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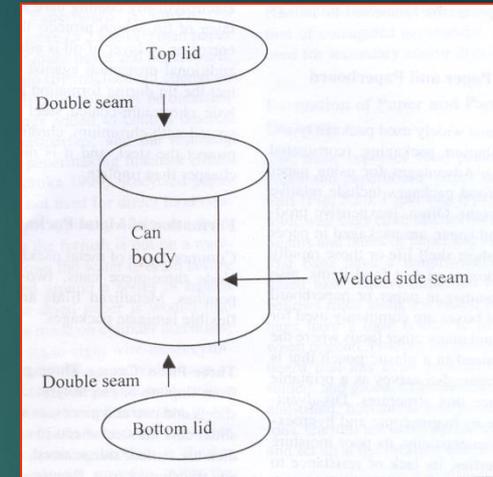


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CAN MAKING MACHINERIES

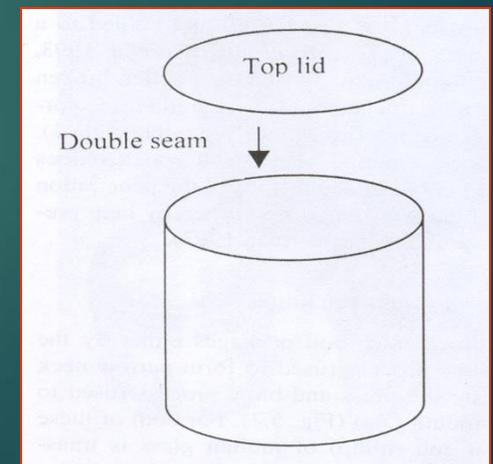
▶ **Three piece can:**

Consists of a cylindrical body with soldered side and two can ends attached to the cylindrical body by double seaming

