



CRC

for

Premium

Quality

Wool

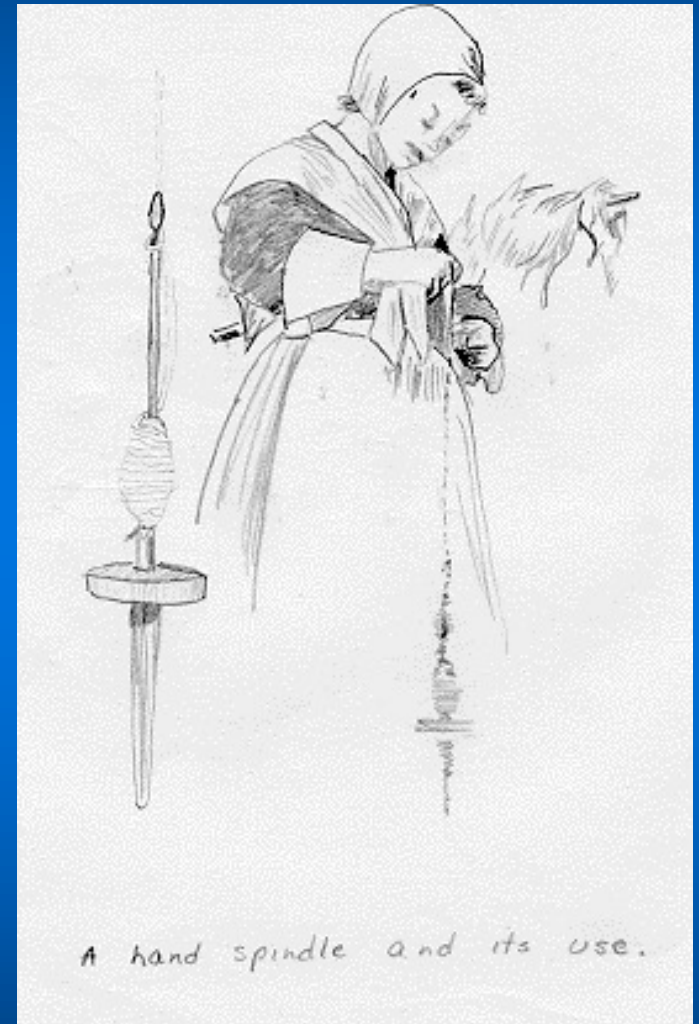
Yarn Production

Produced for the CRC for Premium Quality Wool undergraduate program by;
Dr. Peter Auer, The University of New South Wales.



Yarn Production

- **Drawing**
 - "New" Bradford
 - "New" Continental
- **Spinning**
 - ring spinning
 - OE spinning
 - not wool
- **Folding**
 - plying



A hand spindle and its use.

