

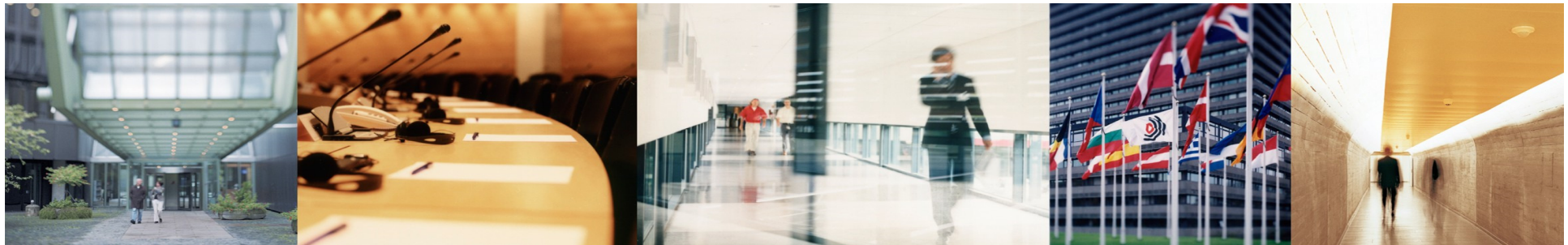


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Patentamt  
European  
Patent Office  
Office européen  
des brevets

# A graphical representation of the problem-solution approach (PSA) - a powerful tool facilitating the assessment of inventive step of patents

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European Patent Office  
Directorate Advisor  
Industrial Chemistry

II-SDV Nice 15./16. April 2013

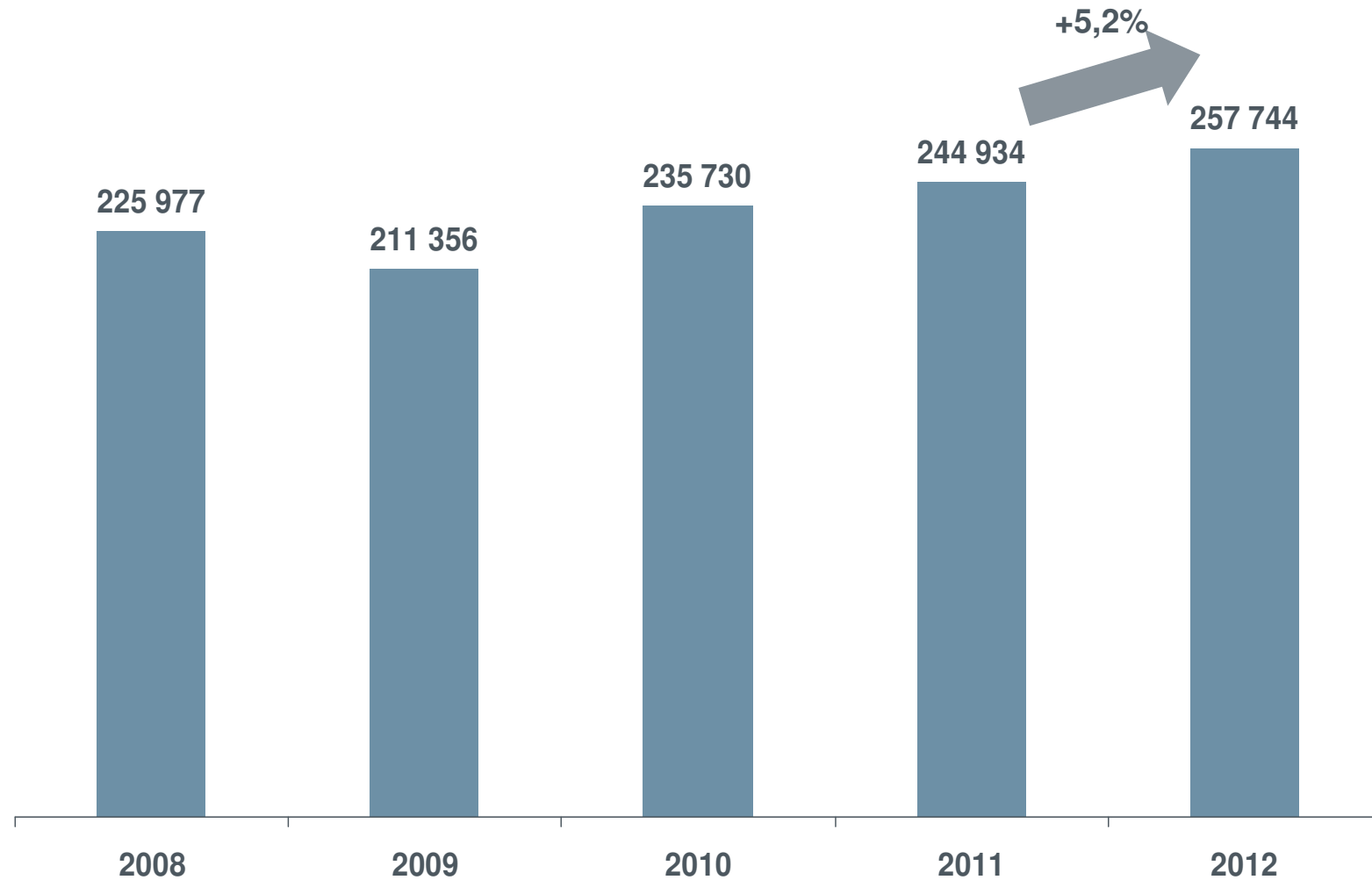


## Who am I ?

- **Joachim Stellmach** (DE), directorate advisor, EPO Munich
  - - Studied Organic Chemistry in Münster/Westf. and Freiburg/Brsg.
  - - German Patent Office 12/1982- 3/1986
  - - At the EPO since 4/1986 (Munich)
  - - BEST tutor from 9/1990 - 1/1994 (The Hague)
  - - BEST examiner since 2/1994 (Munich)



# Total European patent filings<sup>1</sup>



<sup>1</sup> Direct European filings under the EPC and International filings under the PCT

- **Some general Remarks on patentability; the difference between novelty and inventive step**
- **The different steps of the problem and solution approach - the text**
- **A graphical representation as visual supplement using the PSA during search and examination**
- **SAR/SRR and PSA as expert assessment of inventive step**
- **Examples from the Technical Boards of Appeal of the EPO**
- **Generalisation and further concrete Examples ( quantitative effects, evidence of inventive step, deviation, use claims )**

### Guidelines 2012 G-VI, 2

#### Implicit features or well-known equivalents

- A document takes away the **novelty** of any claimed subject-matter derivable **directly** and **unambiguously** from that document including any features implicit to a person skilled in the art in what is expressly mentioned in the document, e.g. a disclosure of the use of rubber in circumstances where clearly its elastic properties are used even if this is not explicitly stated takes away the **novelty** of the use of an elastic material. The limitation to subject-matter "derivable directly and unambiguously" from the document is important. Thus, when considering **novelty**, it is not correct to interpret the teaching of a document as embracing well-known equivalents which are not disclosed in the documents; this is a matter of **obviousness**.

## Guidelines 2012 G-VII, 1 General

- An invention is considered as involving an **inventive step** if, having regard to the state of the art, it is not **obvious** to a person skilled in the Art. **Novelty** (see G-IV, 5) and **inventive step** are different criteria. The question – "is there inventive step?" – only arises if the invention is novel.

## PCT-Guidelines III 13.04

### *Light of Later Knowledge*

13.04 In considering **inventive step**, as distinct from novelty (see paragraph 12.02 and the appendix to chapter 12), it is fair to construe any published document in the light of subsequent knowledge and to have regard to all the knowledge generally available to the person skilled in the art at the relevant date of the claim.

- **Novelty**: - construe the claim in order to determine its *technical* ( *structural, functional* ) **features**
- **Inventive step**: - investigating ( technical ) **effects** ( *activities, properties, functions* ) or ( technical ) problems underlying the application and the closest prior art and eventually
- construct a **logical chain** connecting the prior art and the claimed subject-matter
- **Novelty**: *direct* disclosure
- **Inventive Step**: *indirect* disclosure
- **PSA**: correlation/separation of technical features/effects

- **Some general Remarks on patentability; the difference between novelty and inventive step**
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- In accordance with the "problem-solution approach" ( **Rule 42 (1) c, Guidelines C-II, 4.5, 4.6 and C-IV, 11.7 EPC 2000; Guidelines 2012 F-II, 4.5, 4.6 and G-VII, 5** ), which is established jurisprudence of the Boards of Appeal, to assess **inventive step** on an **objective** basis it is in particular necessary to establish the **closest** state of the art forming the **starting** point, to determine in the light thereof the technical problem which the invention addresses and **successfully** solves, and to examine the obviousness of the claimed solution to this problem in view of the state of the art. This "problem-solution approach" ensures assessing inventive step on an **objective** basis and avoids an *ex post facto*. ( DG3 decision )

- **Problem-Solution-Approach**

- The problem-solution-approach comprises **three** steps
  - I identifying the nearest prior art
  - II formulating an objective technical problem to be solved when considering the nearest prior art
  - III deciding whether there is an inventive step

# The PROBLEM !

- actual technical problem in a field
- artificial problem created by the Applicant ( subjective problem )
- patent related technical problem
- since the problem is directly related to the closest prior art it is a **parameter** of the PSA (more/less ambitious/further/alternative)
- the problem has **not** to be **new** !