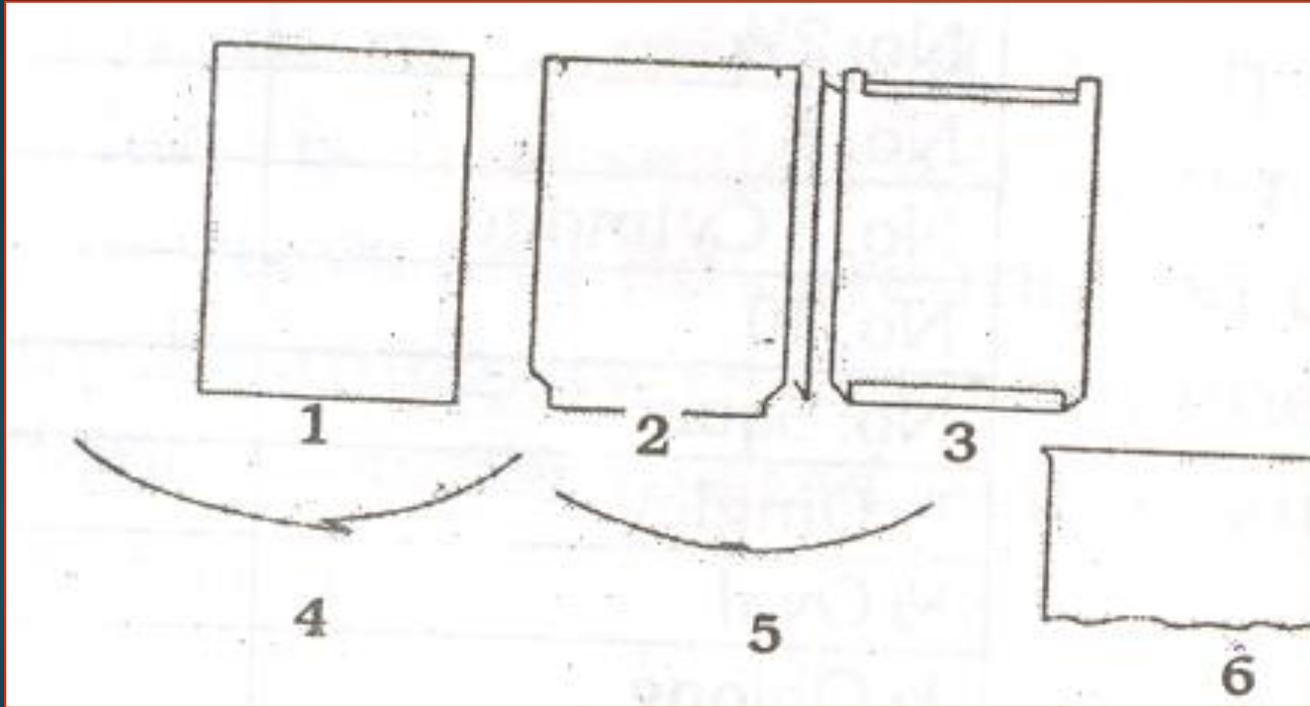


▶ **Two piece can:**

Consists of a seamless body and ends secured on top by double seaming



Fabrication of can – 3 piece cans



1. Body blank
2. Notching
3. Edging
4. Forming
5. Formed
6. Flanging

Body making

- ▶ **Slitter or trimmer machine**

Cuts body blank from tinplate to the type of can

- ▶ **Flexing machine**

Flexing machine removes irregularity and hardens the sheet

- ▶ **Notching** - Corners of the blanks are 'notched'

- ▶ **Edging** - Blank is then 'edged' i.e. formation of hook on each of the two shorter edges of the blank by bending the edges in opposite directions

- ▶ **Fluxing** - Hook is then coated with 'flux'

- ▶ **Locking** - Cylindrical body formed with blanks by locking hooks together

Body making ...



- ▶ **Hammering** – Hammer locked hook flat to form ‘side lock’ or ‘lap seam’ or ‘lock seam’
- ▶ **Fluxing** - Second coat of flux applied outside the side lock and soldered in solder mill to make it water tight
- ▶ **Refining** - Excess flux (solder) removed by rotating brush or buffing wheel
- ▶ Solder solidified by blast of cold air
- ▶ Lock seam have 4 thickness of metal
- ▶ Notched end have 2 thickness of metal
- ▶ Cylindrical body flattened to occupy less space

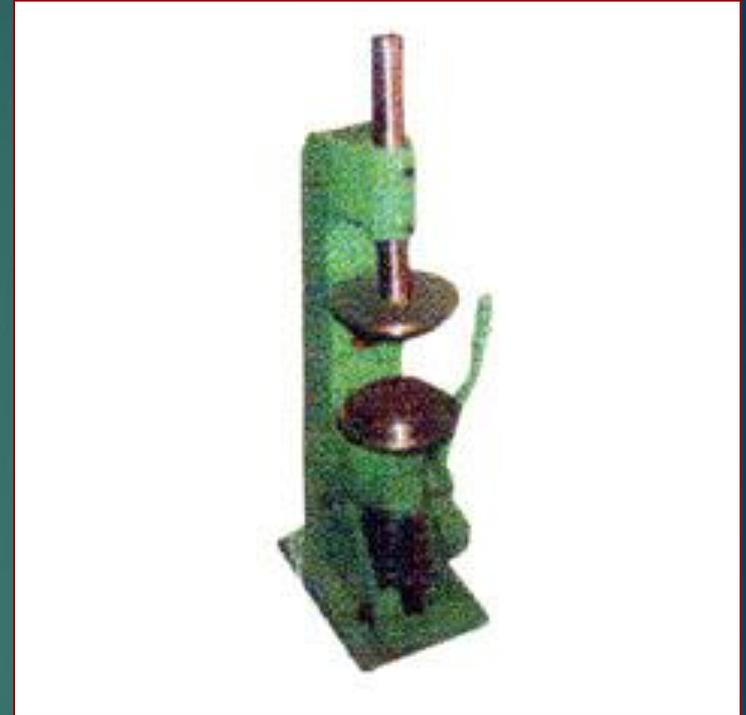
Can body reformer:

- ▶ Reform flattened cans to cylindrical cans
- ▶ Can reform 10-15 cans/min



Flanging machine

- ▶ Flanging can ends after reforming
- ▶ Can reform 10-15cans/min
- ▶ Place can between two flanging punches that fit into the ends of the can
- ▶ Move the punches slightly towards each other forcing the edges outwards to form flanges on both ends



