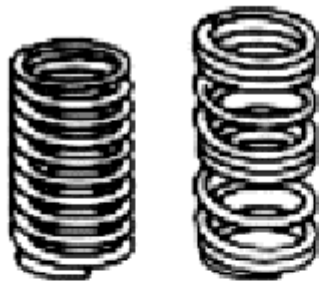


# Tangling

Difficult to feed



Preferred



Opening less than wire diameter prevents nesting

Difficult to feed



Preferred



Open ends



Closed ends



Tight coils prevent nesting

Larger tab

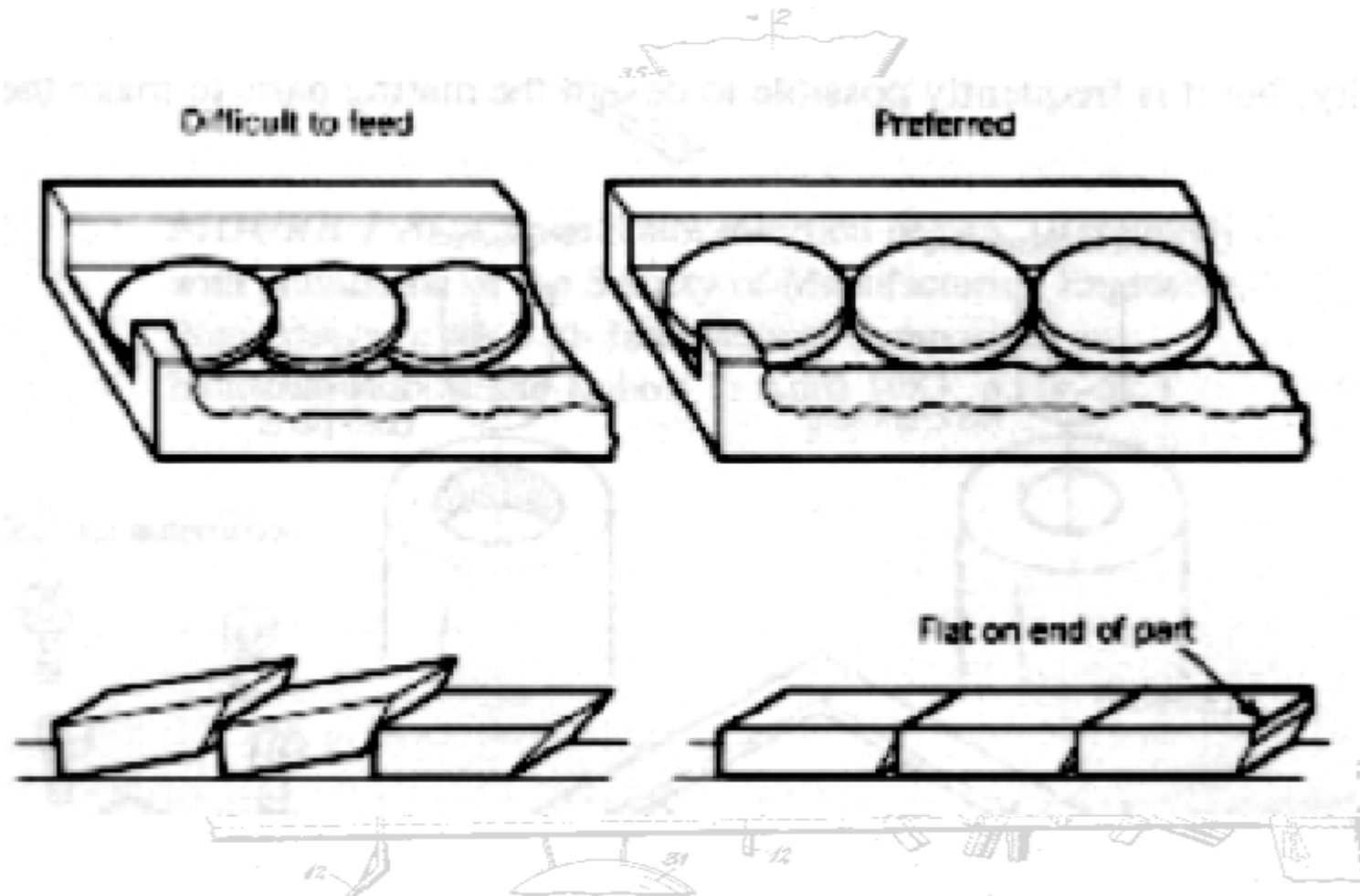


Smaller hole



# Shingling

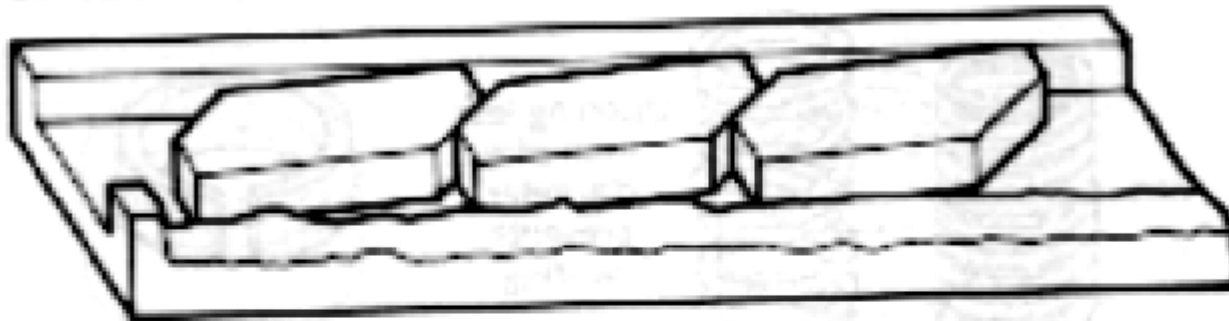
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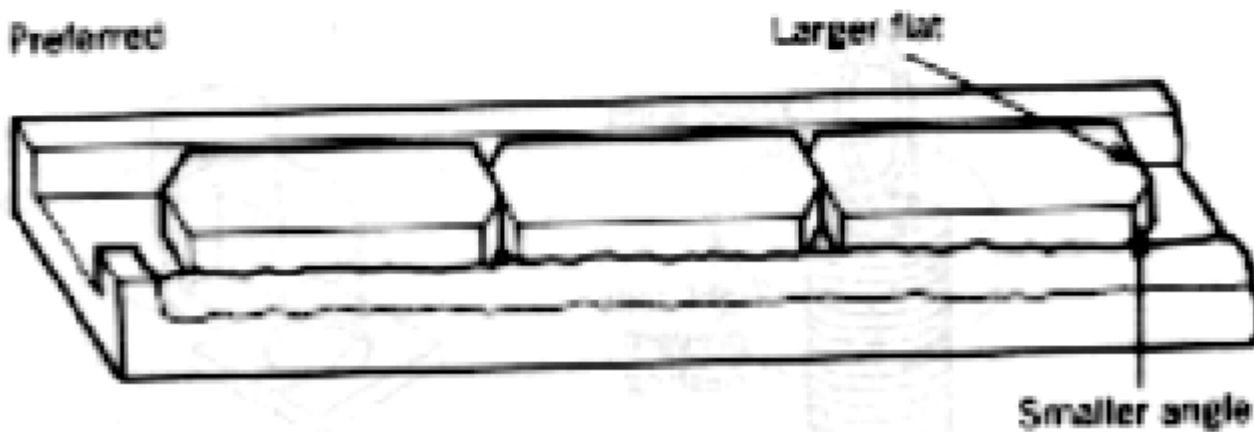
