferentially spaced cylindrical] tool holes [extending radially] for receiving a round rod to [shaft-tool for] rotate [ing] the nut[s] for reacting with the collar for moving the screw relative to the frame. A bearing is disposed about each screw [to engage each of the collars at the spaced ends] for transmitting thrust loads from and facilitating rotation of the nut [associated therewith]. A tension spring is pulled through the tubular frame and connected to the second screw and released to pull the inner ends of the screws together to retain the nuts in engagement with the bearings to maintain the components together.

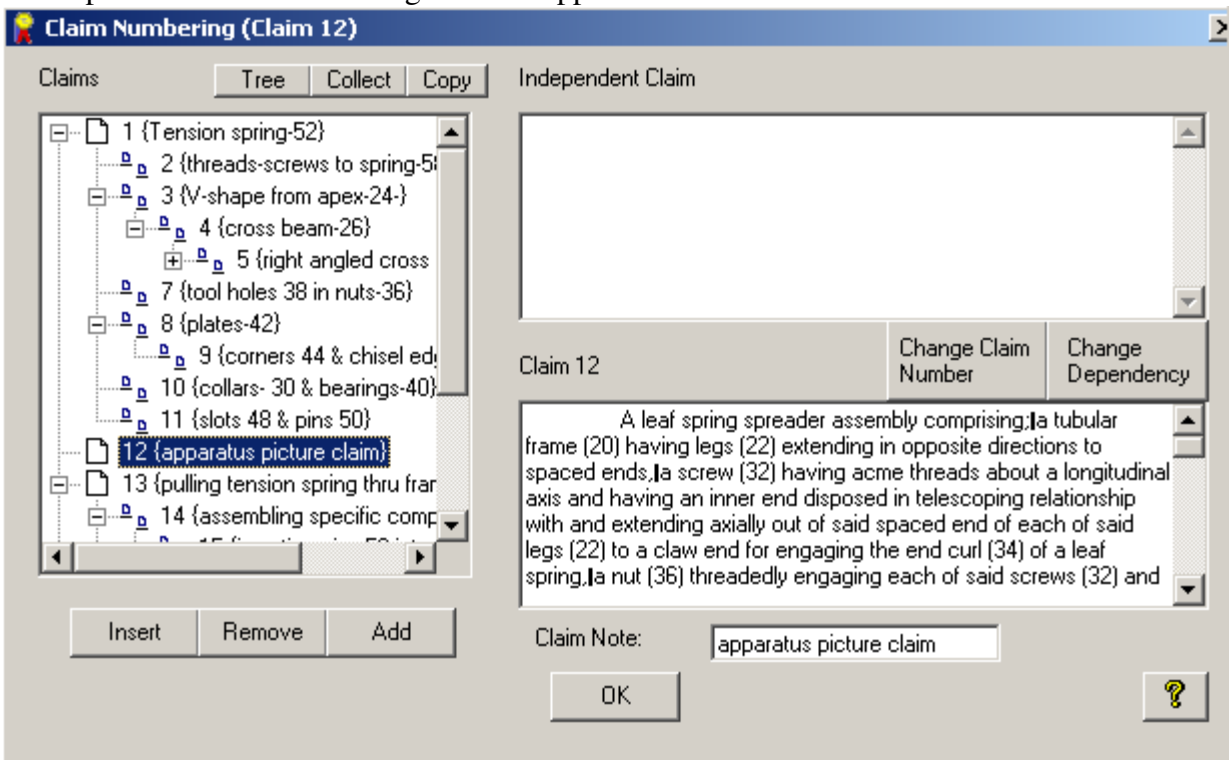


The Count Abstract is clicked upon in the Other Sections box once the Abstract is complete and the Word Count box is displayed showing the number of words in the Abstract.

Section 16 Building a Claim Tree with Notes

Albeit the picture claim will include all of the recitations in the broad claim and dependent claims, the respective limitations will not be accumulated successively in the dependent claims. Each dependent claim will depend from the claim furthest back up the chain that has all of the necessary antecedents. Since the dependent claims are not successively dependent one upon the next, a claim results. It is very helpful to have a visual presentation of this claim tree, particularly when the application is reviewed many months later during prosecution.