Can ends or lids

- ▶ **Scroll shears** cut sheets into req. size
- ▶ **Automatic press** has dye and punch
- ▶ Dye leave markings and cut the ends
- ▶ Dye also promote concentric expansion rings to receive seaming compounds
- ▶ **Curler** bends the edges
- ▶ Apply seaming compound
- ▶ **Seaming compound** is a rubber solution or emulsion, dried by passing through oven
- ▶ It acts as a gasket and ensures air tight seal

Lining (Seaming) compound

Solvent based used in food cans

- ▶ Rubber 20-25%
- ▶ Filler and pigment 50-75%
- ▶ Resin 10-25%
- ▶ Plasticiser < 1%
- ▶ Antioxidants <1%

Double seaming

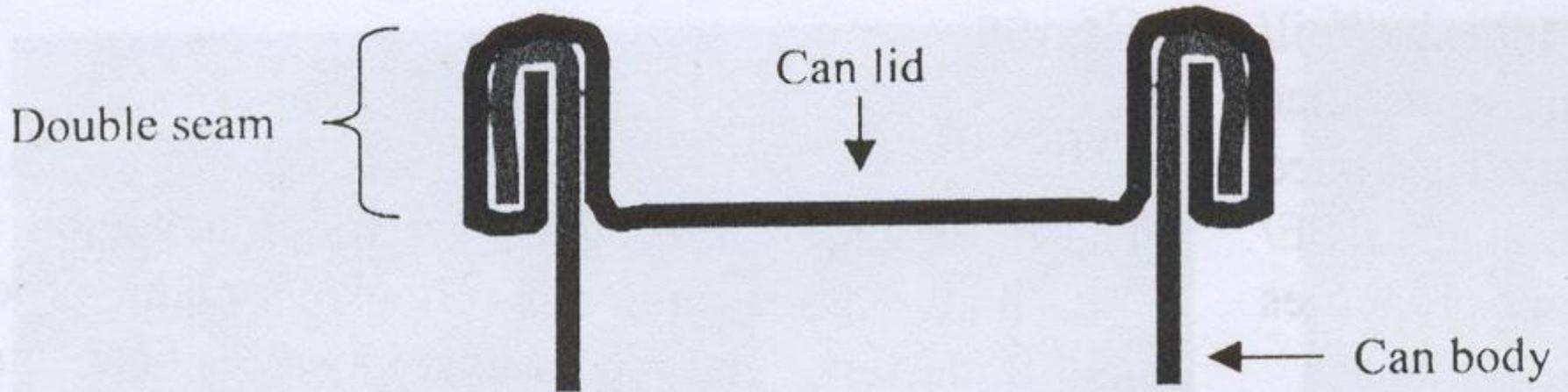
- ▶ Attach can ends to the can body
- ▶ Hooks interlock and form a hermetic seal
- ▶ Double seam consists of 5 thickness of metal
- ▶ Seven thickness at the coincidence of double seam with side seam (If not notched – 11)
- ▶ Can seam 10-15 cans/min



Double seaming...

- ▶ Consists three parts – a base plate, a chuck and a pair of seaming rolls
- ▶ Seaming rolls are grooved wheels, one with a deep and other with a shallow groove
- ▶ Base plate supports the can
- ▶ It raises it with the end in position causing the chuck to fit firmly in the countersink of the end.
- ▶ The chuck rotating on its own axis, causes the can ends to rotate
- ▶ Seaming rolls can rotate on its own axes

