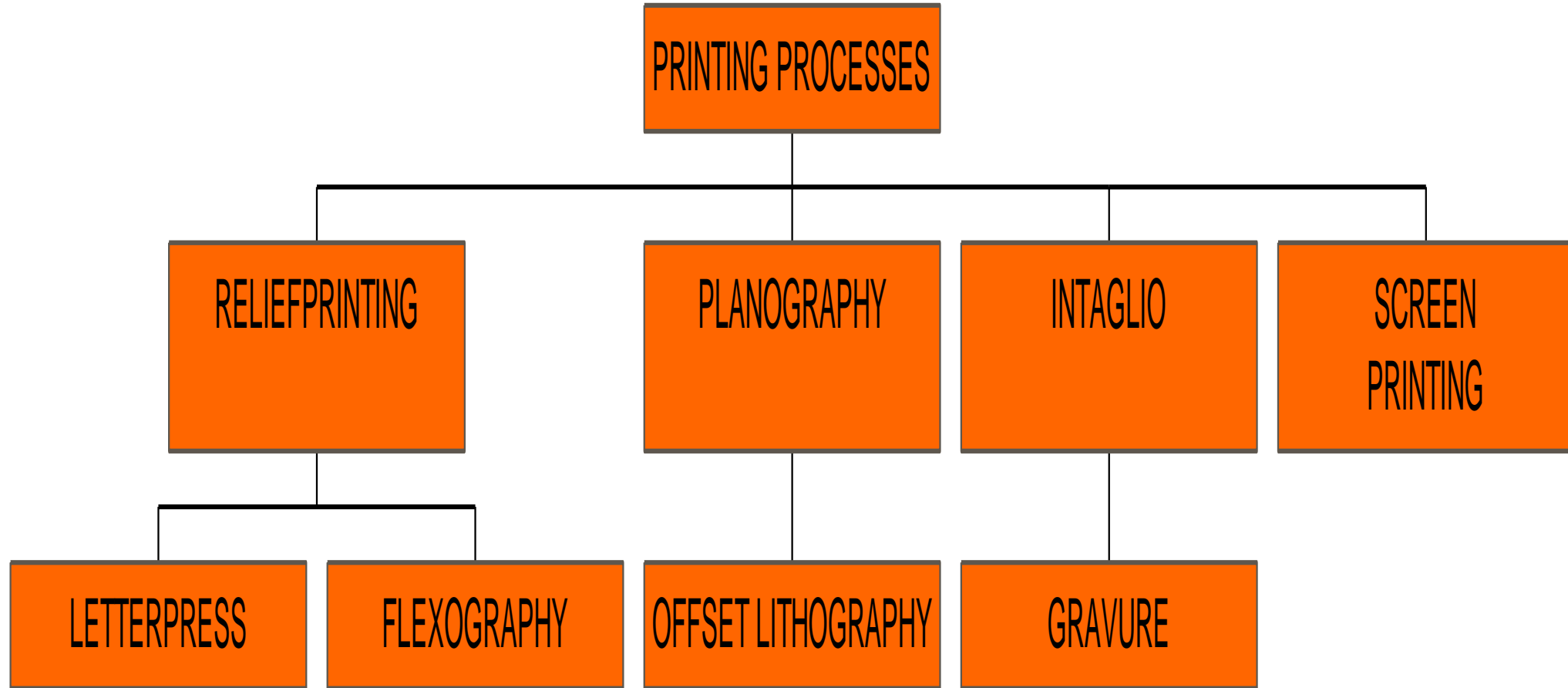


Printing Processes

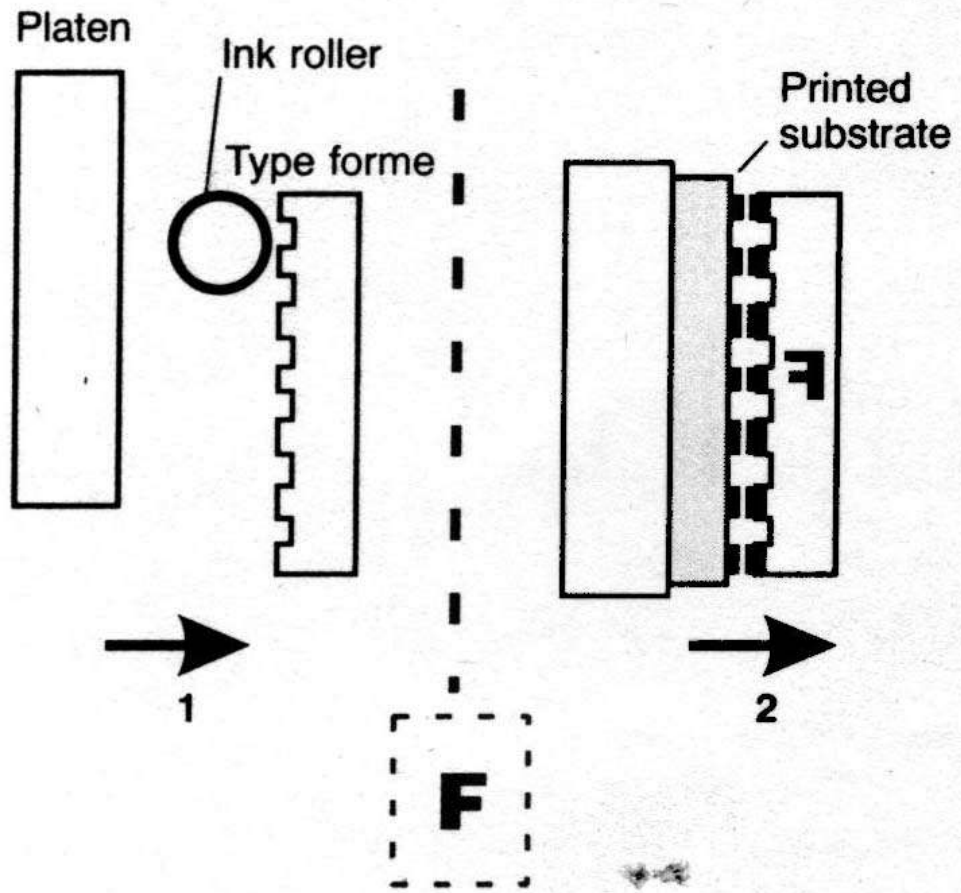


Difference in the Processes

- **Relief Printing** : In this printing, image area are in raised form where non image are in the bottom. Ex. Letter Press, Flexography
- **Planography** : In this printing, Image and non image areas are on same surface. Ex. Lithography, Offset
- **Intaglio Printing** : In this, image area are incised into the surface. This process of printing is directly opposite to the relief printing process. Ex. Gravure

