MCG 2101
DELIVERABLE #10
GROUP E2-2

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DESIGN PROCESS OVERVIEW

READ DESIGN BRIEF WITH CARE

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GENERATE DESIGN MANDATE

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CREATE LIST OF REQUIREMENTS AND CRITERIA

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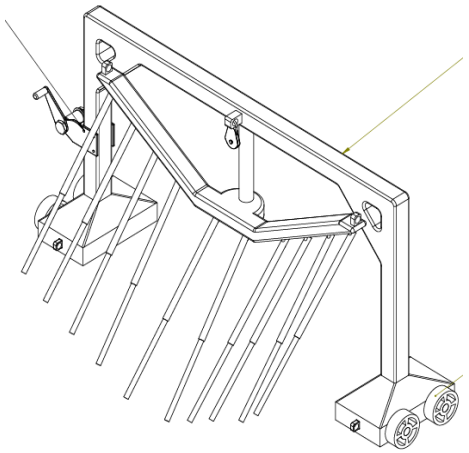
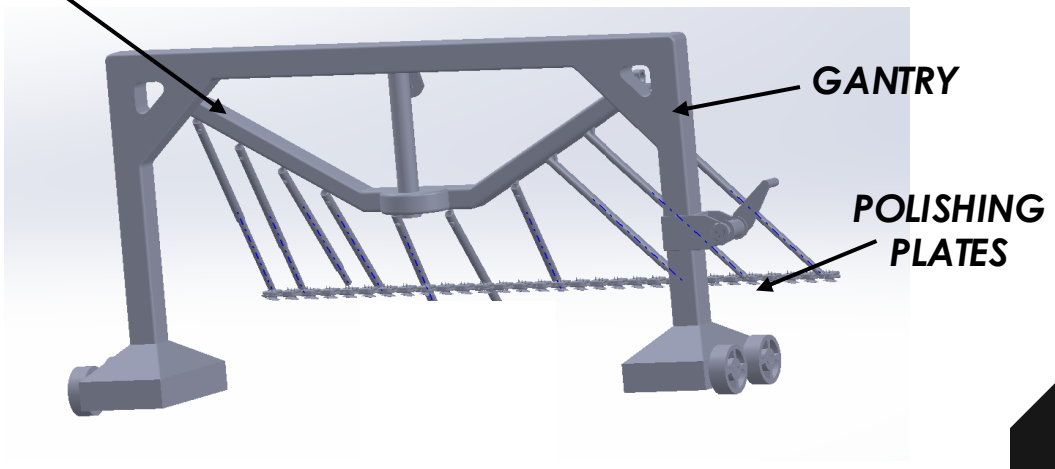
IDEATE AND GENERATE SOLUTION

DESIGN SOLUTION OVERVIEW



ISOMETRIC VIEW (WITHOUT POLISHING PLATES FOR CLARITY)