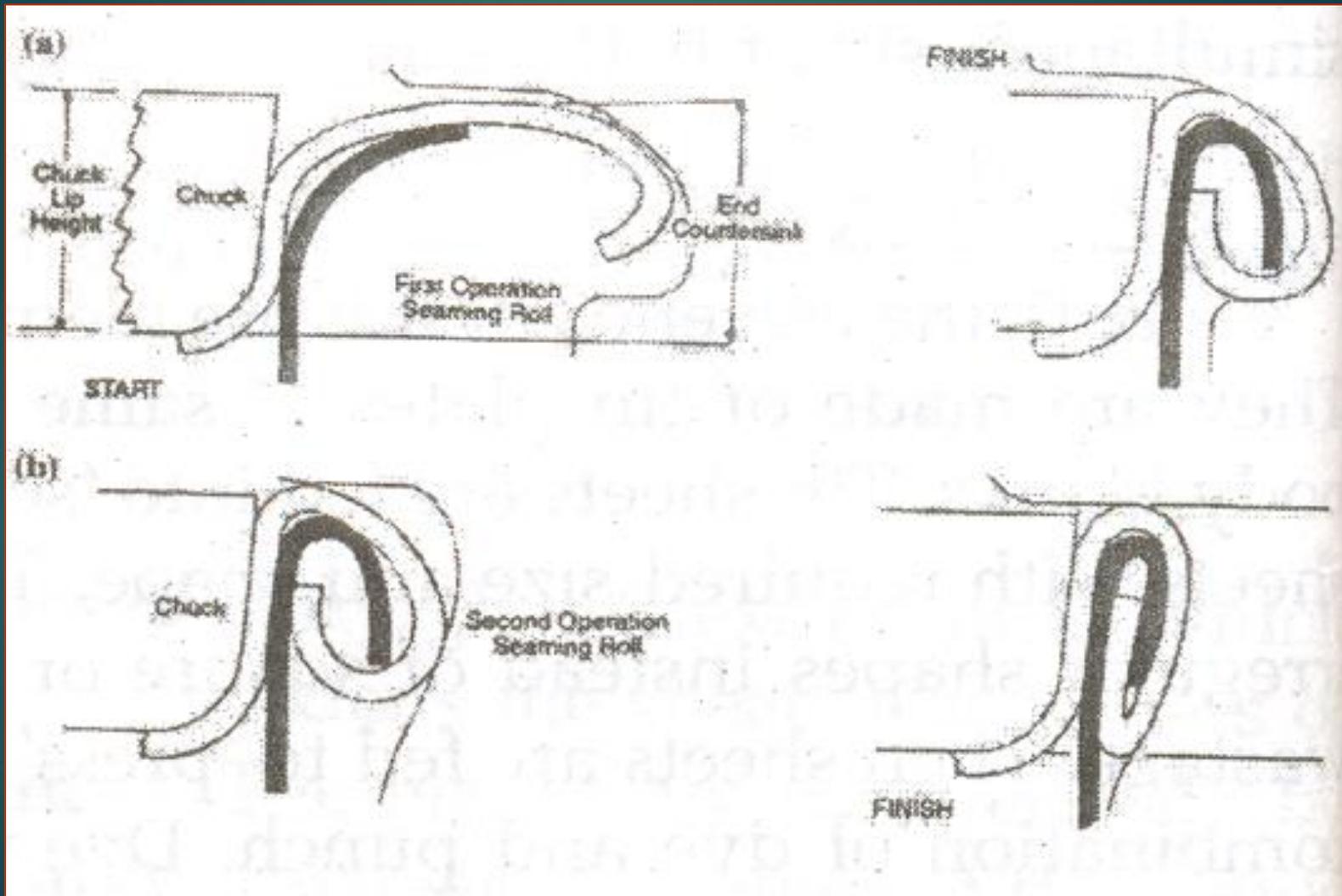
Double seaming



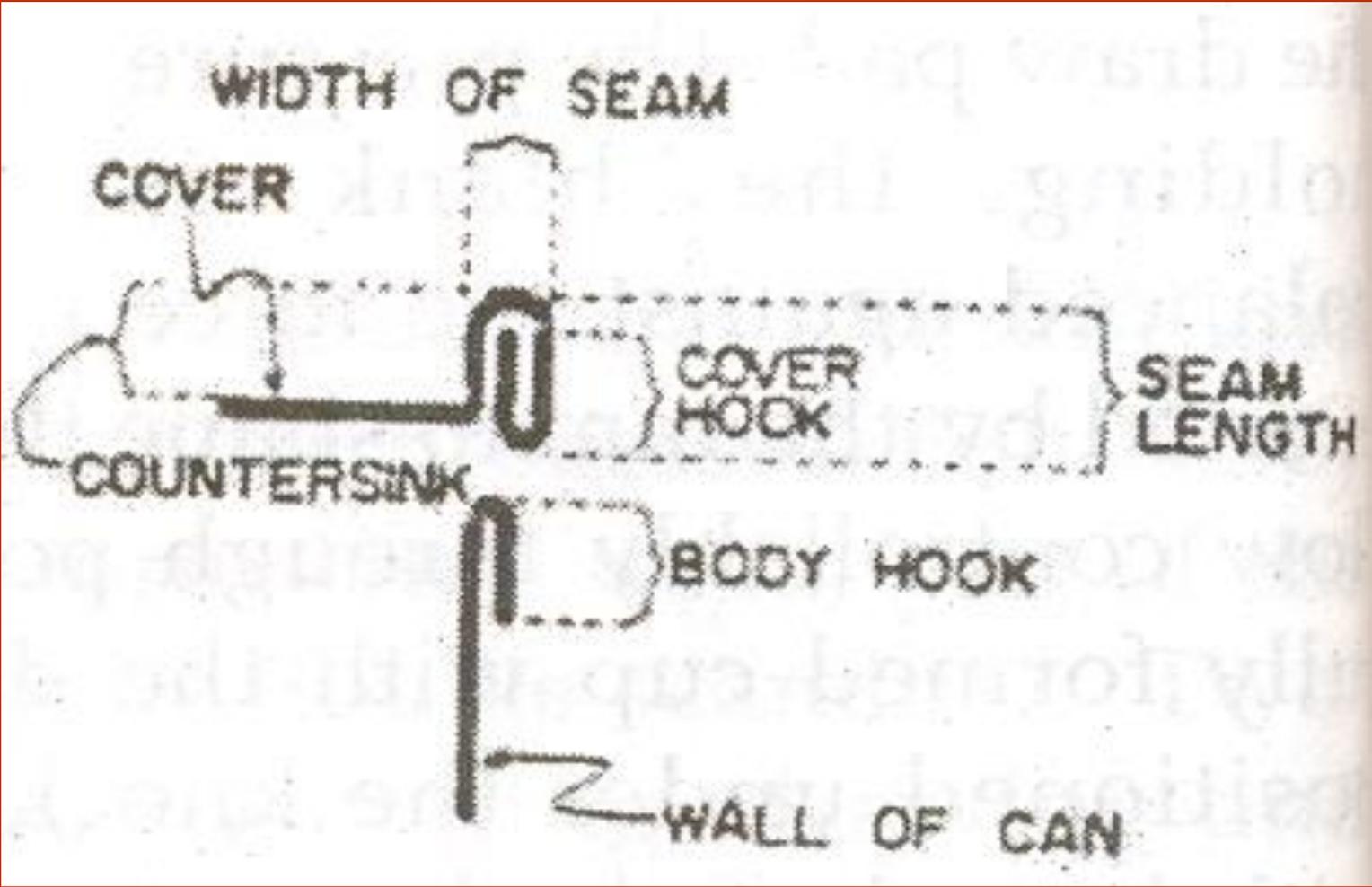
Double seaming...

- ▶ Double seaming involves two operations
- ▶ Seaming roll with deep groove comes first into operation, pressing tightly and revolving at high speed round the curled rim of the end and tucking it under the flange of the body (COVER HOOK)
- ▶ The second roll then compress and smooth out the first operation. This tightly presses and flattens together the hooked edge of the end and the can body against the chuck, forming the final hermetic structure (BODY HOOK)

Double seaming operation



Characteristics of Double Seam



Characteristics of Double Seam

- ▶ **Seam thickness:** Maximum dimension across or perpendicular to the layers of the metal
- ▶ **Seam length:** Maximum dimension of the seam parallel to the layers of metal
- ▶ **Overlap:** Degree of interlock between body hook and cover hook

