

Expendable-Mold Casting Processes


Three Molding Categories

Expendable Molds

- Single-use with multiple-use patterns
- Single-use with single-use patterns

Reusable Molds

- Multiple-use molds

The image shows a complex industrial machine used for green-sand mold casting. In the center, a large, dark, rectangular mold is being processed. Below it, a series of horizontal rollers or conveyor belts are visible. The machine is constructed from various metal components, including pipes, valves, and structural frames. A red light is visible on the left side of the machine, and a blue light is on the right. The overall scene is dimly lit, with the primary light source coming from the machine's internal components.

Green-Sand Mold Casting

[Watch Video Here](#)

Sand-Cast Parts



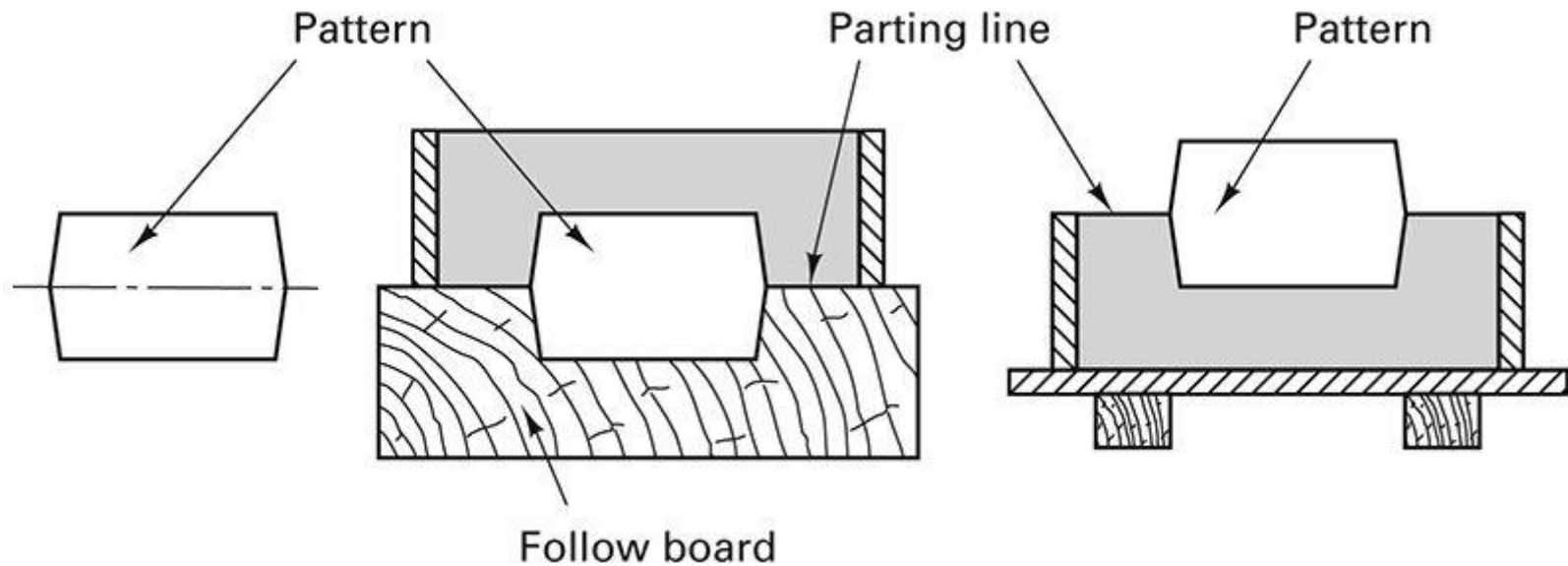


[Watch Video Here](#)