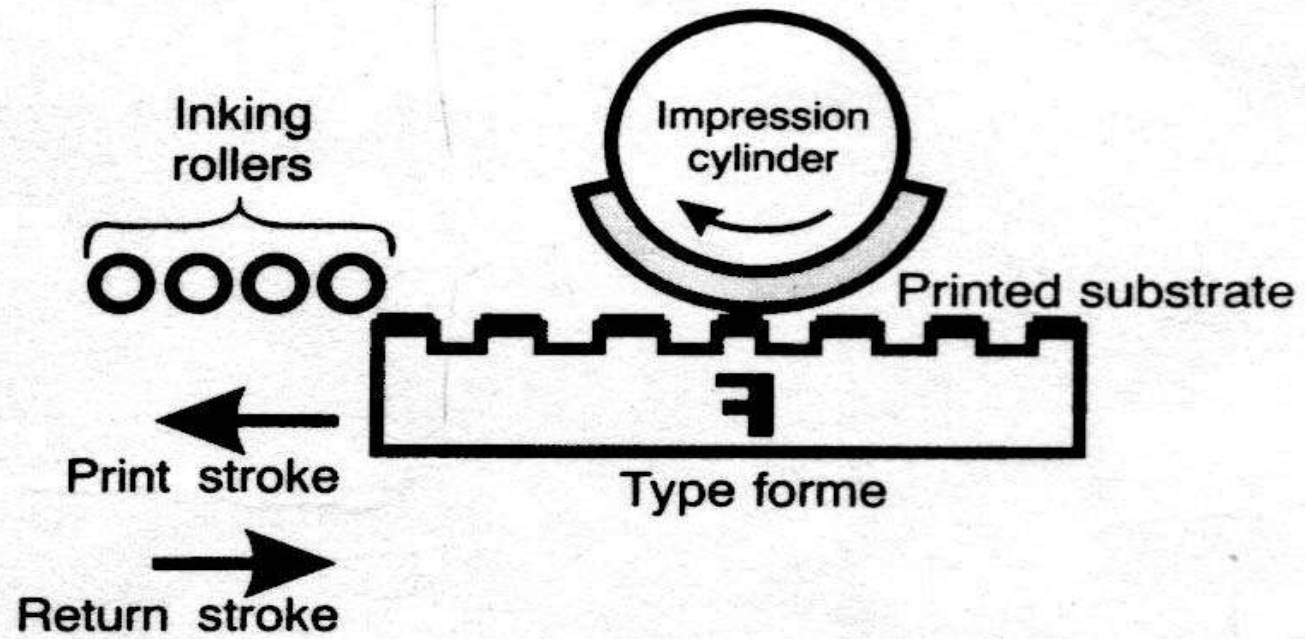
Types of Letter press M/C

- Platen Or Tradle Machine.
- Flat Bed Cylinder Machine.
- Rotary Machine.