- **Some general Remarks on patentability; the difference between novelty and inventive step**
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## Graphical representation of novelty (rendering structural/technical features)

closest prior art (similar  
purpose, most technical  
features in common)

Replacement



claimed subject-matter



**F1, F2** (red) : distinguishing structural/technical features; (green) triangles **A**:  
activity, effect, property, function, (blue) rectangles: common technical features

# Graphical representation of novelty (rendering structural/technical features)

closest prior art (similar purpose, most technical features in common)

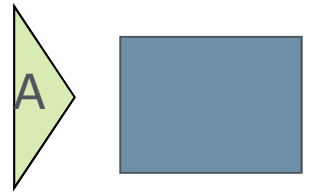
Replacement



claimed subject-matter



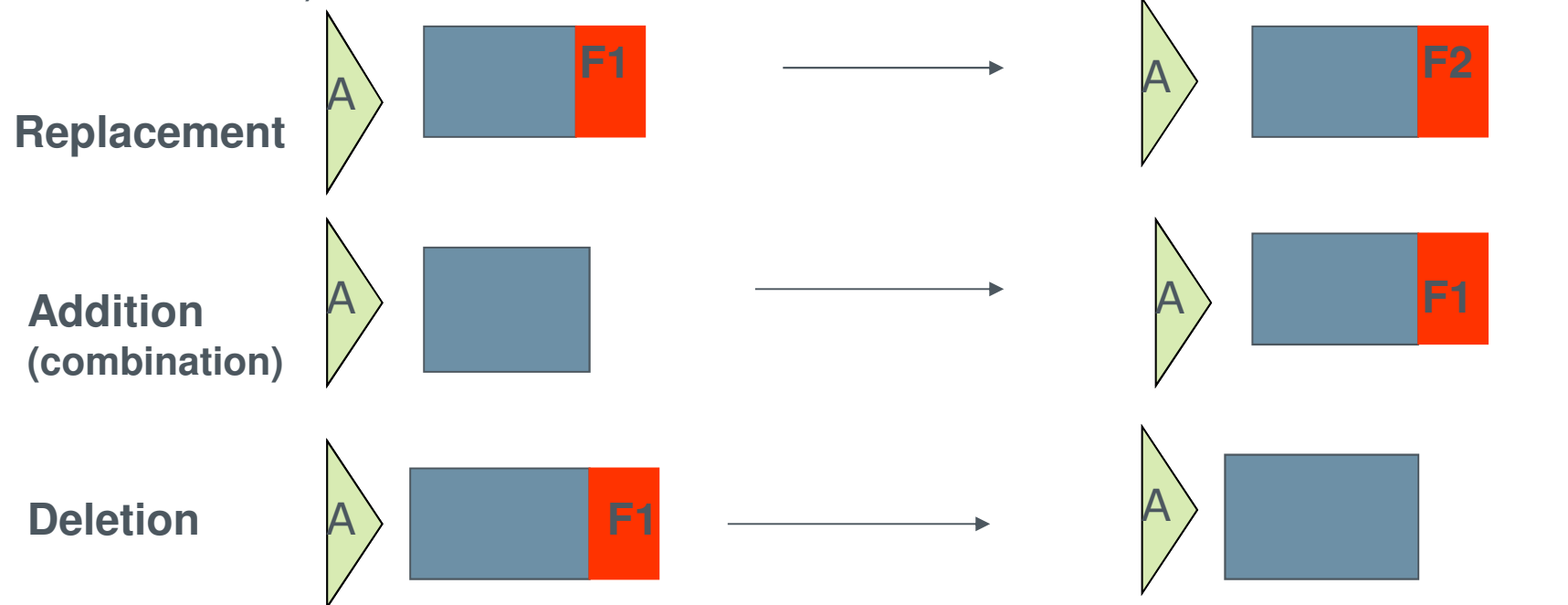
Addition  
(combination)



**F1, F2** (red) : distinguishing structural/technical features; (green) triangles **A**: activity, effect, property, function, (blue) rectangles: common technical features

## Graphical representation of novelty (rendering structural/technical features)

closest prior art (similar  
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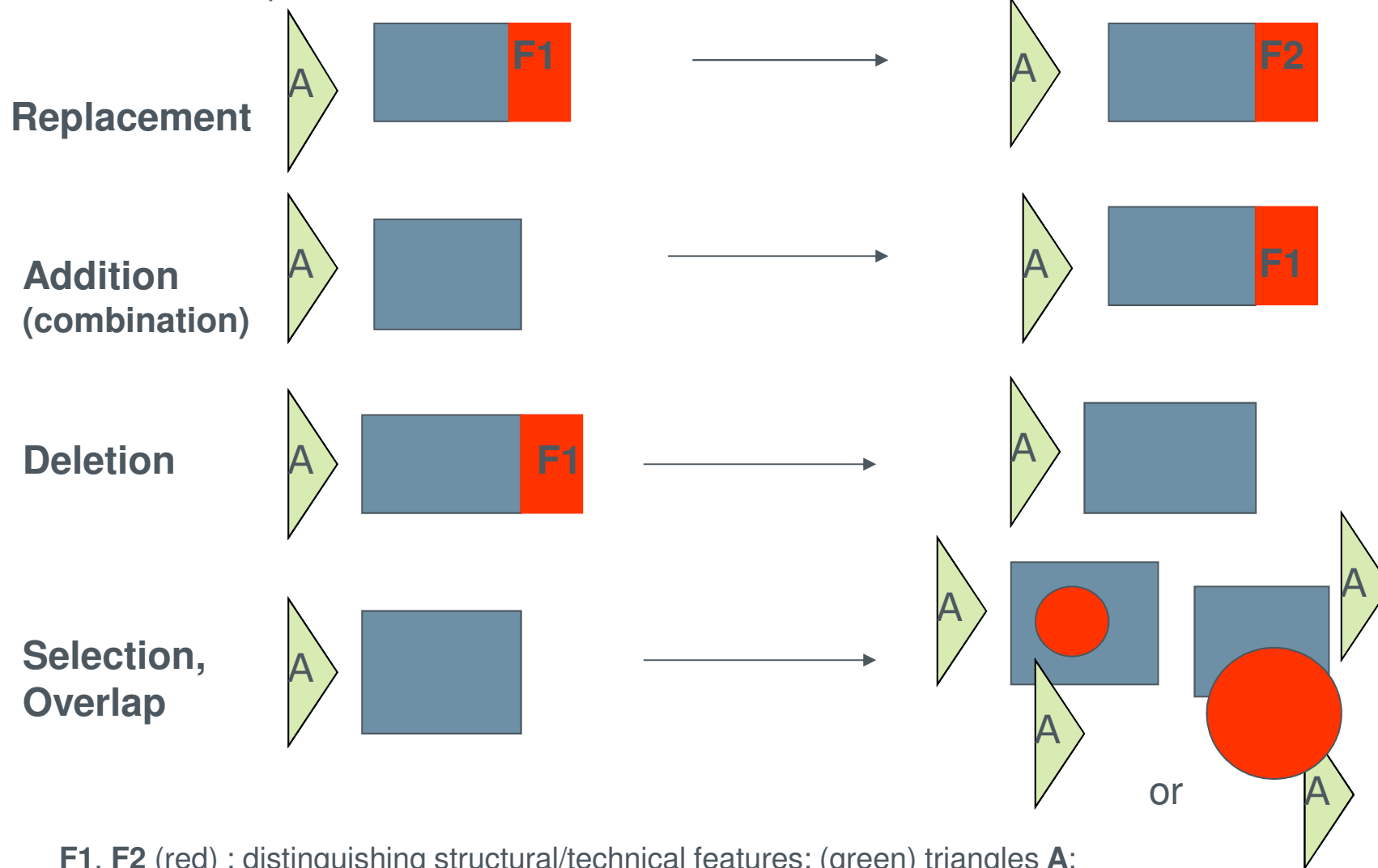


**F1, F2** (red) : distinguishing structural/technical features; (green) triangles **A**: activity, effect, property, function, (blue) rectangles: common technical features

# Graphical representation of novelty (rendering structural/technical features)

closest prior art (similar purpose, most technical features in common)

claimed subject-matter

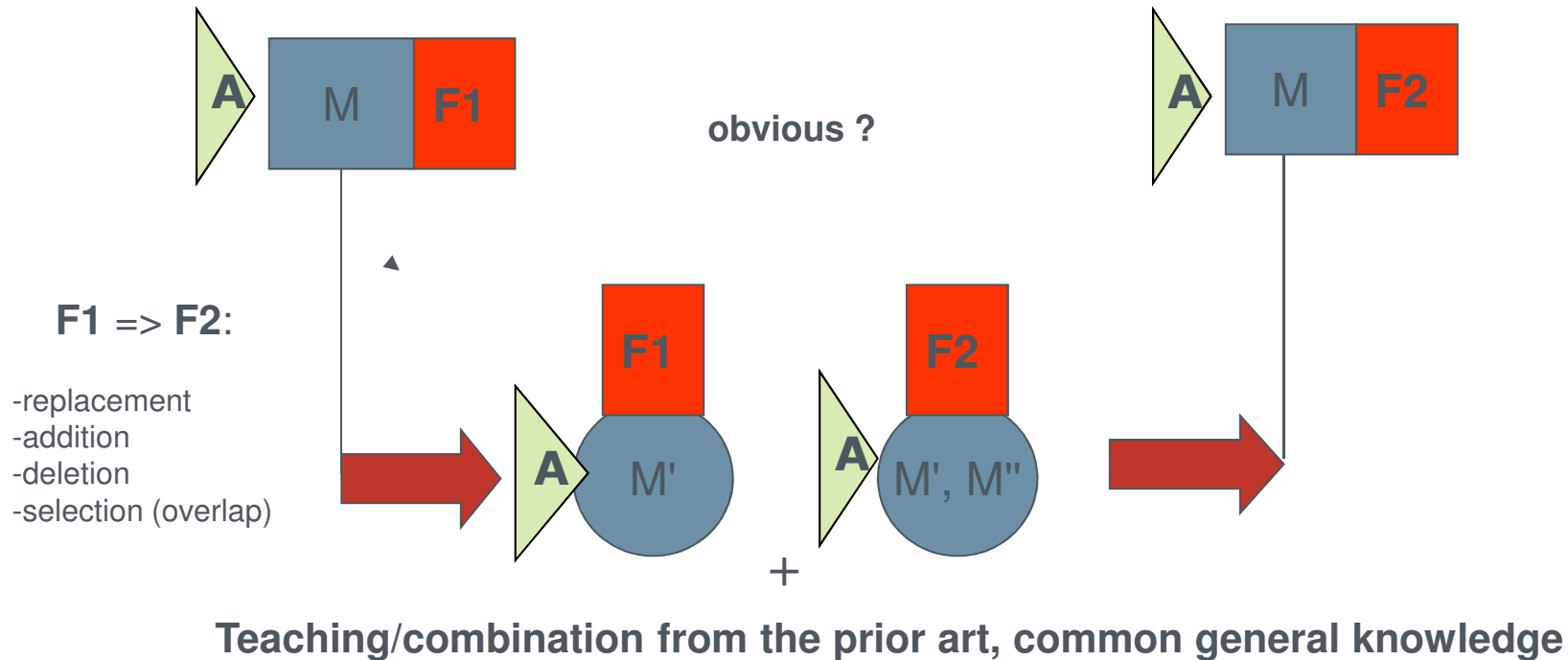


F1, F2 (red) : distinguishing structural/technical features; (green) triangles **A**: activity, effect, property, function, (blue) rectangles: common technical features

