

*Patent Tracker*

# **Advances in Paper Drying**

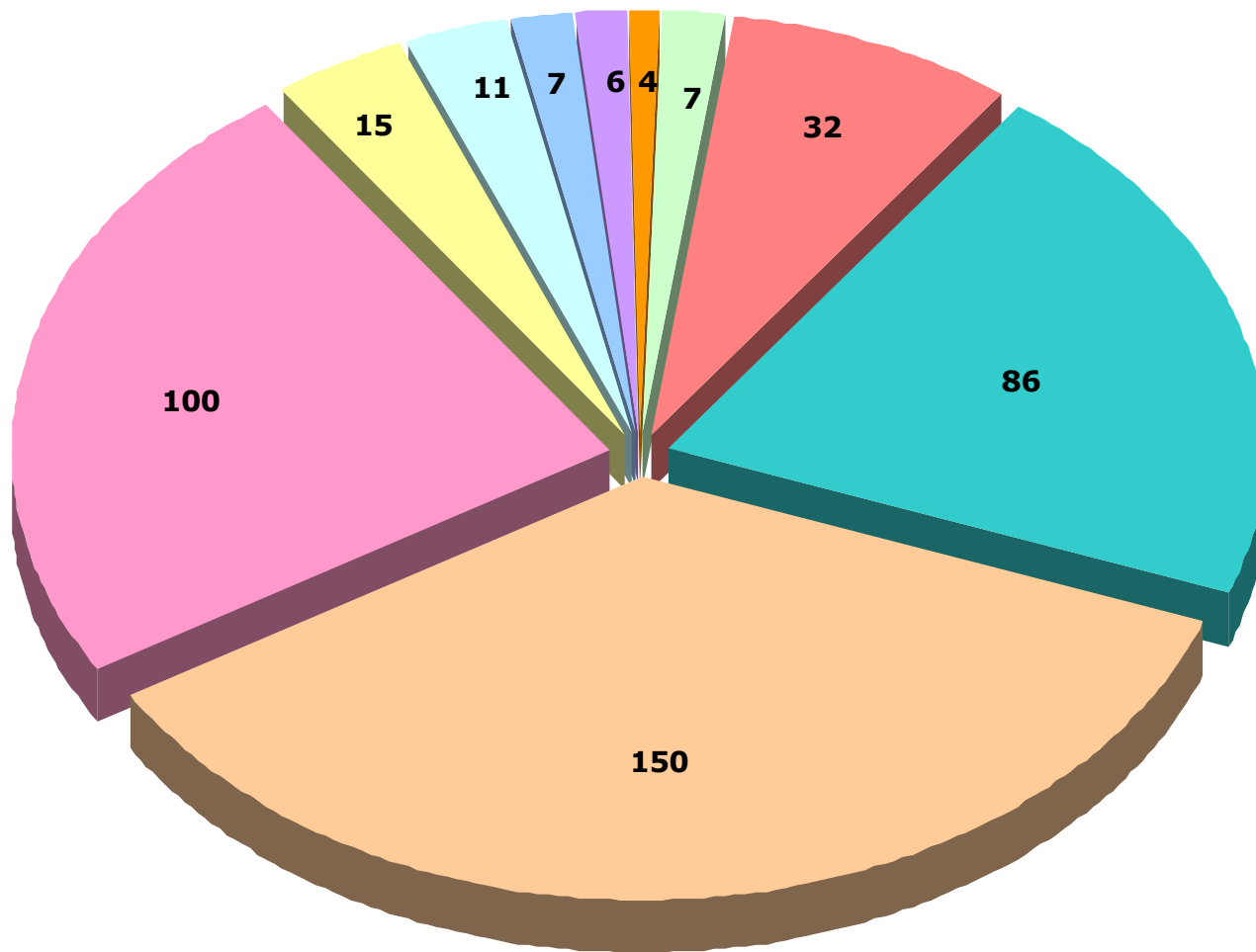
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## Assignee-wise distribution of Patent activity



Voith J.M. AG

Metso OY

Kimberly-Clark Corp

Andritz AG

Procter & Gamble Co.

Koch Industries Inc

ABB Ltd

Research/Educational Institution

Independent Inventor(s)

Other Assignee(s)

## Research & Academic Institutions

| S. No. | Research/Educational Institution                | No. of Records | Focus   |
|--------|---|----------------|---|
| 1      | Shaanxi University of Science & Technology      | 3              | Cylindrical interlayer multi-passage paper dryer;<br>Drying device for paper-making machine   |
| 2      | Shandong Light Industrial College               | 1              | Supporting device used for built-in magnetic flux generator electromagnetic drying cylinder for paper manufacturing machine   |
| 3      | McGill University                               | 1              | Through drying and after-drying of semi-permeable webs, involves starting through drying at low moisture content, using low drying intensity, and using through drying as after-dryer |
| 4      | Institute of Paper Science and Technology, Inc. | 1              | Paper fibrous web or sheet atmospheric pressure impulse drying by using air knives for elevated pressures round web at press roll nip exit positions                                  |
| 5      | Georgia Institute of Technology                 | 1              | In plane liquid matrix spreading reducing system in web material impulse dryer, has upper belt with mesh, provided between conveyor belt and upper heated roller                      |