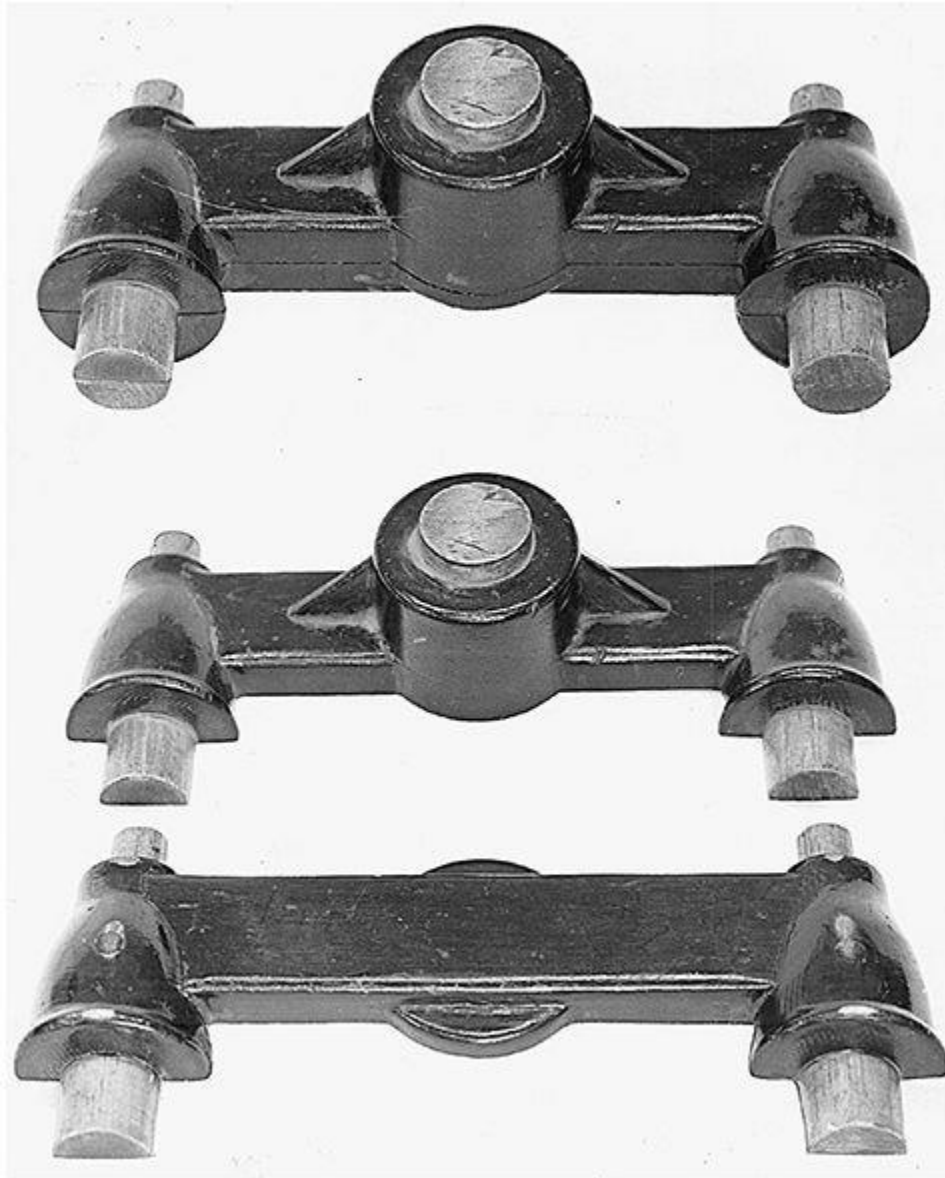
Single-piece pattern



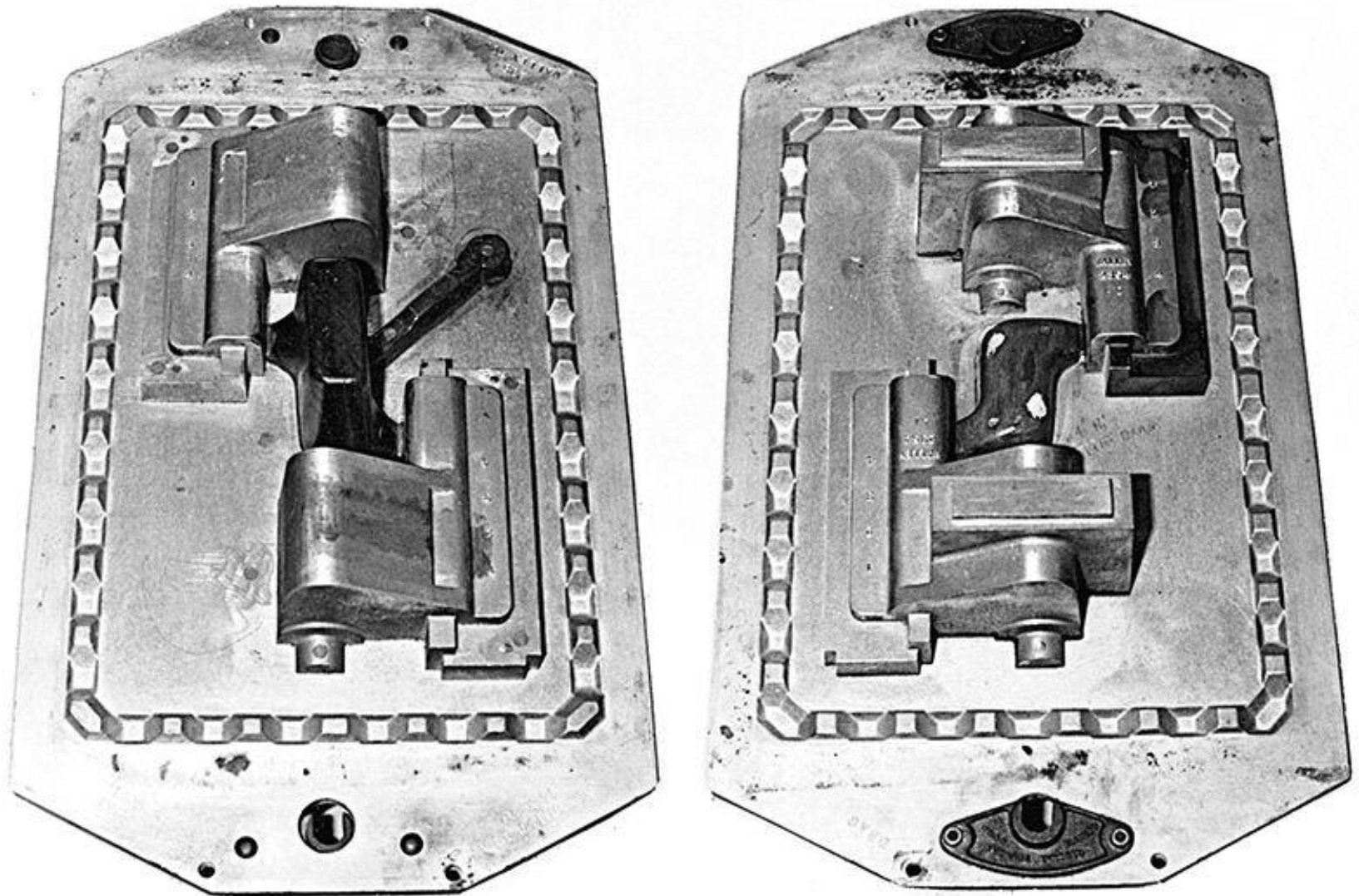
Follow Board for Single-piece Pattern



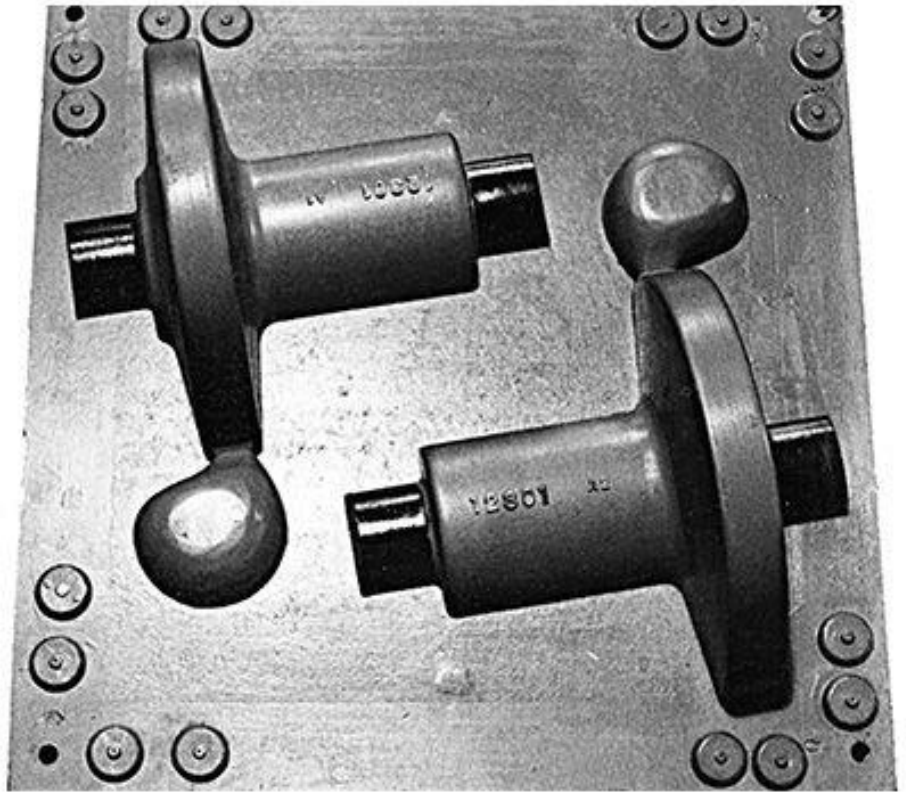
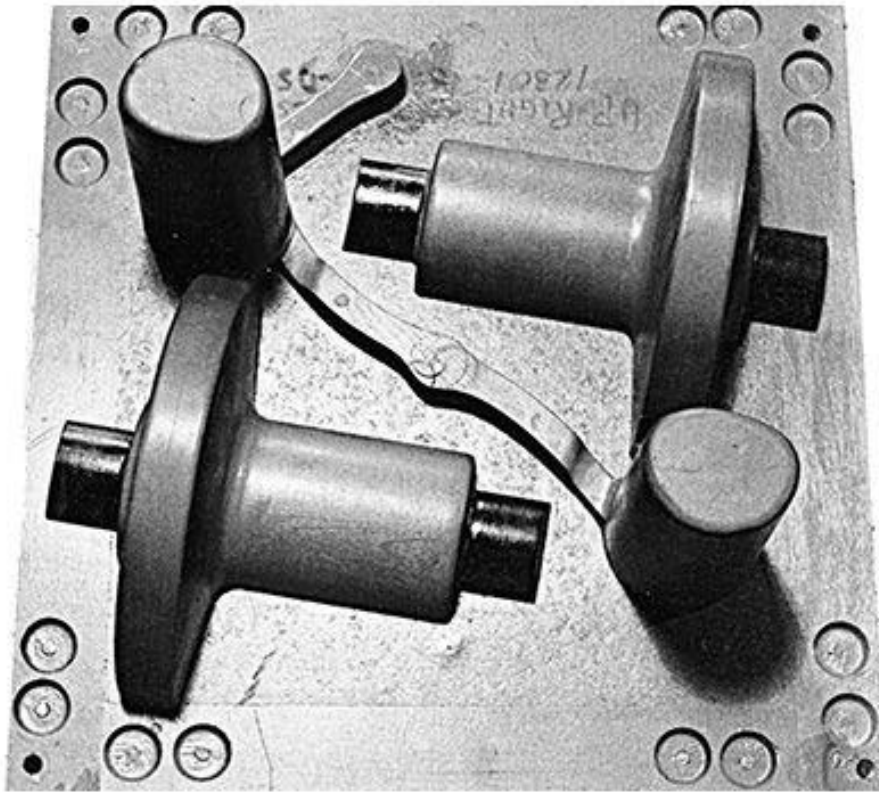
Split Pattern