# Most general abstraction of the PSA using novelty rendering features

closest prior art (similar purpose, effect, use, property; most technical features in common)

claimed subject-matter



**F1, F2:** characterizing portion; distinguishing technical features; **A:** activity, effect, property, function;  
**M, M', M'':** equivalents, analogues, synonyms (in the same or similar technical field); prior art features



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prior art

**Patents**

**Research  
Laboratory**

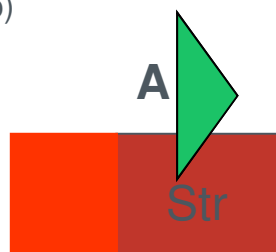
**new** subject-matter

Reviews  
 structure-property-relationships  
 structure-function-relationships  
 structure-odour-relationships  
 structure-toxicity-relationships

Str, Str'

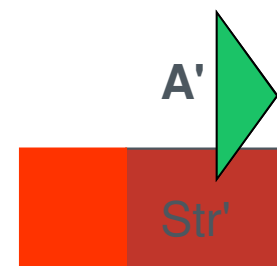
-replacement  
 -addition  
 -deletion  
 -selection (overlap)

known  
structure



**SAR**

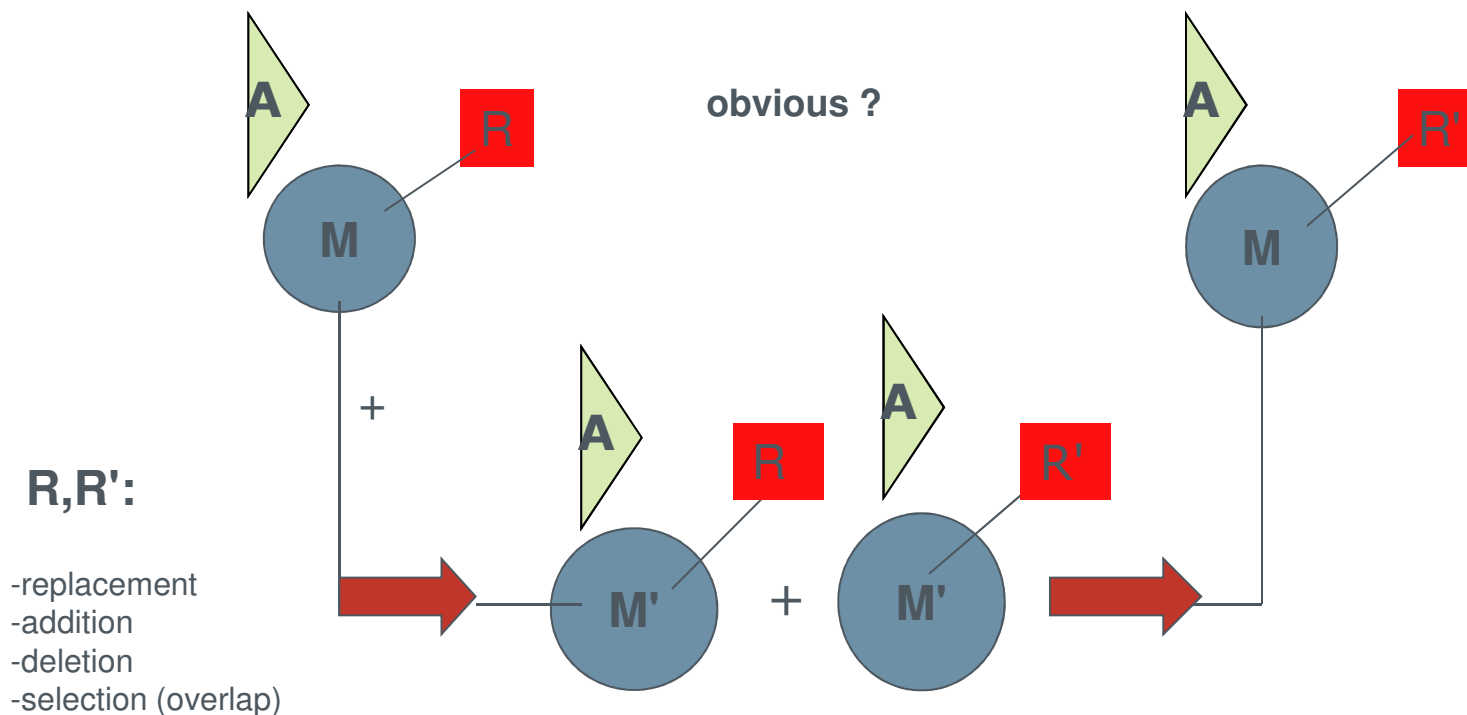
new  
structure



**Str,Str'**: chemical basic structures; green **A,A'**: activity, property; effect; function;  
 Definition: SAR: if  $Str \sim Str' \Rightarrow$  then  $A \sim A'$ , red: **novelty** (by: replacement, addition,  
 deletion, selection)

closest prior art (similar purpose, effect, use, property; most technical features in common)

claimed subject-matter



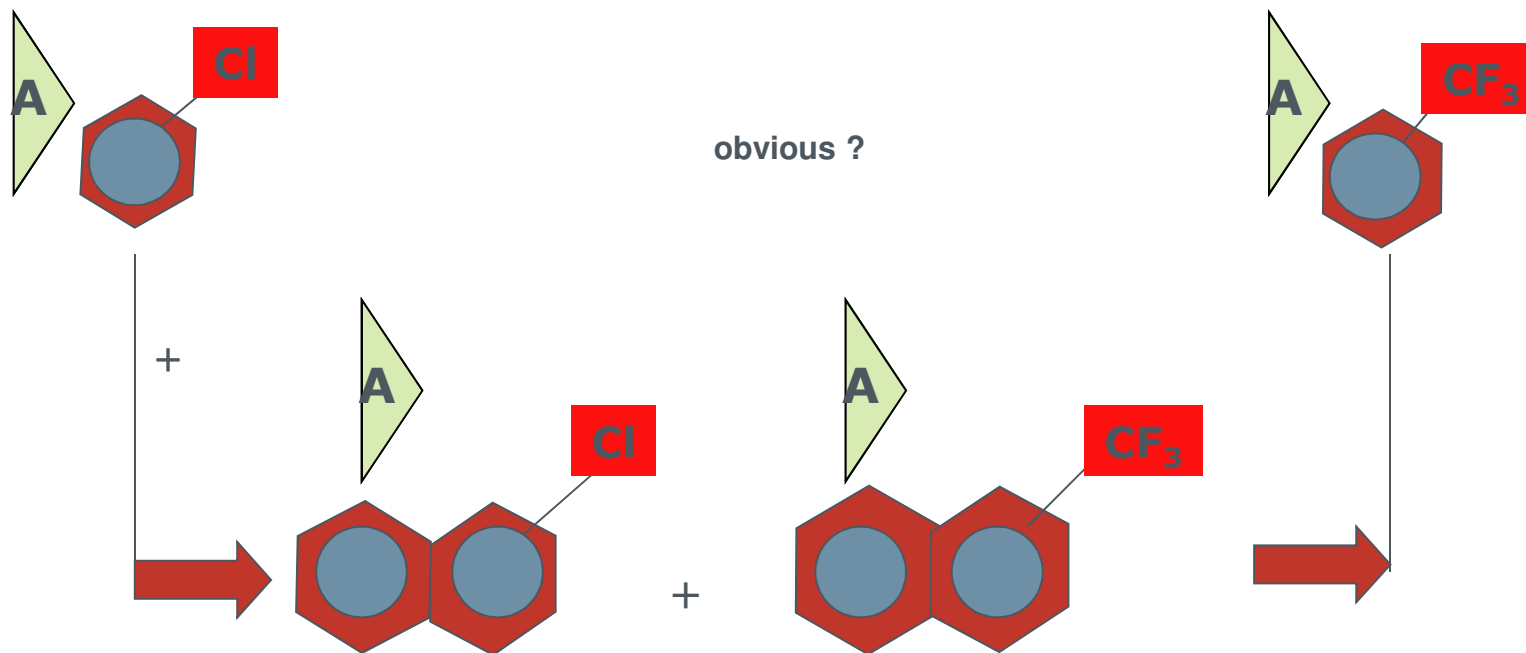
Teaching/combination from the prior art, common general knowledge; reaction mechanism; pharmacophor(ic group); known lead compound

R, R': common substituents; M, M': (analogous) families of compounds; A: activity, property; novelty  
 R => R' ( distinguishing features )