## Collaboration

| S. No. | Patent Number                         | Collaborators                           | Focus   |
|--------|---------------------------------------|---|---|
| 1      | <a href="#"><u>WO2004059077A1</u></a> | Maintech Co Ltd.;<br>Oji Paper Co. Ltd. | Spraying anti-staining agent while drying paper material. |

## Focus of Key players

| S. No. | Major Assignees      | No. of Records | Focus   |
|--------|----------------------|----------------|---|
| 1      | Voith J.M. AG        | 150            | Paper/cardboard web production device having heatable and rotatable dry cylinder; Drying hood; Regulation of the moisture content of paper web; Infrared radiator for dryer system; drying drum with high thermal conductivity inner lining     |
| 2      | Metso OY             | 100            | Operation method for dryer section of paper or board machine; Hood for dryer section; Drive system for drying cylinders; Drying condition control method; Through-air device to treat or dry the webs; Drying tissue paper web on Yankee dryer  |
| 3      | Kimberly-Clark Corp  | 15             | Through-air drying apparatus for tissue webs; Tissue paper machine containing blow box for drying; Recycling exhaust gas from throughdryer; Warming up and cooling method for through air dryer roll  |
| 4      | Andritz AG           | 11             | Drying of paper; Perforated drying drum for wet paper web; Yankee cylinder drying hood; Stabilization of moving web upon leaving the drying cylinder  |
| 5      | Procter & Gamble Co. | 7              | Micropore drying apparatus for through air drying of tissue paper; High efficiency heat transfer apparatus for drying paper webs; Papermaking apparatus containing Yankee drying drum and pressure roll; Belt having improved drying efficiency |
| 6      | Koch Industries Inc  | 6              | Method and apparatus for drying wet webs; Through drying nascent fiber web; Diverter damper systems to selectively direct moisture laden air from wet end and dry end hood sections; Air supplier to supply air to drums for drying paper web.  |
| 7      | ABB Ltd              | 4              | Drying traveling paper web over steam heated drying cylinders; Drying hood for Yankee paper web drying cylinder; Controlling of process gas in a drying chamber   |

## Citation Velocity

| S. No. | Document ID                            | Title  | Assignee                | Year Issued | Cited by       |   |       | Average Cites by Year |
|--------|--|--|-------------------------|-------------|----------------|---|-------|-----------------------|
|        |  |  |                         |             | Self-citations | Cited by others   | Total |                       |
| 1      | <a href="#"><u>US20020060036A1</u></a> | Shortened layout from dryer to reel in tissue machine  | Metso Paper Karlstad AB | 2002        | 6              | Andritz AG (3)<br>Metso Paper Inc (2)<br>Voith Patent GmbH (3)  | 14    | 1.47                  |
| 2      | <a href="#"><u>US6488816B1</u></a>     | Drying section for drying a paper web in a papermaking machine   | Metso Paper Karlstad AB | 2002        | 6              | Voith Patent GmbH (4)<br>Worldwide Inc (2)<br>Celli Paper S.P.A. (1)<br>Kimberly Clark NexPress Solutions LLC (1)     | 14    | 1.32                  |
| 3      | <a href="#"><u>US6169848B1</u></a>     | Cross-direction dryer for a machine producing sheet material moving in a machine direction having both gas powered and electric heating portions | Impact Systems Inc.     | 2001        | Nil            | Kimberly Clark Co (10)<br>Stora Enso Oyj (1)<br>Westroc Inc (1)<br>SimTek Inc (1)                                     | 13    | 1.30                  |
| 4      | <a href="#"><u>US6199296B1</u></a>     | Seal arrangement for through-air drying papermaking machine  | Valmet Karlstad AB      | 2001        | Nil            | Kimberly Clark (6)<br>Metso Paper Karlstad Aktiebolag AB (1)<br>Metso Paper Karlstad AB (2)<br>LG Electronics Inc (1) | 10    | 0.99                  |
| 5      | <a href="#"><u>US6398916B1</u></a>     | Simplified through-air drying paper making machine having a twin wire forming section  | Valmet Karlstad AB      | 2002        | Nil            | Metso Paper Karlstad AB (6)<br>Kimberly Clark Worldwide Inc (3)<br>Voith Paper Patent GmbH (1)                        | 10    | 0.99                  |



## Recent Non-patent literature

- **Effect of Fiber Recycling on Paper Drying**
- **Trends in Paper Drying section for higher productivity**
- **Numerical and experimental investigation of paper drying**
- **Feasibility of energy efficient steam drying of paper and textile including process integration**
- **The modelling of drop behaviour in siphon riser tubes in paper drying cylinders**
- **Apparatus for investigating boiling phenomena in a fibrous porous medium**