

ELEMENT ONE: An electro-mechanical reactor environment (EMRE) which provides an effective “Phase Space” environment to: 1) unpack the GTRP, re-set the vulcanization pre-cursor for 2) subsequent sulfidic bridge realignment, 3) with minimal alteration to the native, elastomer-filler matrix.

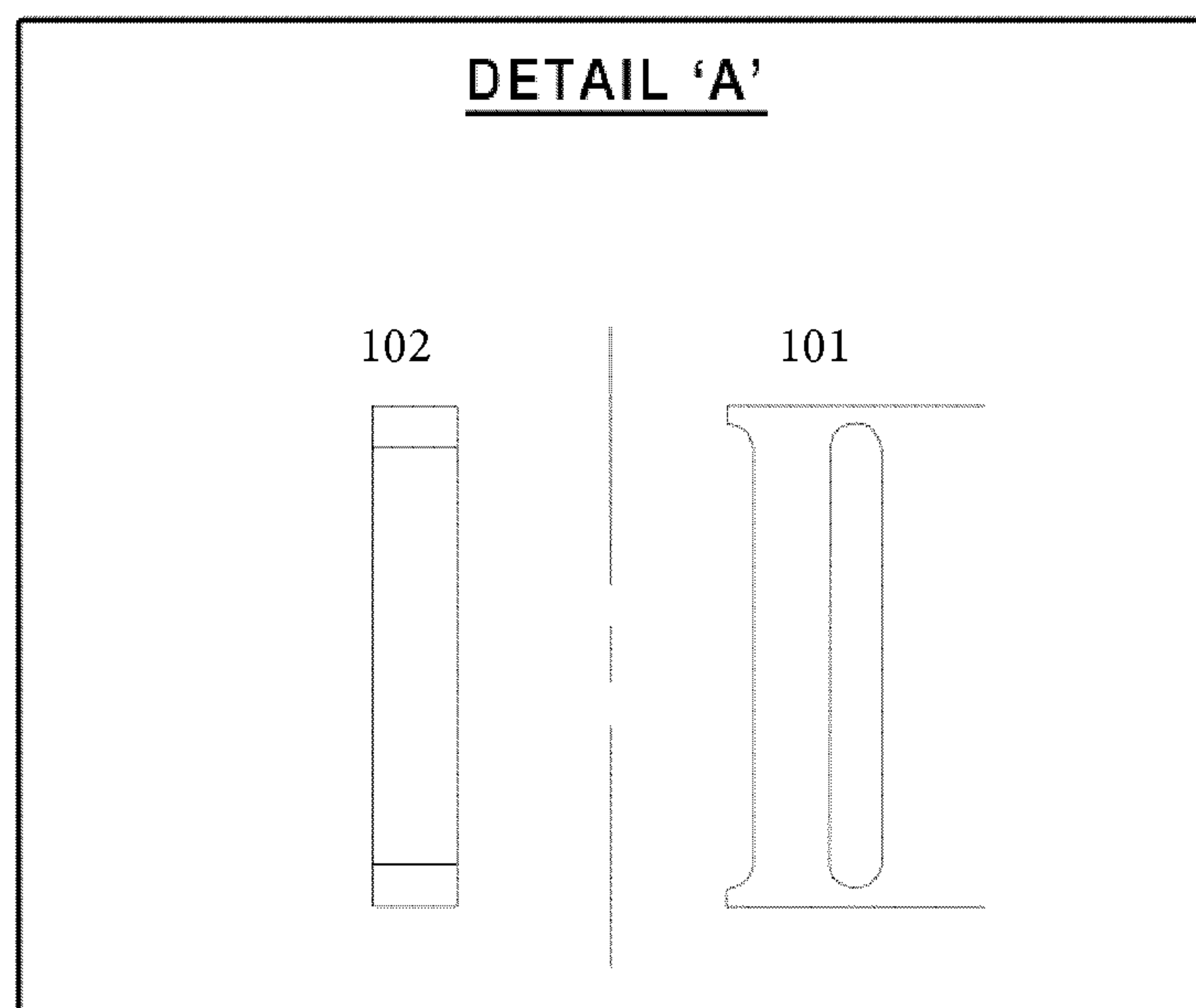
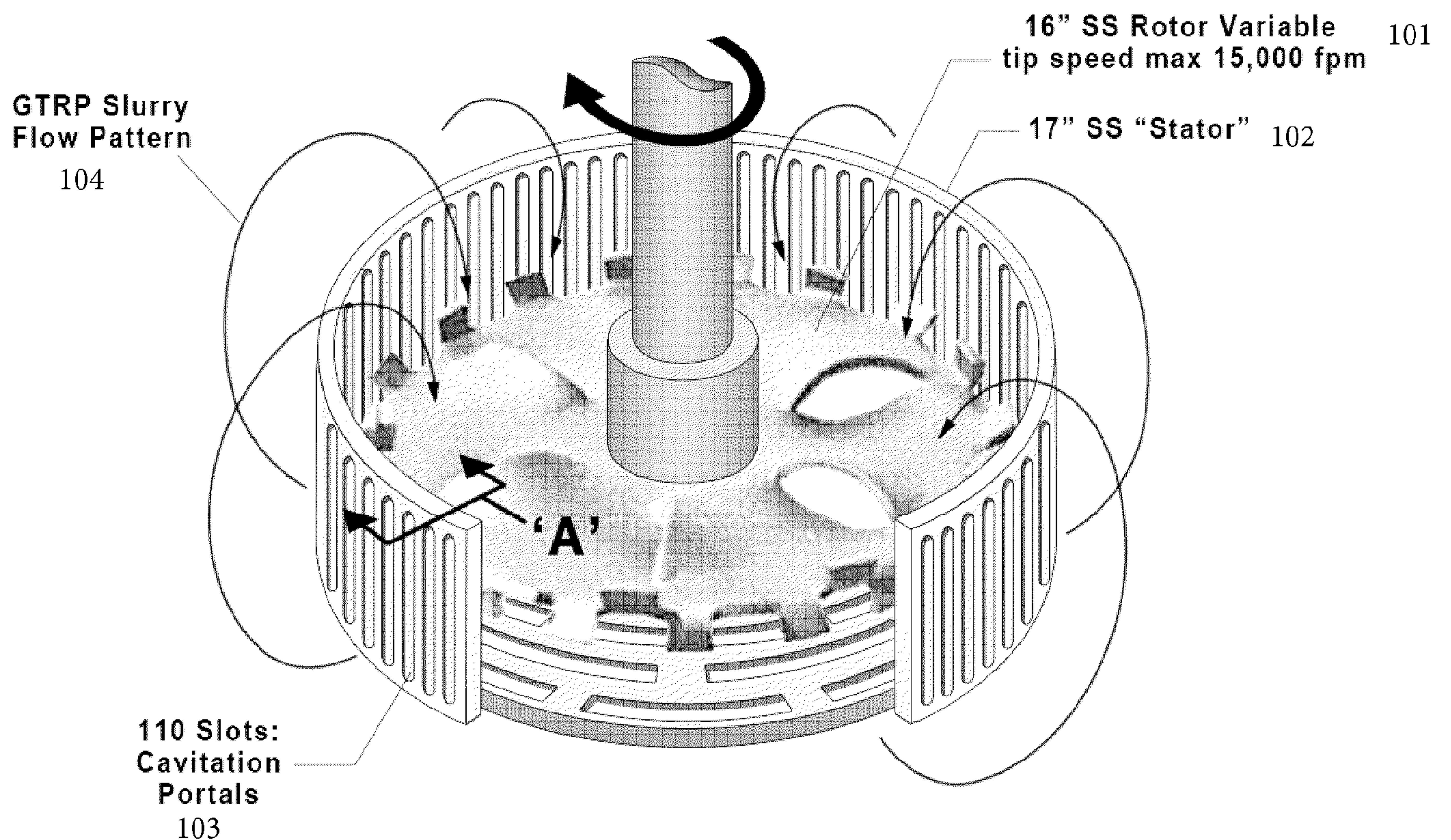