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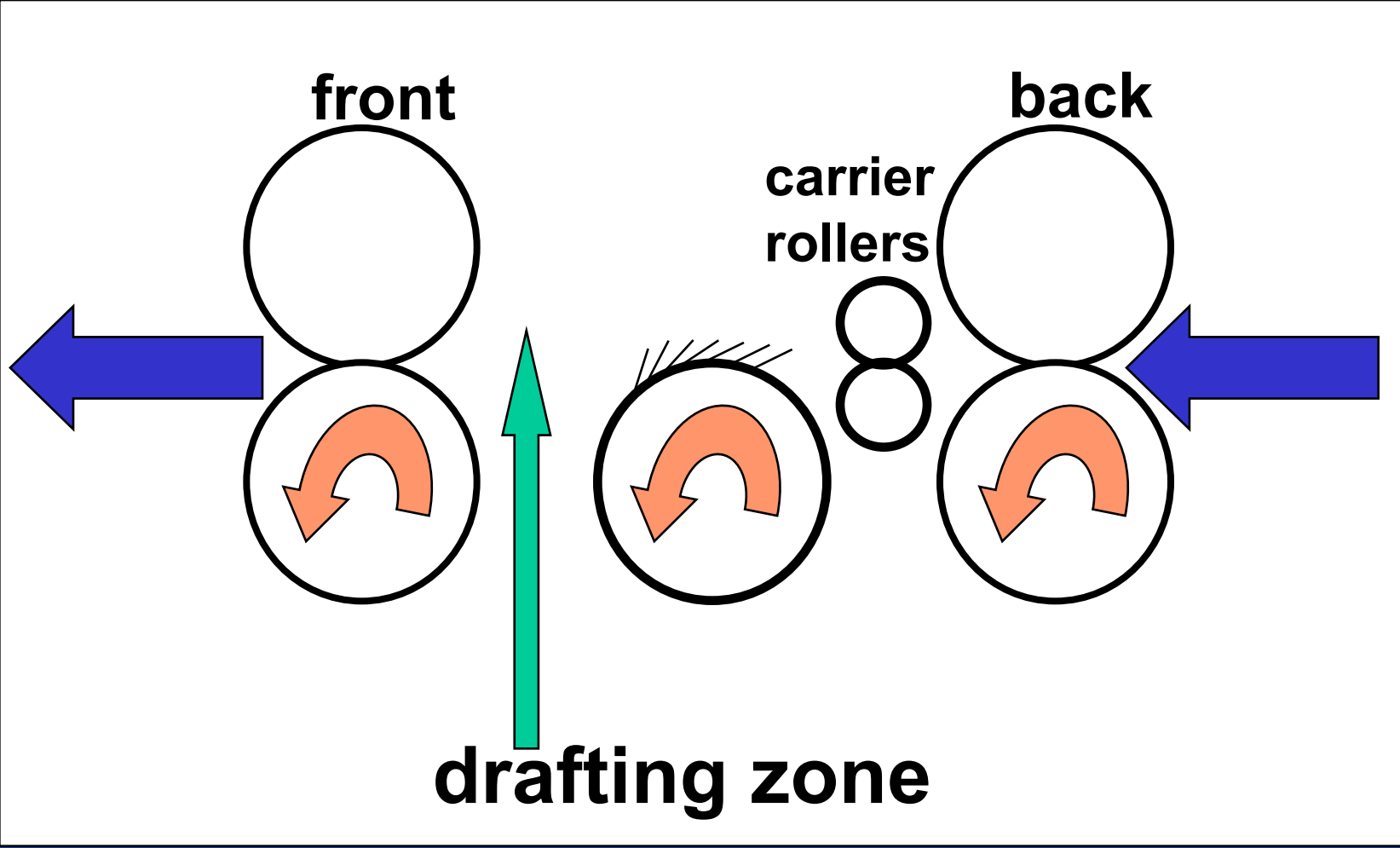
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Drawing

- **Fibres in X-section**
 - top ~25,000 fibres
 - roving ~800 fibres
 - singles yarn ~35 fibres
- **sequential drafting**
 - maximum draft never exceeded
- **gilling process**
 - 3 gillings in modern mills
 - pin control
 - chain gill is last



Porcupine Gilling



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Roving Formation

- roving frame
 - fibre control critical
 - sample or aprons
 - INPUT: ~3,000 fibres in X-section
 - OUTPUT: ~800 fibres
- False Twist
 - rubbing aprons
- Take-up
 - Bobbins (2 ends per bobbin)
 - saves creel space
 - 1 bobbin = 2 spindles

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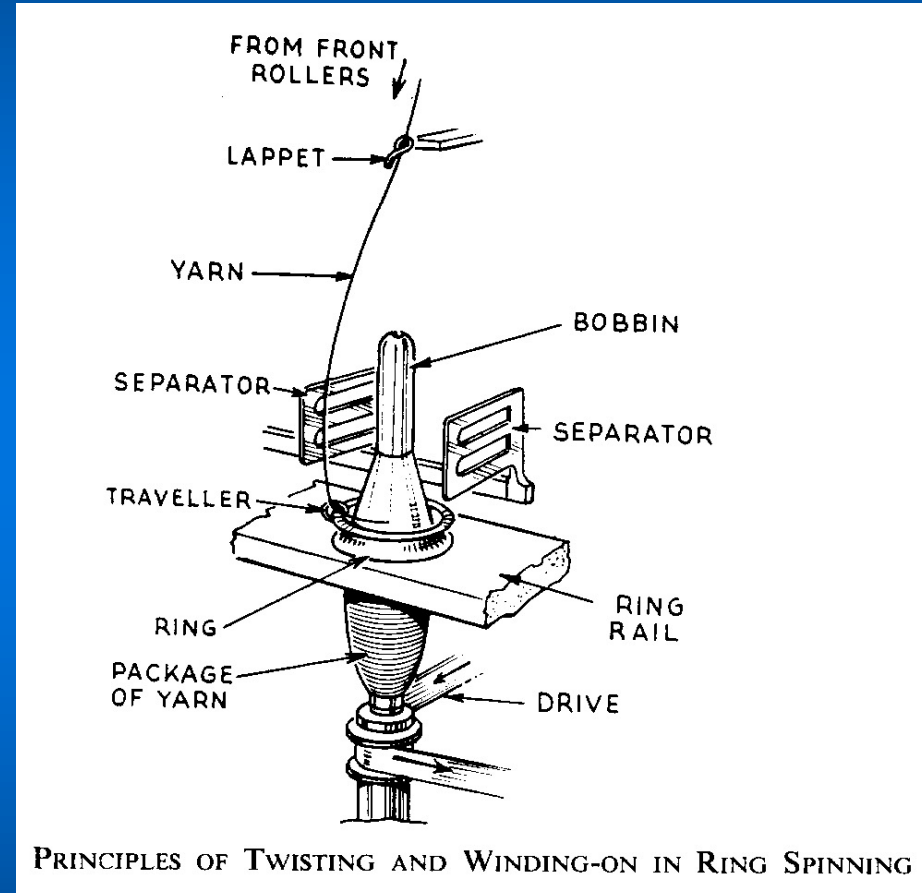
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Ring Spinning Operations