Overlap percentage

$$OL\% = \frac{BH+CH+t+W}{W - 3t} \times 100$$

BH – Body hook

CH – Cover hook

t – Tin plate thickness

W – Seam length or height

Can embossing machine

- ▶ Suitable for embossing batch number, manufacturing date, expiry date etc. on the lid before seaming
- ▶ Helps to provide necessary details as per the International packaging standards



Can body beader

- ▶ Suitable for beading of cans
- ▶ Bead 10 to 15 cans/min



Two piece cans

- ▶ Electrolytic chromium coated steel or aluminum sheets
- ▶ Seamless body
- ▶ End secured on top by double seaming

Advantages

- ▶ Elimination of two seams **reduce leakage**
- ▶ Elimination of **lead contamination**
- ▶ Give **aesthetic appeal**
- ▶ Bottom design permits better **stackability**
- ▶ Elimination of overlap **reduce metal**

Manufacture of two piece cans

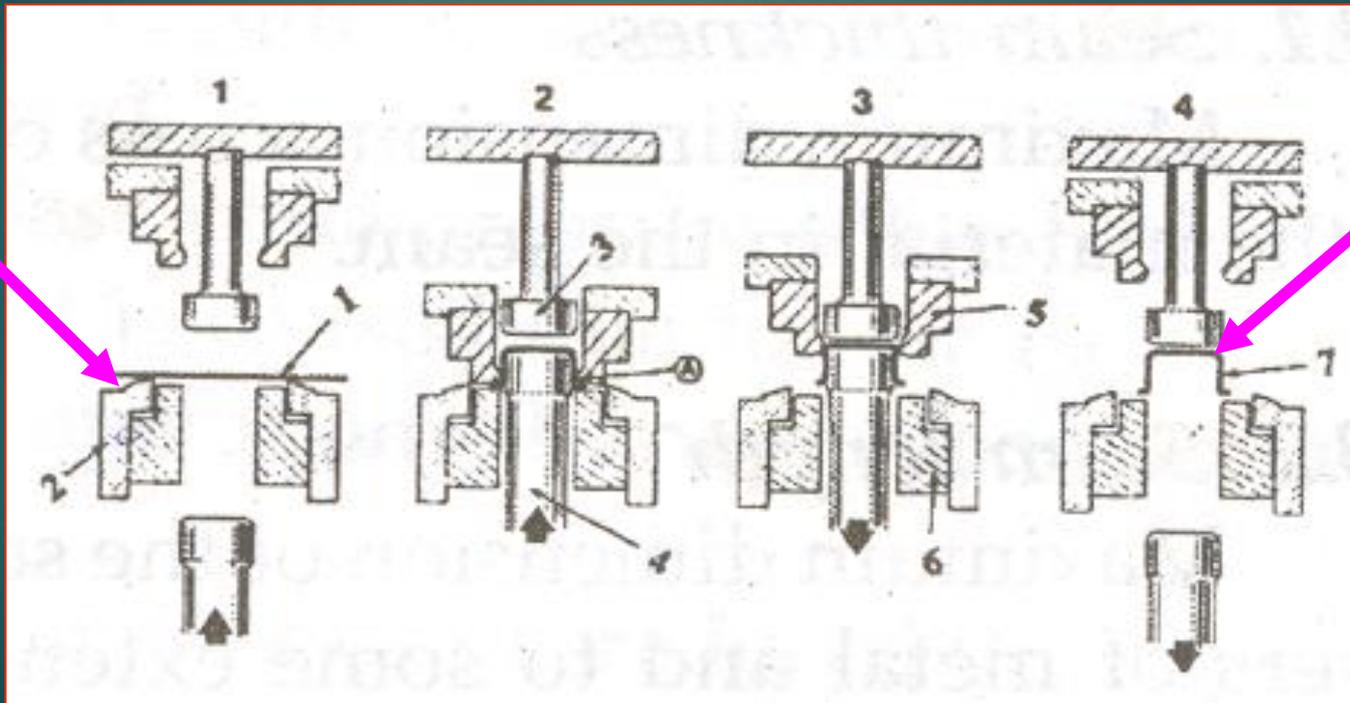
- ▶ **Drawn cans** made by cutting, drawing and flanging in one operation
- ▶ Require heavier and more ductile metal
- ▶ Two processes
 1. Draw and re-draw (DRD) process
 2. Draw and wall iron (DWI) process