In order to view the claim tree, Number Claims is clicked upon in the Claims box, whereupon the Claim Numbering box will appear.



In order for a claim tree to be fully useful, it should contain notes regarding the limitation in each claim. The claim number is highlighted (as shown for claim 12) and the note is added in the Claim Note line. The broad claim could contain a cryptic note derived from the characterized by clause, e.g., the tension spring 52. For further clarity, the reference numeral can be added to the cryptic note. Such a cryptic note is added to each dependent claim number in the claim tree with the attendant reference number but the picture claim is merely labeled as a picture claim.

In a similar fashion to copying the Claim Errors above, the claim tree may be copied to the clipboard and printed and/or added to the application by clicking Copy at the top of the Claim Numbering box.

Section 17 This Tutorial and the Actual U. S. Patent 7,264,225

Had the spring spreader '255 patent been prepared with Patent Architect® there would be changes in the actual patent. This tutorial prepares the patent application in accordance with the checks and balances provided by Patent Architect® while following the draftsmanship of the original application. Therefore, in order to go full circle and complete the training afforded by this tutorial, the differences between the application prepared by this tutorial and the actual spring spreader '255 patent are reviewed with explanations for the differences.

A. Differences in the Background Sections

There are no differences between the application of this tutorial and the actual spring spreader '255 patent.

B. Differences in the Summary Section

The only differences are in second paragraph of the summary.

The invention also provides a method of fabricating such a leaf spring spreader assembly characterized by the steps of attaching [~~a first screw to a first end of a tension spring and a second screw to a second end of a tension spring, connecting~~] the first end of [~~the~~] **a** tension spring to [~~the inner end of~~] a first of the screws, attaching **an adapter to** a first end of a string **and** to the second end of the tension spring, attaching a weight to the second end of the string, dropping the weight through the tubular frame, inserting the first screw into a first [~~leg~~] **end** of the tubular frame [~~to retain the nut thereon in engagement with the end of the first leg~~], pulling [~~the string and~~] the second end of the tension spring out of the second [~~leg~~] **end of the tubular frame**, gripping the second end of the tension spring to hold **it beyond** the second end **at** [~~of the tension spring out of~~] the second [~~leg~~] **end of the tubular frame**, removing the string from the second end of the tension spring, attaching the second end of the tension spring to the second screw, and [~~inserting the second screw into the second leg of the tubular frame to retain the nut thereon in~~

~~engagement with the second leg~~] **releasing the gripping and holding of the tension spring out beyond the second end of the tubular frame, and allowing the second screw to insert into the second end of the tubular frame with the inner ends of both screws biased into the tubular frame by the tension spring** whereby the screws may be pulled axially [~~along~~] into and out of the [~~legs~~] **tubular frame** against the biasing of the tension spring.

C. Differences in the Description of the Drawings

There are no differences.

D. Differences in the Description

Referring to the Figures, wherein like numerals indicate corresponding parts throughout the several views, a leaf spring spreader assembly constructed in accordance with the subject invention is shown in FIGS. 1 and 2.

The spring spreader assembly is fabricated from a pipe bent into a tubular frame **20** generally indicated and having a V-shape with legs **22** extending **along respective as in opposite** directions from an apex **24** to spaced ends. A cross beam **26** extends across the V-shape and interconnects the legs **22** for stabilizing the legs **22**, the cross beam **26** having a right angled cross section with each end thereof cradling one of the legs **22** of the frame. In other words, the cross beam **26** is an angle iron welded to the underside of the tubular legs **22** of the frame. In addition, truss members **28** diverge from one another under the apex **24** and interconnect the cross beam **26** and the legs **22**, the truss members 28 being almost perpendicular to the respective legs **22**.

NOTE: Since the picture claim is copied into the description and since the picture claim contains the words "along respective as", the words are correctly inserted into the description to conform to the process of using the picture claim to build the description.