- **Drafting**
 - roller drafting
- **Fibre Control**
 - apron (worsted)
 - false twist (woollen)
- **Twist Insertion**
 - ring & traveller
- **Take-up**
 - winding-on
 - bobbin & spindle



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Twist Insertion & Twist Level

- fibres are delivered by the front rollers
 - bobbin is driven by the spindle
 - yarn is wound on to the bobbin
 - traveller is pulled along by the yarn
 - traveller rotation causes twist
 - point of zero twist
 - bobbin circumference increases
- twist level (tpm) = $\frac{\text{spindle speed (rpm)}}{\text{delivery speed (mpm)}}$
(approx.)

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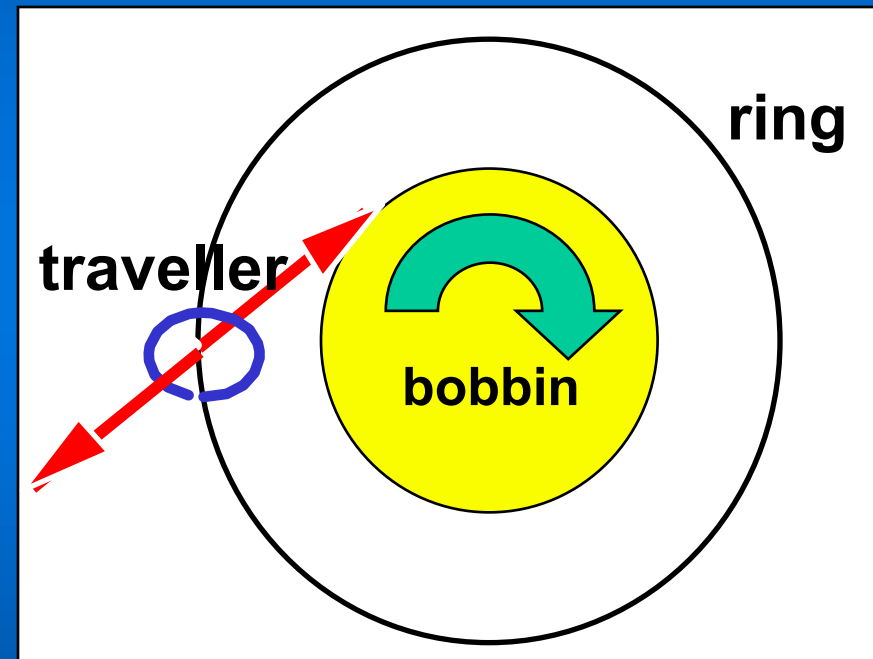
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Failures in Spinning

- Why do ends break?
- Tension on Yarn
 - frictional resistance of traveller
 - centripetal force of balloon
- Spinning limit
 - 35 fibres in X-section
 - random distribution
 - too few to withstand tension
 - point of zero twist



