"Peering thru the Fog"; a personal review of some patent issues related to SAP

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Why Ian on IP?

Why not discuss supply?

At INDEX14 in Geneva a major SAP producer, when asked by potential customers for details of a much trumpeted new improvement said “why not look at the patent literature?”

Why this approach can be misleading as well as helpful…with a historic review of some patents and their application to SAP & diaper production.

Consider

1. SAP patents
2. Milestone patents
3. What big improvement?

- **SAP is heavily patented**
  - **Process**
  - **Product**
  - **Application**

Who should own what IP?

SAP Producer	Diaper Maker
SAP production process	
SAP properties	***SAP properties***
	Diaper design

This assumes that in a collaboration, the majority of SAP property & process development is done by the SAP producer and vice versa for hygiene articles

Quick overview

Process
Product
Application

1) PROCESS

Reactor type
Reaction conditions
Surface treating
Addition of additives
Reduction of residual monomer

2) PRODUCT PROPERTIES

PSD = Small or Large
Speed of Absorption = Fast or Slow
Odor reducing
AUL
Absorbency Index
Permeability
SFC

3) APPLICATION

Baby Diaper
Adult Inco
Femcare
all categorized as ‘absorbent articles’
Far too numerous to mention

QUICK SEARCHES:

USPO only since 1976 - keywords

KEYWORDS	HITS
SUPERABSORBENT	6012
SUPERABSORBENT + PROCESS	4892
SUPERABSORBENT + ACRYLIC + PROCESS	2688
SUPERABSORBENT + POLYMER	4788
SUPERABSORBENT + ACRYLIC + POLYMER	2818

IT'S NOT VERY SCIENTIFIC:

I had expected more!
There are many false hits
There is duplication

But a trend is clear

And there is a fit; at one point in late 80's we were monitoring 30+ filings a month at Dow

KEYWORDS	HITS
SUPERABSORBENT	6012
SUPERABSORBENT + ACRYLIC + APPLICATION	2838
SUPERABSORBENT + ACRYLIC + ARTICLE	1898
SUPERABSORBENT + ACRYLIC + DIAPER	1525

ASSIGNEES	HITS
P&G	612
K-C	856
SCA HYGIENE	239
UNICHARM	29

ASSIGNEES	HITS
DOW	992
STOCKHAUSEN	765
BASF	629
EVONIK	100
SHOKUBAI	133

ASSIGNEES	HITS
CHEMDAL	88
SUMITOMO	75
LG CHEM	16
KOLON	9
SANYO (mostly application)	137

WHY PATENT?

(a) Use technology to gain commercial advantage

- **Improved product**
- **Lower cost**

(b) Block or restrict competitors

(c) Gain leverage

- **Future cross license**

PATENTS THAT CAUSE(D) PAIN IN THE INDUSTRY

Merely a selection; not exhaustive, and no opinion is presented on validity or otherwise…

Selected Influential Patents

DATE	AUTHOR	ASSIGNED	PATENT	TOPIC
1966 (filed May 31st)	Harper et al	Dow	3,669,103	Absorbent product containing a hydrocolloidal composition
1966 (filed May 20th)	Harmon et al	J&J	3,670,731	Absorbent product containing a hydrocolloidal composition

Selected Influential Patents

DATE	AUTHOR	ASSIGNED	PATENT	TOPIC
1985	Brandt et al	P&G	4,654,039	Improved gel volume & gel strength polymers
1988	Kellenberger et al	K-C	5,147,343	Absorbent products containing hydrogels with ability to swell against pressure

Selected Influential Patents(2)

DATE	AUTHOR	ASSIGNED	PATENT	TOPIC
1990	Goldman et al	P&G	5,061,259	400-700 micron preferred PSD
1993	Melius et al	K-C	5,601,542	Pressure Absorbency Index
1994	Goldman et al	P&G	5,599,335	SFC > 30 & Performance Under Pressure

AND NOW BACK TO THE ORIGINAL QUESTION THAT PROMPTED THIS PAPER…

OR, WHAT COMES NEXT?

PRODUCER ‘A’ IP STRATEGY

- **Patent everything possible**

‘A’ SAP PROCESSES

PROCESS	SOURCE	LOCATIONS	STATUS
Batch Kneader reactor	In house (1980’s)	Germany	Closed
Kneader Reactor	In License	Germany	Special products only
Bulk Batch	Acquisition	USA	Now Closed
Continuous Belt	Acquisition	USA UK Thailand	Closed Burned down Running
Continuous Kneader	In house (late 90’s)	Europe USA China	Running

What patents might be linked to these different processes?

‘A’ SAP PROCESS PATENTS(1)

PROCESS	SOURCE	YEAR	AUTHOR	US #
Kneader reactor	In house	1988	Hennig et al	4729877
Single Kneader Reactor	In house	1988	Nowakowsky et al	4769427
Bulk Batch	Acquisition	1989	Alexander et al	4820742
Double Kneader	In house	2001	Heide et al	WO/2001/038402
Continuous Kneader	In house	2008	Steuven et al	2008/0004408

Those are probably all too old to be the references for the recent announcement…

So let us examine more recent literature…

‘A’ SAP PROCESS PATENTS(2)

SAP PROCESS	YEAR	AUTHOR	US #
Droplet Polymer	2007	Loesch et al	8,529,805
Radiation Initiated Conti Belt	2007	Weismantel et al	8,546,461
Novel forced air drying	2005	Weismantel et al Funk et al	8,592,516 8,541,528
Use of conveying screw for solid additives	2007	Funk et al	8,633,285

CONCLUSION ON ‘A’:

- **Future possible switch from dual kneader to belt reactor with novel drying process**
- **Probable lower unit capital**
- **Potential for improved SAP properties**

If ‘A’ goes ahead:

- Reinvention for improvement is brave but…how can they get acceptable ROI on existing global production units which are relatively new?
- Will new technology be limited to niche new SAP products?

Finally, what of SAP supply?

- Expansions continue!
- Demand growth globally around 6%
- Plenty of SAP
- Watch this space for details

THANK YOU – ANY QUESTIONS?
Ian Davenport

Note:
These are the personal views of the presenter. We thank all who contribute information and invite others to participate by contacting Ian Davenport at any time.

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