A collar **30** is welded to each of the spaced ends of the legs **22**. A screw **32** having acme threads about a longitudinal axis has an inner end disposed in telescoping relationship with and extends axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring. A nut **36** threadedly engages each of the screws **32** and reacts with the collar **30** at each spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36.** Each of the nuts **36** has a plurality of circumferentially spaced cylindrical **tool** holes **38** extending radially for receiving a shaft-tool for rotating the nuts **36**. The shaft-tool may comprise a simple round rod for insertion into successive **tool** holes **38** for rotating the nuts **36**. The acme threads threadedly interconnecting the screws **32** and the nuts **36** provide easier rotation of the nuts **36** as compared to machine threads and fewer turns are required for the same linear movement of the screws **32** relative to the frame.

NOTE: The addition of "tool" is very clear to differentiate between the three different holes in the original application, to wit; the "cross" hole, the "tool" hole, and the "threaded" hole. The cross holes are labeled with the reference numeral "33" in the original patent drawings but not mentioned in the description. The tool holes are labeled with the reference numeral "38" in the original description and drawings but the reference numeral 38 is applied to every occurrence of the word "hole" in the description even though the holes are different. The threaded holes are labeled with the reference numeral "58" in the original drawings but the numeral 58 is not used in the description as all of the holes have the reference numeral 38 applied thereto. In order to make sure these numerals remain assigned the numeral 33 was locked to the cross hole, the numeral 38 was locked to the toll hole, and the numeral 58 to the threaded hole.

For transmitting thrust loads and reducing friction, a bearing **40** is disposed about each screw **32** to engage each of the collars **30 at the spaced** ends for transmitting thrust loads from, and facilitating rotation of the nut **36** associated therewith. **Each of the nuts 36 reacts with the collar 30 through the bearing 40 at the spaced end of each of the legs 22.** The diameter of the screw **32** is slightly less, i.e., a slip fit, than the internal diameter of the tubular legs **22**.

NOTE: The following additions which do not appear in the '225 patent were made to conform to the process where the picture claim is copied into the description. The '225 patent application was prepared without the picture apparatus claim 12 including every phrase of each and every one of the other apparatus claims 1-11. Had the picture claim been prepared to include the phraseology of the remaining claims, the following additions would have been copied into the description for editing upon. Some of the changes are merely typographical.

A plate **42** is secured by welding to the claw end of each screw **32** and is disposed at an angle of forty degrees relative to the axis of the screw **32** associated therewith and extends above the screw **32** **associated therewith to an upper-outer corner** **44**. Each of the plates **42** has a chisel edge **46** between [~~in~~] the upper-outer corners **44** to define a guide for engaging the side edges [~~and~~] **of** the end curl 34 of the leaf spring.

The legs **22** each have a slot **48** through the near wall extending axially along the screw **32** associated therewith and a pin **50** extends radially from each of the screws **32** and into the slot **48** of the leg **22** associated therewith for sliding movement along the slot[~~s~~] **48** as the screw[~~s~~] **32** move**s** axially relative to the leg[~~s~~] **22**. The slot **48** and pin **50** mechanism maintains the plates **42** at the claw ends oriented relative to the frame and to maintain the frame upright above the differential while being placed in position and thereafter rotating the nuts **36**. A **cross** hole **33**[~~8~~] is provided through the far wall of each leg **22** at one end of the slot **48** for access to drive the pin **50** out of **the** screw **32** for disassembly.

A threaded hole [~~3~~]**58** is [~~provided in~~] **disposed at** each of the inner ends of the screws **32** and threadedly engages each end of a tension spring **52** [~~which~~] **with male threaded ends interconnecting the threaded holes 58 of the screws 32 to retain the nuts 36 in engagement with the bearings 40 at the spaced ends of the leg 22. The tension spring 52** insures that the nuts **36** and bearings **40** are always up against the **collars 30 at the** spaced ends of the legs **22** and

allow the screws **32** to be pulled axially along and **into and** out of the legs **22**. **An adapter 54 is threaded via adapter-threads 56 into each of the threaded holes 58 for threaded attachment to the ends of the tension spring 52.** One of the screws **32** may be fully inserted and the tension spring **52** extended out the opposite tubular end sufficiently to attach to the other **adapter 54 in the other** threaded hole [~~3~~]**58** whereby both screws **32** are pulled into the tubular frame **20**. The tension spring **52** has sufficient elasticity to be pulled out of one end of one of the legs **22** for attachment to the threaded hole [~~3~~]**58** on the other screw **32** and yet retract both screws **32** into the respective legs **22**. In the preferred embodiment, the tension spring **52** comprises a bungee cord, or the like, but any suitable device may be employed.