Match-plate Pattern



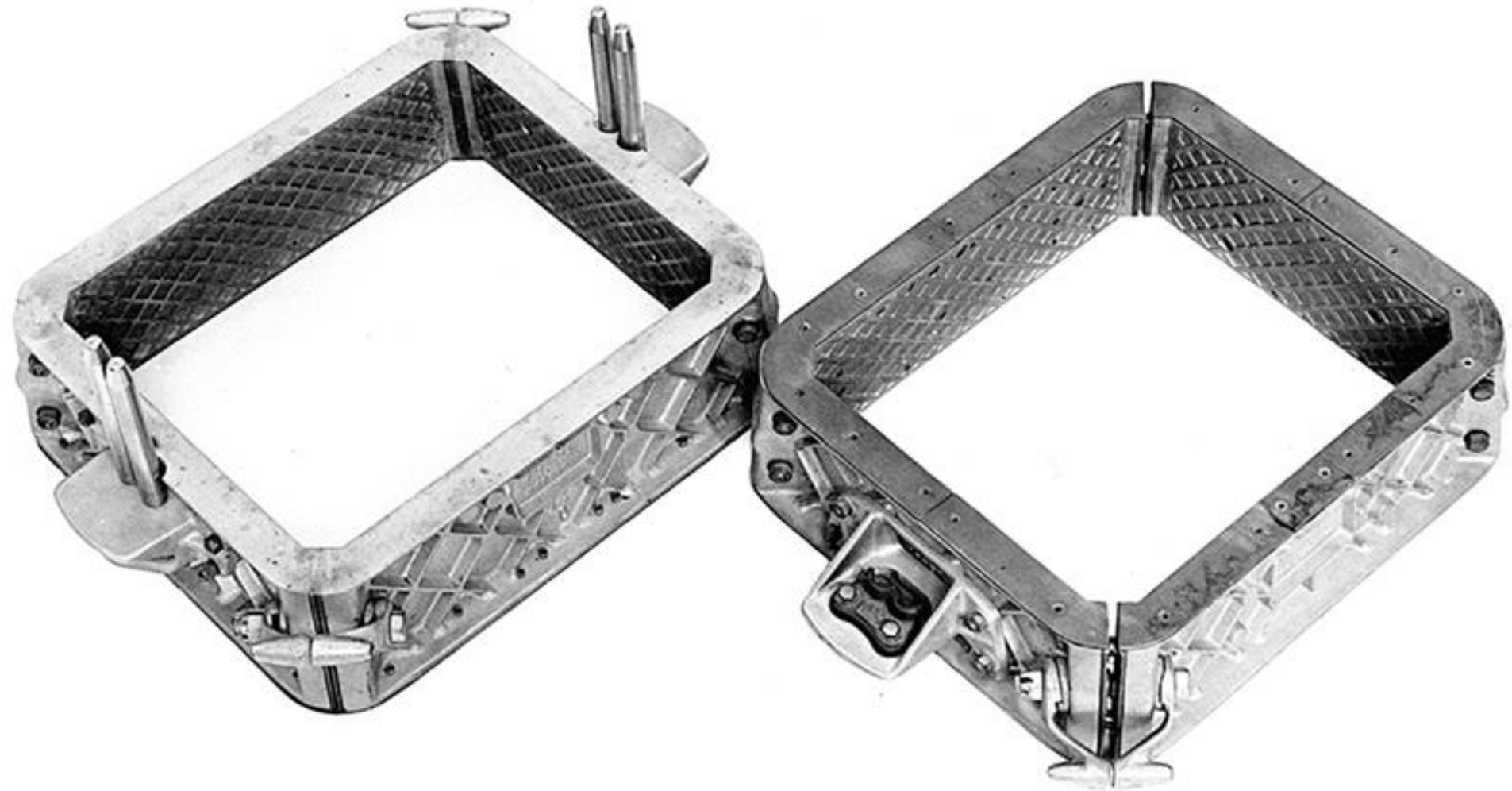
Cope and Drag Patterns



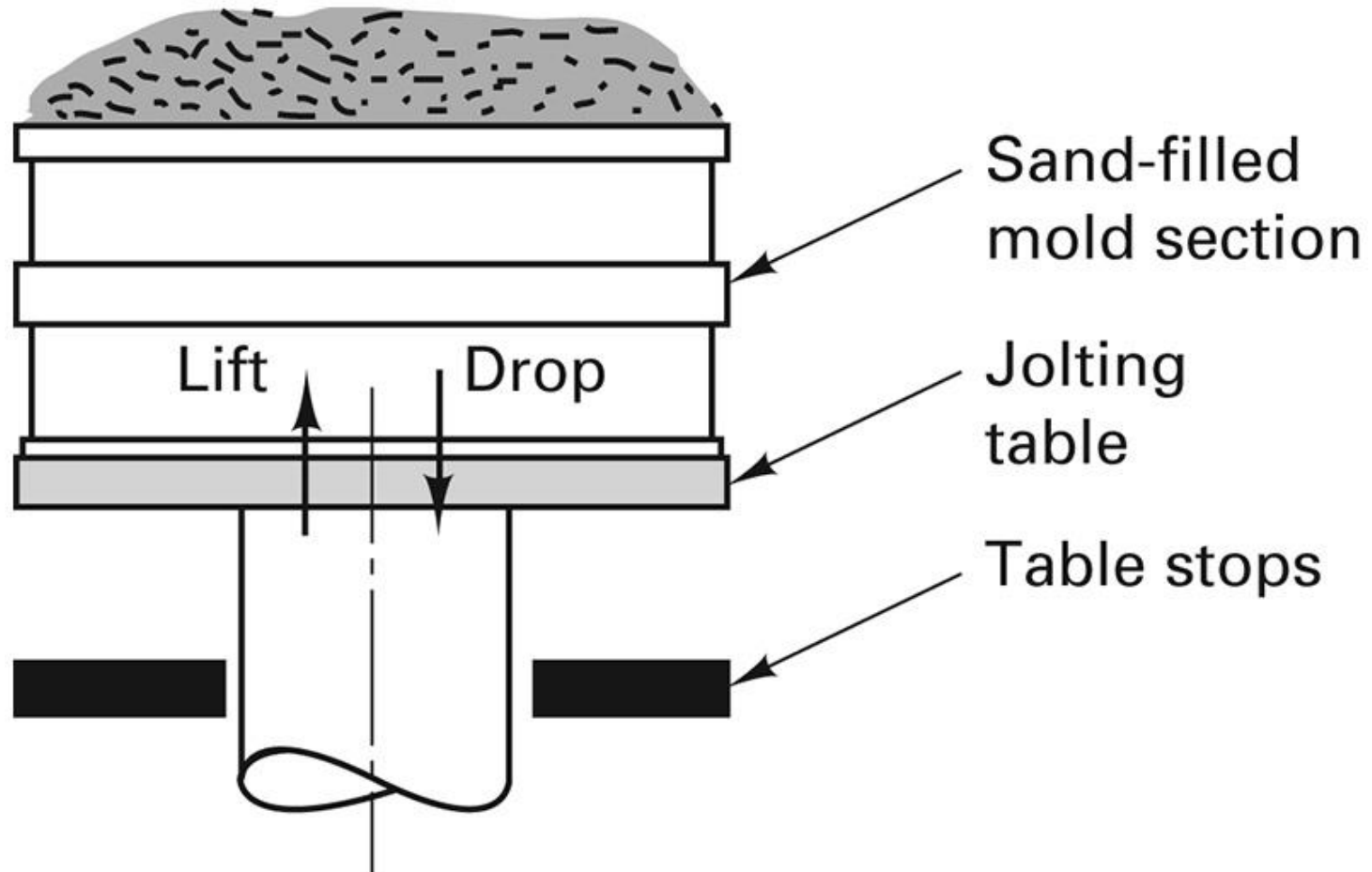
Sand Requirements

1. Refractoriness – withstand high temps.
2. Cohesiveness – retain given shape
3. Permeability – allow gasses to escape
4. Collapsibility – allow metal to shrink and free casting by disintegration