## Simple concrete example of the analogisation of substituents of a basic skeleton

closest prior art (similar purpose, effect, use, property; most technical features in common)

claimed subject-matter



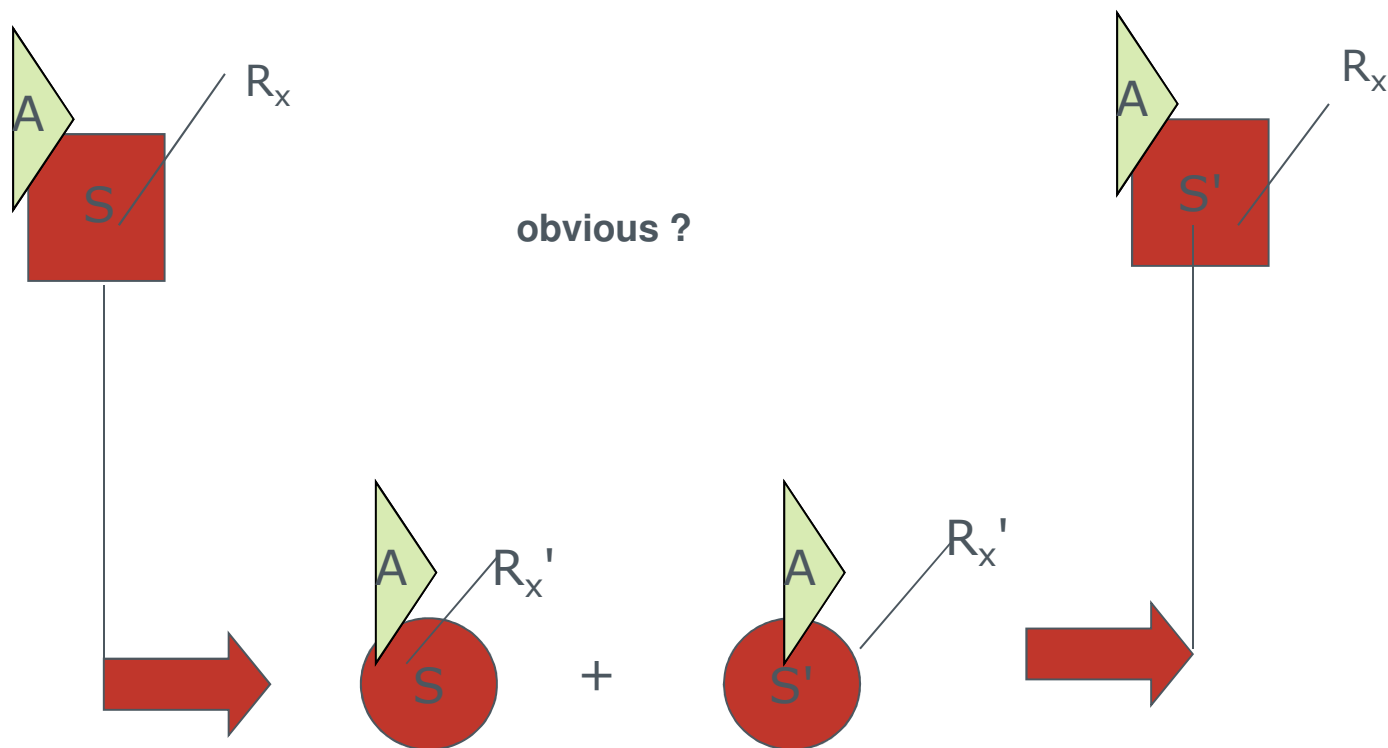
Teaching/combination from the prior art, common general knowledge (SAR)

A: (biological) activity, property; substituents Cl, CF<sub>3</sub>; similar basic skeletons: phenyl, naphthyl; novelty : Cl => CF<sub>3</sub>

## Analogueisation of the Basic Skeleton

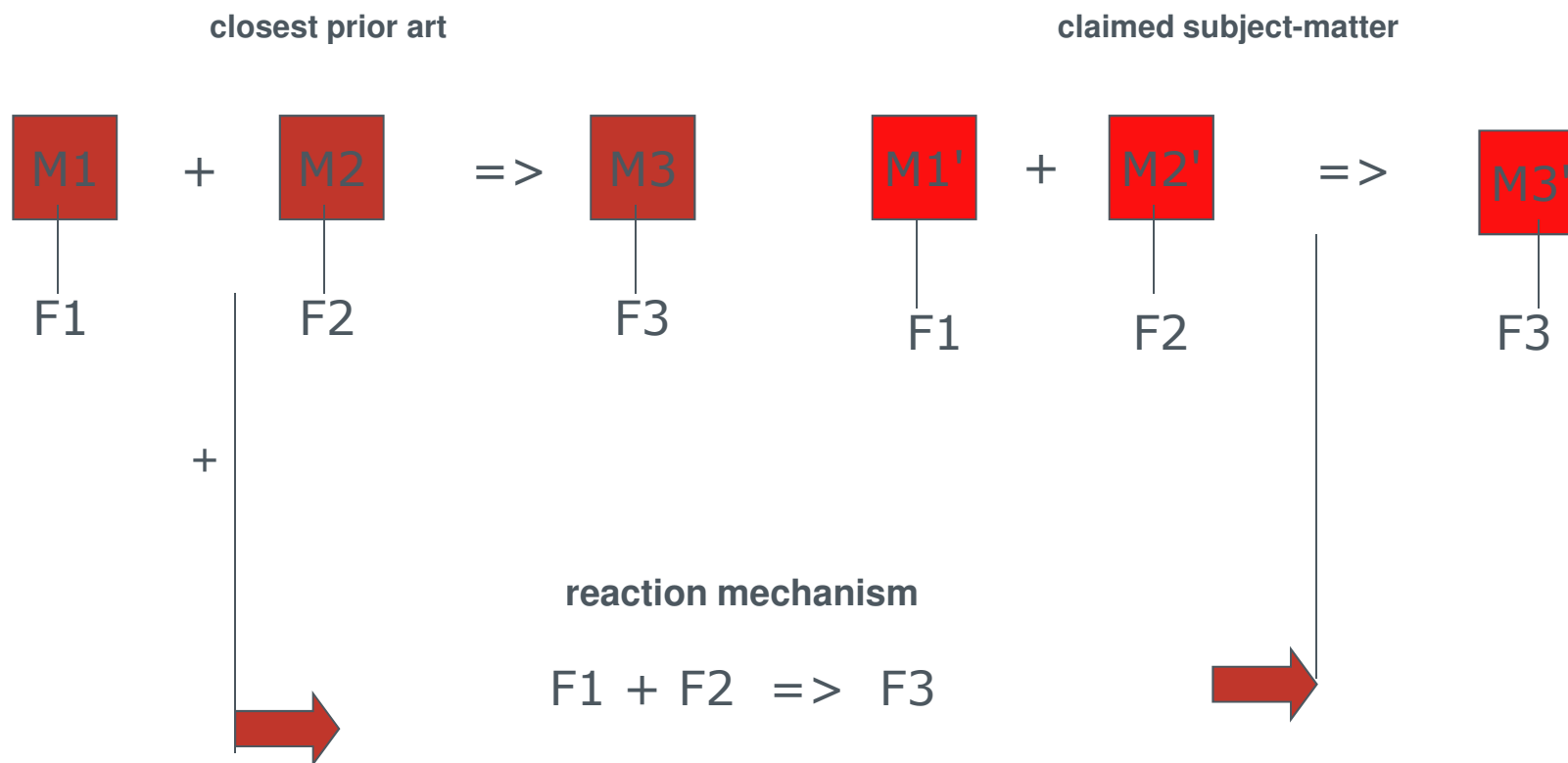
closest prior art (similar purpose, effect, use, property; most technical features in common)

claimed subject-matter



### Teaching/combination from the prior art

**R<sub>x</sub>, R<sub>x</sub>'** :Substituent pattern; **S, S'**: (analogous) families of compounds, **A**: activity, property; novelty **S** => **S'** (e.g. bioisosterism)