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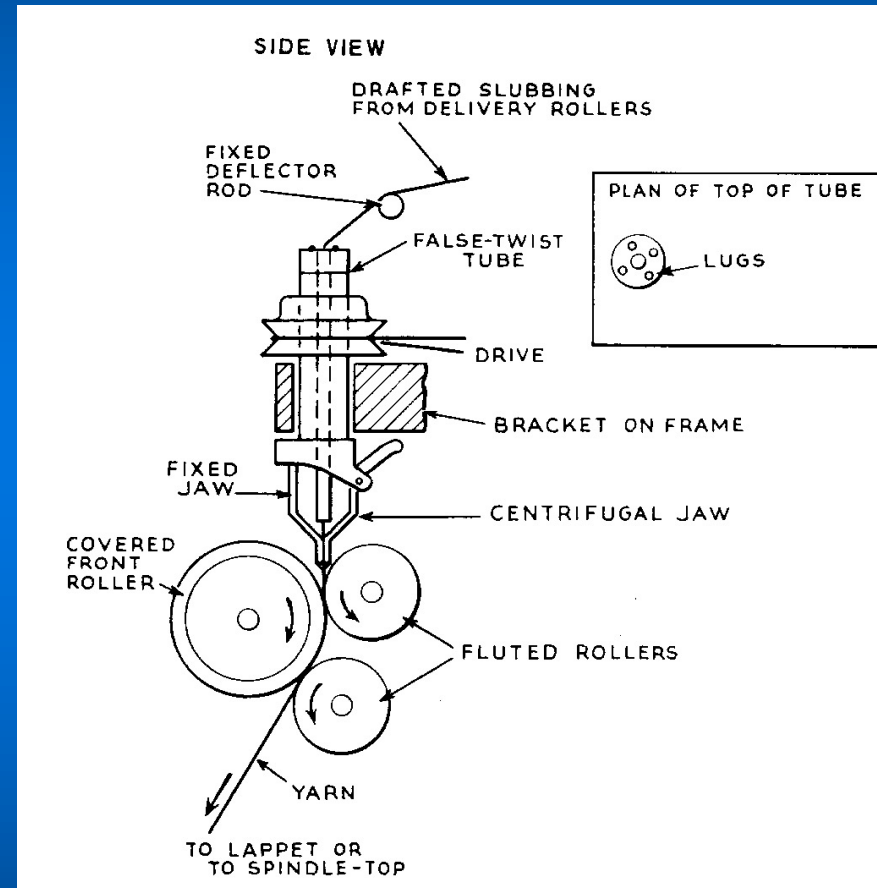
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Woollen Spinning

- **Yarn Characteristics**
 - Bulky, Soft Yarn
- **Low Draft**
 - Slow speed
- **Drafting**
 - rollers
- **Fibre Control**
 - false twist tube
- **Twist & Takeup**
 - ring spinning



False-twist tube (centrifugal type) and front rollers of a Woollen ring-frame.

Peter Auer

Source: Brearley, A., (1965)

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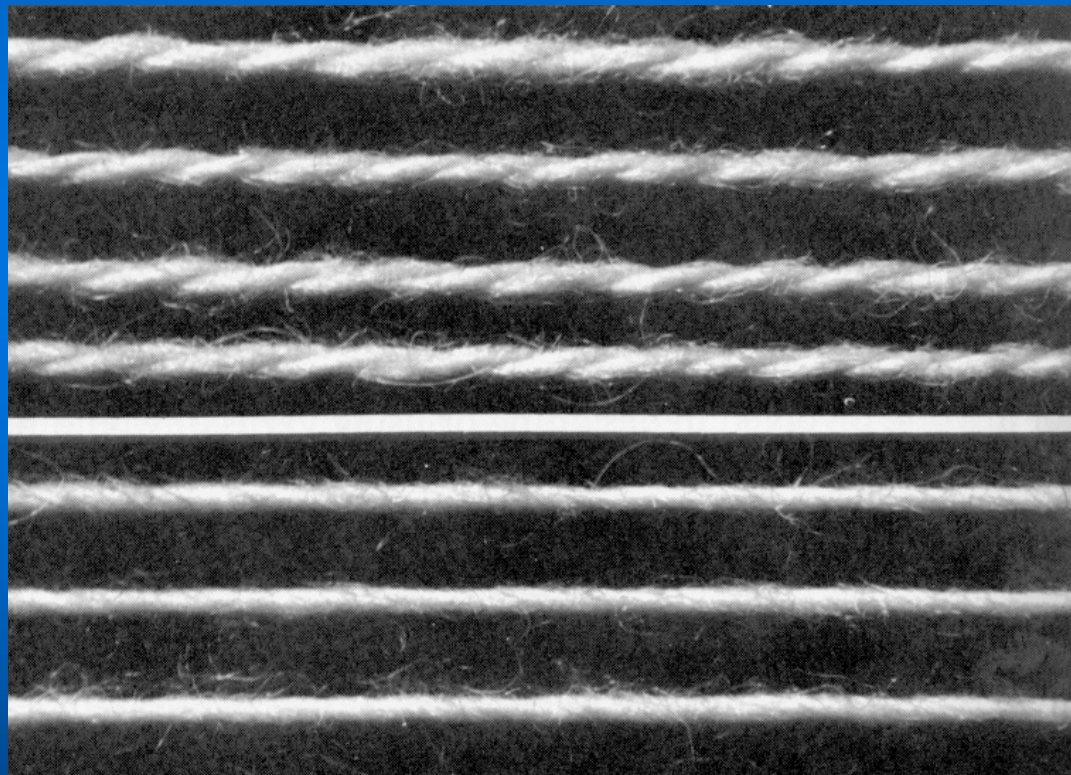
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Folding