As alluded to above, the subject invention also includes a method of fabricating a leaf spring spreader assembly comprising the steps of bending a pipe into a tubular frame **20** having a V-shape with legs **22** extending in opposite directions from an apex **24** to spaced ends, welding a cross beam **26** extending across the V-shape and interconnecting the legs **22** for stabilizing the legs **22,** and welding truss members **28** to the cross beam **26** and the legs **22** to diverge from one another. The fabrication continues by welding a collar **30** to each of the spaced ends of the legs **22**, and [~~forming~~] **producing** a slot **48** through the near wall extending axially along each of the legs **22**.

A plate **42** is welded to a claw end of each of the screws **32** at an angle of forty degrees relative to the axis of the screw **32** associated therewith so as to extend above the screw **32 welded thereto** to form a chisel edge **46** between upper-outer corners **44**. The assembly includes threadedly engaging a nut **36** on each of two screws **32 and screwing the nuts (36) to the claw ends of the respective screws (32) and** disposing a bearing **40** about each screw **32** for engaging each of the collars **30**.

A male threaded end is formed on each of opposite ends of a tension spring **52** and a first of the **thusly** threaded ends is connected by threads to the inner end of a first of the screws **32**. Surgical tubing of pure latex has **been** found to be an excellent tension spring **52**. An adapter **54** is attached to a first end of a string and is [~~threadedly~~] attached to the second end of the spring. The assembly continues by attaching a weight to the second end of the string and dropping the weight through the tubular frame **20**, starting at the open end of the first leg **22**. The pulling of the second end of the tension spring **52** out of the second leg **22**, requires [~~the~~] inserting [~~of~~] the first screw **32** into a first leg **22** of the tubular frame **20** to retain the nut **36** and bearing **40** thereon in engagement with the collar **30** at the end of the first leg **22**.

By gripping the second end of the tension **spring 52** with a tool to hold the second end of the tension spring **52** out of the second leg **22**, the adapter **54 at** [~~and spring are removed from~~] the second end of the tension spring **52**[~~. The second end of the spring~~] is then threadedly connected to the inner end of the second screw **32**. A**ccordingly, the** tension spring **52[4**] is pulled through the tubular frame **20** and connected **via the adapter 54** to the second screw **32** and released to pull the inner ends of the screws **32** together to retain the nuts **36** in engagement with the bearings **40** to maintain the components together. The **first screw 32 is already in the tubular frame 20 and the second screw 32 is inserted into the second leg 22 of the tubular frame 20 to retain the nut 36 thereon in engagement with the bearing 40 thereon in** engagement **with the collar 30 at the end of the second leg 22 whereby the screws 32 may be pulled axially along into and out of the legs 22 against the biasing of the tension spring 52. The** final step includes securing a pin **50 in**to **a cross hole 33 in** each of the screws **32** to extend radially from and into the slot **48** of the surrounding leg **22** for sliding movement along the slot **48** as the screws **32** move axially relative to the legs **22**.

Accordingly, the invention provides a method of fabricating a leaf spring spreader assembly of the type including a tubular frame **20** having legs **22** extending in opposite directions to spaced ends, a screw **32** having threads about a longitudinal axis and having an inner end disposed in telescoping relationship with and extending axially out of the spaced end of each of the legs **22** to a claw end for engaging the end curl **34** of a leaf spring, and a nut **36** threadedly engaging each of the screws **32** and reacting with the spaced end of each of the legs **22** for moving the associated screw **32** into and out of the leg **22** associated therewith in response to rotation of the nut **36**. The method includes the steps of [~~connecting~~] **attaching** the first end of a tension spring **52** to a first **of the** screw**s** **32**, attaching the first end of a string to the second end of the tension spring **52**, attaching a weight to the second end of the string, and dropping the weight through the first end of the tubular frame **20** through and beyond the second end of the tubular frame **20**.