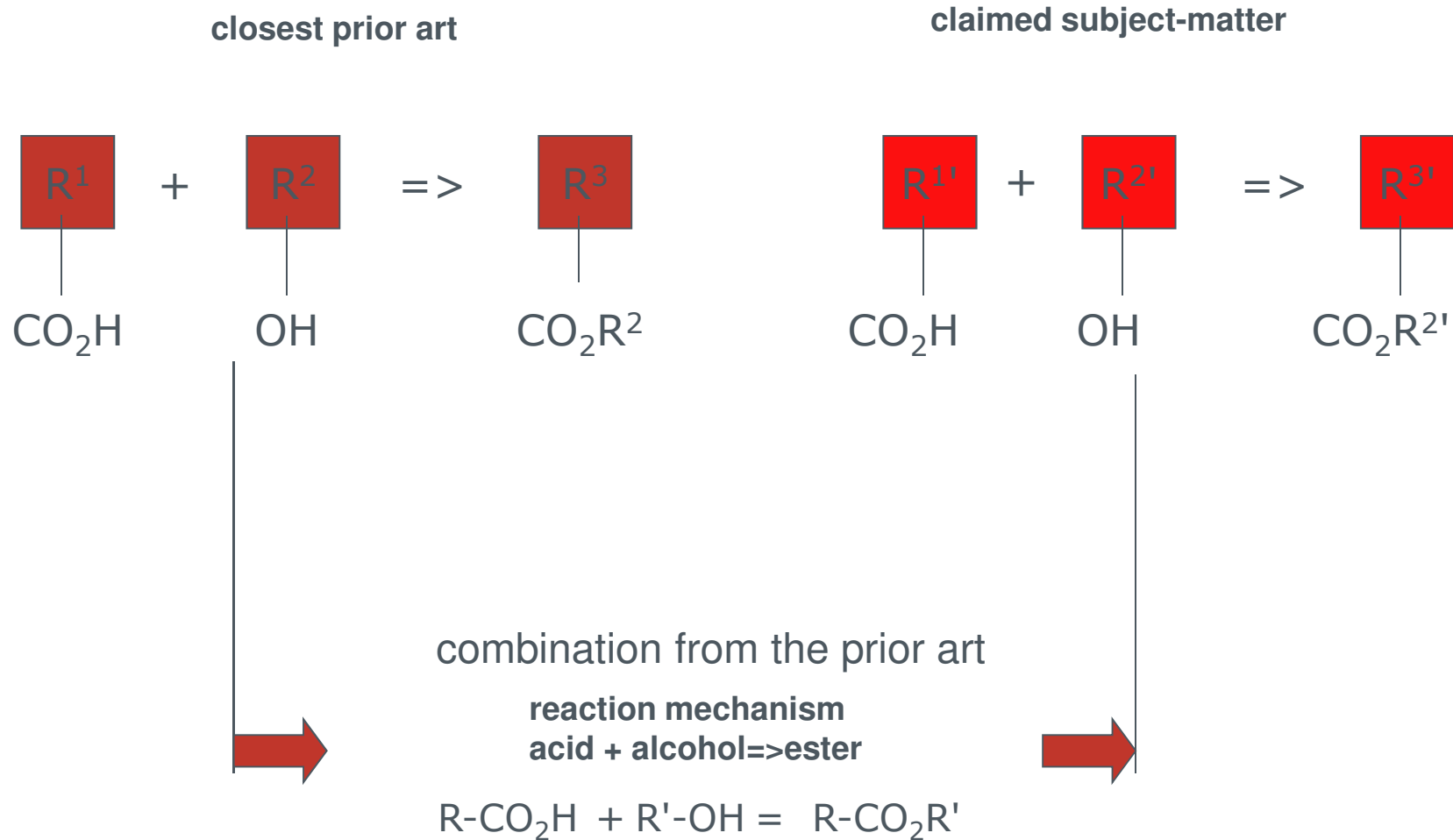


combination from the prior art, common general knowledge

**F1,F2,F3**: functional groups; **M1,M2,M3**:molecular basic skeletons; novelty:  $M \Rightarrow M'$

## Example of a structure-reactivity-relationship

### Reaction of (carboxylic) *acid* with *alcohol* yielding *ester*



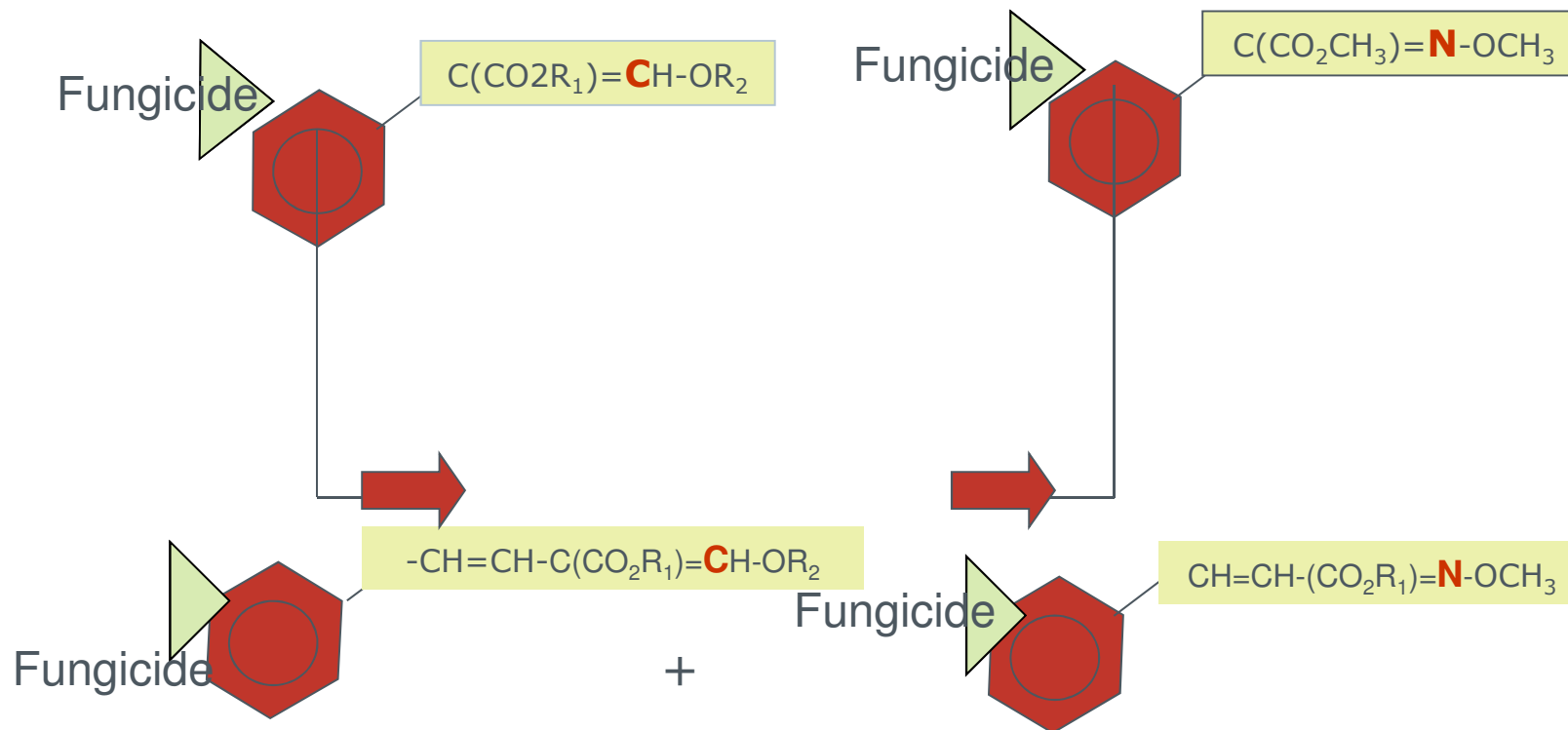
Simple example for the reaction of functional groups

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closest prior art (similar purpose, effect, use, property; most technical features in common)

claimed subject-matter



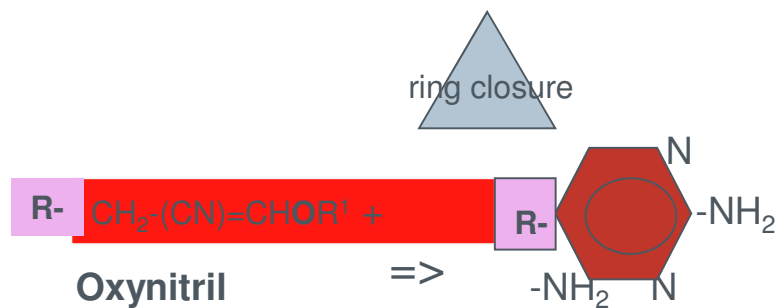
Teaching/combination from the prior art, common general knowledge

Strobilurin Analogues, (Aza-)Bioisosterism C => N, Fungicides

## Applying PSA to reactions of functional groups

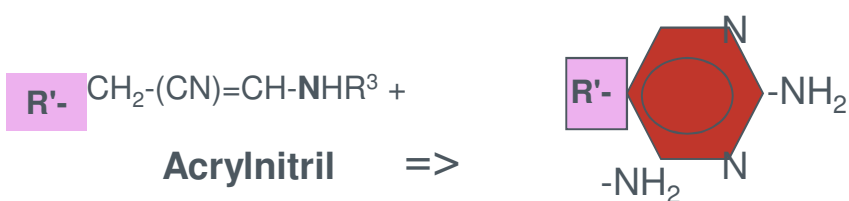
closest prior art (similar purpose, most technical features in common)

DE-A-2313261



Guanidin

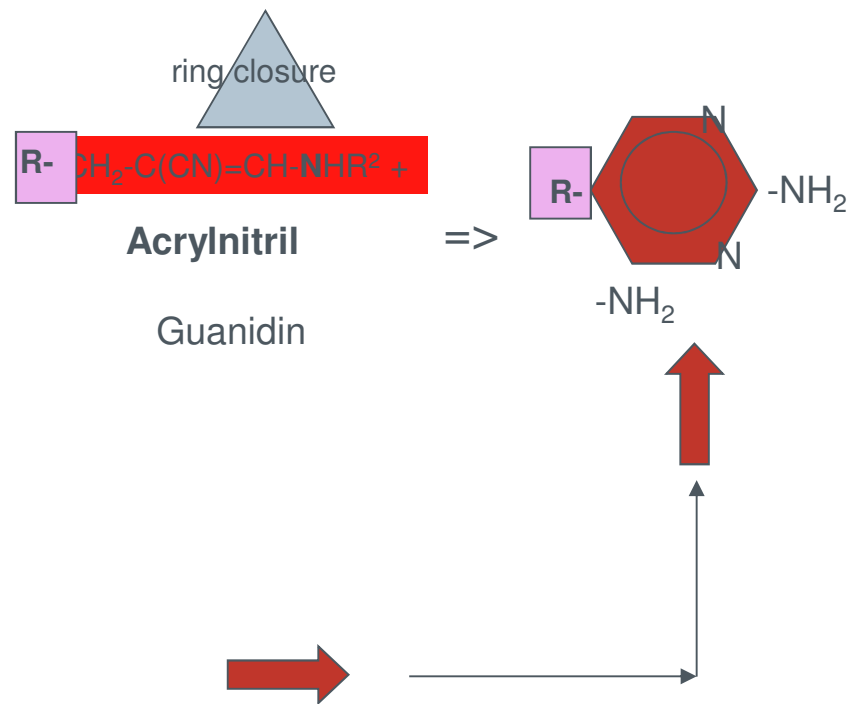
DE-A-2010166



Guanidin

claimed subject-matter

EP-A-0 065705



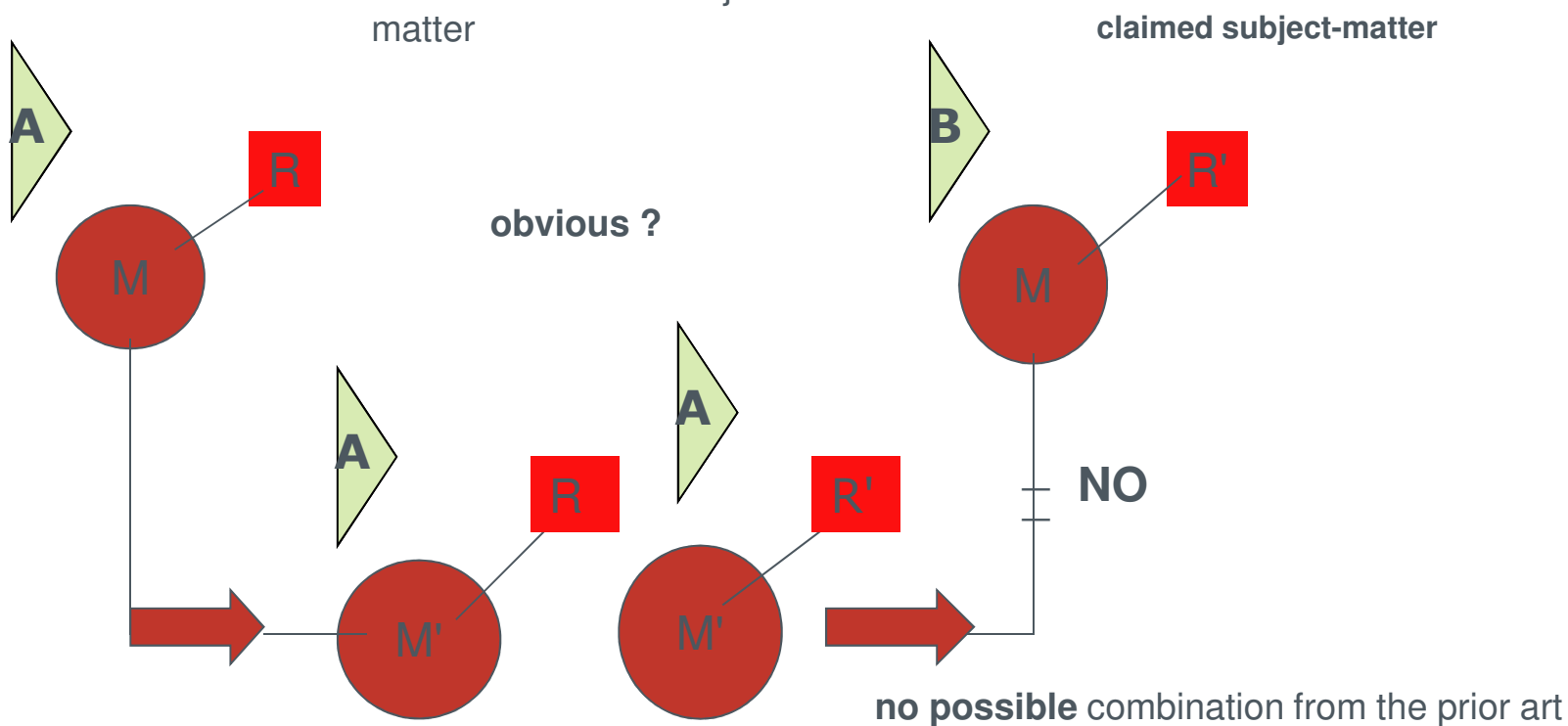
**Novelty** : -N=  $\Rightarrow$  -O- ; R  $\Rightarrow$  R'; analogisation -OCH<sub>3</sub>  $\Rightarrow$  -O-(CH<sub>2</sub>)<sub>2</sub>-CH<sub>3</sub>