# Wedging

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Difficult to feed



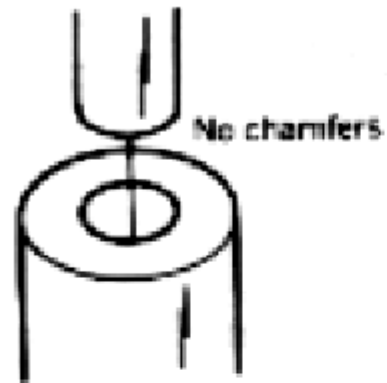
Preferred



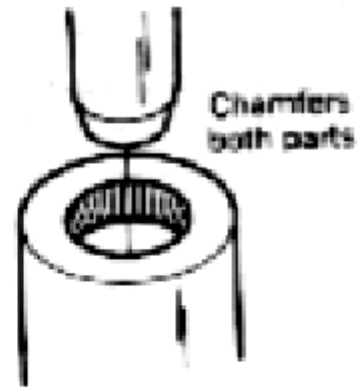
# Designing for Insertion

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Difficult to assemble



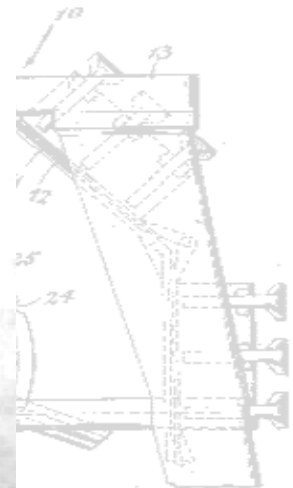
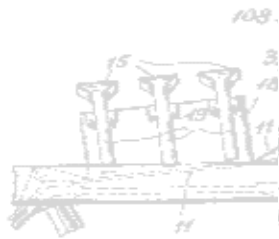
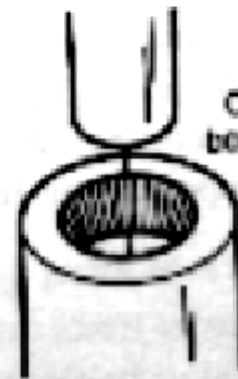
Preferred