REAR ASSEMBLY VIEW

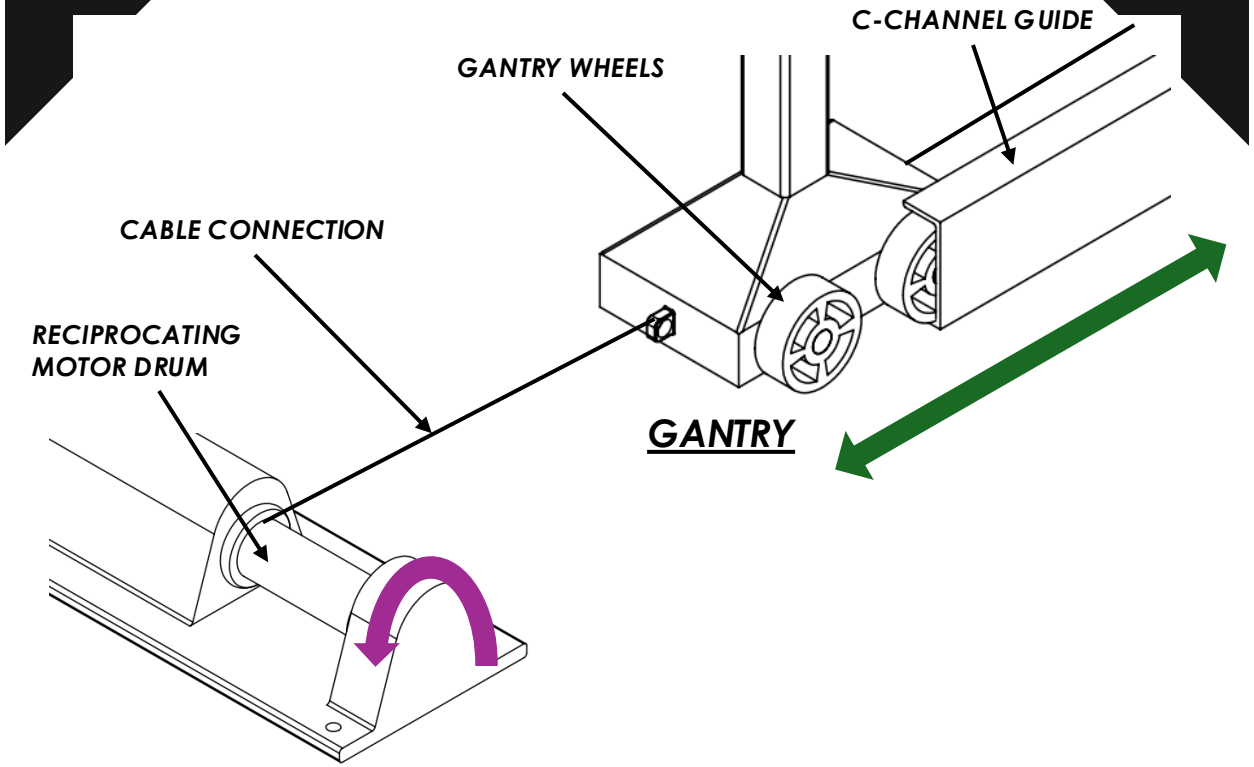
OVERVIEW:

- Gantry with lagging yoke attachment to pull polishing plates down blade mold

ADVANTAGES:

- Time Efficient
- Articulation to conform to mold geometry
- Simple pneumatic system

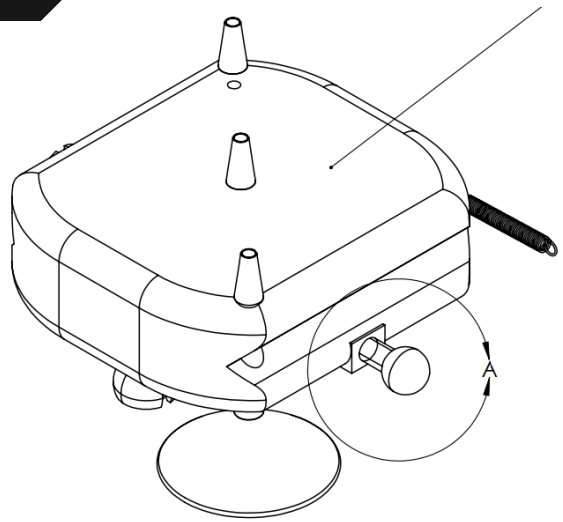
GANTRY MOVEMENT



OVERVIEW:

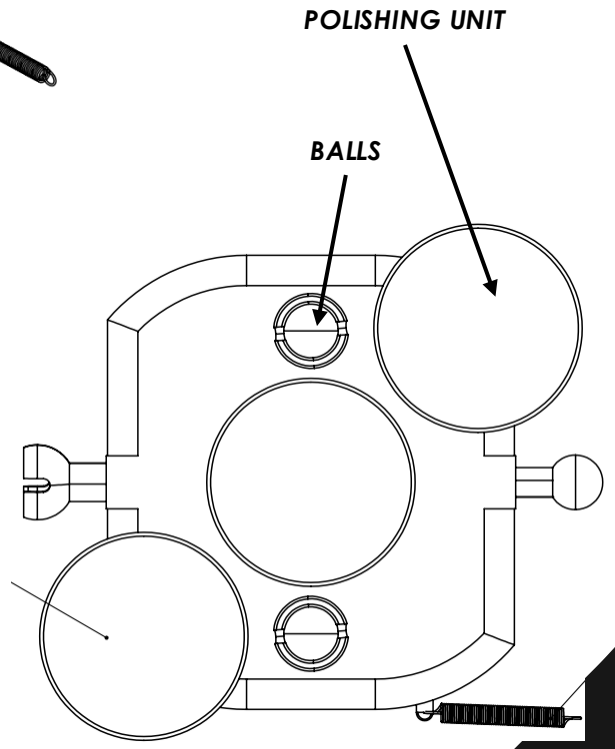
- Gantry rolls along C-channel guides using wheels
- Pneumatic motor units on either side can spool up cable (attached to base of gantry) to pull gantry