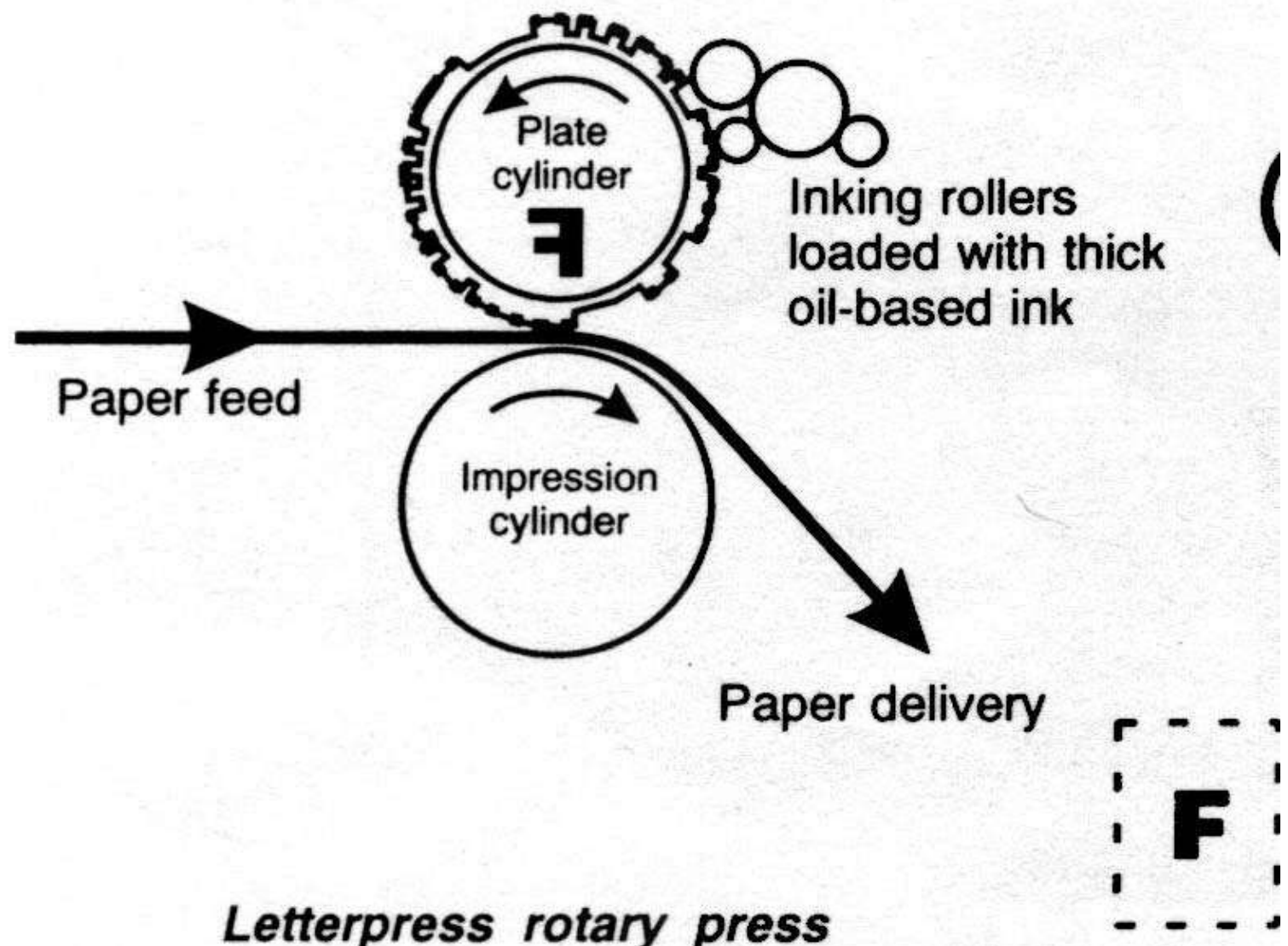


Letterpress platen press





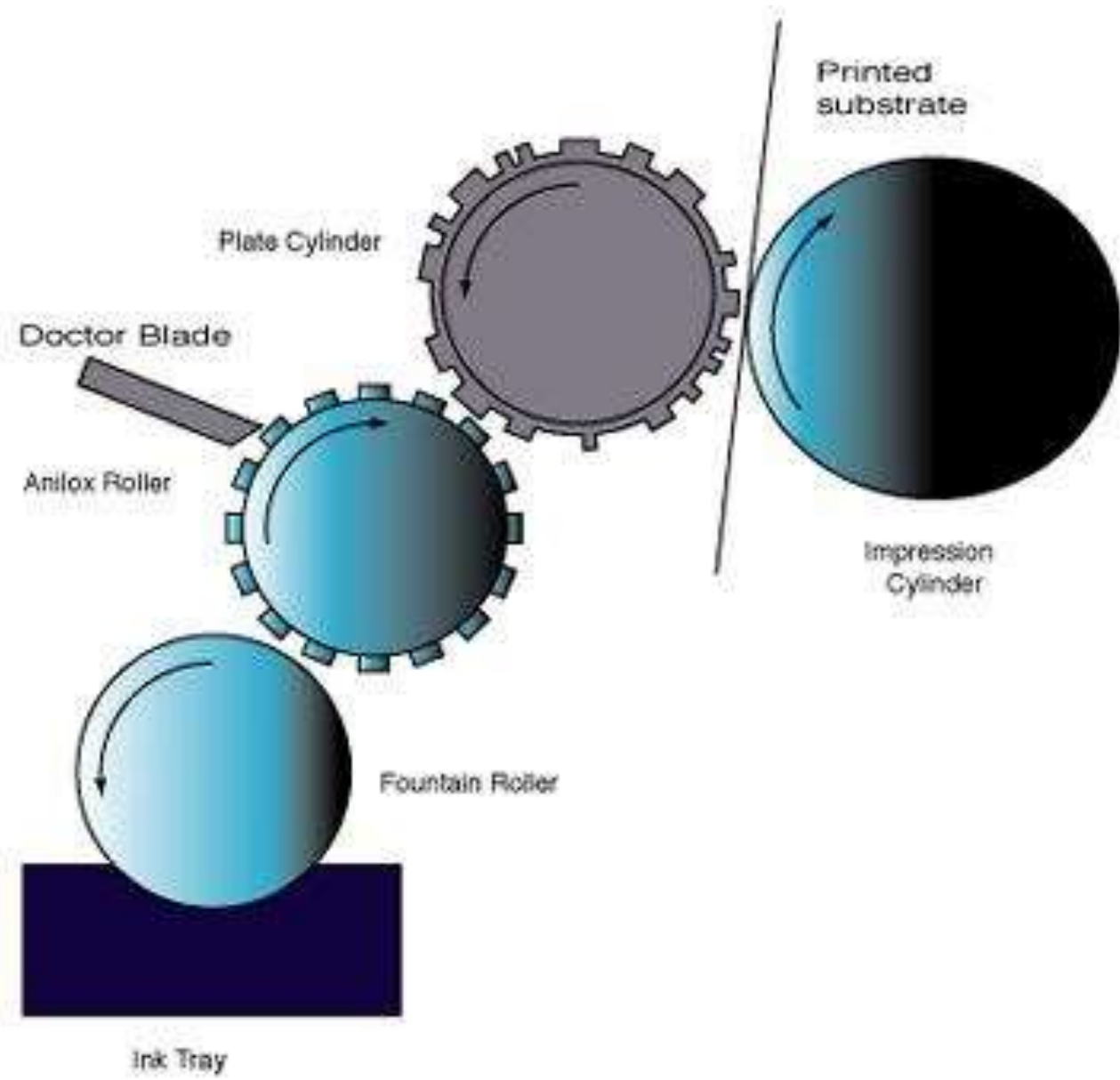
Letterpress flatbed cylinder press



Letterpress rotary press

Flexography Printing

- It's a direct rotary printing using resilient relief plates such as rubber or photopolymer plates.
- Also referred as Aniline Printing because of aniline dies used.
- Fast drying solvents or water based inks are used i.e. liquid inks.



Flexography Application

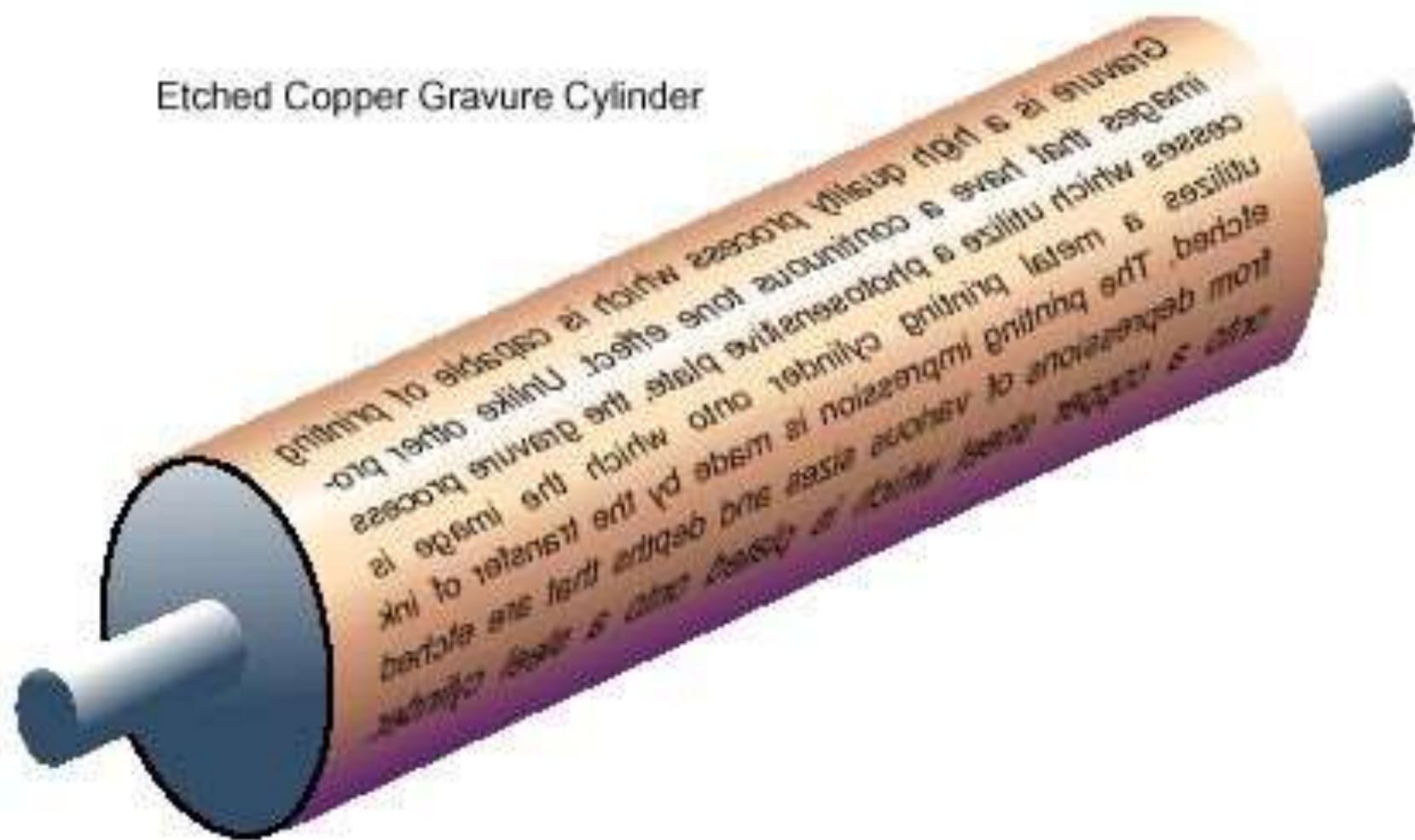
- Packaging Material
- Folding Cartons
- Paper bags
- Plastic films
- Candy Wrappers



Gravure Printing

- Image area is below or recessed then non-image area.
- Basic concept of this process was filling the recessed image area with ink on plate or cylinder.
- Removing the ink from the surface which is non-image area by a doctor blade.

