Understanding patent claims

(b) Heating element for a washing machine
The invention

A heating element for a washing machine which is cheap and compact and helps to reduce water consumption.

The heating element is a foil heating element at the bottom of the tub of a washing machine.
The invention

A heating element for a washing machine which is cheap and compact and helps to reduce water consumption.

How can you protect it from imitation?

• "cheap", "helps to reduce ..."
  → too vague and subjective

• "compact"
  = technical function → patent
How to patent this invention: claim it!

Patent Claim:
"A heating element for a washing machine which is compact ... "

No, this is stating the technical problem. Problems cannot be patented – only specific solutions.

What are the technical features that solve the problem and make the heating element compact?

Patent Claim: "A washing machine with a heating element for heating water inside the tub of the washing machine wherein the heating element is arranged in and adapted in its shape to the bottom of the tub."

You don’t want anyone circumventing the patent by heating something other than water or by arranging the heating element at a different point not exactly at the bottom of the tub.
How to patent this invention: claim it!

Patent claim: "A washing machine with a heating element for heating a medium inside the tub of the washing machine, wherein the heating element is arranged in and adapted in its shape to the tub."

A prior art search will show whether the invention – as claimed – is actually new.
Result of the prior art search

The prior art search found a document that shows a similar heating element for a washing machine.

"... curved plate of electrically insulating material with electrically conductive material applied to at least one surface thereof ..."
Comparison of the two inventions

The invention as claimed

"A washing machine with a heating element for heating a medium inside the tub of the washing machine wherein the heating element is arranged in and adapted in its shape to the tub."

"… a foil heating element … which is fitted to and adapted in its shape to the tub ..."

EP 0 352 499 A2

"The heating device ... is mounted in correspondence with the bottom wall ... of the vessel, and expediently spaced therefrom."

- New ("foil heating element" and "fitted to the tub" are not disclosed in EP...)
- Inventive step (technical effect: lower water level in the tub is possible)
Claim to protect the invention

Claim to be filed:

"A washing machine with a foil heating element for heating a medium inside the tub of the washing machine, wherein the heating element is fitted to and adapted in its shape to the tub."
Use of dependent claims to improve protection

An independent (broader) claim helps prevent the patent from being circumvented.

Dependent (more specific) claims are tailored to fit exactly to potential infringing products.

Main claim

Specific claim A

Specific claim B
Claim 1:
A washing machine with a foil heating element for heating a medium inside the tub of the washing machine, wherein the heating element is fitted to and adapted in its shape to the tub.

Claim 2: The washing machine of claim 1, characterised in that the foil heating element is glued to the inside of the tub.

Claim 3: The washing machine of claim 1, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof.

The EPO will perform its own prior art search and then consider whether the invention AS CLAIMED is new and non-obvious.
Additional prior art found by the EPO

"Heating device for a household appliance"

DE 100 25 539 A1:
"Heating device ... comprising a foil heating element (1) ... adapted and attached to a tub (7) of a washing machine ..."
The opinion of the EPO

Applicant's claim:

"A washing machine with a foil heating element for heating a medium inside the tub of the washing machine, wherein the heating element is fitted to and adapted in its shape to the tub."

This is already shown in DE 100 25 539 A1

EPO response:
Please amend your claims if you want your invention protected!
Further analysis

Did the EPO overlook any important features of the invention?

Applicant's reply:
Amendments to the application, explanation of the relationship between the invention and the prior art

How can the claims be amended to reflect the invention in such a way that it is new (considering all the prior art)?
## Comparison of the invention with the prior art

<table>
<thead>
<tr>
<th>Technical features of the invention</th>
<th>EP 0 352 499 A2</th>
<th>DE 100 25 539 A1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapted in its shape to the tub</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Foil heating element</td>
<td>No</td>
<td>✓</td>
</tr>
<tr>
<td>Glued to outside of tub</td>
<td>No</td>
<td>✓</td>
</tr>
<tr>
<td>During injection moulding</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

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<tr>
<th>Advantages/technical result</th>
<th></th>
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<tbody>
<tr>
<td>Compact + excellent heat transfer + easy assembly with fewer parts</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Result of the analysis

It is known in the prior art to fit and adapt a foil heating element to the bottom of the tub of a washing machine.

However, the present invention suggests that the foil heating element can be formed in the tub during the injection moulding of the tub.

This particular way of fitting the foil heating element to the tub is not known and produces new, unique benefits.

There is no hint in the prior art to take a foil heating element and to form it in a tub during injection moulding of the tub.

→ The inventive step requirement is fulfilled!

The claim must be changed to distinguish it from DE 100 25 539 A1.
"A washing machine with a foil heating element for heating a medium inside the tub of the washing machine, wherein the heating element is fitted to and adapted in its shape to the tub, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof."
The original description filed with the EPO supports the amendments to the claims

The **object of the invention** is to provide an electrical heating device for a domestic appliance ... cheap ... easy to assemble ... requires less space ... offers the possibility of reducing energy and water consumption.

... the foil heating element allows a very compact arrangement ... at the same time ... an optimal heat transfer ... 

... the foil heating element is integrated during the production of the tub, for instance during the injection moulding ... requires only a few production steps; it does not require complex tools, either ... 

Claim 3: The washing machine of claim 1, characterised in that the foil heating element is an integral constituent of the tub and has been formed in the tub during injection moulding thereof.
The patent is finally granted

Response from EPO: granted!

EUROPIESCHE PATENTSCHRIFT

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Elektrisch beheizbares Haushaltgerät
Electrically hestable household appliance
Appareil ménager chauffé électriquement

Benannte Vertragspacht:
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- EP A- 0 362 490
- DE A- 19 925 987
- US A- 5 444 226
- DE A- 10 025 539
- DE U- 1823 414

Sub-module C
Understanding patent claims - (b) Heating element for a washing machine