POLISHING PLATE SYSTEM



ISOMETRIC VIEW ↕

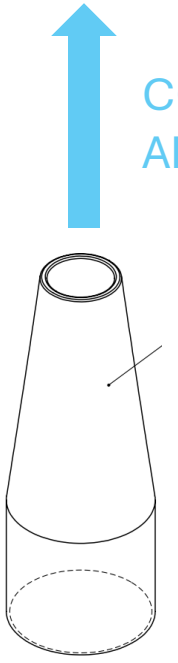
BOTTOM VIEW →



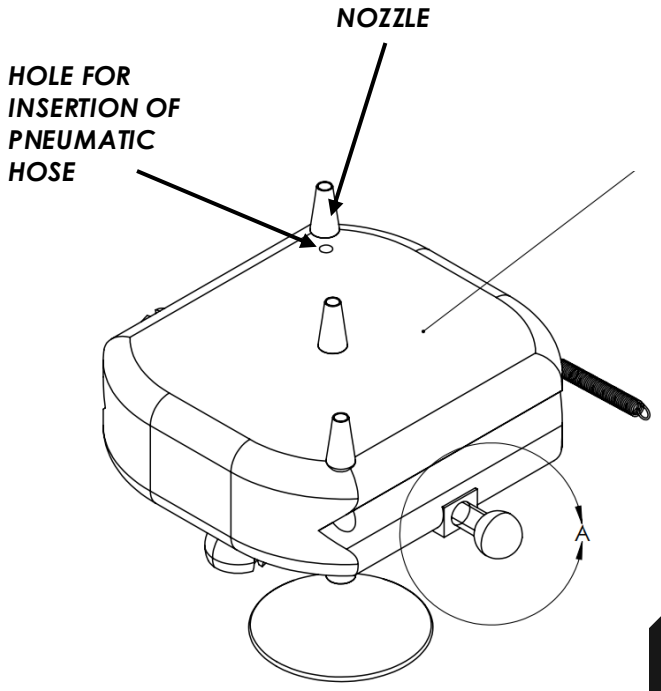
OVERVIEW:

- Polishing Plates are pulled along by gantry → Not self-propelled
- Balls on bottom of plate help to maintain stability
- Each plate features 3 polishing units arranged diagonally

POLISHING PLATE SYSTEM (PNEUMATICS)



NOZZLE



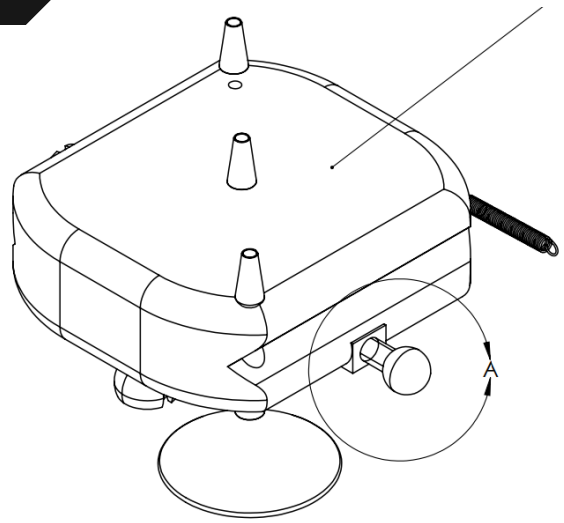
OVERVIEW:

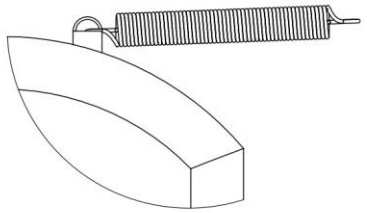
- Polishing plates feature holes for insertion of pneumatic hose (supplies air to polishers)
- Air is filtered and released into atmosphere through nozzles