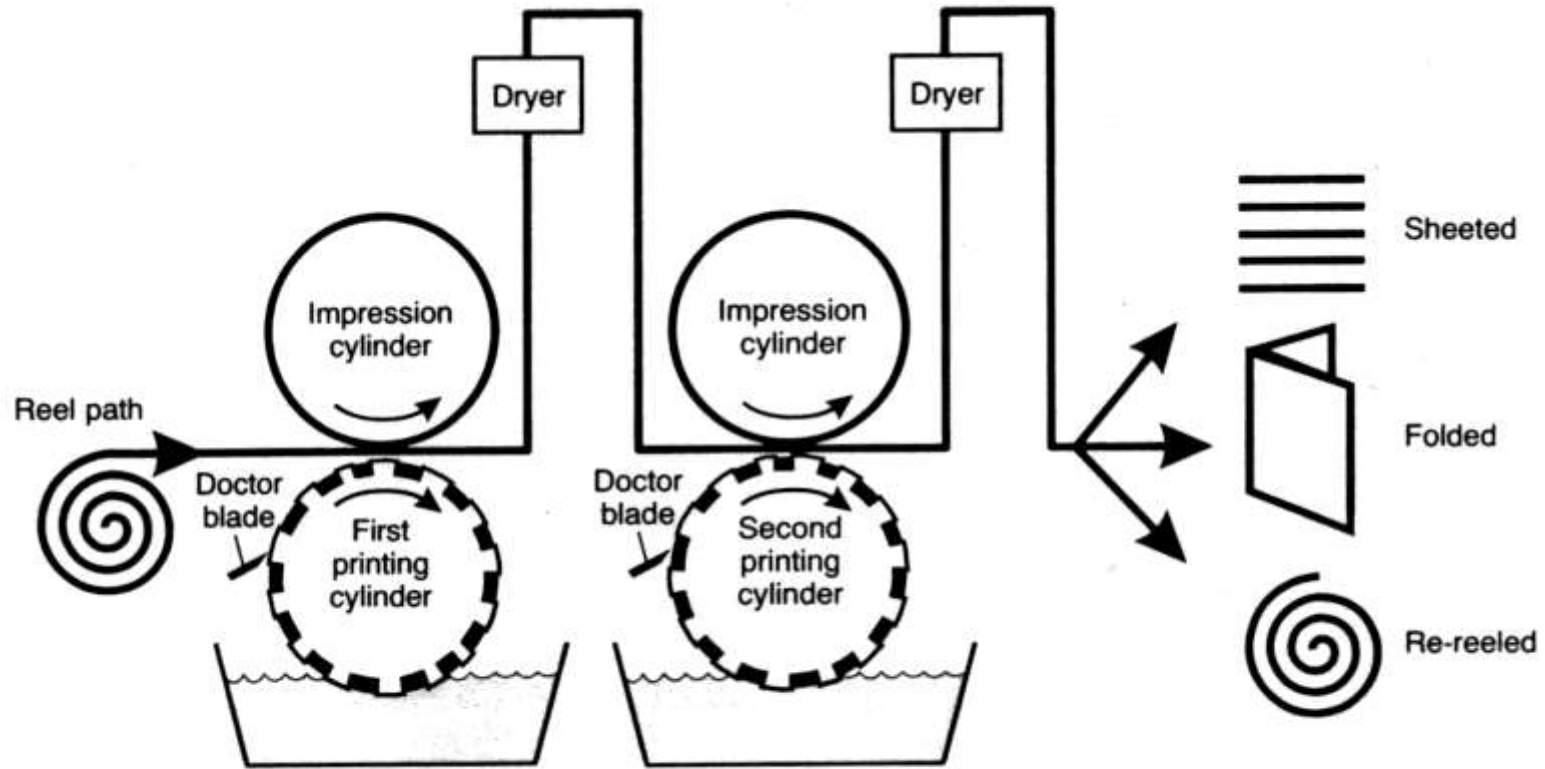
Etched Copper Gravure Cylinder



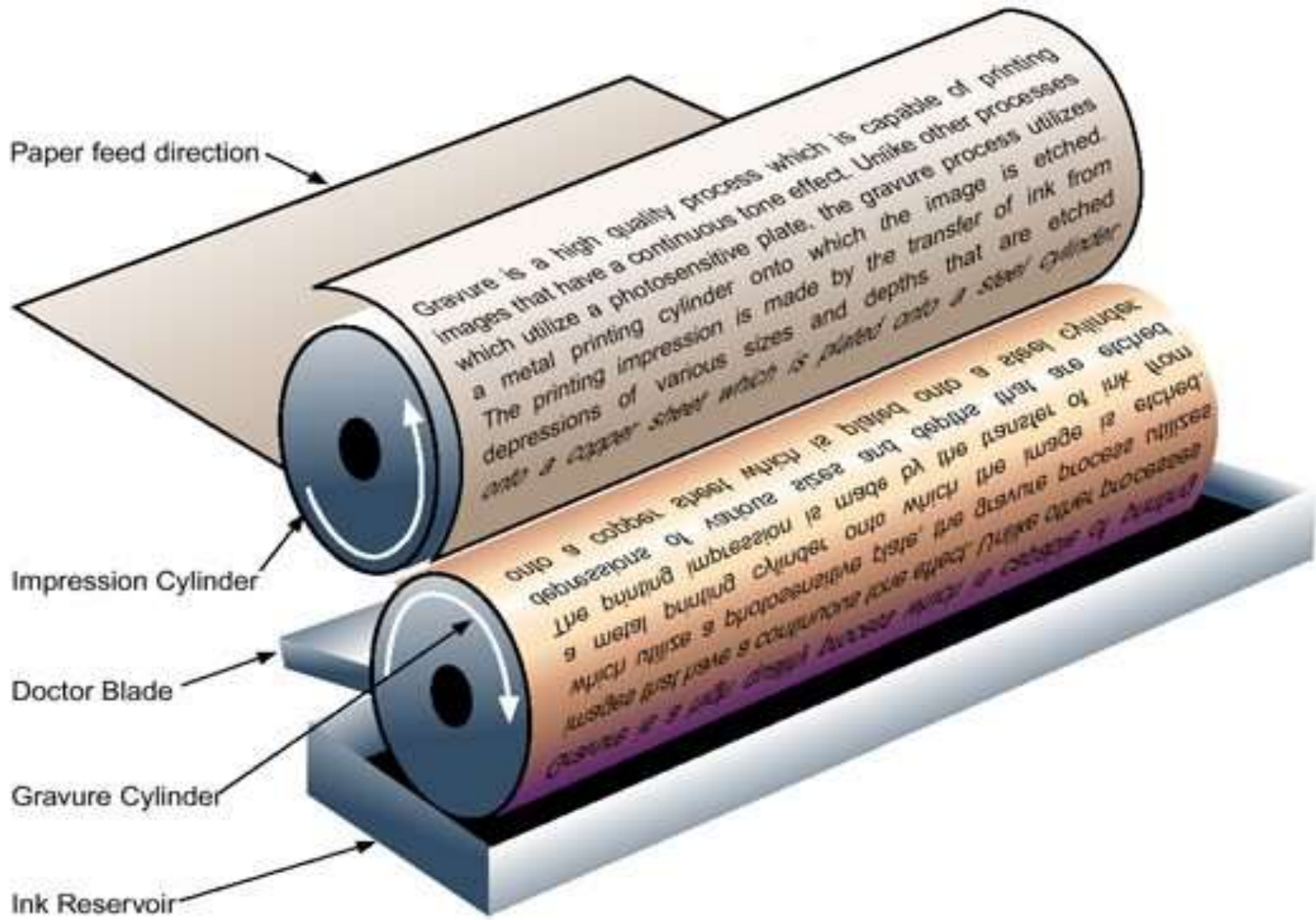


Recessed image areas only retain ink and print

Surface non-image areas do not retain ink and therefore do not print



Rotogravure two-colour press



Gravure Application

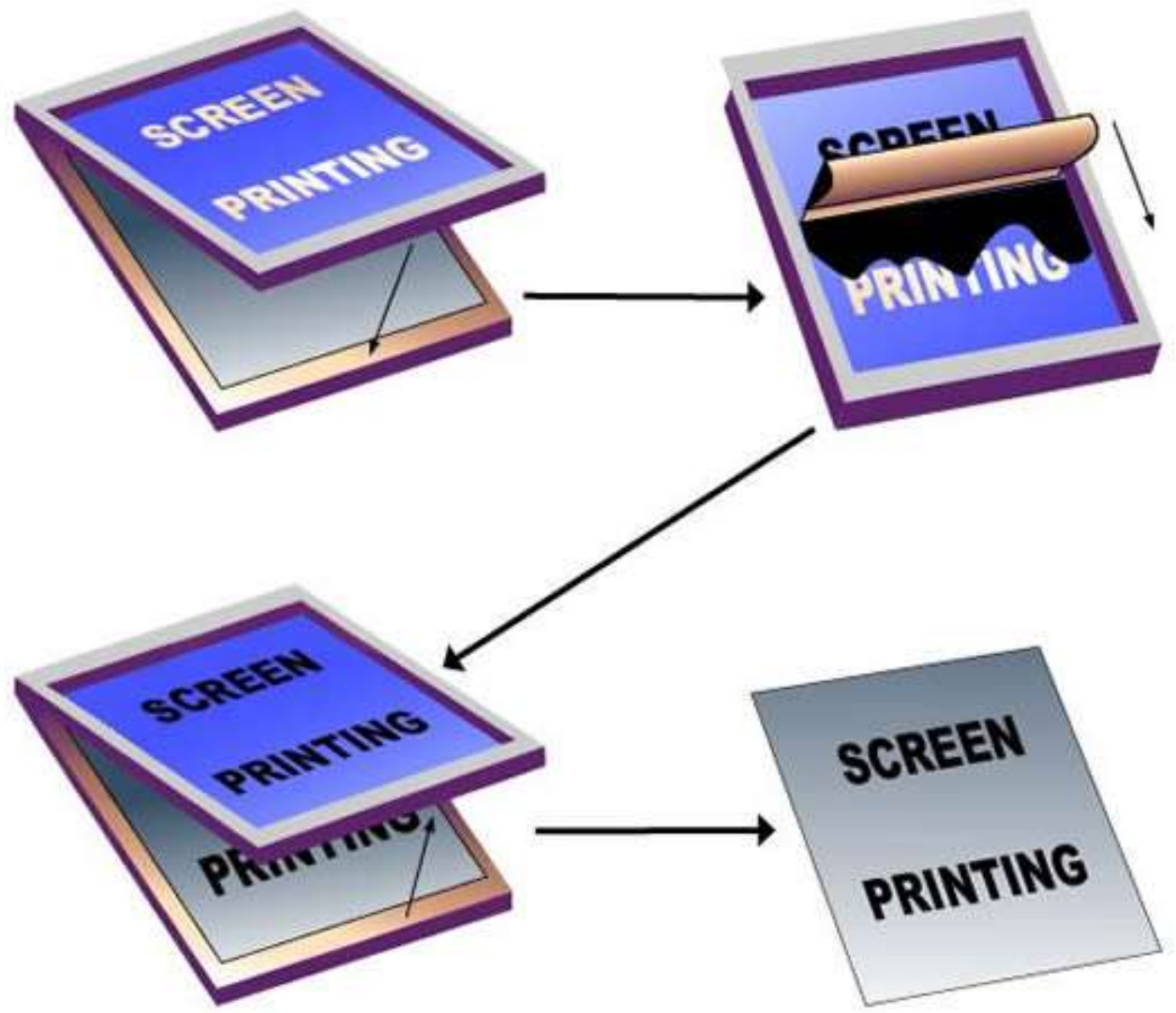
- Packaging
- Publications
- Magazines
- National Geographic