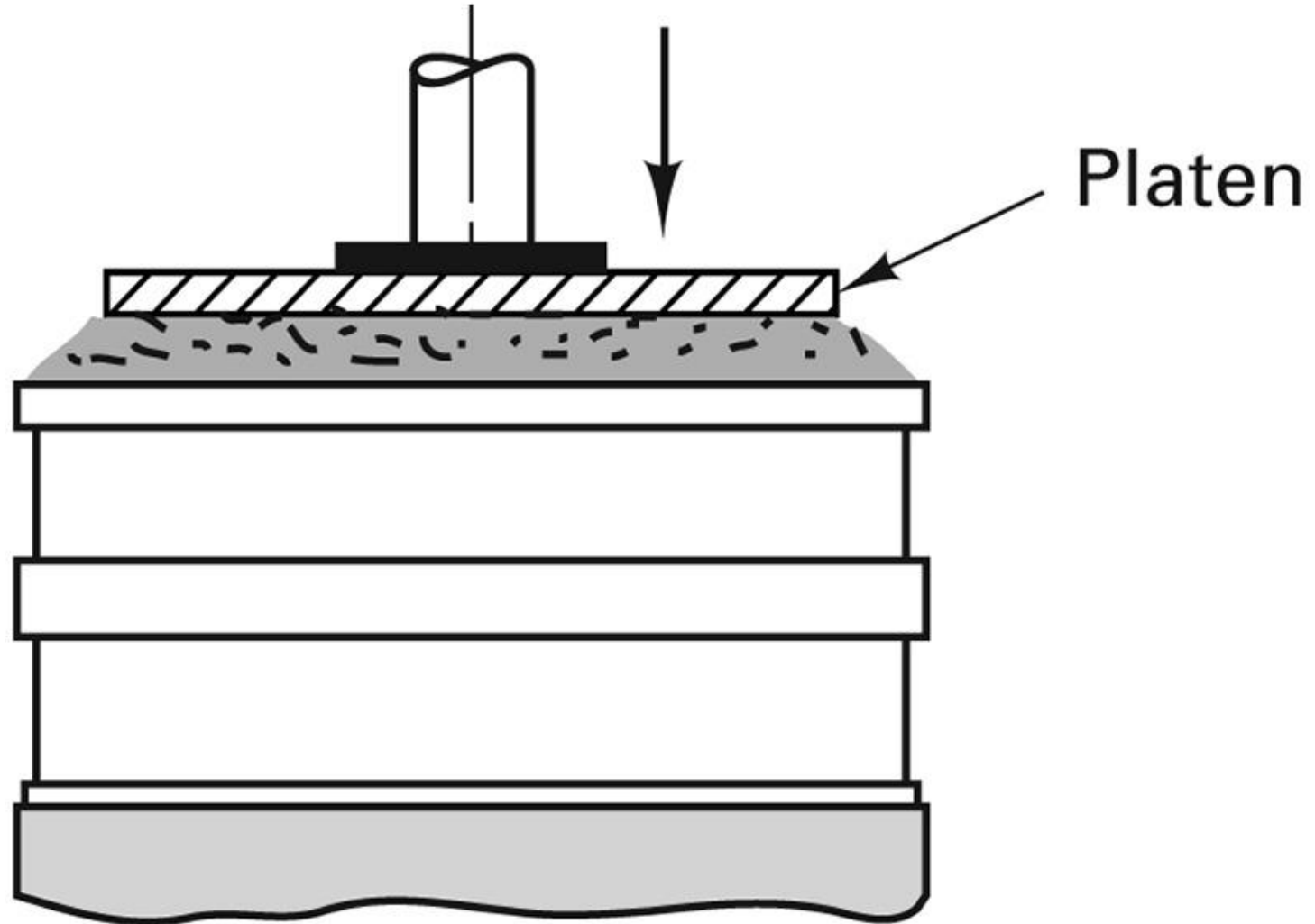
Flasks



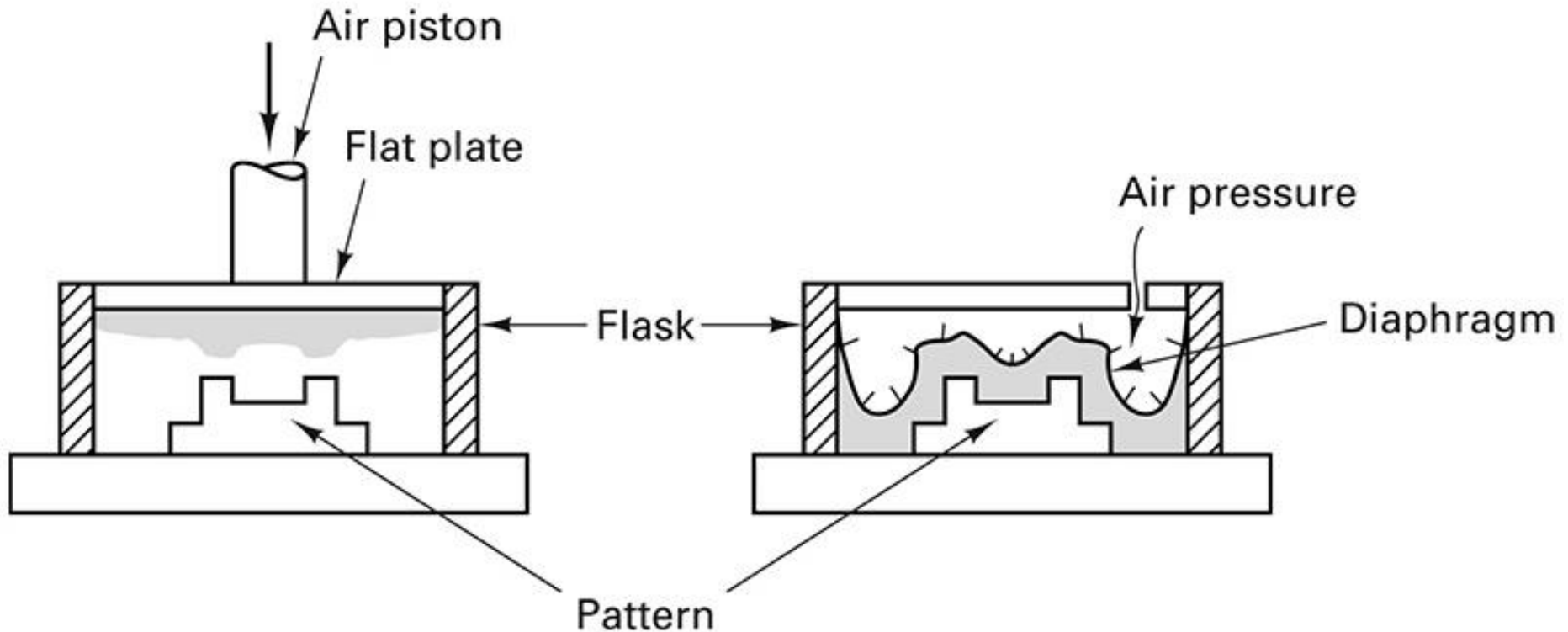
Mold-Making by Jolting



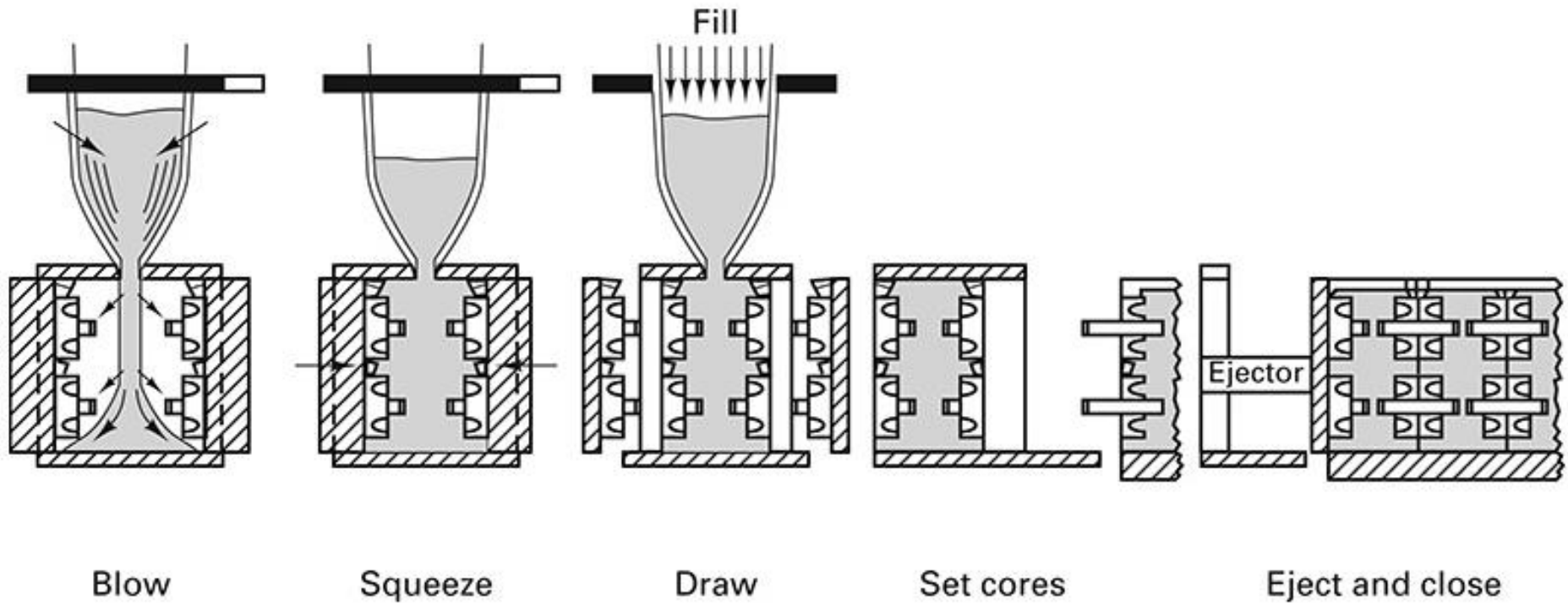