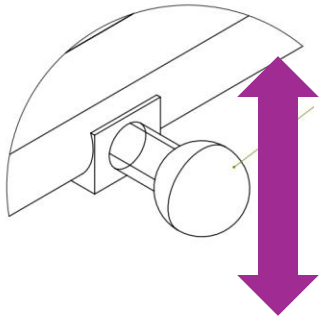
  → Air applies downward force

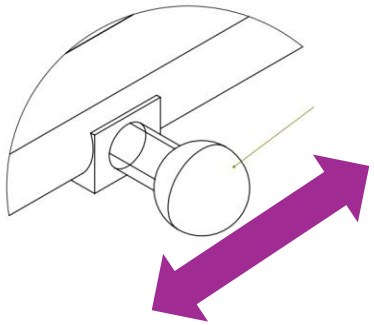
  → Force is normal to mold surface

POLISHING PLATE SYSTEM (ARTICULATION)





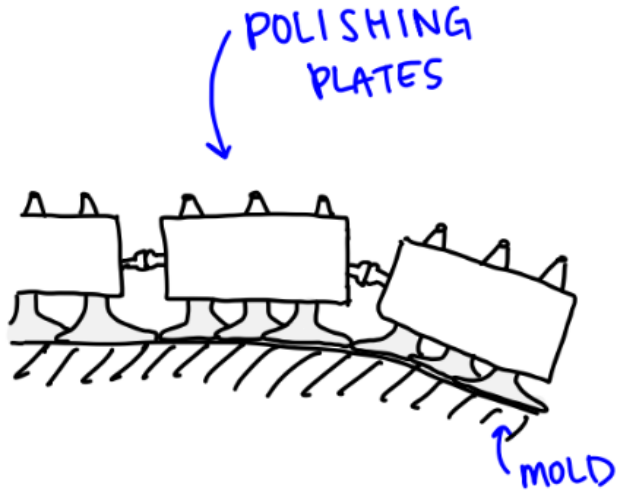


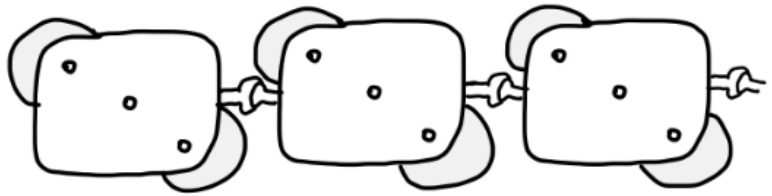


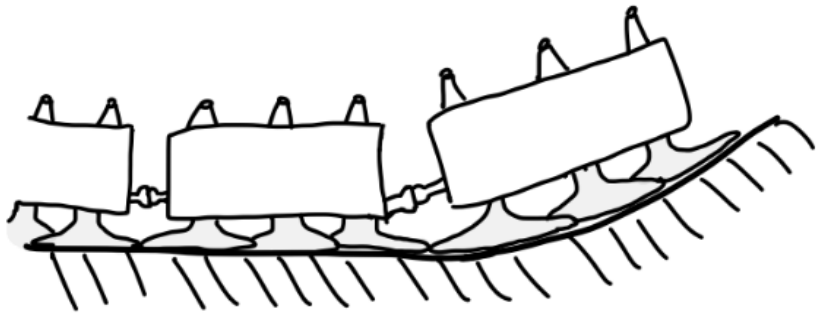
OVERVIEW:

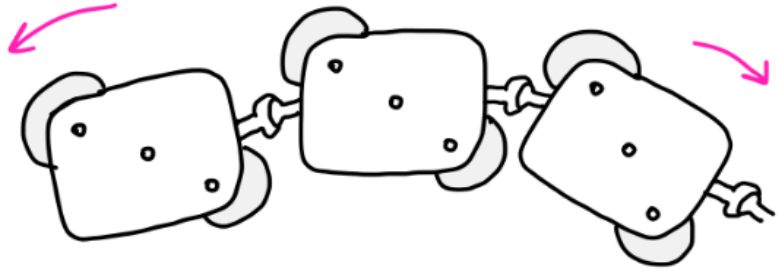
- Ball & Socket joints permit vertical and lateral movement of a given plate relative to neighbors
- Plates will conform to mold geometry moving behind one another as mold profile narrows
- Spring loaded in tension ensures that plates return to linear arrangement as profile widens