- Specialty
- – Money, Stamps, Wall paper

Products printed on gravure

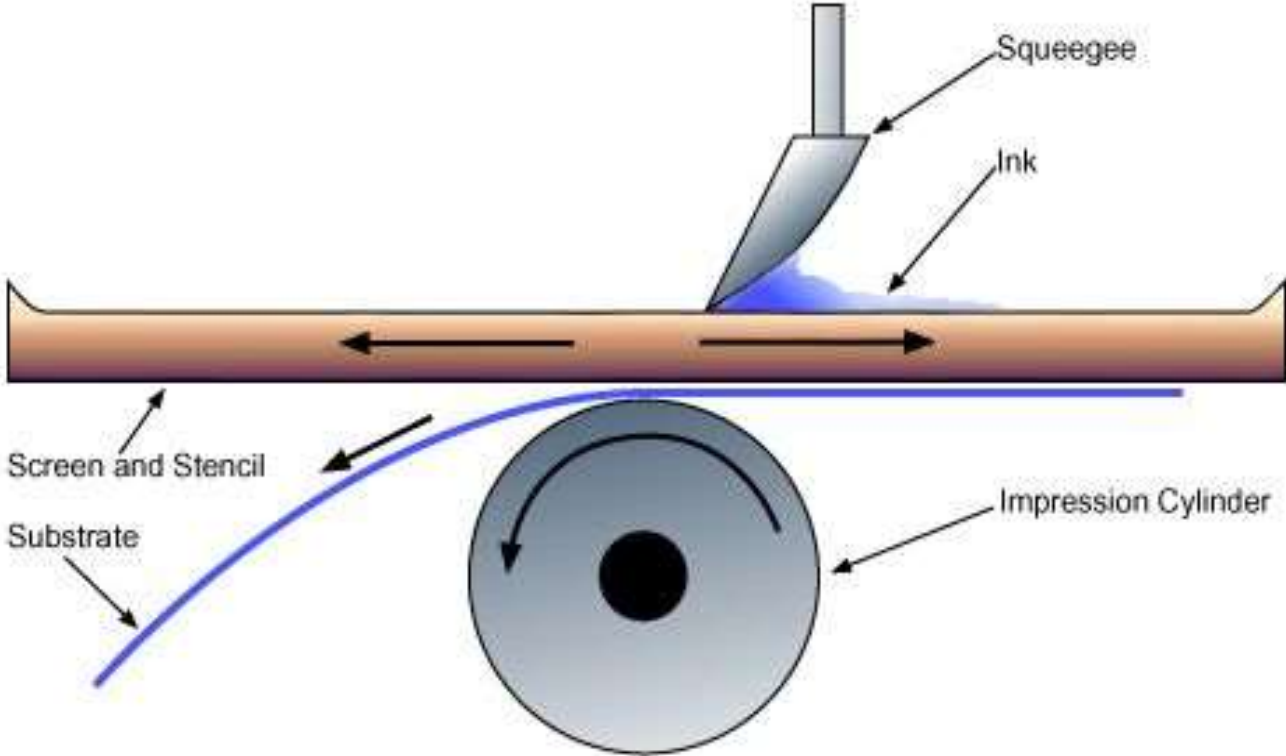


Screen Printing

- Form of stenciling where ink is forced through the clear or porous elements of the stencil on to the substrate to be printed.
- Screen meshes for printing frames are made from nylon, polyester or fine mesh stainless steel.
- Semi-liquid inks are used