Mold-Making by Squeezing



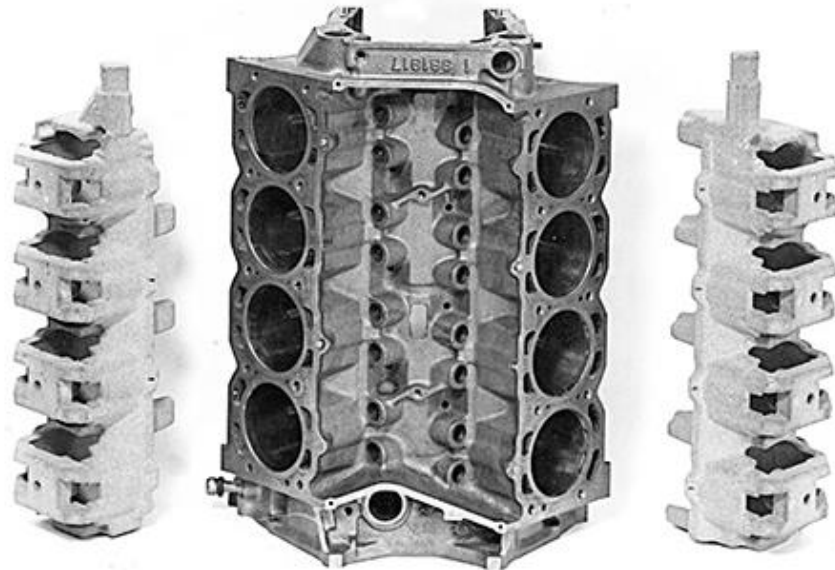
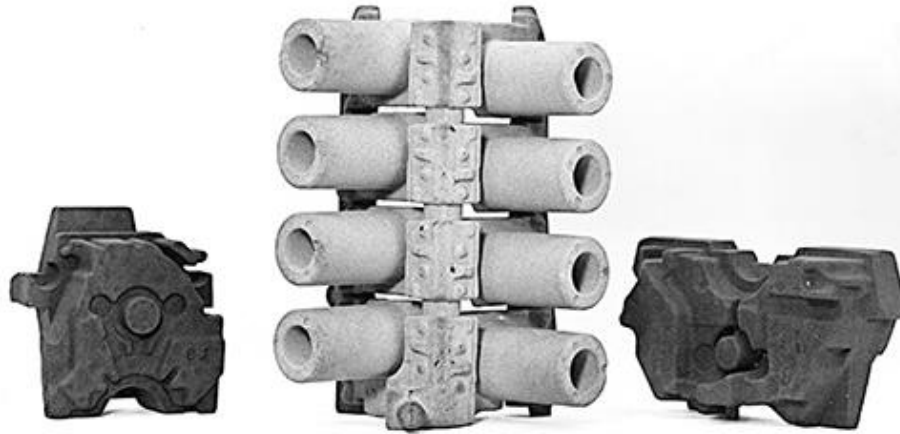
Squeezing and Flexible Diaphragm