POLISHING PLATE SYSTEM (ARTICULATION)

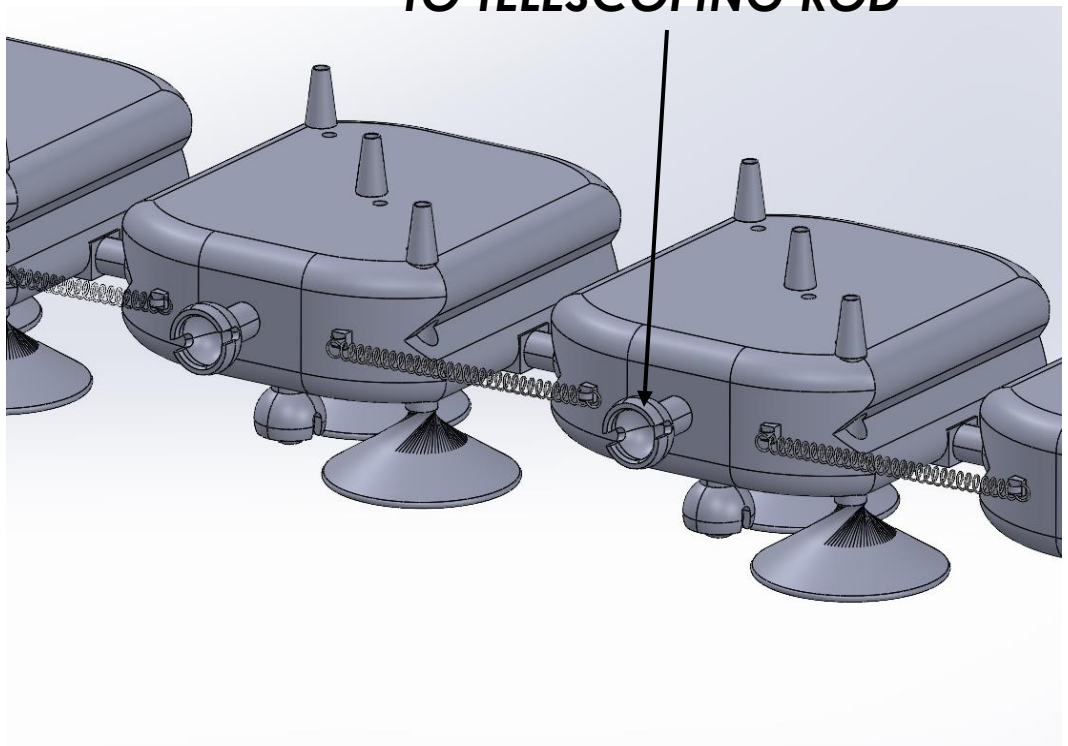








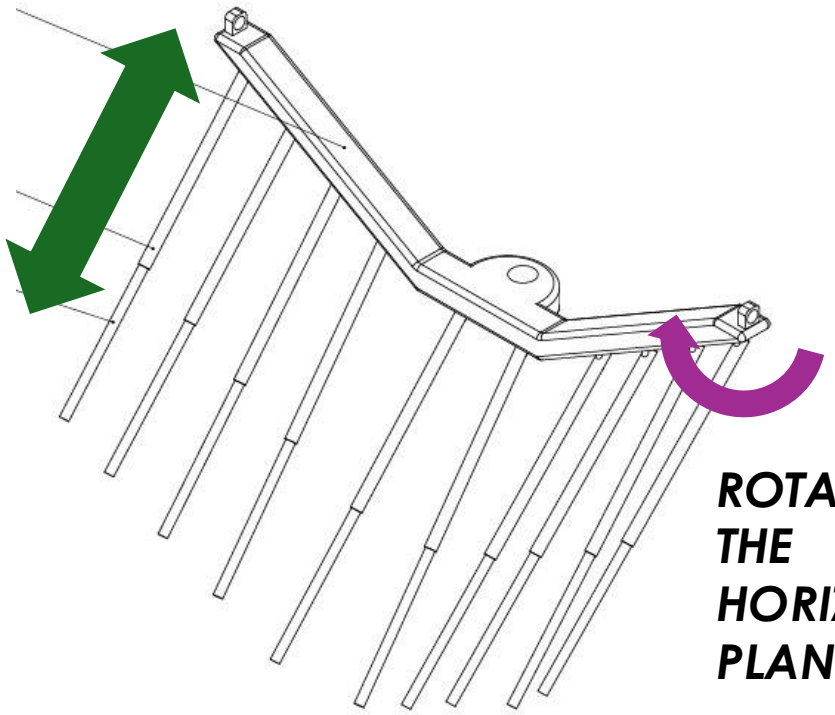
POLISHING PLATE SYSTEM (CONNECTION TO GANTRY)



