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(71) Applicant: **California Manufacturing Engineering Company LLC**
Kerman, CA 93630 (US)

(72) Inventors:
- **Crook, Gary**
  Visalia, CA 93277 (US)
- **Posner, Aaron**
  Fresno, CA 93711 (US)

(74) Representative: **Ruschke, Hans Edvard**
Ruschke Madgwick Seide & Kollegen
Postfach 86 06 29
81633 München (DE)

(54) Aerial work platform and pinless guardrail

(57) An aerial work platform (10) and guardrail system having a deck (12) which may include a deck frame (14); vertically extending guardrail supports (40) affixed to the deck (12) or deck frame (14); and guardrail sections (20,22) at the periphery of the deck (12). The sections (20,22) have legs (30,32) receivable in the guardrail supports (40) with spaced upper and lower guides (50,52) affixed to the legs (30,32), the guides (50,52) being receivable in said guardrail supports (40) and having surfaces for engaging inner surfaces of the guardrail supports (40). Retainers (54,56) retain the lower guides (52) in the guardrail supports (40) whereby the guardrail sections (20,22) may be individually lifted from a lower operative position to an upper pivot position at which the sections (20,22) are retained in the supports (40) by engagement of lower guides (52) with the retainers (54,56) and may be pivoted about the lower guides (52) to a horizontal position for storage.

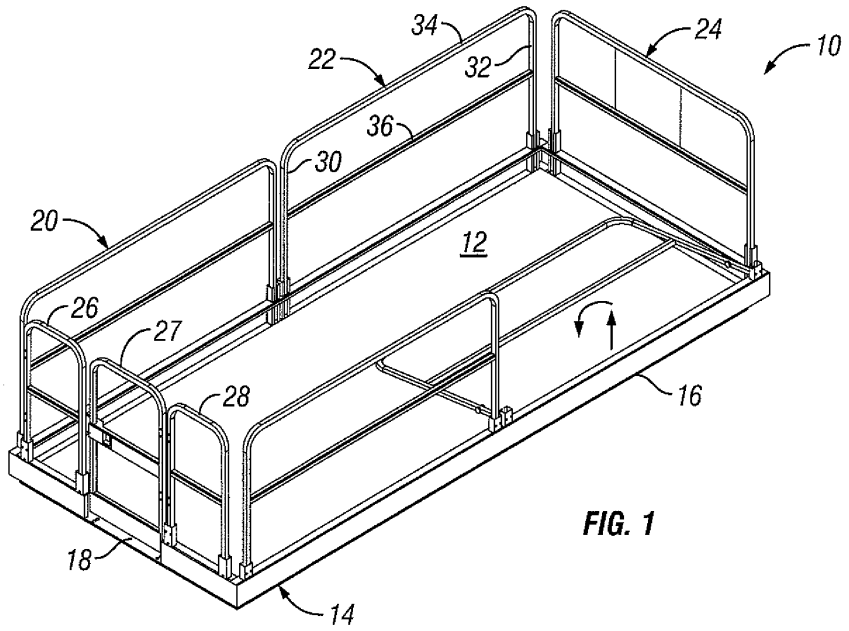

FIG. 1

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Description

Background of the Invention and Prior Art

Field of the Invention:

[0001] Guardrails for aerial work platforms are mandatory for safety and safety standards typically require that the guardrails must resist a 300 1b outward force such that when leaned on, the guardrail prevents a worker from falling and likely serious injury or death. Typically, the guardrails are between 42" and 45" above the deck and comprise a number of separate individual sections.

[0002] Aerial work platforms are moved to and from work positions by extensible booms or scissor lifts which may extend to significant elevations and, when lowered for transport or storage, the work platform may still be high off the ground. Accordingly, there is need to lower the guardrails particularly when the work platform apparatus is loaded on a truck or trailer during transport to minimize the height of the apparatus to safely clear bridges and other obstacles. There is also occasional need to lower the guardrails to gain access into buildings through low doorways.