- **Some general Remarks on patentability; the difference between novelty and inventive step**
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## Acknowledgement of inventive step

closest prior art  
(similar purpose,  
effect, use, pro-  
perty; most tech-  
nical features in  
common)

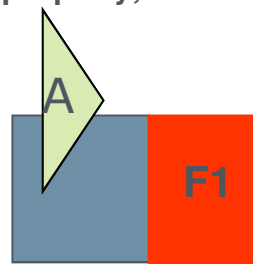
**problem:**  
inventive provision of a  
further/alternative subject-  
matter



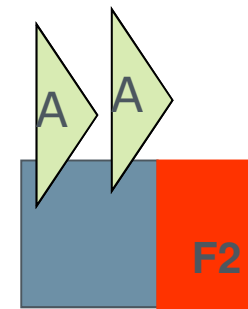
**Novelty**  $R \Rightarrow R'$   $R, R'$ : Substituents;  $M, M'$ : (analogous) families of compounds;  
**A not B**: different activity;

## Quantitative effects, beneficial/advantageous effects

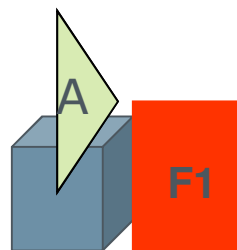
closest prior art (similar purpose, effect, use, property; most technical features in common)



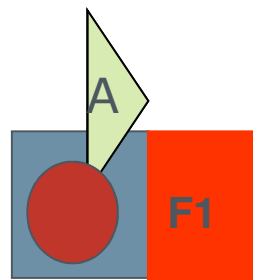
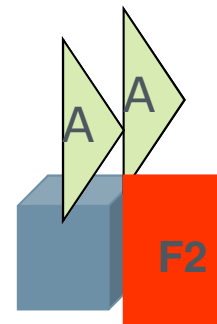
claimed subject-matter



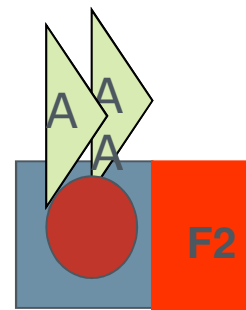
obvious ?



+



+



**F1 => F2:**

- replacement
- addition
- deletion
- selection(overlap)

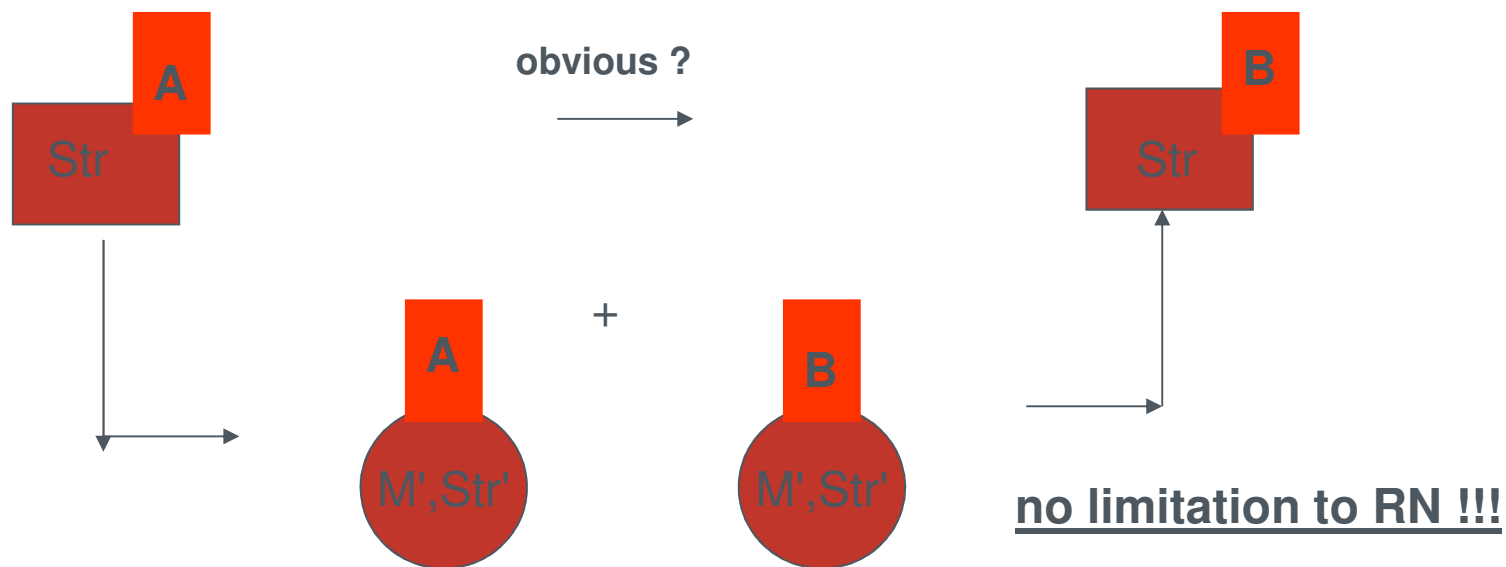
Teaching/combination from the prior art

**F1, F2:** Novelty, distinguishing technical features; green triangles **A => AA:** (improved) activity, effect, here: double activity; blue: similar prior art;

## Use claims, second (non-) medical indication

closest prior art (similar purpose, most technical features in common)

claimed subject-matter

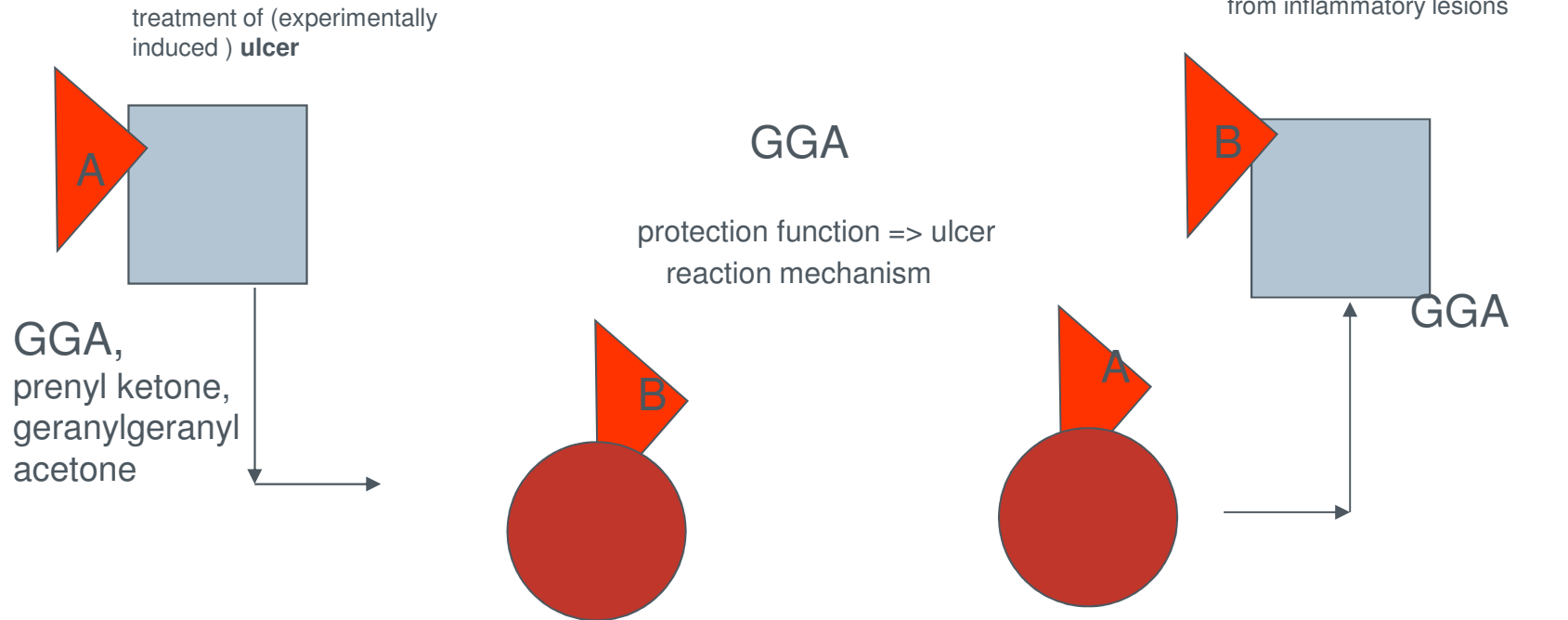


Teaching/combination from the prior art, common mechanism

**Novelty**= replacement of use/activity  $A \Rightarrow B$ ;  $M'$ ,  $Str$ ,  $Str'$  : families of compounds, e.g. Isosteres, Analogues

closest prior art ( most similar use,  
 most common technical features ),  
 Drug Des. 31, 799 (1981)

claimed subject-matter  
 (EP-A-0 207 505)