OVERVIEW:

- Polishing plates connected to spring-loaded telescoping rods by ball & socket connection
- Telescoping ability of rods allows plates on extremity to move behind other plates as mold profile narrows
- Spring-loaded nature of rods allows them to retract after being extended

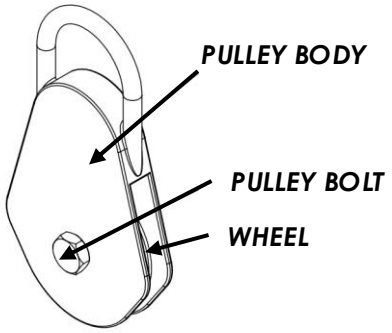
YOKE AND ROD ASSEMBLY



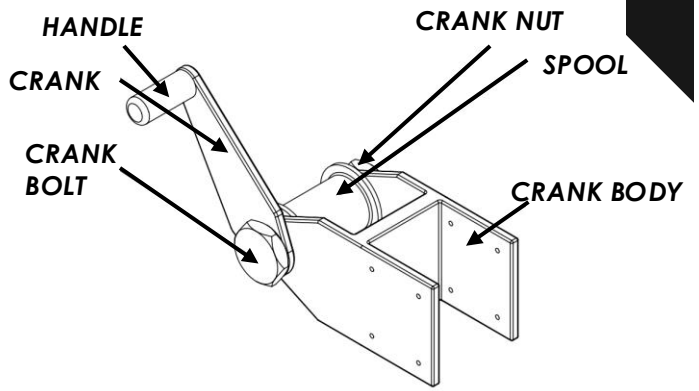
OVERVIEW:

- Telescoping ability of rods allows plates on extremity to move behind other plates as mold profile narrows
- Rods are attached to yoke by pins and can rotate freely in the horizontal plane
- Rods DO NOT apply downwards force on polishers; serve only to transfer forward movement of gantry to polishing plates
- Cable attaches to either side of yoke, and yoke can move up and down central pillar