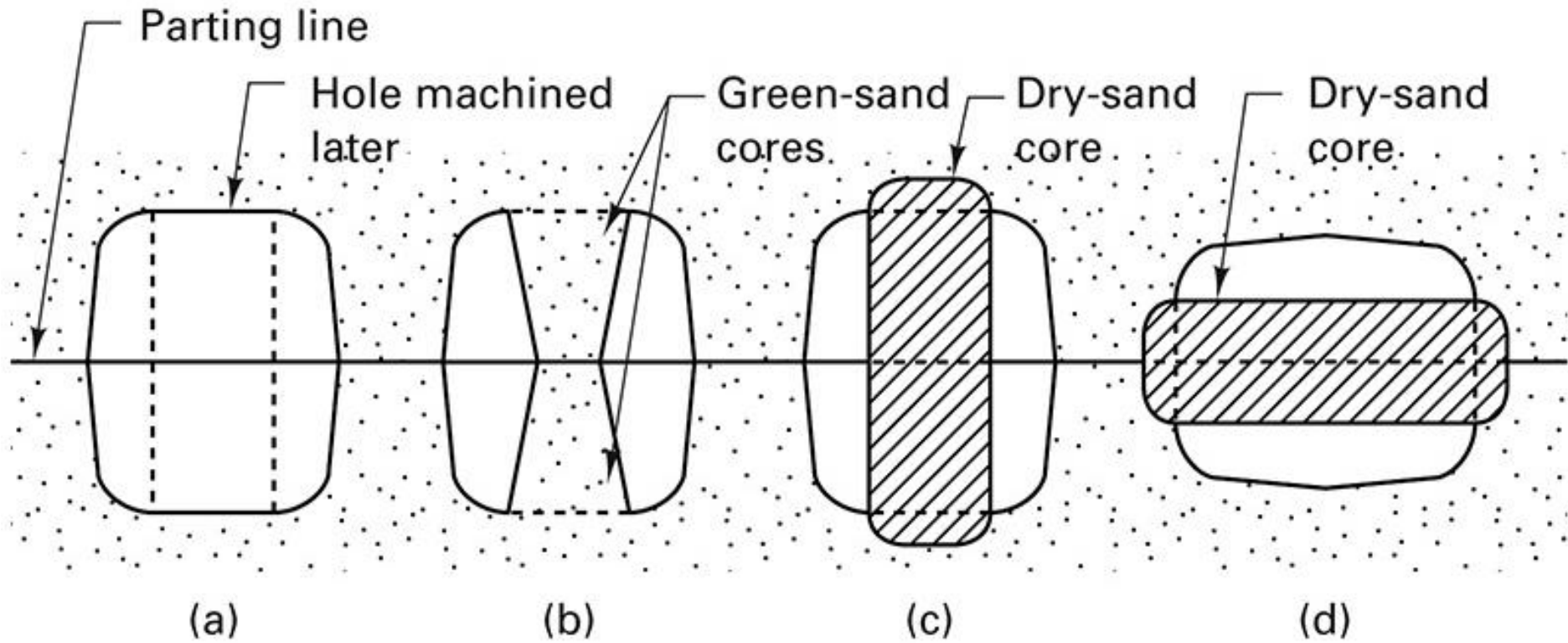
Flaskless Molding Process



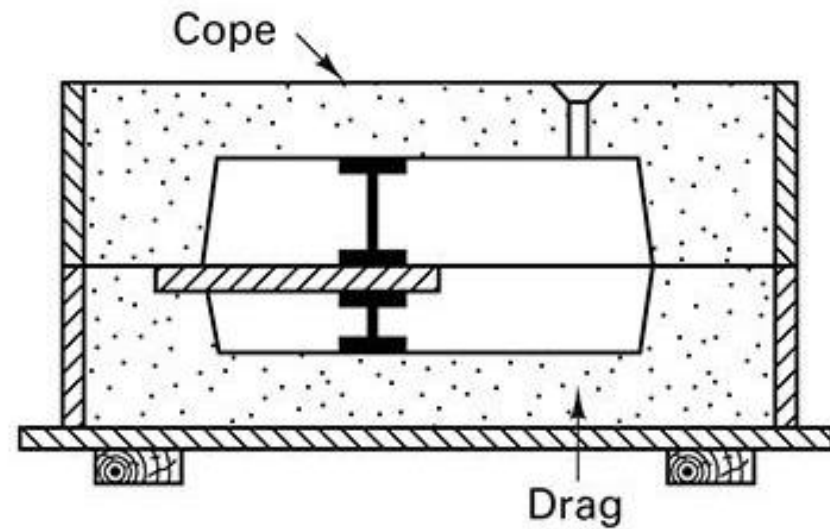
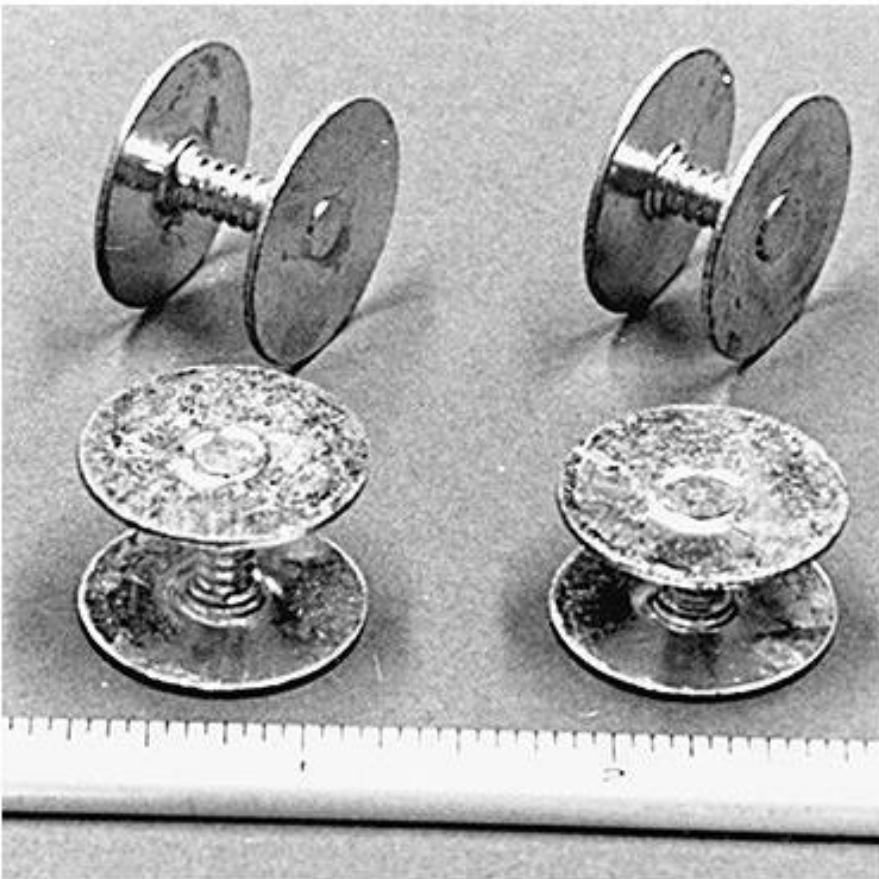
Engine Block Cores