Chamfer top part

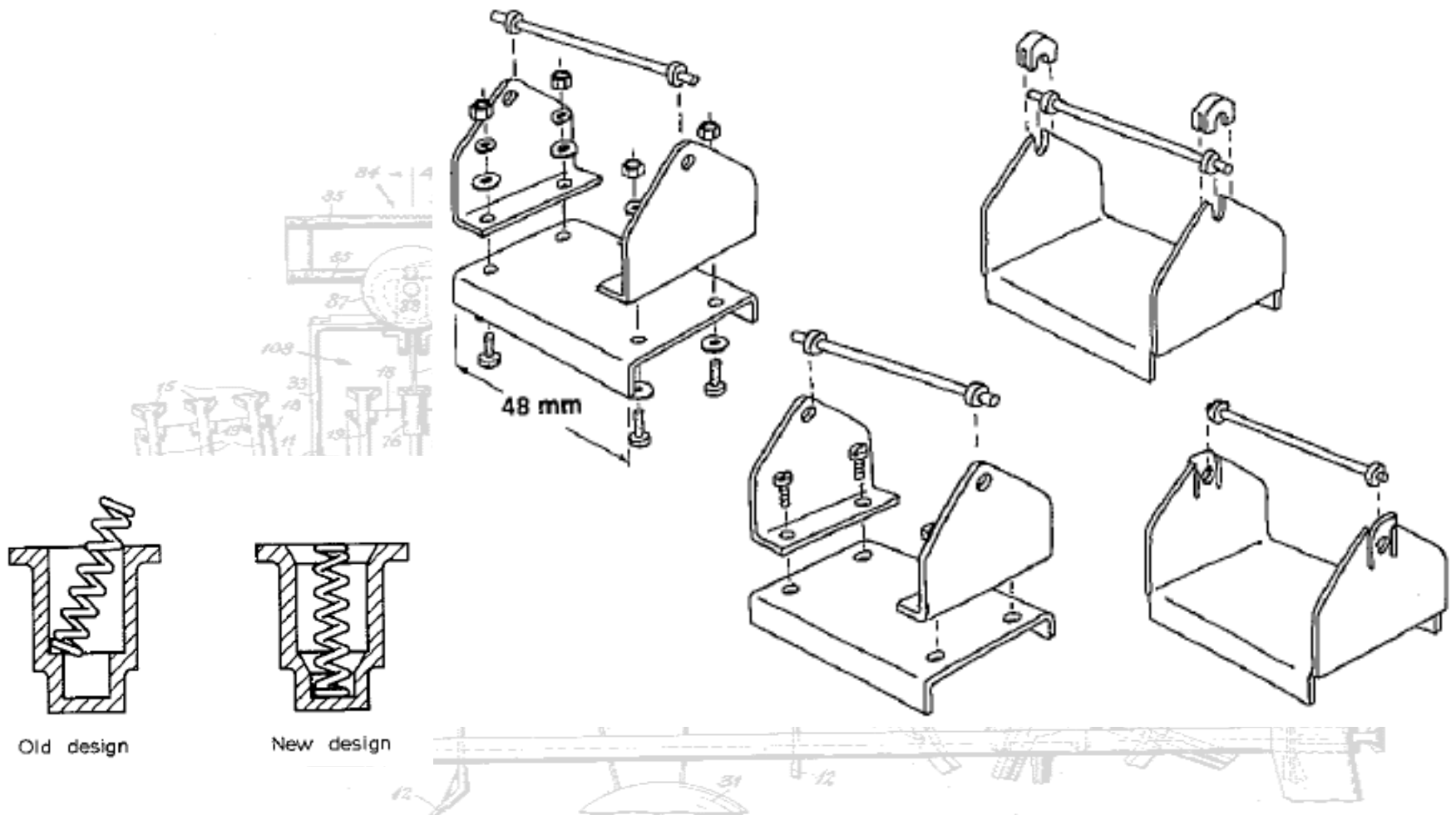


Chamfer bottom part



# Simplifying the Design

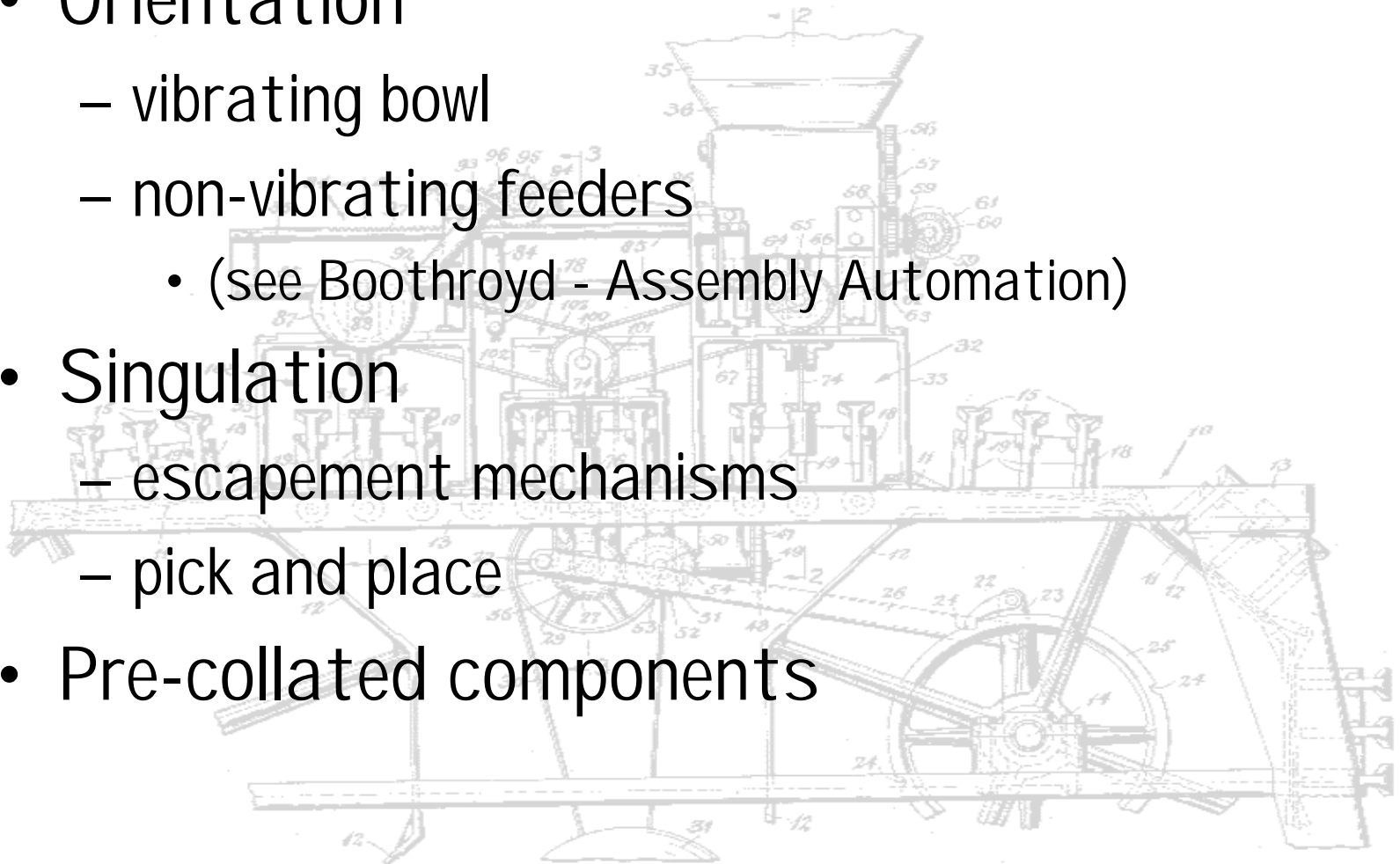