I. Draw and re - draw process

Drawing

- ▶ Stamp (draw) metal (chromium) blank through a die to form a shallow can shape

Metal blank

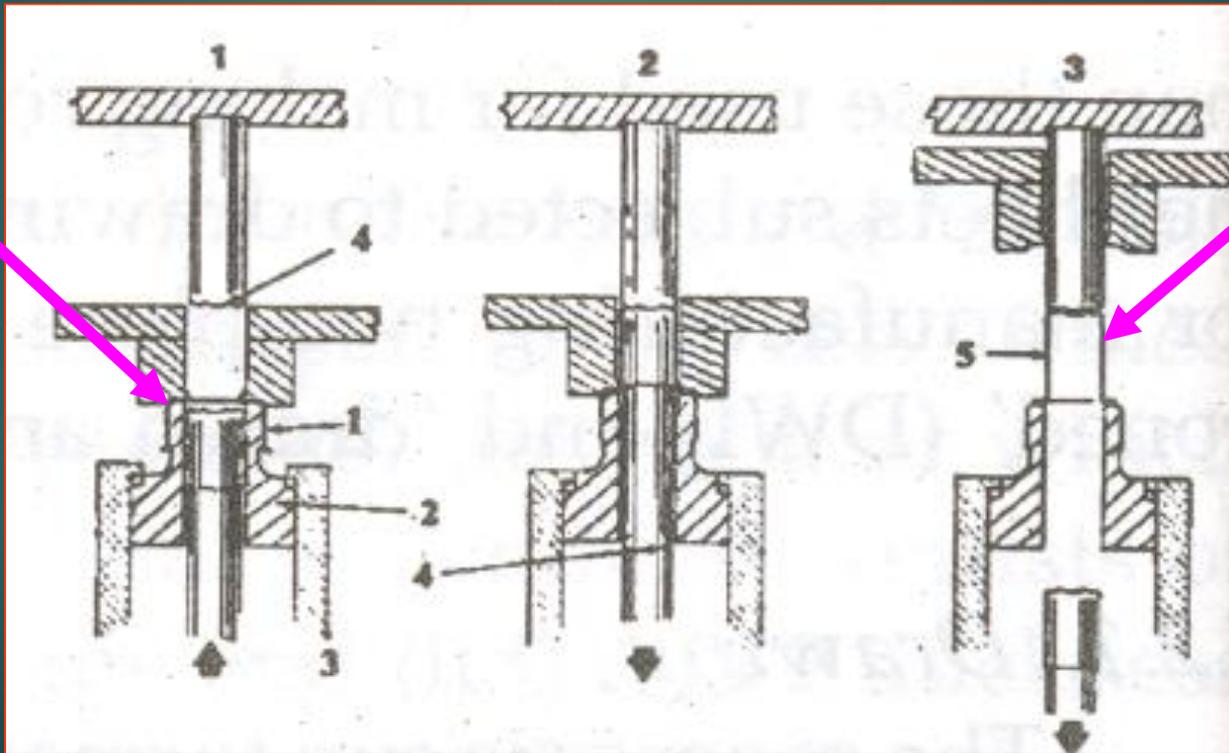


Drawn can

Re-Drawing

- ▶ Force the shape through additional dies (second and third draws)
- ▶ It increases the height of the can without decreasing the thickness of the can