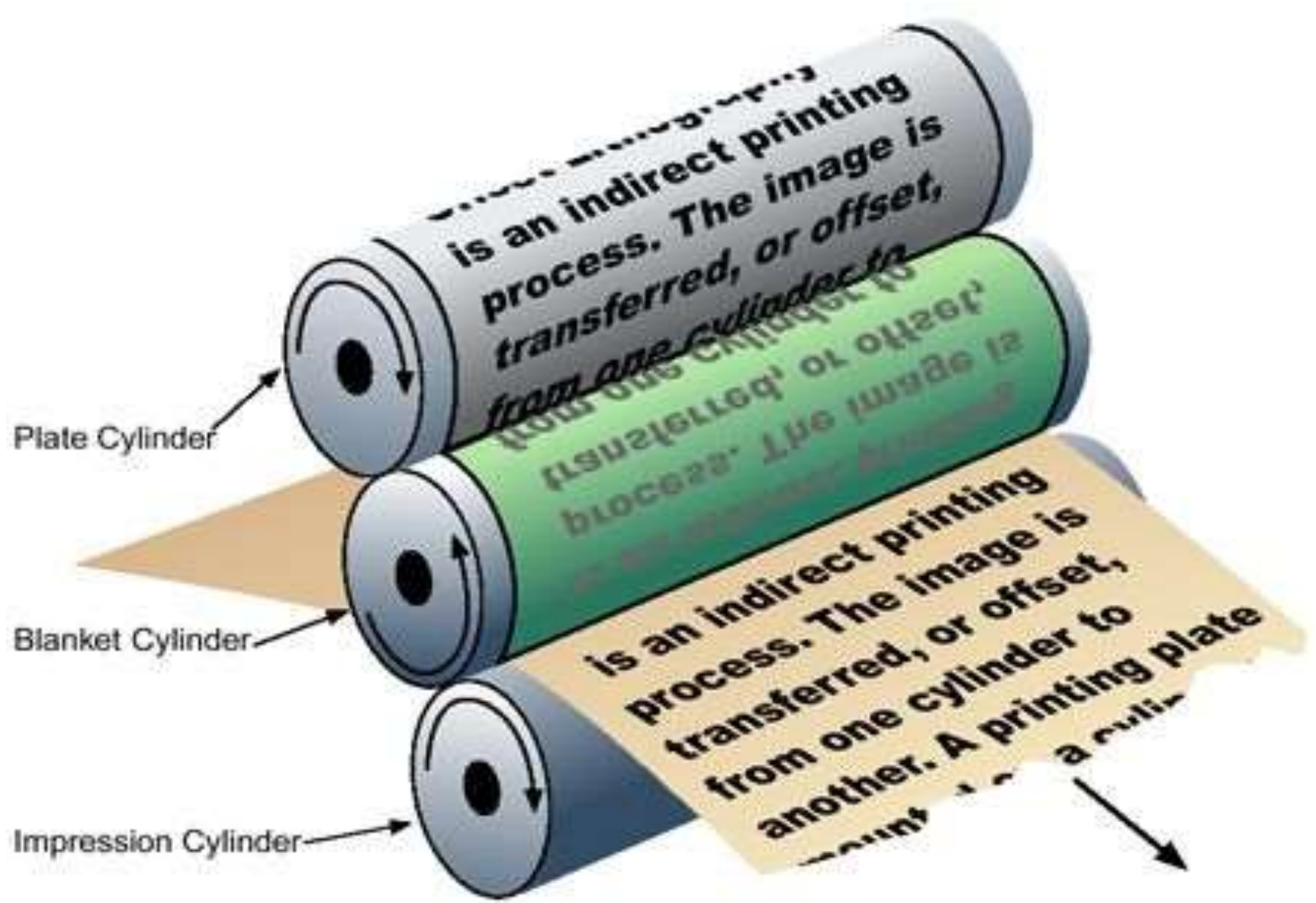
Screen Printing

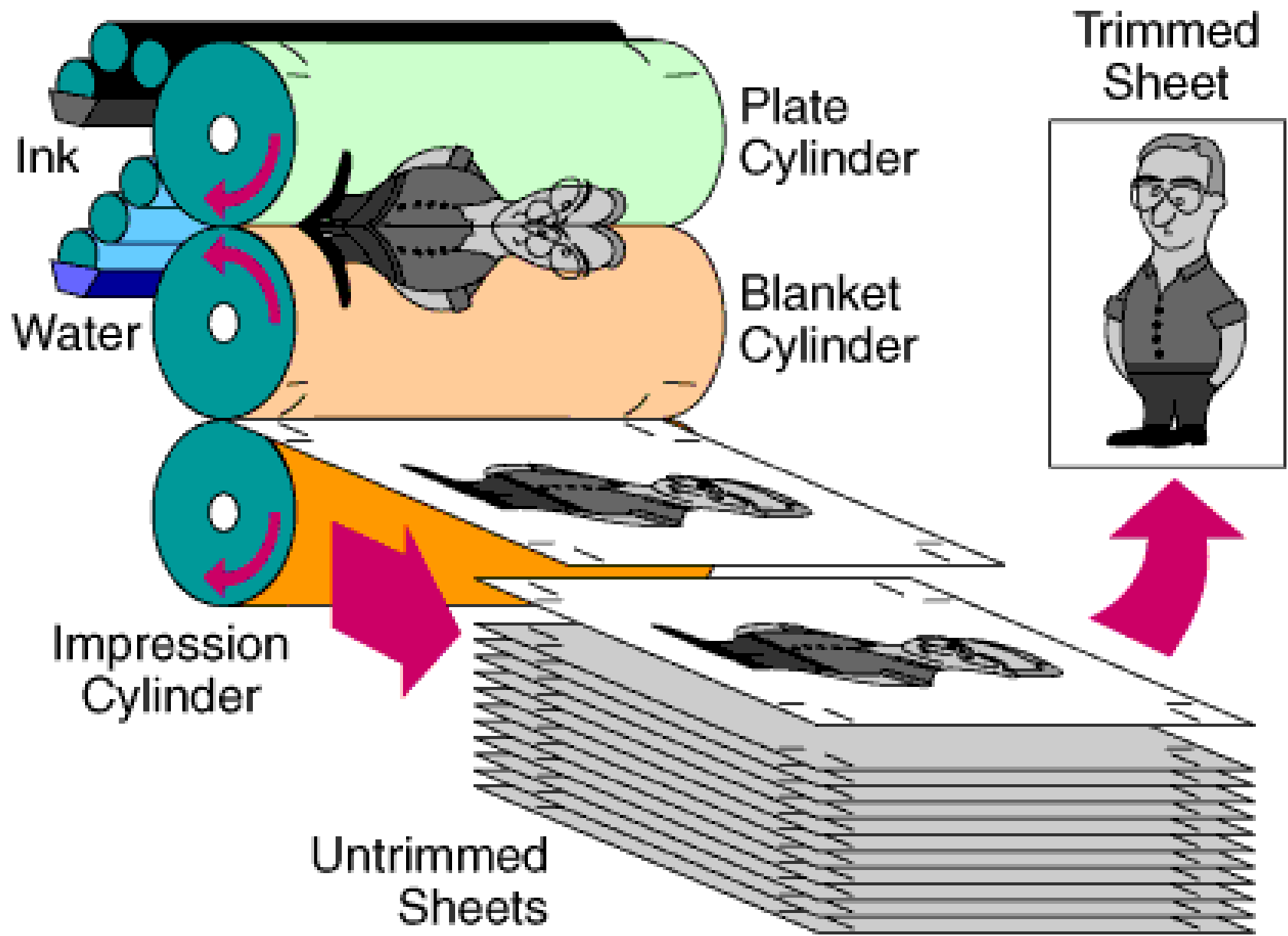


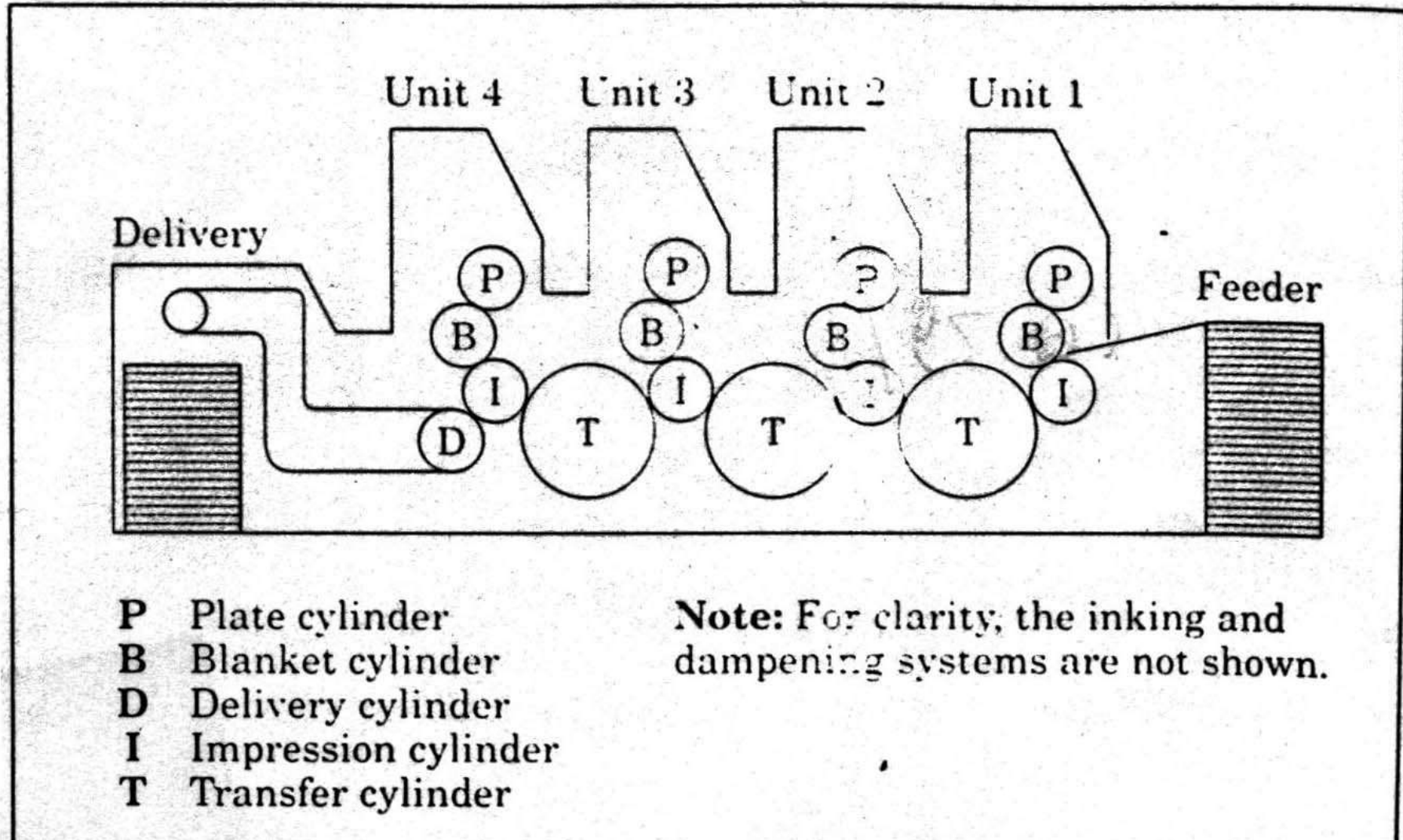
Lithography

- Lith-stone Graphy- Printing
- Image and non-image are on the same plane.
- PRINCIPLE:
 - 1) Oil and water do not mix, they repel each other.
 - 2) Natural affinity of limestone for either grease or water.
- INVENTOR- Alois Senefelder

- **Offset Printing** process based on lithography printing principle because here coated metal plates