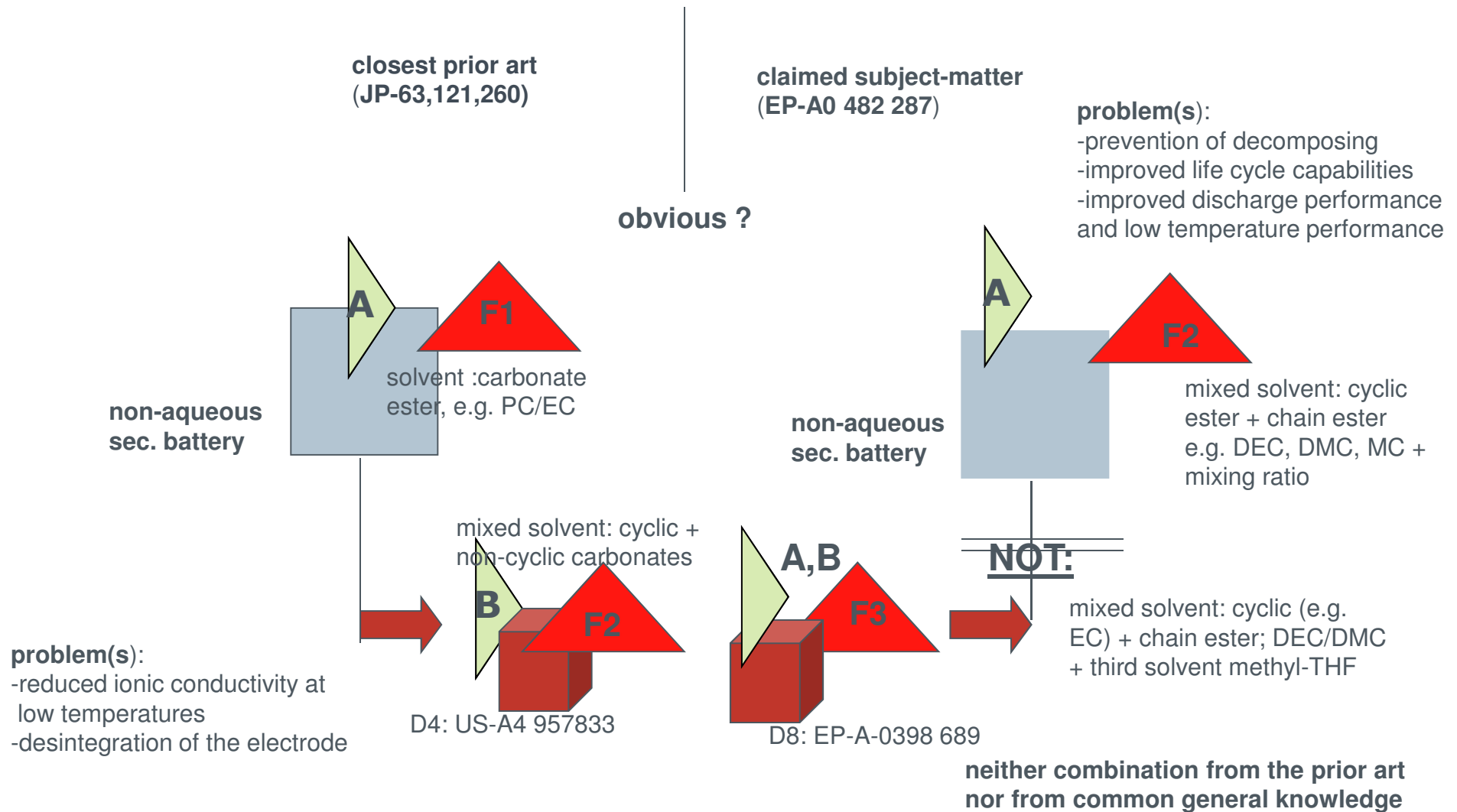
anti-ulcer mechanism due to maintaining the integrity of the mucosal barrier and prophylactic and curative treatment of ulcer

textbook: same drugs can generate/predispose => gastritis and formation of ulcer

**Novelty:** Different diseases, **A=> B**,

**Inventive step:** prior art: common aspects in relation to the causative factors, same origin

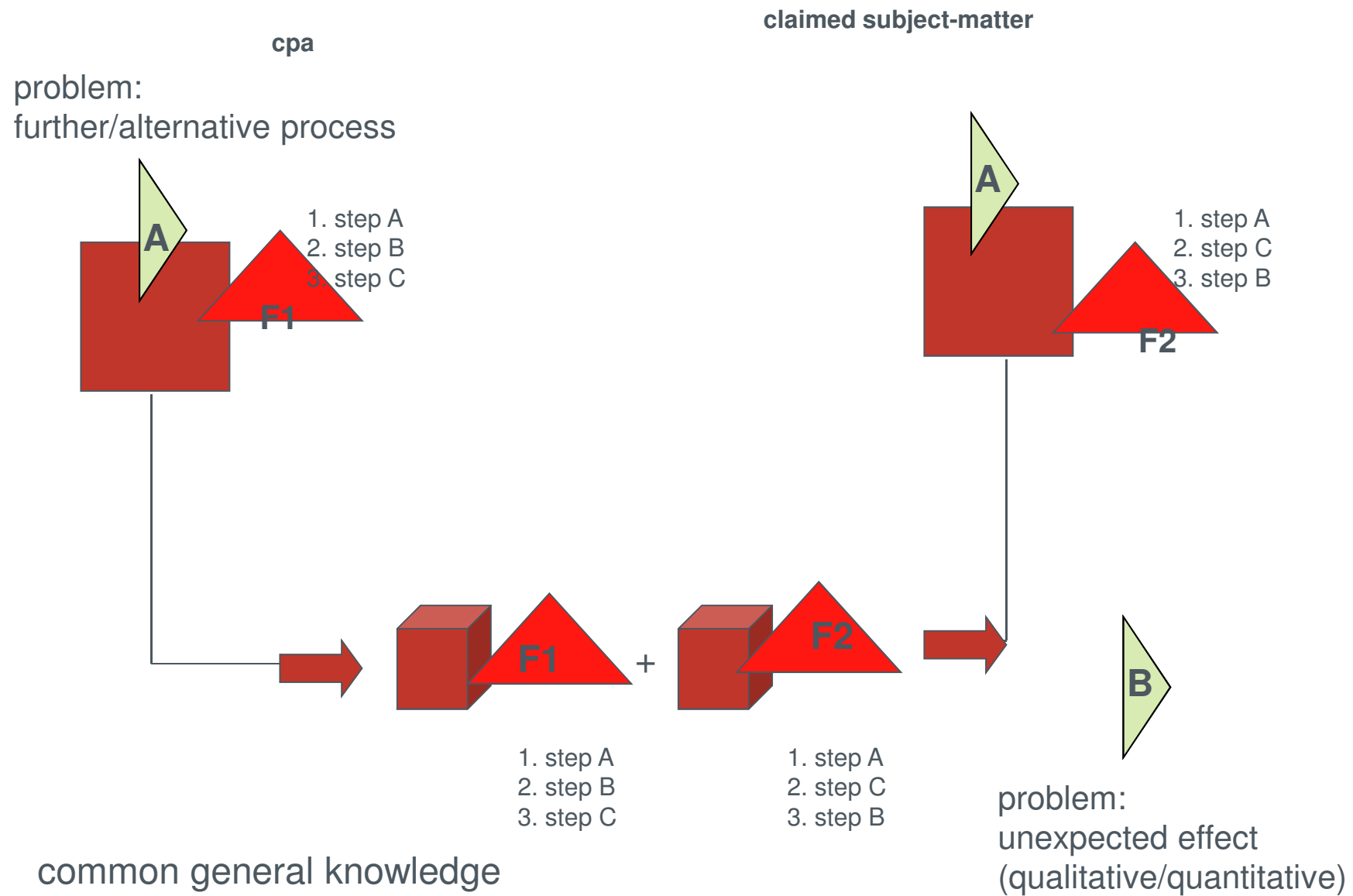
# Graphical Decision T 678/02



A,B: no equivalents; A: anode: carbon; cathode: LiCo<sub>2</sub>; B: anode: Li (alloy); cathode: org. polymer; different electrode systems/ different, electrochemical processes of the different electrode systems, though similar effects => different problems



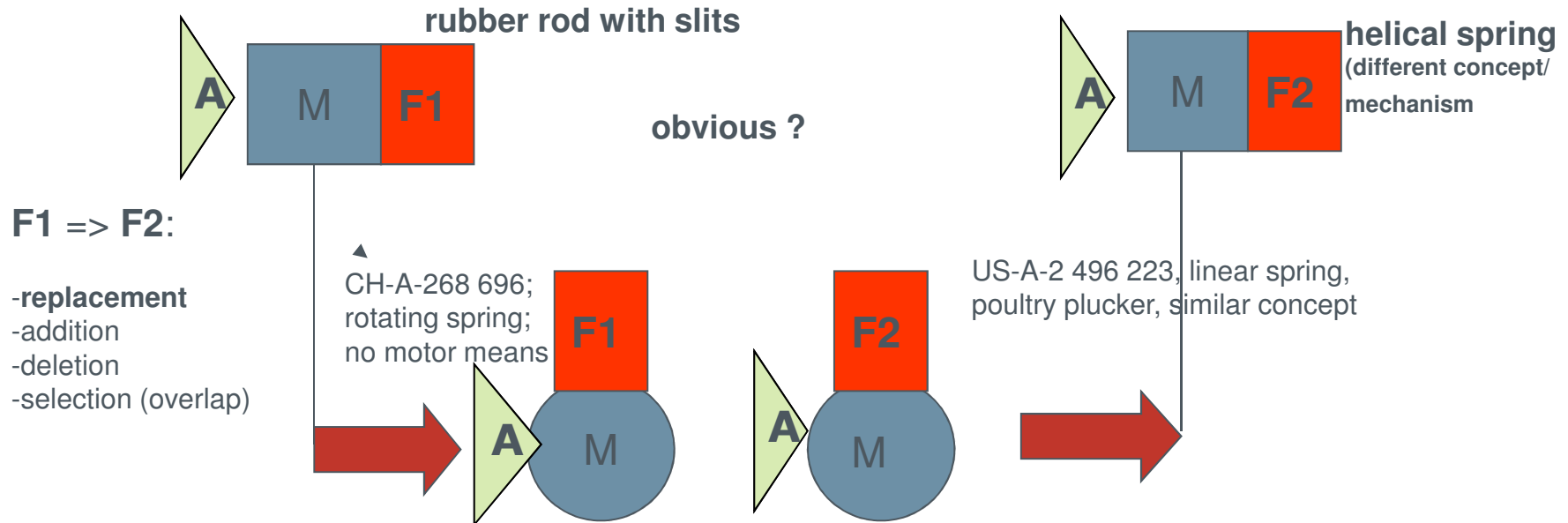
# ( Non-chemical ) Process claims and PSA