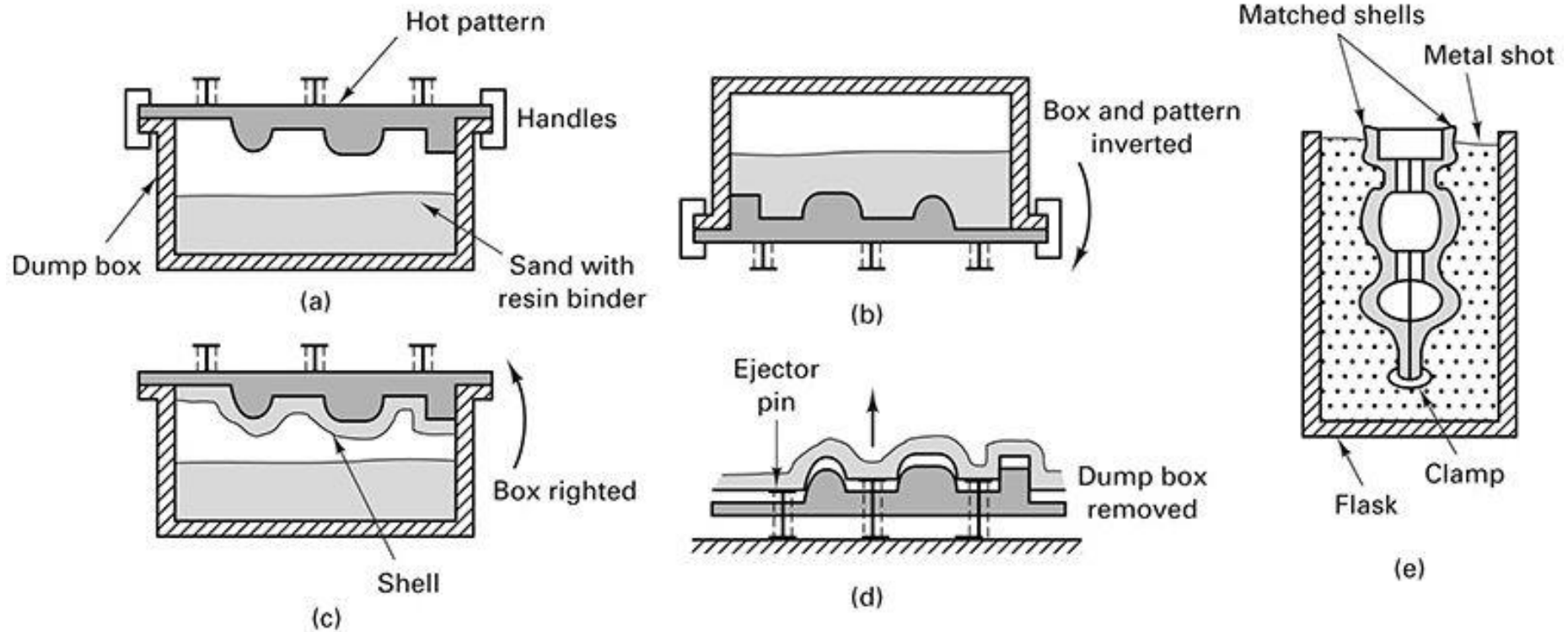
Core Prints



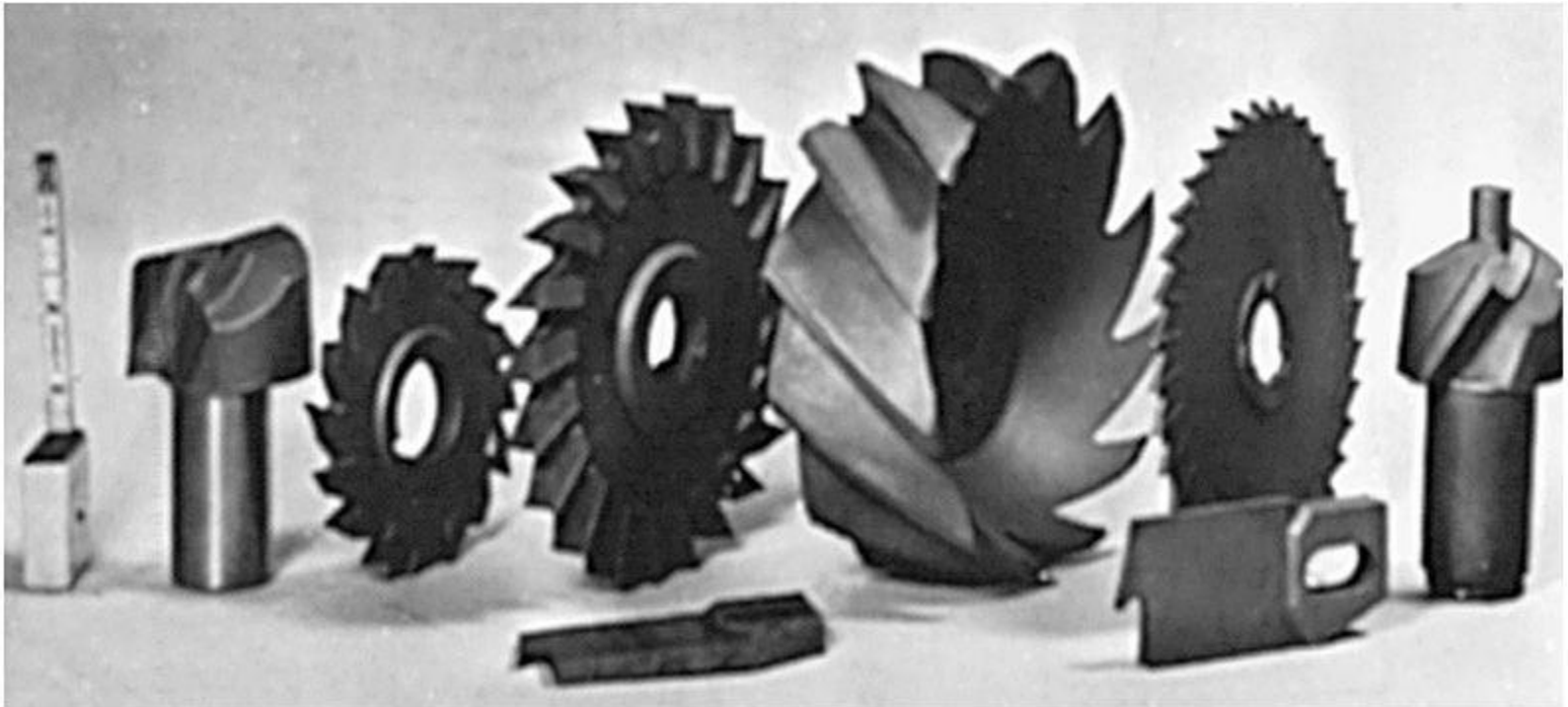
Chaplets to Support Cores



Shell Molding



Intricate cutters produce by ceramic casting

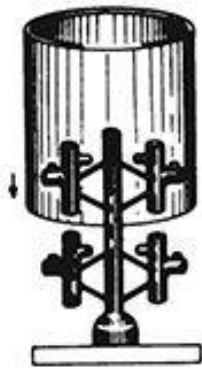




Investment Casting

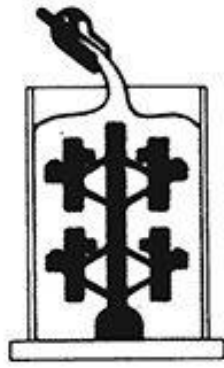
[Watch Video Here](#)

Investment Casting by Flask-Casting



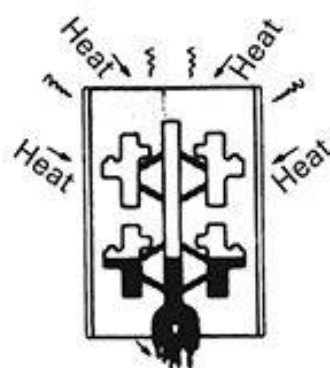
3

A metal flask is placed around the pattern cluster.



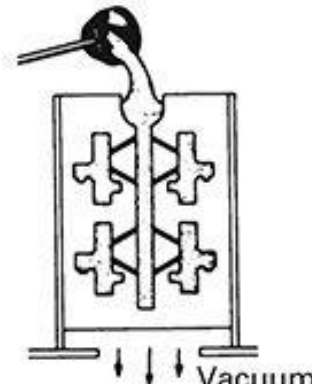
4

Flask is filled with investment-mold slurry.



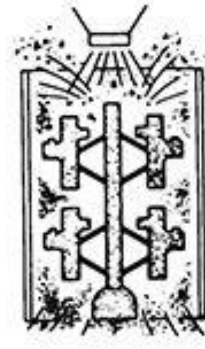
5

After mold material has set and dried, patterns are melted out of mold.



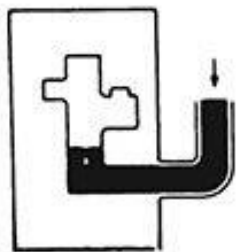
6

Hot molds are filled with metal by gravity, pressure, vacuum, or centrifugal force.



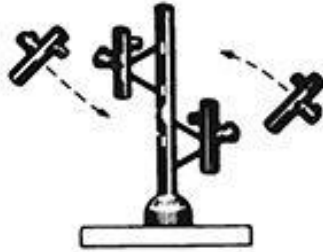
7

Mold material is broken away from castings.



1

Wax or plastic is injected into die to make a pattern.



2

Patterns are gated to a central sprue.



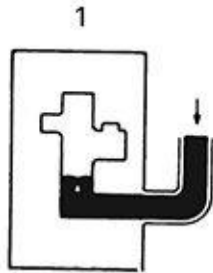
8

Castings are removed from sprue, and gate stubs are ground off.

To shipping

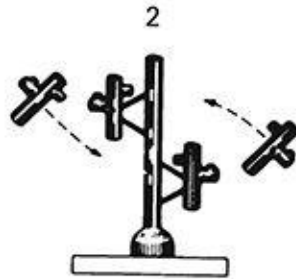
Investment Casting by Shell-Casting

Wax or plastic is injected into die to make a pattern.



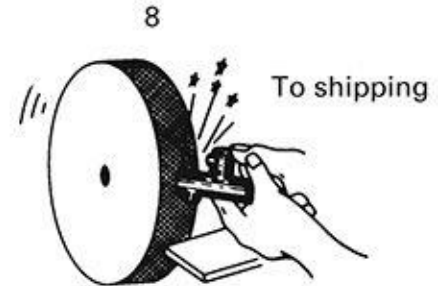
1

Patterns are gated to a central sprue.



2

Castings are removed from sprue, and gate stubs are ground off.



8



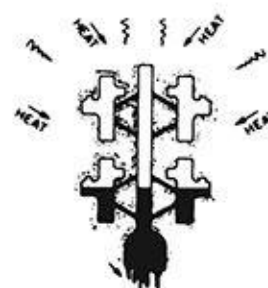
3

Pattern clusters are dipped in ceramic slurry.