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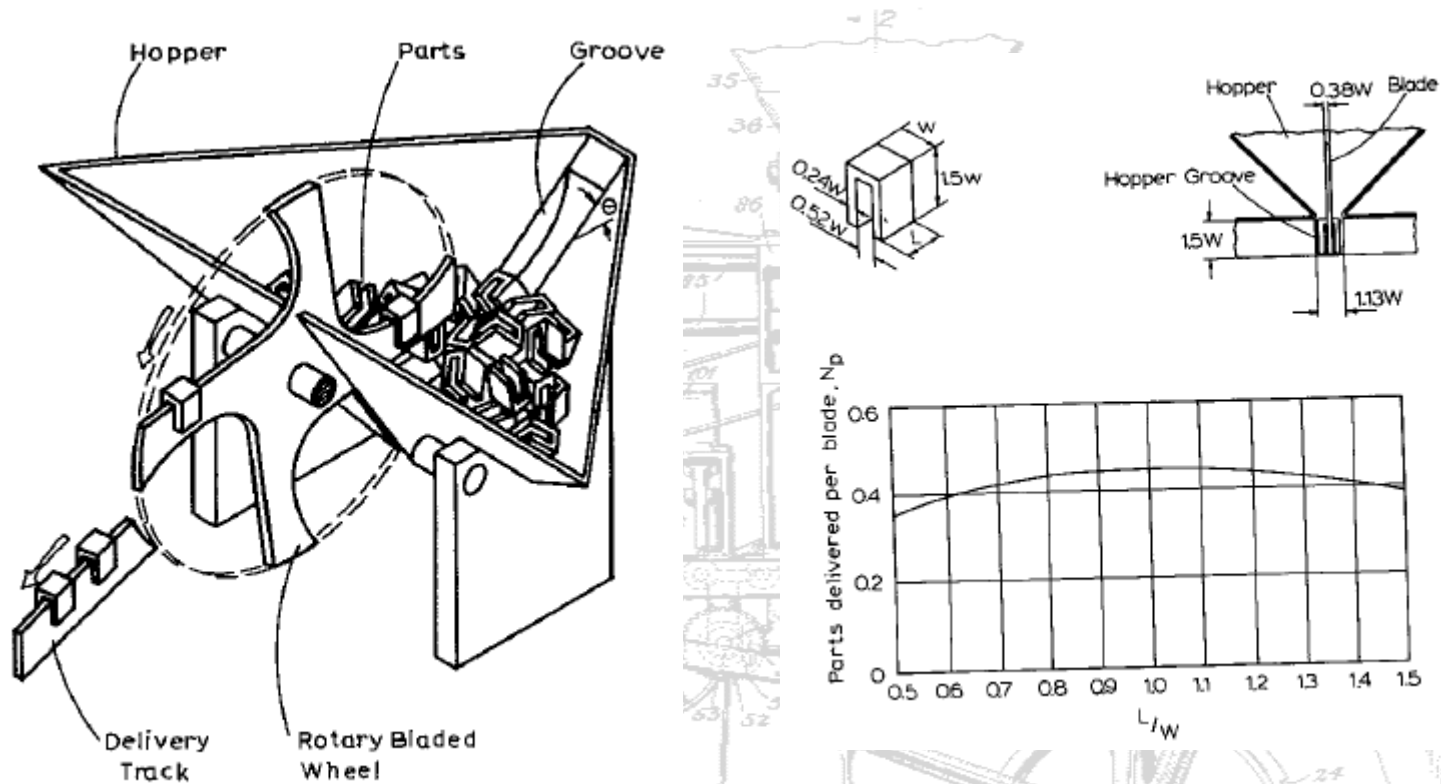
# Fastener Feeding Requirements