# Graphical Decision T 754/89 ( Epilady #1 problem)

**US-A-4 079 741**: closest prior art (similar purpose, most technical features in common)  
 linear spring, feminine cosmetics hair plucking device, similar concept

**EP-A-0 101 656** claimed subject-matter: Apparatus for hair removal



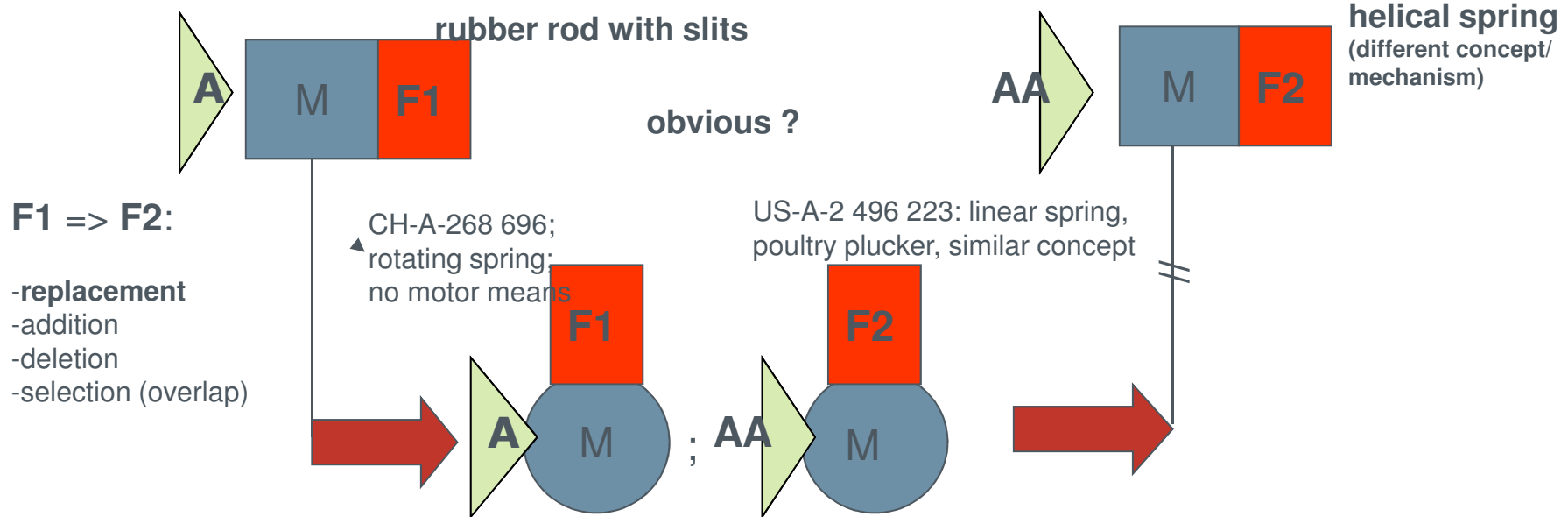
## Teaching/combination from the prior art, common general knowledge

**F1, F2**: characterizing portion; distinguishing technical features; **A**: ( qualitative/quantitative ) activity, effect, property, function; **M** : preamble; prior art features in the same or similar technical field;

# Graphical Decision T 754/89 ( Epilady # 2 problem)

**US-A-4 079 741**: closest prior art (similar purpose, most technical features in common)

**EP-A-0 101 656** claimed subject-matter: Apparatus for hair removal



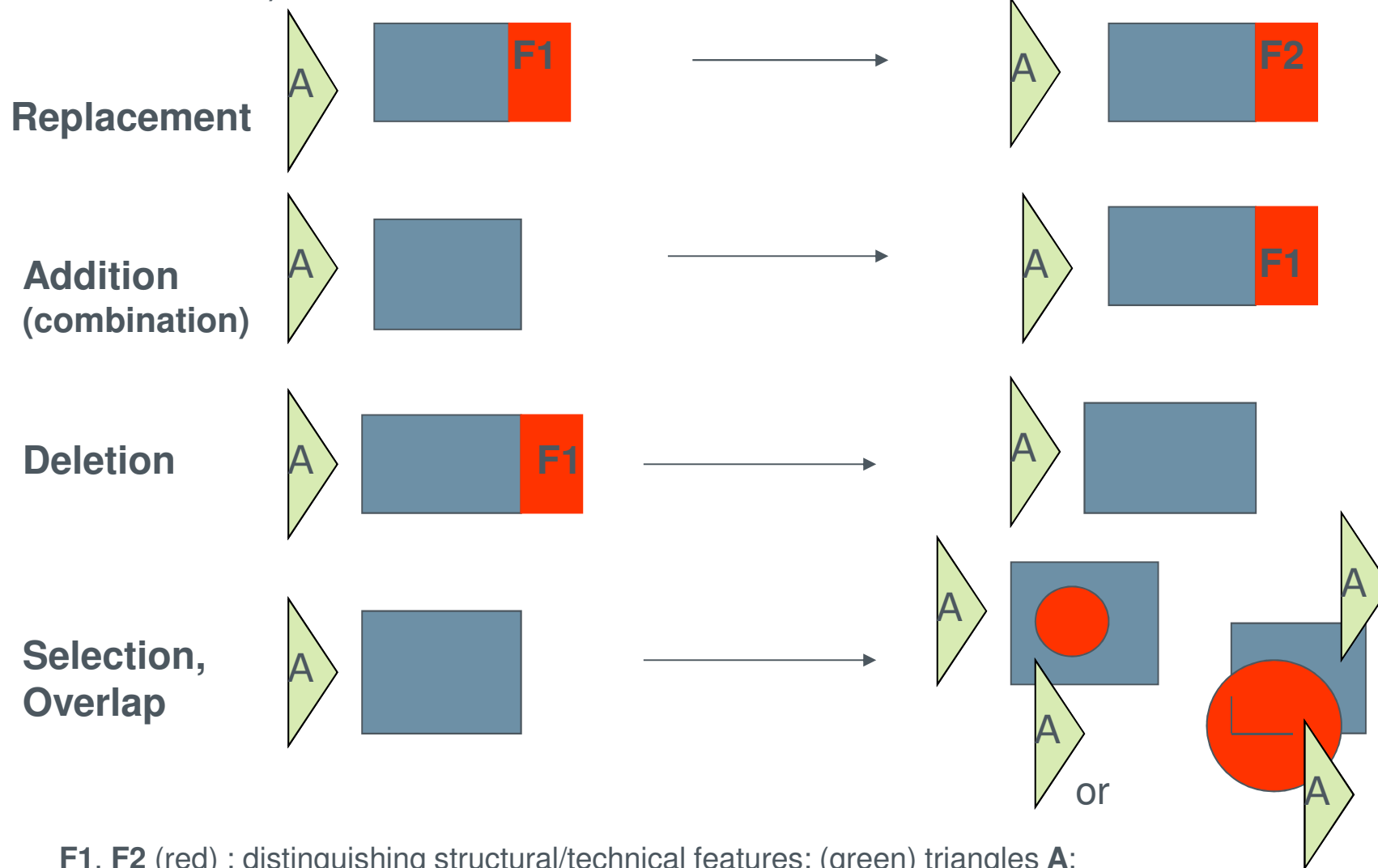
## Teaching/combination from the prior art

**F1, F2**: characterizing portion; distinguishing technical features; **A**: ( qualitative/quantitative ) activity, effect, property, function; **M** : preamble; prior art features in the same or similar technical field;

# Graphical representation of novelty (rendering structural/technical features)

closest prior art (similar purpose, most technical features in common)

claimed subject-matter



F1, F2 (red) : distinguishing structural/technical features; (green) triangles **A**: activity, effect, property, function, (blue) rectangles: common technical features

## Some consequences to keep in mind or what did we learn ?

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- **Novelty:** - *direct* disclosure, technical **features**
- **Inventive step:** - *indirect* disclosure, equivalents/analogues/modifications; technical **effects/activities/properties/functions**
  
- correlation/separation of (technical) **features** ( novelty ) $\Leftrightarrow$  (technical) **effects** ( inventive step )
- technical problem is a **parameter** of the PSA ( e.g. more/less) ambitious, further/ alternative )
- **PSA: mandatory** for search and examination => limitation of the number of documents
- PSA opens a **dialogue** with the Applicant inviting him to take position ( parameter: problem )
- being too **generous** for inventive step will lead to an increase in the **number** of trivial patents
- granting too minor developments ( **trivial patents** ) might lead to a lack of credibility of the patent system

A **graphical** representation of the PSA allows

- **standardisation** (independent from any personal knowledge)
- reproducible, expert, quick, reliable assessment
- being **abstract** the visual formalism allows a nearly **objective and expert** assessment of inventive step ( in chemistry (SAR/LFER is PSA )
- graphical verification/representation as **visual** supplement of the text
- generalisation of structural/functional => technical features => general application in all fields meeting the graphical novelty approach
- quick visual check for identification of a trivial patent possible

## Publications:

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- J. Stellmach, CIPA Journal **38** (10), 674 (2009)
- J. Stellmach, World Patent Information **31**, 4 (2009)
- J. Stellmach, Prop. Ind. **8**, 21 (2009)
- J. Stellmach, Mitt. **98**, 542 (2007)
  
- SAR: J. Stellmach, World Patent Information **31**, 226 (2009)
- J. Stellmach, Prop. Ind. **4**, 26 (2006)
- J. Stellmach, GRUR Int. **54**, 665 (2005)
  
- SRR/LFER: J. Stellmach, World Patent Information **33**, 11 (2011)
- J. Stellmach, Mitt. **98**, 5 (2007)

**Thank you for your attention !**

- Questions ????