Drawn can



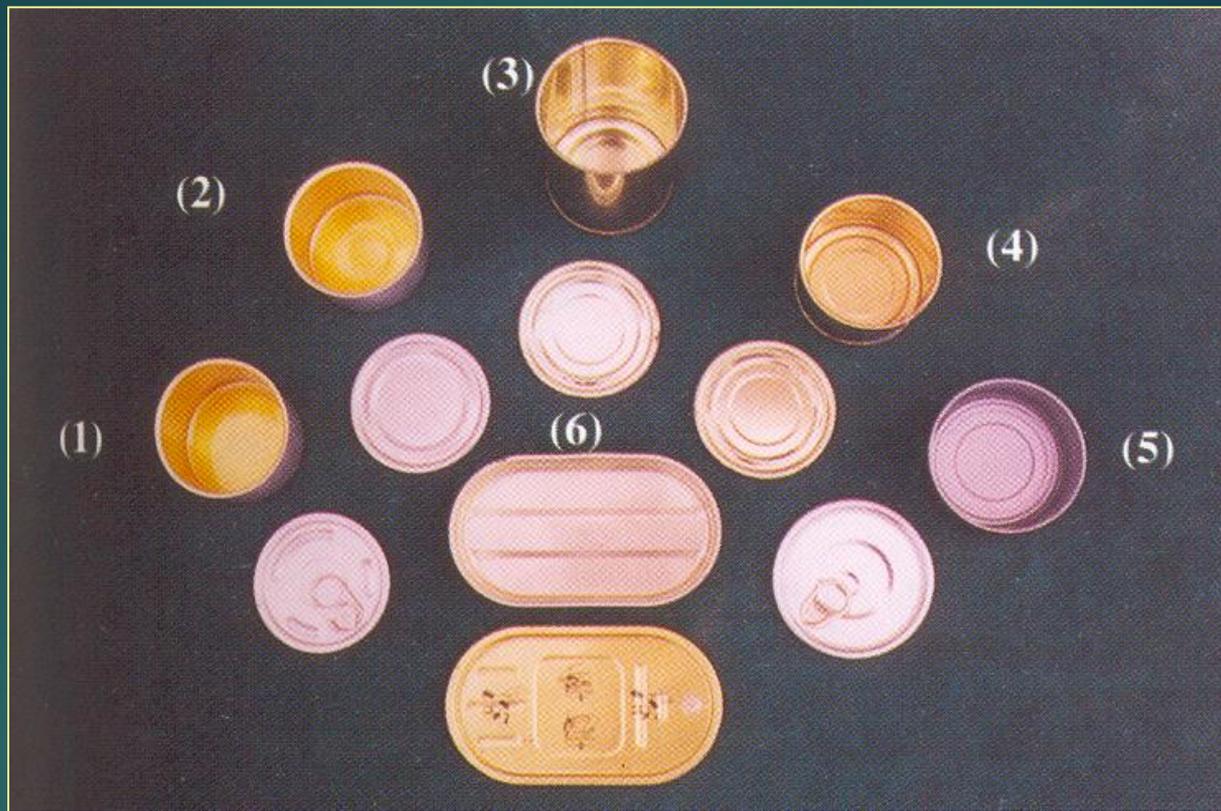
Re-drawn can

II. Draw and wall iron process

- ▶ **Draw** metal blank (aluminum) into a wide cup
- ▶ **Redraw** to the final can diameter
- ▶ **Iron** to reduce sidewall thickness
- ▶ Neck and narrow ends
- ▶ This reduce size and packaging cost
- ▶ eg. Carbonated beverages

Can sizes

- ▶ Trade name
- ▶ Dimensions - **401 x 411**
- ▶ Diameter (1 digit) in integral inches
- ▶ Height (next 2 digits) in – sixteenths of an inch
- ▶ $4\frac{1}{16}$ " in diameter and $4\frac{11}{16}$ " in height
- ▶ Now-a-days, dimensions in mm



1. 301 x 203 Al can with pull on tab
2. 301 x 203 Al. can without pull on tab
3. 301 x 409 No. 1 Tall tin can
4. 301 x 203 tin can
5. 8 oz TFS can
6. Hansa flat can (Al)

Trade name and dimensions of cans

Trade name	Dimensions	Dimensions
4½ oz prawn	301 x 203	77 x 56
8 oz prawn	301 x 206	77 x 60
1 lb jam	301 x 309	77 x 90
No. 1 Tall	301 x 409	77 x 116
8 oz Tuna	307 x 113	87 x 43
¼ dingley	404 x 302 x 014	108 x 80 x 22
½ oval	309 x 515 x 103	90 x 150 x 80
¾ oblong	508 x 204 x 103	140 x 56 x 80