Description of the Related Art:

[0003] Hinged guardrail sections are well known but require the use of removable pins to retain the guardrail sections in both a vertically extending work position and in a horizontally extending storage position. The retainer pins are frequently dropped or lost during transport or work conditions and, for this reason, lanyards or other pin retainers are ordinarily used. Time consuming and tedious removal of the pins is required when raising or lowering the guardrail sections and worker frustration is compounded by having to hold the guardrail section with one arm while installing or removing pins with the other, a particularly difficult task when the machine is positioned on a slope.

Summary

[0004] The system disclosed herein comprises: a work platform having a deck; vertically extending guardrail supports affixed to the deck; and guardrail sections at the periphery of the deck. The guardrail sections have legs receivable in the guardrail supports which may comprise channels having open sides facing the deck. Spaced upper and lower guides not unlike hockey pucks are affixed to the guardrail legs, and the guides are receivable in the guardrail supports and are spaced from each other a length less than the length of the guardrail supports. The guides have contact surfaces engageable with inner surfaces of the guardrail supports. Retainers retain the lower guides in the guardrail supports whereby the guardrail sections may be lifted from operative position to an upper pivot position at which the guardrail sections are retained in the supports by engagement of the lower guides with the retainers. The guardrail sections may be pivoted about the lower guides to a horizontal position for storage.

Brief Description of the Drawings

[0005]

Figure 1 is a perspective view of a rectangular aerial work platform having guardrail sections at its sides and ends showing one section horizontally positioned for storage.

Figure 2 is an enlarged partial perspective view of one side of the work platform showing guardrail supports.

Figure 3 is an enlarged horizontal cross section taken at line 3-3 in Fig. 2 showing guardrails in the operative position engaged with the guardrail supports.

Figure 4 is a partial perspective view showing guardrail legs positioned in the guardrail supports.

Figure 5 is a partial perspective view showing guardrails legs lifted partially out of the supports for later folding to a horizontal storage position.

Figure 6 is a partial perspective view showing the guardrail legs folded to a horizontal storage position.

Description of the Preferred Embodiments

[0006] As used herein, the terms horizontal and vertical are general expressions not strictly limited to 0° and 90° orientations and relate to the positions occupied when the apparatus is on a generally horizontal surface with the guardrail sections in operative (vertical) position.

[0007] Figure 1 is a perspective view of an aerial work platform and guardrail system suitable for use with a scissors or boom type lift, not shown. The work platform 10 includes a deck 12. The deck 12 may be supported on a generally rectangular deck frame 14 comprising structural members which, as seen in Fig. 2, have spaced upper and lower inwardly extending horizontal flanges 16, 18 which face the work platform. In the embodiment shown in Figure 1, two elongated guardrail sections 20, 22 are used at either long side of the deck 12. One short side of the deck is provided with a single guardrail section 24 and the other short side of the deck of the platform is provided with three separate guardrail sections 26 - 28, the center one 27 of which is an entry section or vertically liftable gate.

[0008] Each guardrail section has at least two legs 30, 32 and a pair of generally horizontally extending guardrail members 34, 36 extending between the legs. Tubular metal stock is generally used for construction .of the guardrail sections and guardrail supports more fully described below. The lower ends of each leg are receivable in generally vertically extending guardrail supports 40 affixed to the deck or deck frame. The supports 40 preferably comprise channel sections having open sides facing

the deck 12 of the work platform. The guardrail supports 40 may also be formed of rectangular or square cross-section stock so long as the supports each have a vertically extending opening above and facing the deck.

[0009] Spaced upper and lower guides 50, 52 are affixed to laterally opposite sides of each of the legs of the guardrail sections and are closely receivable in the guardrail supports 40. The guides have a width or diameter approximately the same as the width of the legs 30, 32 with the lower guides 52 positioned at the lower ends of the legs 30, 32. The guides are vertically spaced from each other a length which is preferably only slightly less than the vertical extent of the guardrail supports 40 so as to provide the greatest stability for the guardrail sections when the sections are positioned in vertically extending operative position. The guides 50, 52 have contact surfaces which are engageable with inner vertically extending surfaces of the guardrail supports 40. The guides are sized such that the peripheral surface of the guides will operatively engage facing inner surfaces (41 in Fig. 3) of the guardrail supports 40 which are generally parallel to the long direction of the deck and the exposed outer side surfaces of the guides may engage inner surfaces of the supports 40 which extend generally parallel to the short direction of the deck. The guides 50 and 52 are preferably hexagonal as seen in Fig. 5 or they may be cylindrical about the size and shape of a hockey puck and are preferably made of a lubricious material such as Nylon.