- Reasons for folding
 - Uniformity
 - Smoothness
 - Lustre
 - Strength



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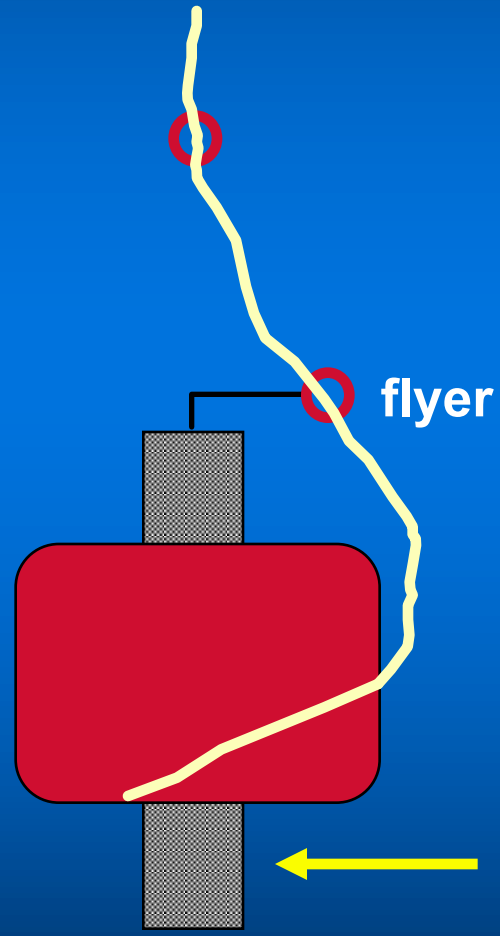
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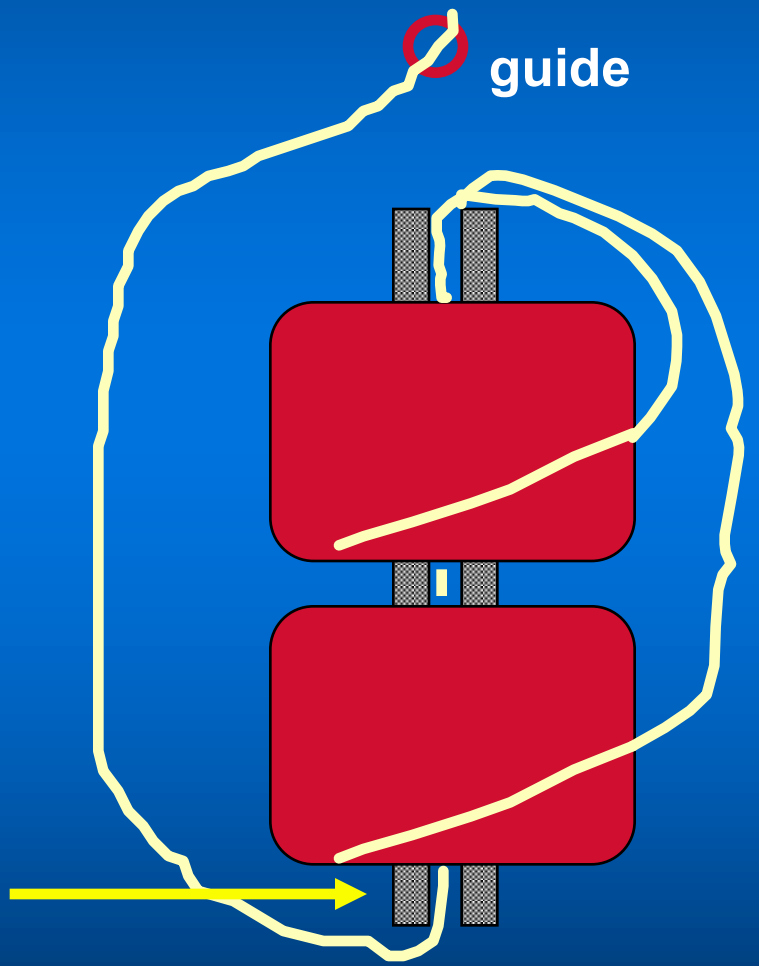


Folding Apparatus

Up-twister



2-for-1 Twister



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