are exposed & developed to make image and non image areas separate. Image areas are ink receptive and non image areas water receptive. It is **indirect process** of printing where images are transferred from plate to rubber blanket and from blanket to substrates.







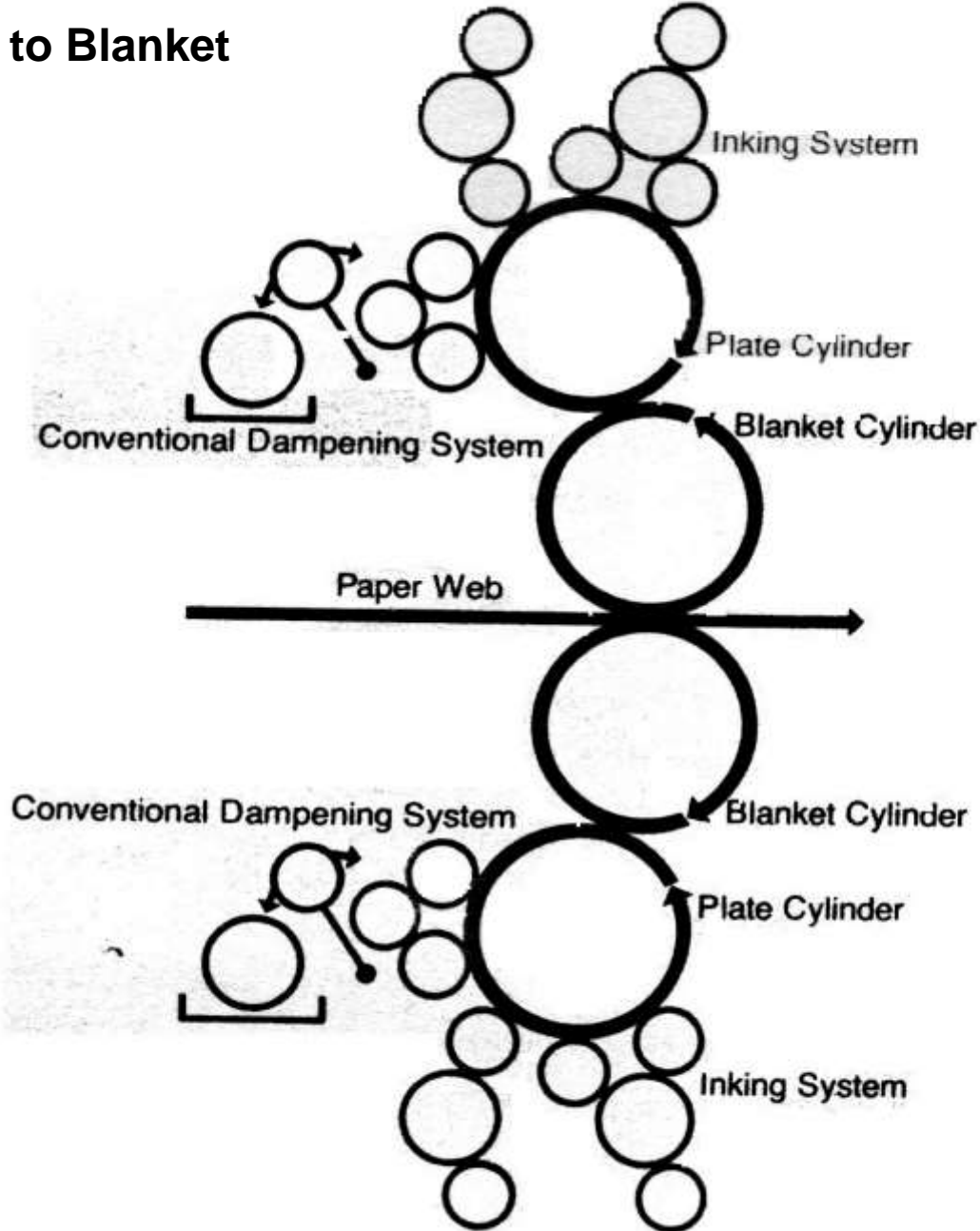
- P** Plate cylinder
- B** Blanket cylinder
- D** Delivery cylinder
- I** Impression cylinder
- T** Transfer cylinder

Note: For clarity, the inking and dampening systems are not shown.