This naturally leads to inserting the first screw **32** into the first end of the tubular frame **20**, pulling and holding the string and [~~second end of the male threaded end and~~] **the** second end of the tension spring **52** beyond the second end of the tubular frame **20**, gripping the second end of the tension spring **52** to hold it beyond **and out of** the second end **of the second leg 22** of the tubular frame **20**, and removing the string from the second end of the tension spring **52**.

The fabrication continues by [connecting] **attaching** the second end of the tension spring **52** to the second screw **32**, releasing the gripping and holding of the tension spring **52** out beyond the second end of the tubular frame **20**, and allowing the second screw **32** to insert into the second end of the tubular frame **20** with the inner ends of both screws **32** biased toward the apex **24** of the tubular frame **20** by the tension spring **52.**

More specifically, the method proceeds by engaging a nut **36** to a first screw **32** and screwing the nut **36** to the claw end of the first screw **32**, disposing a collar **30** on each of the spaced ends of the legs **22,** sliding a bearing **40** over the **first** screw **32** and into contact with the nut **36 for engaging the collar 30**, threadedly [~~connecting~~] **attaching** the first end of [~~a~~] **the** tension spring **52** to [~~the~~] **a** threaded hole [~~3~~]**5**8 in the inner end of [~~a~~] **the** first screw **32**, inserting the first screw **32** into the first end of the tubular frame **20** with the bearing **40** in [~~contact~~] **engagement** with the **collar 30 at the** first end of the **first leg 22 of the** tubular frame **20** [~~and the associated collar 30~~], engaging a nut **36** to a second screw **32** and screwing the **second** nut **36** to the claw end of the second screw **32,** sliding a bearing **40** [~~over~~] **about** the second screw **32** and into contact with the nut **36 for engaging the second collar 30**, and threadedly [~~connecting~~] **attaching** the second end of the tension spring **52** to [~~the~~] **a** threaded hole [~~3~~]**58 in the inner end** of the second screw **32**.

For alignment purposes, the method may include rotating each screw **32** to an orientation within the tubular frame **20** to align a cross hole **33**[~~8~~] in each screw **32** with a slot **48** in each leg **22**, and inserting a pin **50** through each slot 48 into **the** aligned cross hole 3**3**[~~8~~] of each screw **32** with the pin **50** extending **radially from and** outside the slot 48 in the associated **and surrounding** leg **22** of the tubular frame 20 **for sliding movement along the slot 48 as the screws 32 move axially relative to the legs 22**.

E. Differences in the Claims

The only differences in claims 1-11 are to conform the claims to the process and the description prepared by that process as discussed above. More specifically, the word "curls" in claim 1 has been edited to a single case –curl--.In claim 2, "threaded holes (38)" has been edited to –a threaded hole (58)--. The adjective –tool—has been added to the "holes (38)" in claim 7. In order to conform the phraseology of claim 10 to that of the picture claim 12, the words "at said spaced ends" have been added. In a similar fashion, claim 11 was drafted to conform to the words used in picture claim 12.

Picture 12 of the '225 patent includes a double inclusion because "a screw having acme threads" is positively recited early in the claim whereas "each of said screws (32) having acme threads" is recited latter in the claim. This tutorial omits that double inclusion. The reaction of the nuts with the collars "through said bearing (40)" resulted from using the same phraseology as in claim 10. The tutorial also correctly applied the reference numerals.

As mentioned above, method claim 13 was amended to add "said method comprising" before "characterized by" so that which follows the "characterized by" would be inserted into the summary section of the application for editing. To conform the terminology throughout the application, "attaching" was used in this tutorial instead of "connecting." The language of the pulling and holding step of claim 13 is reconciled in this tutorial throughout the picture method claim 20 and the description and claim 13. Claim 13 does not recite the method as being performed on or with a V-shaped frame. Therefore, "toward the apex" was omitted from claim 13 in this tutorial.

The differences in claims 14-20 are a result of the tutorial following to the process to conform the terminology throughout the application while following the editorial decisions made in drafting the original application. The exceptions are the dependency of claims 18 and 19, which have been changed in the tutorial to depend from the lowest claim number having the requisite antecedents.

F. Differences in the Abstract

The only difference in the abstract in this tutorial is the addition of the word "tool" to the recitation of "holes (38)."