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- Orientation
  - vibrating bowl
  - non-vibrating feeders
    - (see Boothroyd - Assembly Automation)
- Singulation
  - escapement mechanisms
  - pick and place
- Pre-collated components

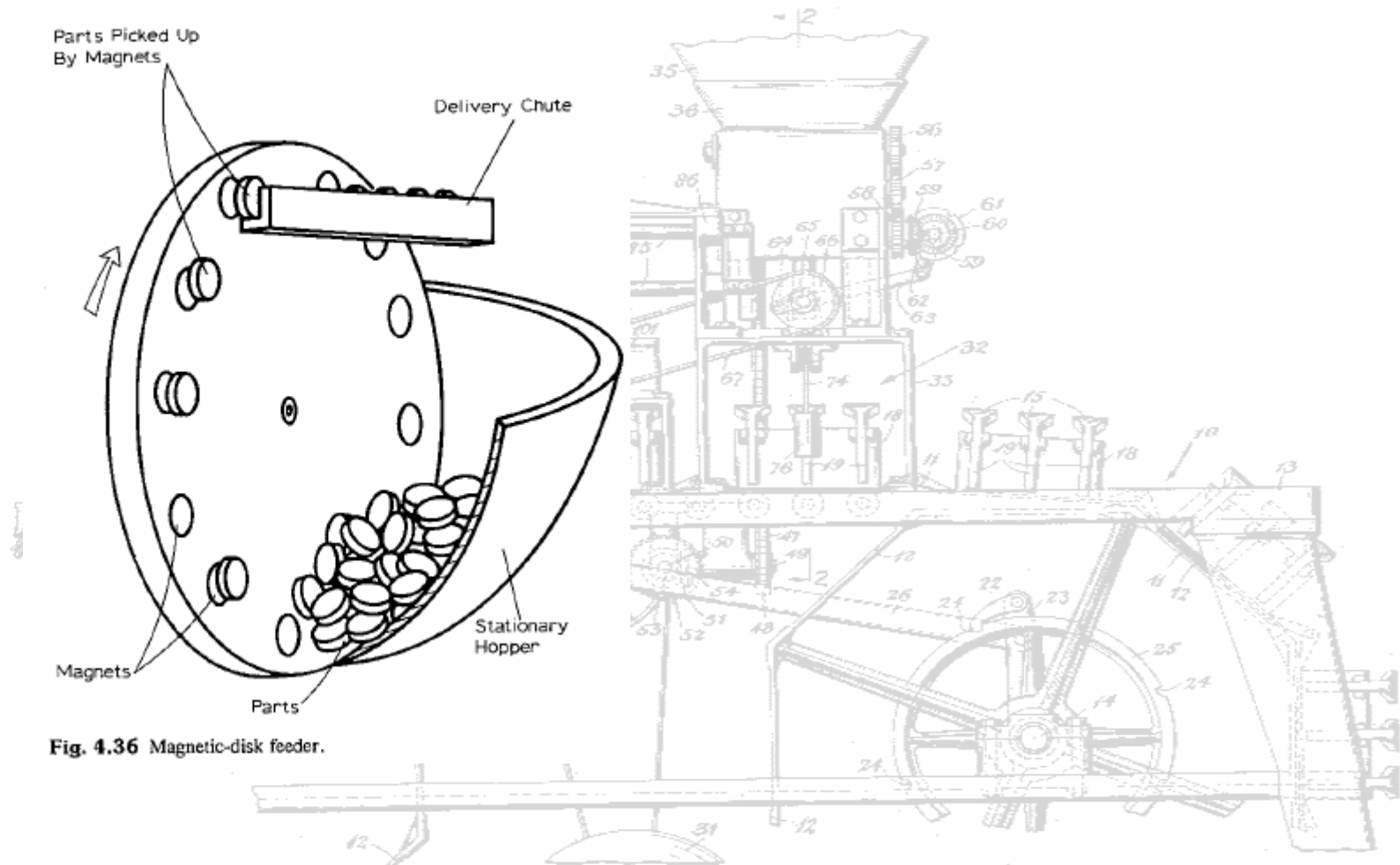


# Non-vibrating Feeders



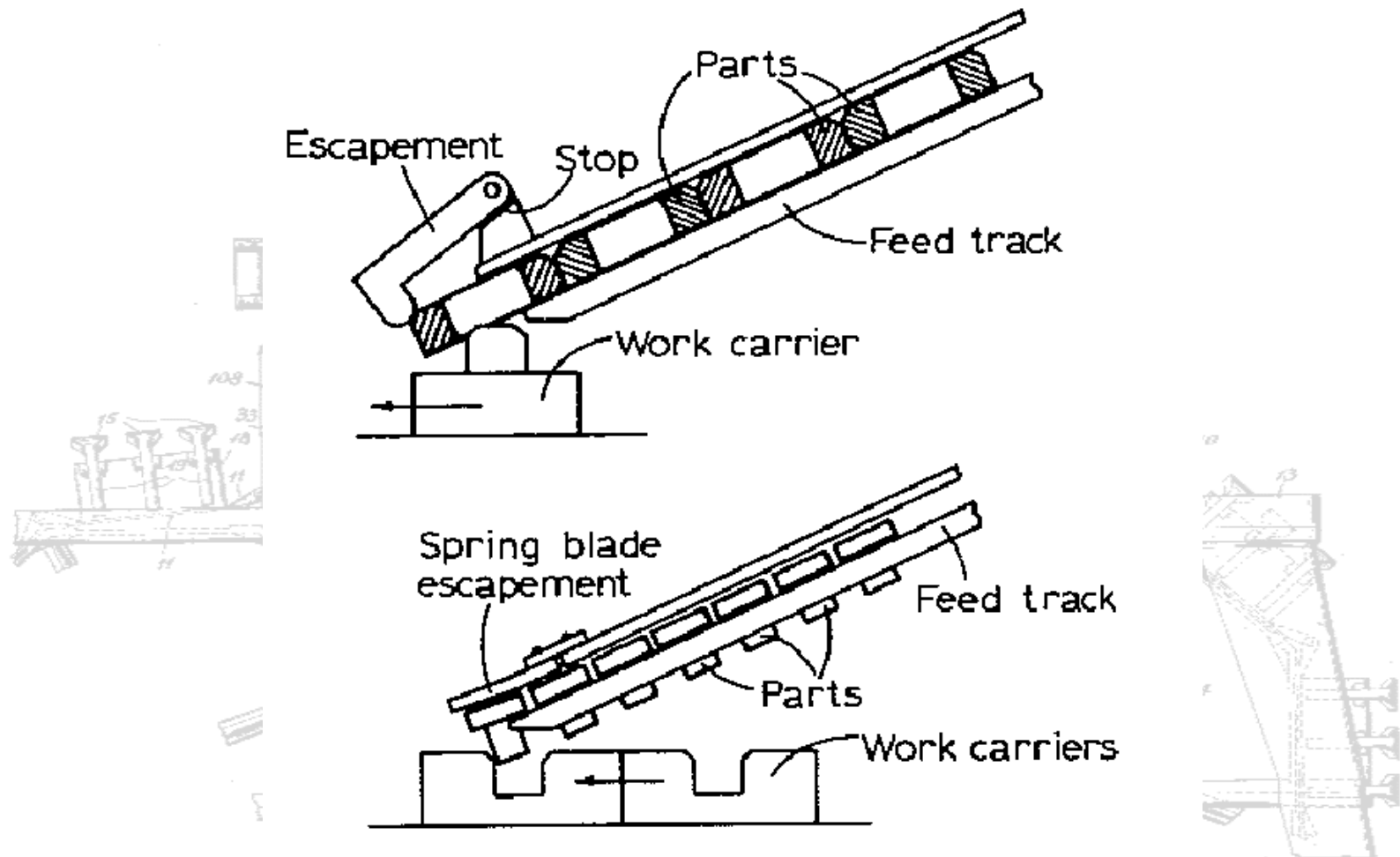
**Fig. 4.34** Rotary centerboard hopper.