WEB OFFSET LITHOGRAPHY



Blanket to Blanket



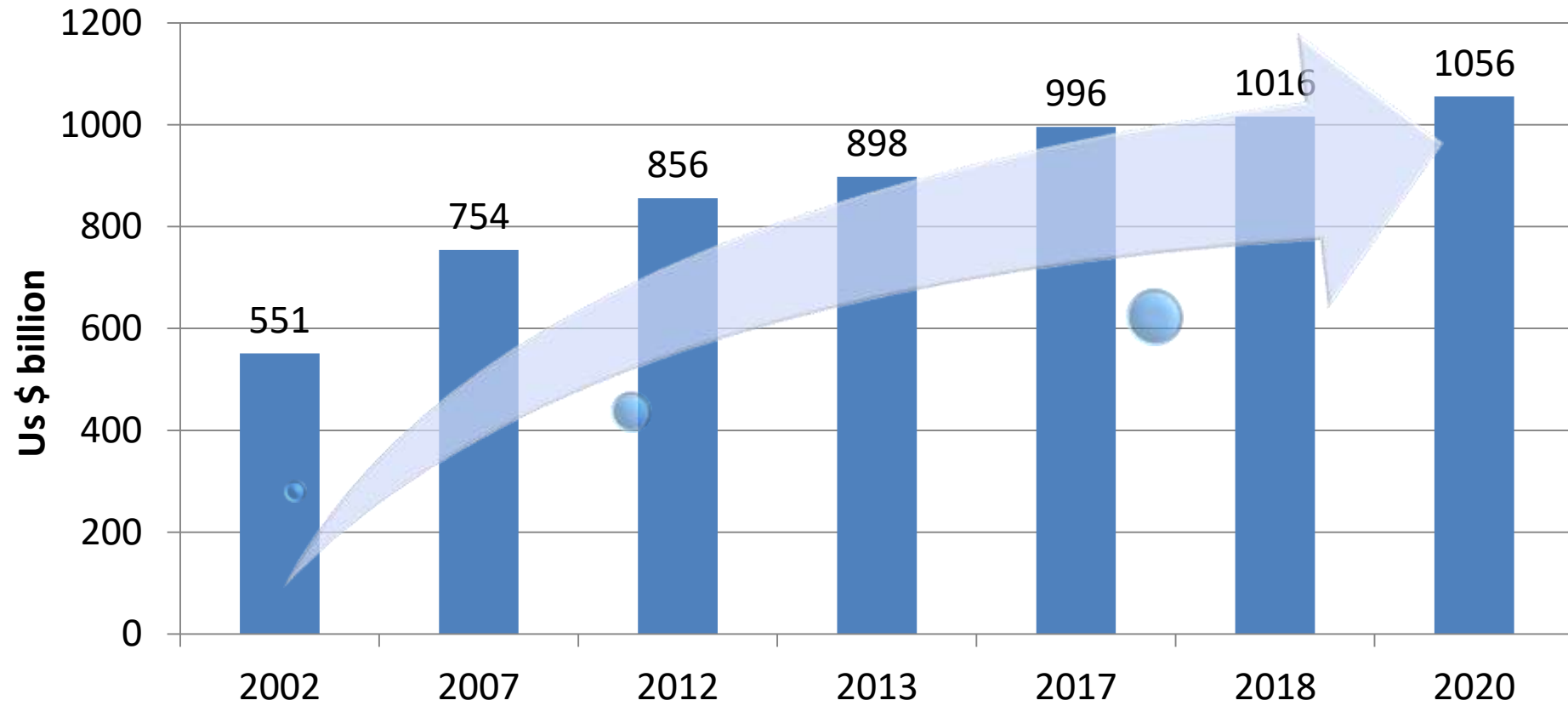
Future of Digital Printing – Nanography

Nanography is an indirect printing process in which the ink image would be fully created on a special blanket and then transferred onto a substrate (similar like offset).

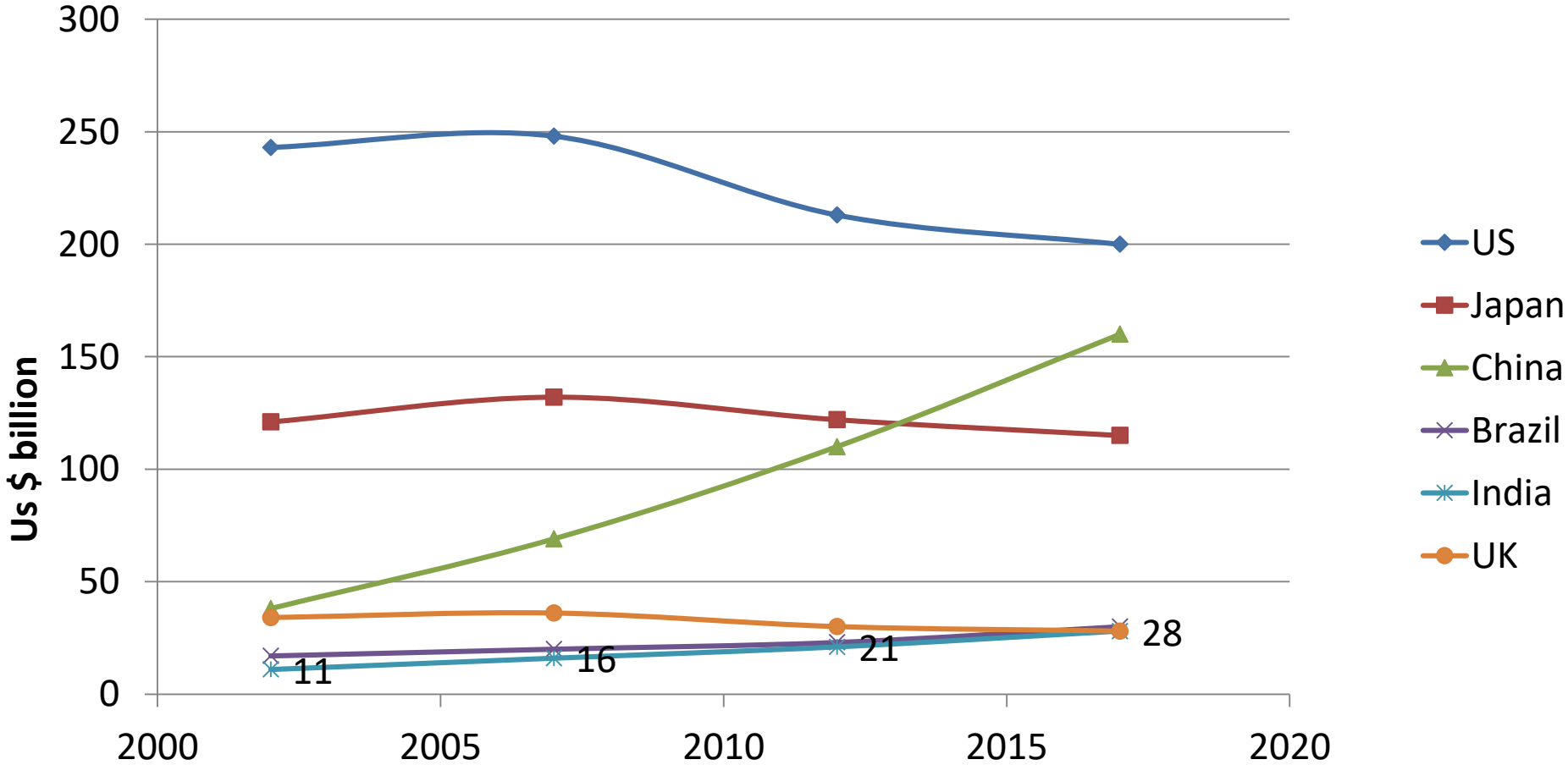
So how does it work? The Nanographic Printing process employs a heated blanket onto which the [NanoInk](#) particles are ejected, as well as warm air dryers above the blanket. As the ink droplets hit the blanket they start to dry, the water is evaporated and a very thin layer, some 500 nanometres in thickness, is formed on the blanket surface. Each colour is laid down onto the blanket in sequence and a dry, warm composite laminated layer of NanoInk is then transferred by the impression cylinder onto the substrate.



Global Printing & Packaging Growth



Leading Market Printing & Packaging



Source: Pira International Ltd

Highlights

- **Global packaging market at 2012 is \$ 799**
- **Global packaging market at 2018 is \$ 975**
- **Global packaging Annual growth of 4% per year to 2018**
- **Global market for folding carton is growing by 5.1% annually**
- **Annual turnover of Indian packaging industry will touch \$ 32 billion by 2025 from the present \$ 24.6 billion**
- **Folding Carton sector has grown by 15% in India in the last 5 years.**
- **Major growth contributors are Health Care, Food, FMCG, Tobacco, Personal Care & Household**

Thanks