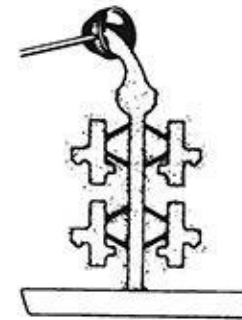
4

Refractory grain is sifted onto coated patterns. Steps 3 and 4 are repeated several times to obtain desired shell.



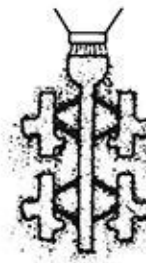
5

After mold material has set and dried, patterns are melted out of mold.



6

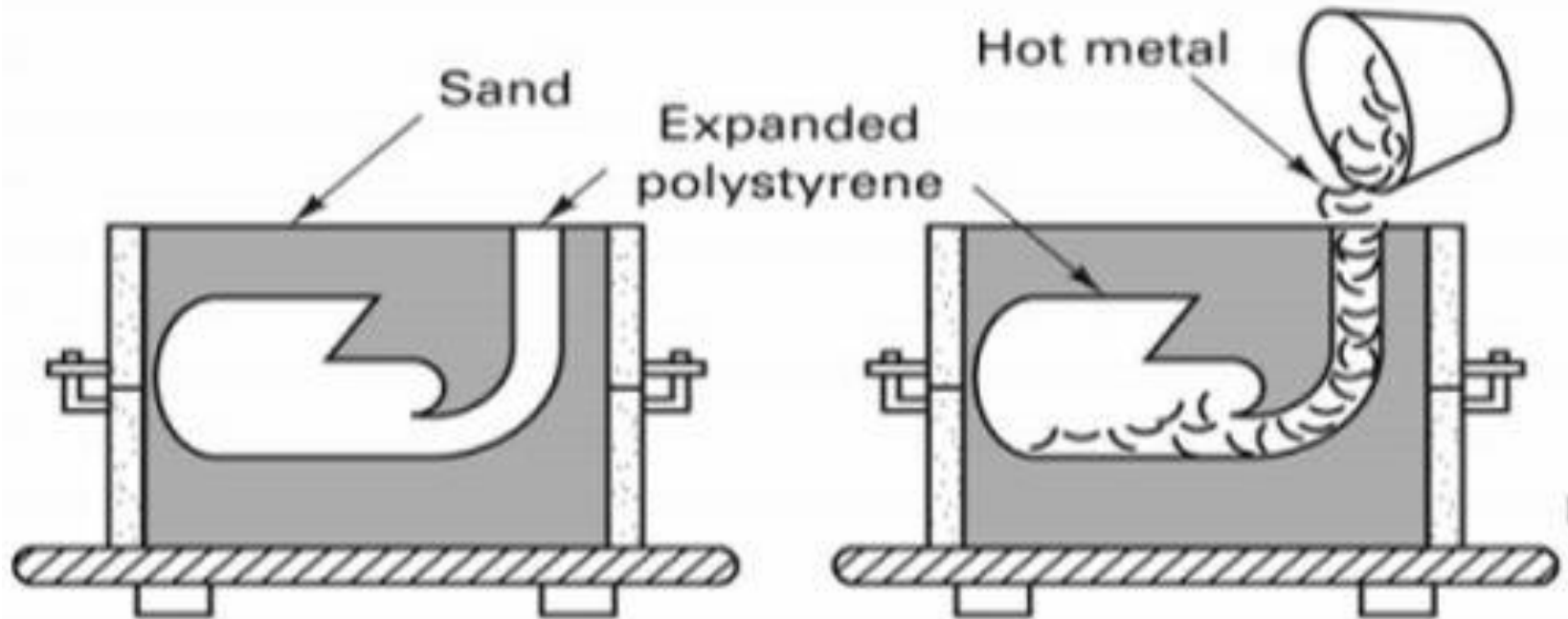
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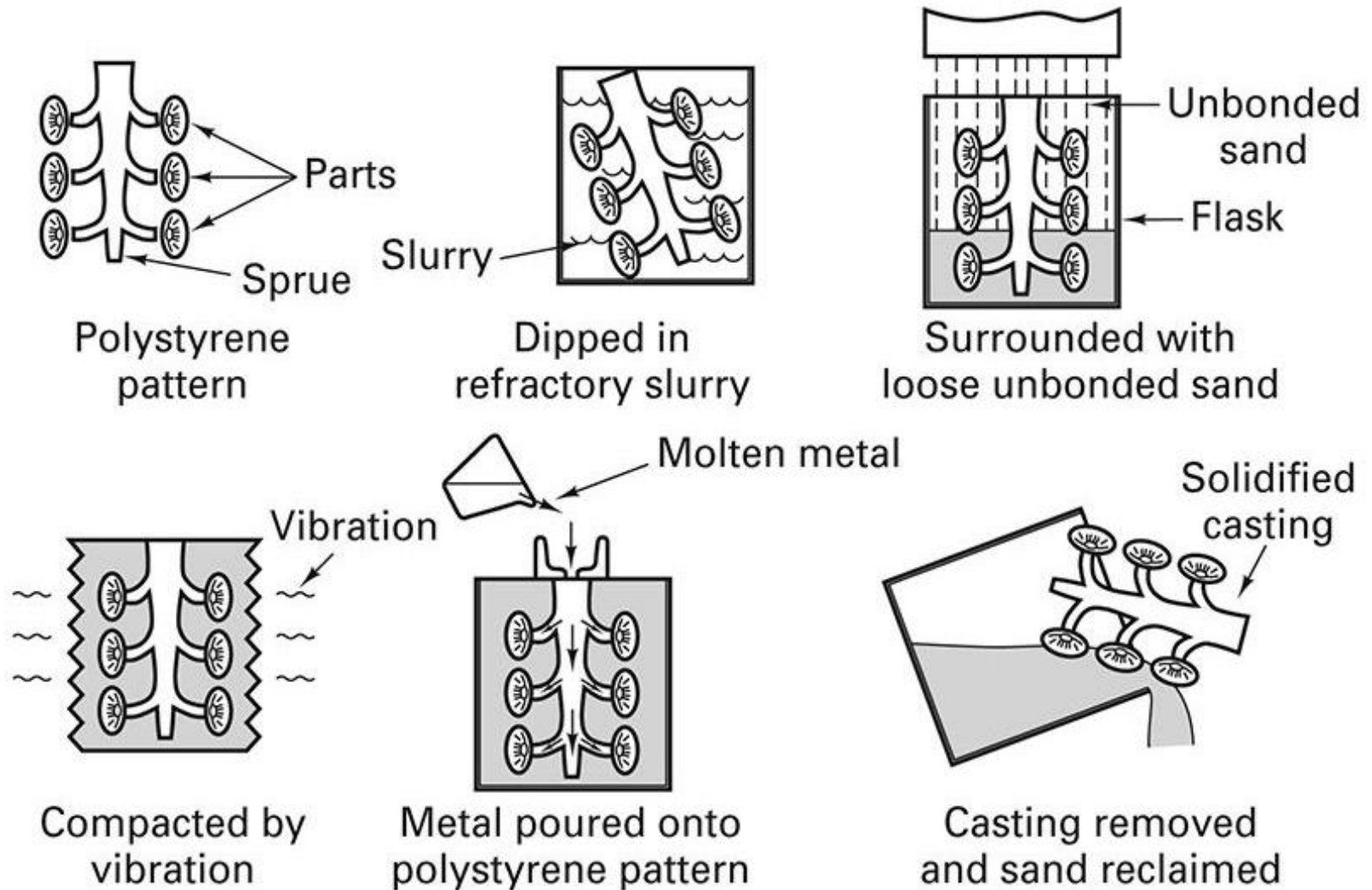
7

Mold material is broken away from castings.

Full-Mold (Lost Foam) Casting



Full Mold (Lost-Foam) Casting Process



Full Mold (Lost-Foam) Engine Block