# Non-vibrating Feeders



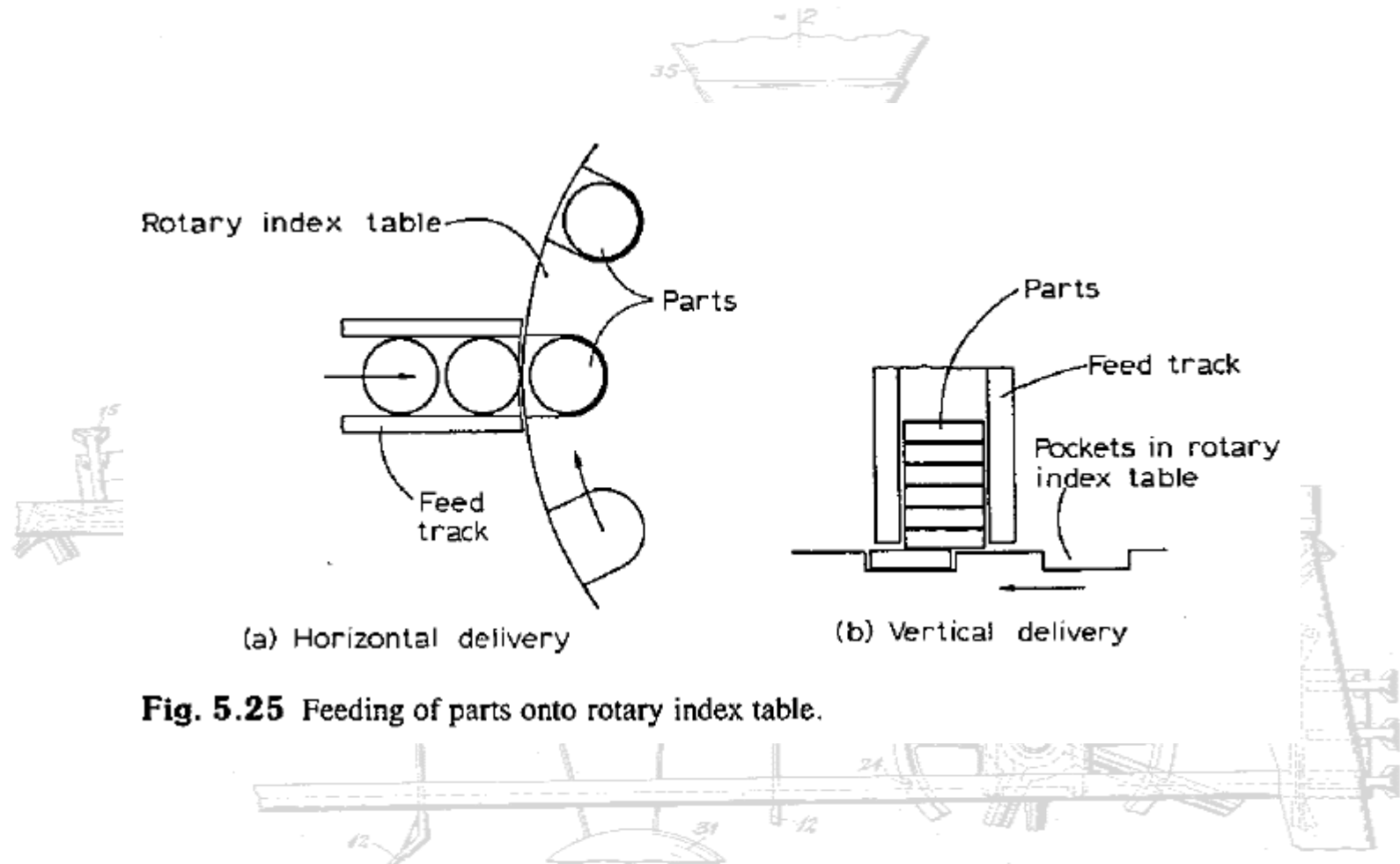


# Singulation

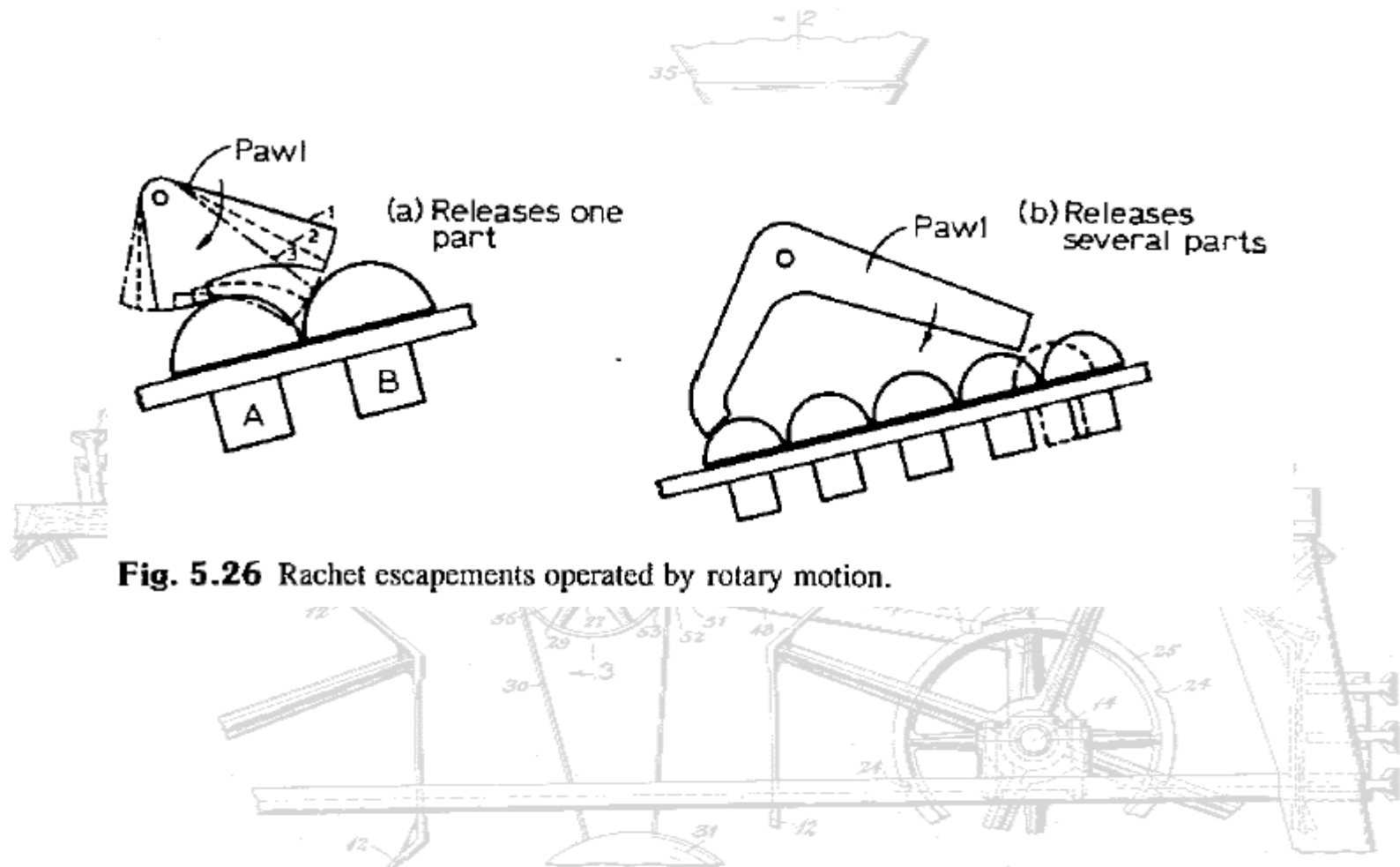


**Fig. 5.24** Escapements actuated by the work carrier.

# Singulation



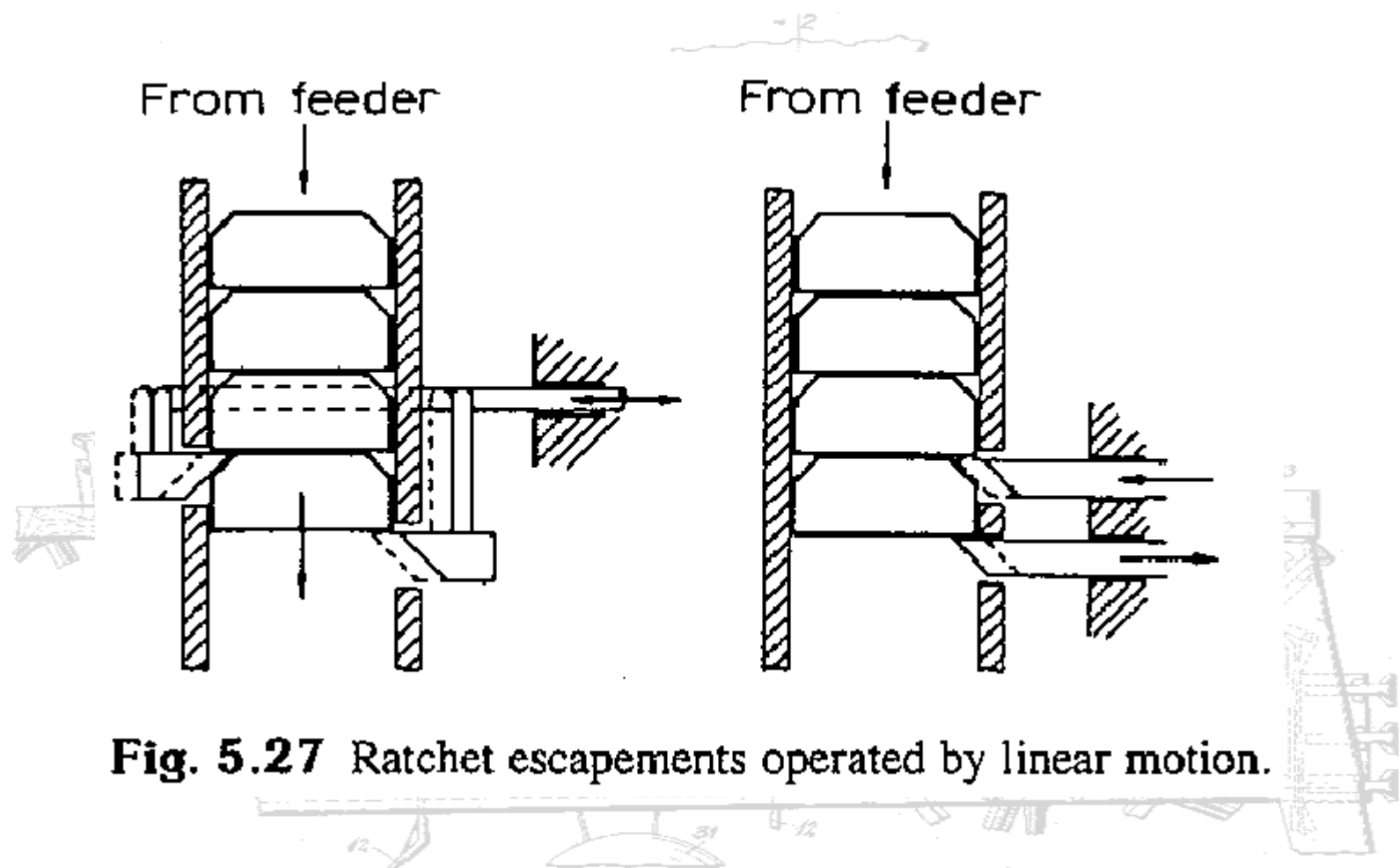
# Singulation



**Fig. 5.26** Ratchet escapements operated by rotary motion.

# Singulation

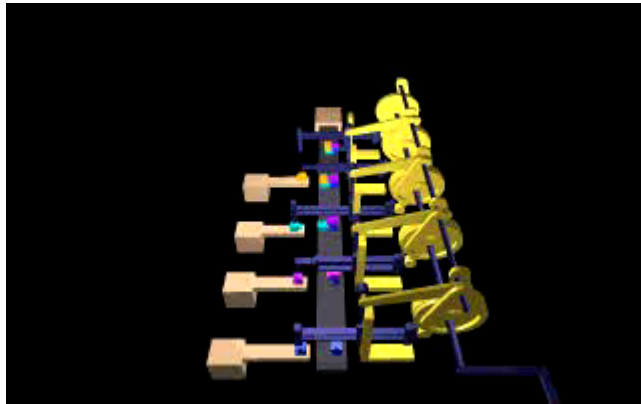
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**Fig. 5.27** Ratchet escapements operated by linear motion.

# Pick & Place

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# Pre-collated Components

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