[0010] Guide retainers 54, 56, preferably in the form of elongated threaded bolts and fastener nuts, retain the lower ones 52 of the guides in the guardrail supports 40. The retainers are positioned as shown in Figures 3 above the lower ones of the guides whereby the guardrail sections may be lifted from the operative generally vertically extending position to an upper pivot position at which the sections are retained in the supports by contact of the lower guides 52 with the retainers 54, 56 and such that the guardrail sections may then be pivoted about the lower guides 52 to a horizontal position for storage. See the arrows in Fig. 1 and 2 indicating the lifting and pivoting of the guardrail sections to storage position. As seen in Figure 1, one guardrail section is pivoted to the horizontal position. The upper and lower retainers 50, 52 are preferably rotatably attached by support axles to the legs of the guardrail sections.

[0011] As described above with reference to Figure 2, a typical deck frame 14 will include side and end frame members in the form of channel sections each having upper and lower horizontally extending flanges 16, 18 whereby the guardrail supports 40 have their lower ends in contact with and supported on the lower horizontally extending flanges of the deck frame. The upper flanges of the deck frame may be provided with apertures or cutouts to receive the vertically extending guardrail supports 40.

[0012] The guardrail system disclosed above eliminates the necessity for retention pins and associated lanyards or other retainers to prevent loss of pins for securing the guardrail sections in either vertically extending work or horizontally extending storage positions. Guardrail systems comprised of multiple guardrail sections and supports as disclosed herein can readily be retrofitted to existing work platforms.

[0013] Those skilled in the art will understand that various modifications .of the preferred embodiments shown and described herein can be made without departing from the scope of the invention which is defined by the appended claims.

Claims

1. An aerial work platform and guardrail system comprising: a work platform having a deck; vertically extending guardrail supports affixed to said deck; and guardrail sections at the periphery of said deck, said sections having legs receivable in said guardrail supports, said guardrail supports each having a vertically extending opening above and facing said deck, spaced upper and lower guides affixed to at least some of said legs, said guides being receivable in said guardrail supports, said guides being spaced a length less than the vertically extending length of said guardrail supports, said guides having contact surfaces engageable with inner surfaces of said guardrail supports, and retainers for retaining the lower ones of said guides in said guardrail supports whereby said guardrail sections may be lifted from operative position to an upper pivot position at which said sections are retained in said supports by engagement of lower ones of said guides with said retainers and may be pivoted about said lower ones of said guides through said openings in said supports to a horizontal position for storage.

2. The system of claim 1, wherein said contact surfaces of said guides comprise flat or arcuate surfaces engageable with said guardrail supports.

3. The system of claim 1, wherein said retainers comprise elongated members affixed to and extending between spaced sides of said guardrail supports.

4. The system of claim 2, wherein said elongated members comprise removable threaded members.

5. The system of claim 4, wherein said lower ones of said guides are rotatably affixed to said legs of said guardrail sections.

6. The system of claim 1, wherein said deck includes side and end frame members having upper and lower horizontally extending flanges, said guardrail supports having lower ends supported on said lower horizontally extending flanges and said supports being

received in apertures or cutouts in said upper horizontally extending flanges.

7. The system of claim 6, wherein said guides are made of lubricious material.

8. A guardrail system for an aerial work platform comprising: a plurality of guardrail supports for attachment in vertical orientation to a deck frame of a work platform; at least one guardrail section having legs receivable in said guardrail supports, said guardrail supports comprising channels each having a vertically extending opening facing said platform, spaced upper and lower guides affixed to opposite sides of each of said legs, said guides being receivable in said guardrail supports and being spaced along said legs a length less than the length of said guardrail supports, said guides having contact areas engageable with inner surfaces of said guardrail supports, and retainers for retaining the lower ones of said guides in said guardrail supports whereby said guardrail section may be lifted from operative position to an upper pivot position at which said section may be retained in said supports by engagement of lower ones of said guides with said retainers and may be pivoted about said lower ones of said guides to a horizontal position for storage.