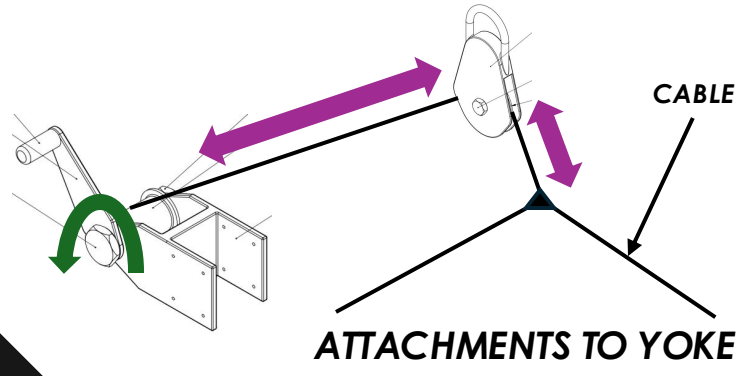
PULLEY AND CRANK



PULLEY



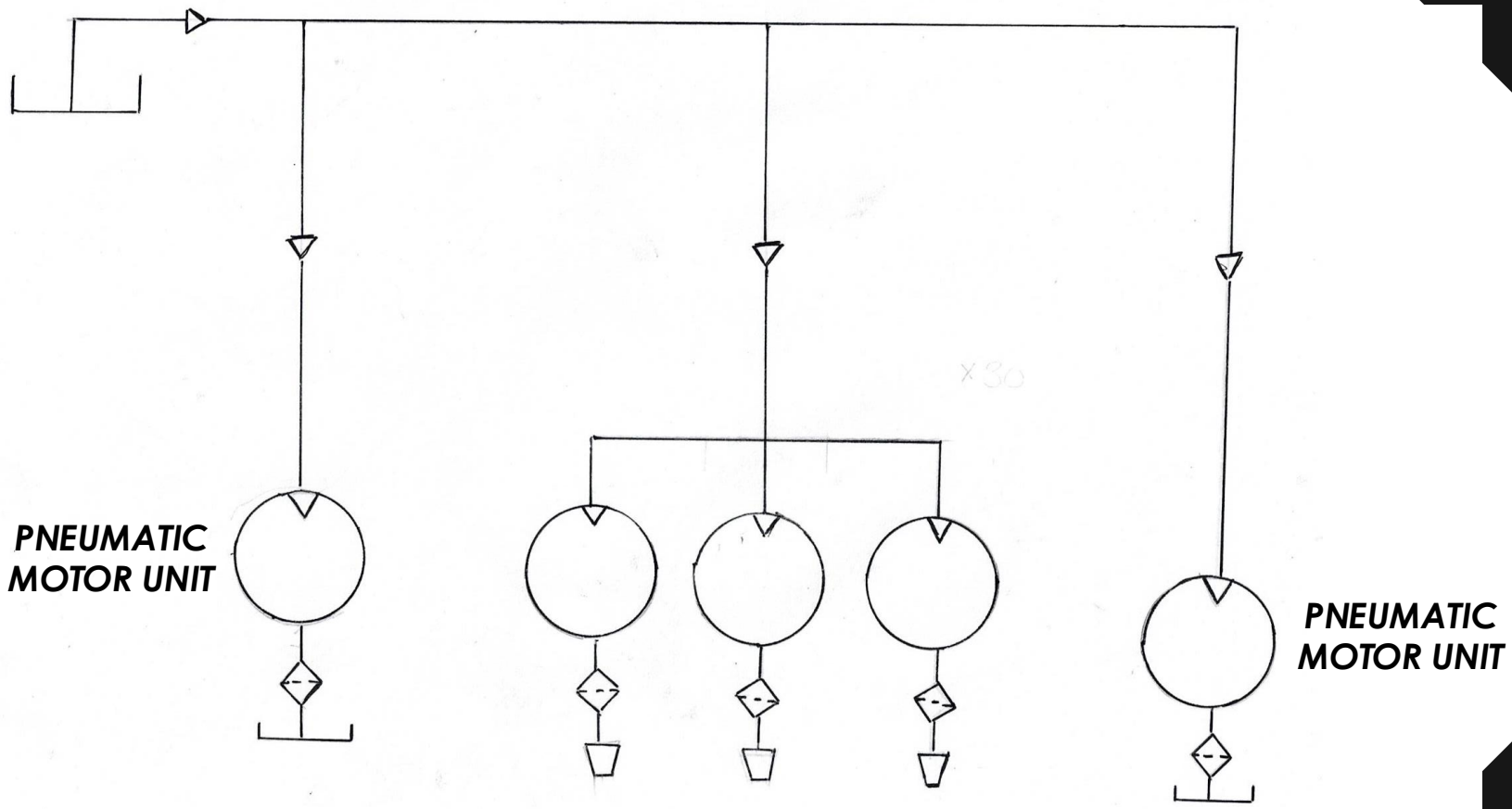
CRANK



OVERVIEW:

- Crank is operated manually before and after polishing process to lower yoke and polishers (for polishing) or to raise yoke and polishers (for storage)
- Pulley offers mechanical advantage for lifting yoke assembly

PNEUMATIC DIAGRAM



OPERATION LOGIC AND SEQUENCE

1) Using manual crank, yoke and polishing plates are lowered onto mold surface (at root)
2) Pneumatic system is turned on
3) Motors steadily pull gantry and polishing plates down the mold
4) Polishing plates polish the mold surface continually, conforming to mold geometry using their ball & socket articulation
5) Once end of blade mold is reached (part of mold that will not be polished manually) gantry hits stoppers in rail tracks
6) Pneumatic switch in stoppers is triggered shutting off pneumatic power and stopping polishing

THANK YOU FOR YOUR ATTENTION