9. The system of claim 8, wherein said contact surfaces of said guides comprise flat surfaces engageable with said guardrail support.

10. The system of claim 8, wherein said retainers comprise elongated members affixed to and extending between spaced sides of said guardrail supports.

11. The system of claim 10, wherein said elongated members comprise removable threaded members.

12. The system of claim 9, wherein said lower ones of said guides are rotatably affixed to said legs of said guardrail section.

13. The system of claim 8, wherein said guides are made of lubricious material.

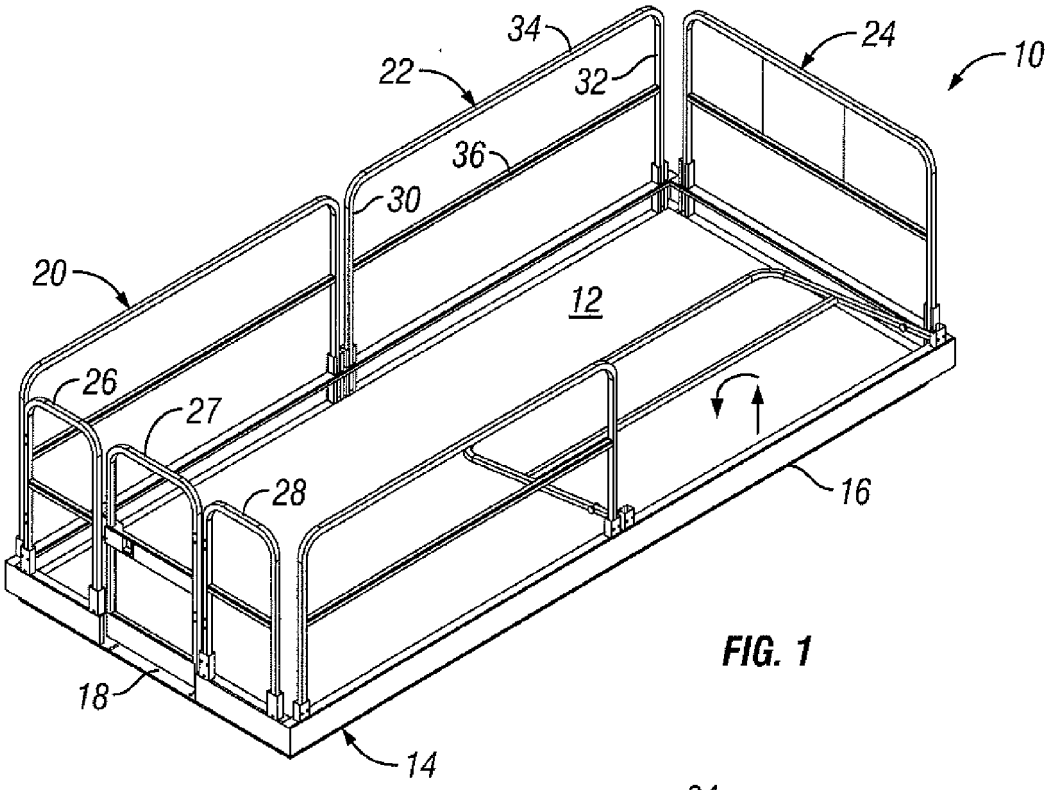

FIG. 1

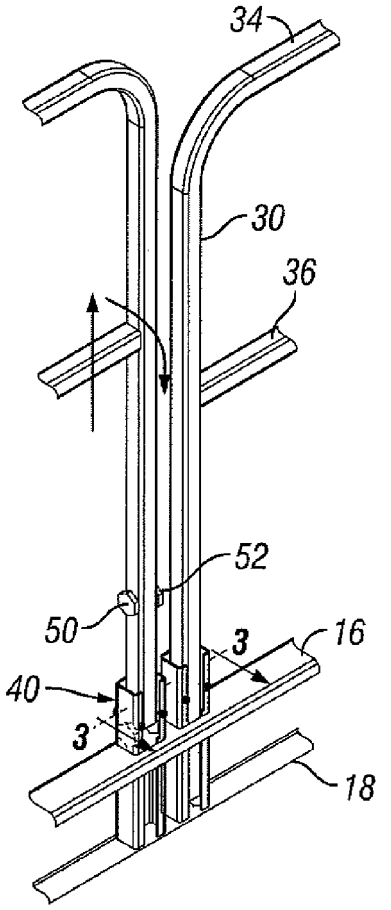

FIG. 2

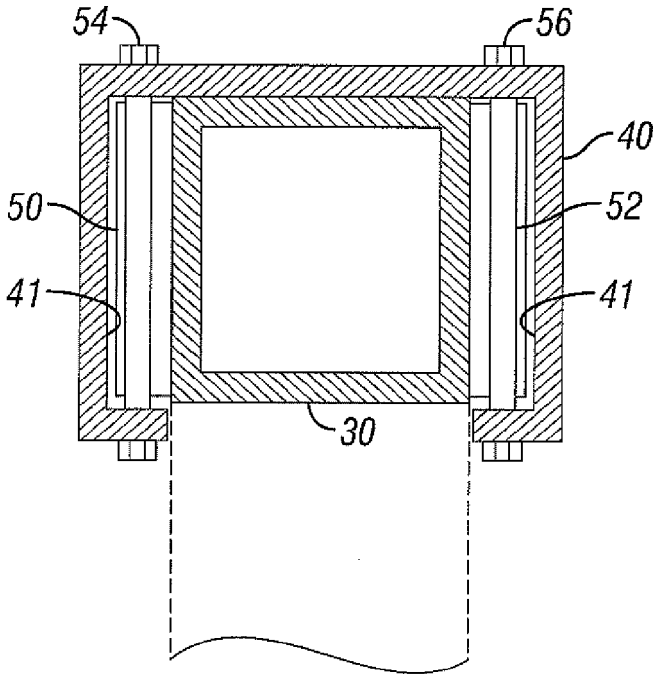

FIG. 3

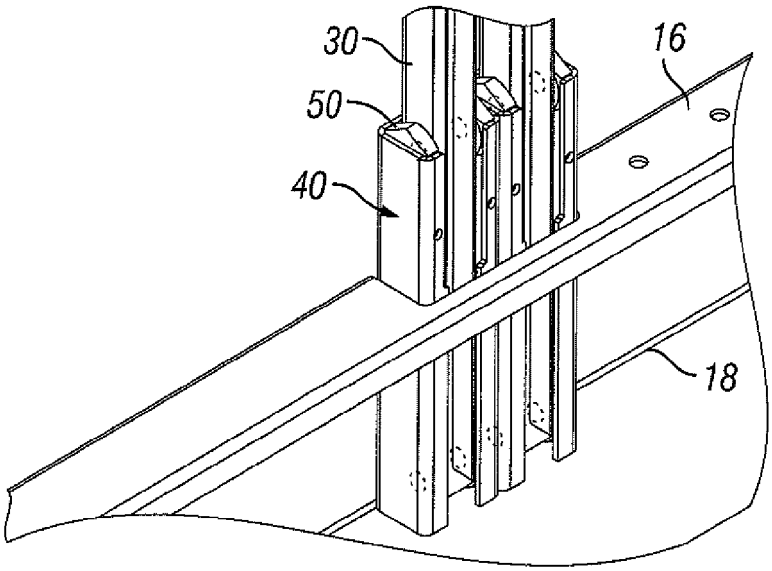

FIG. 4

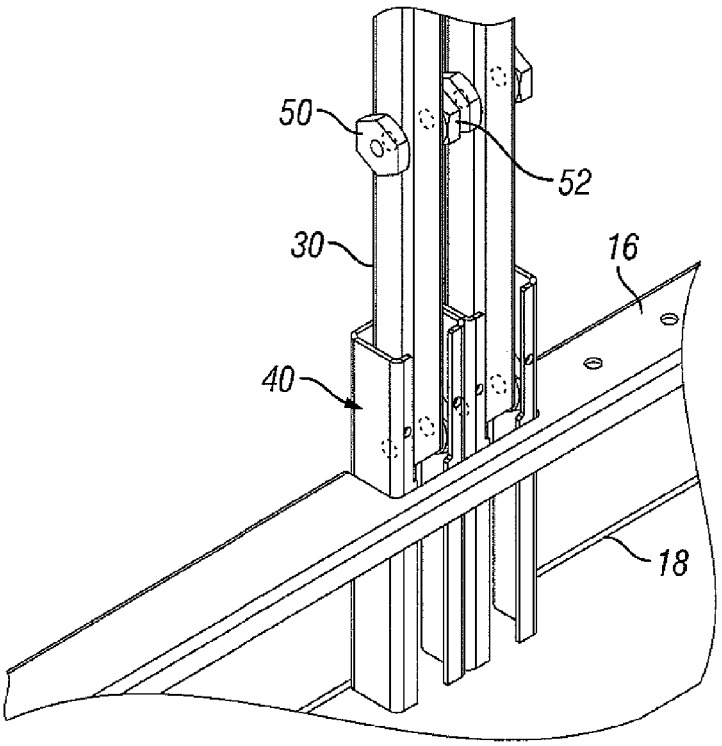

FIG. 5

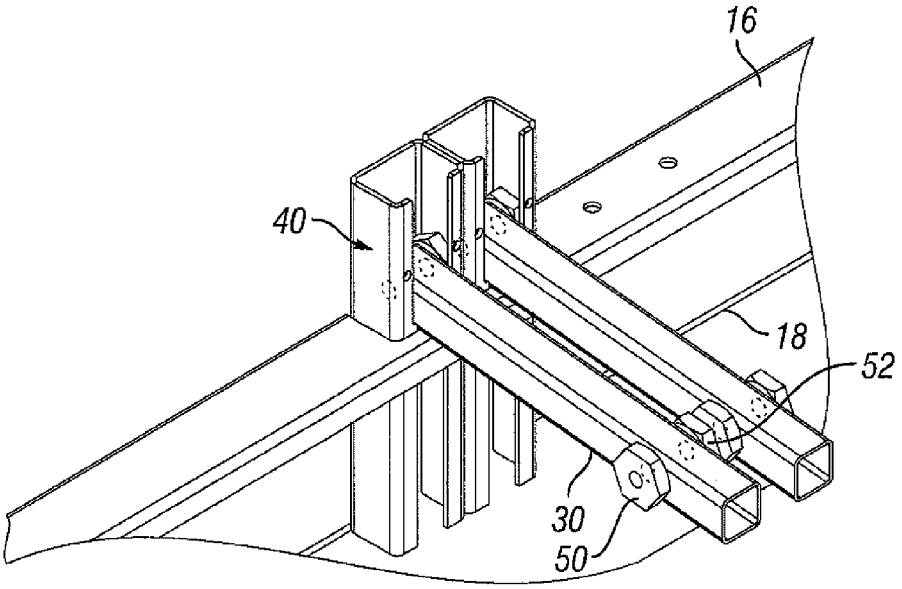

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 10 16 2858

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 437 737 A (ACCESS PRODUCTS LTD [GB] ACCESS PRODUCTS LTD [GB]; PRODUCT SOLUTIONS C) 7 November 2007 (2007-11-07) * page 6 - page 10; figures 1,2,7-9,12 *	1-13	INV. B66F11/04
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A	US 2004/040784 A1 (JOHNSON ROBERT AARON [US]) 4 March 2004 (2004-03-04) * abstract; figures 7-10 *	1,8	

TECHNICAL FIELDS SEARCHED (IPC)

B66F
E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 August 2010	Rupcic, Zoran

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 16 2858

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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25-08-2010

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82