FIG. 1

ELEMENT TWO: Prepare GTRP Slurry for EMRE

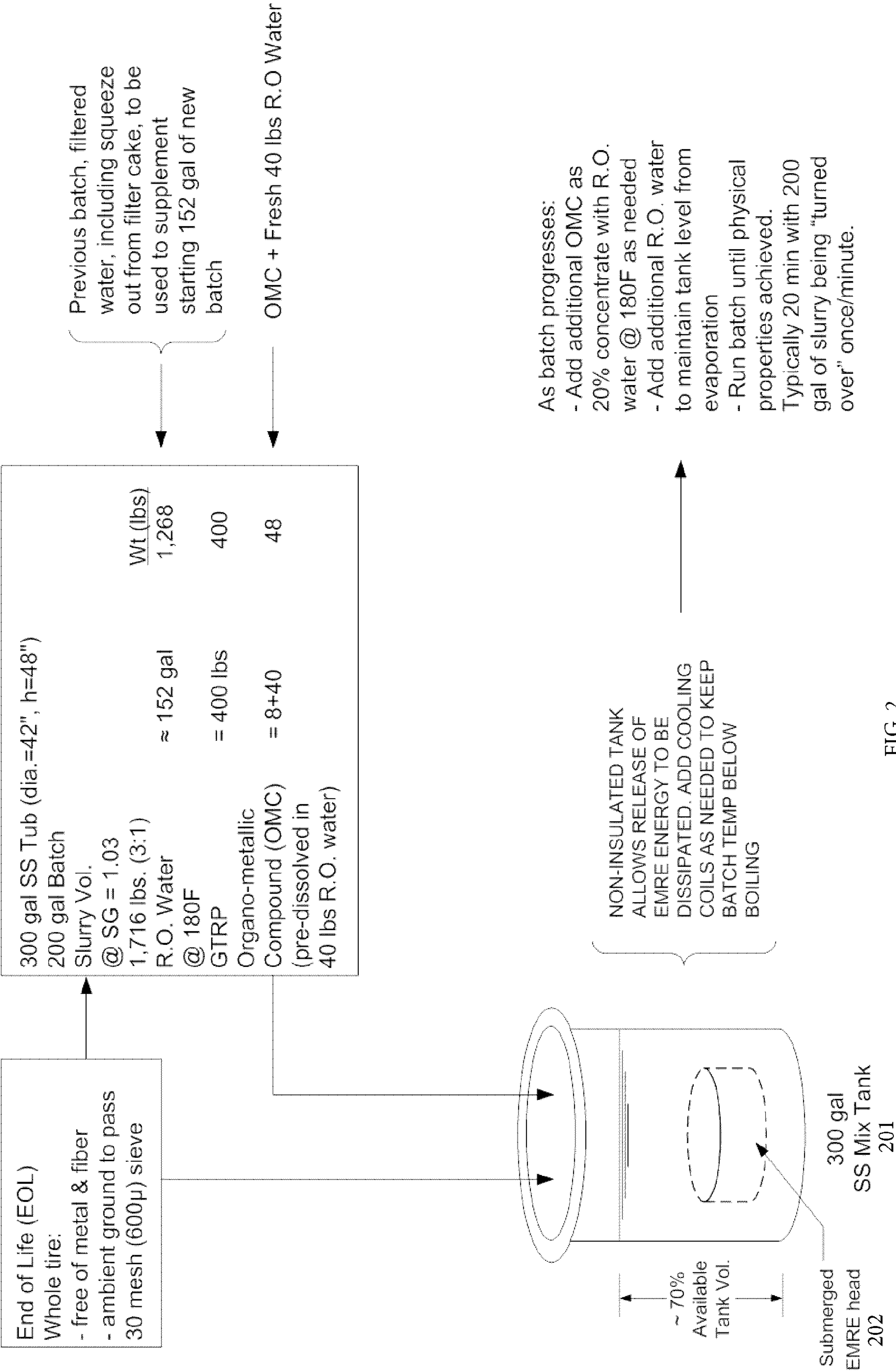
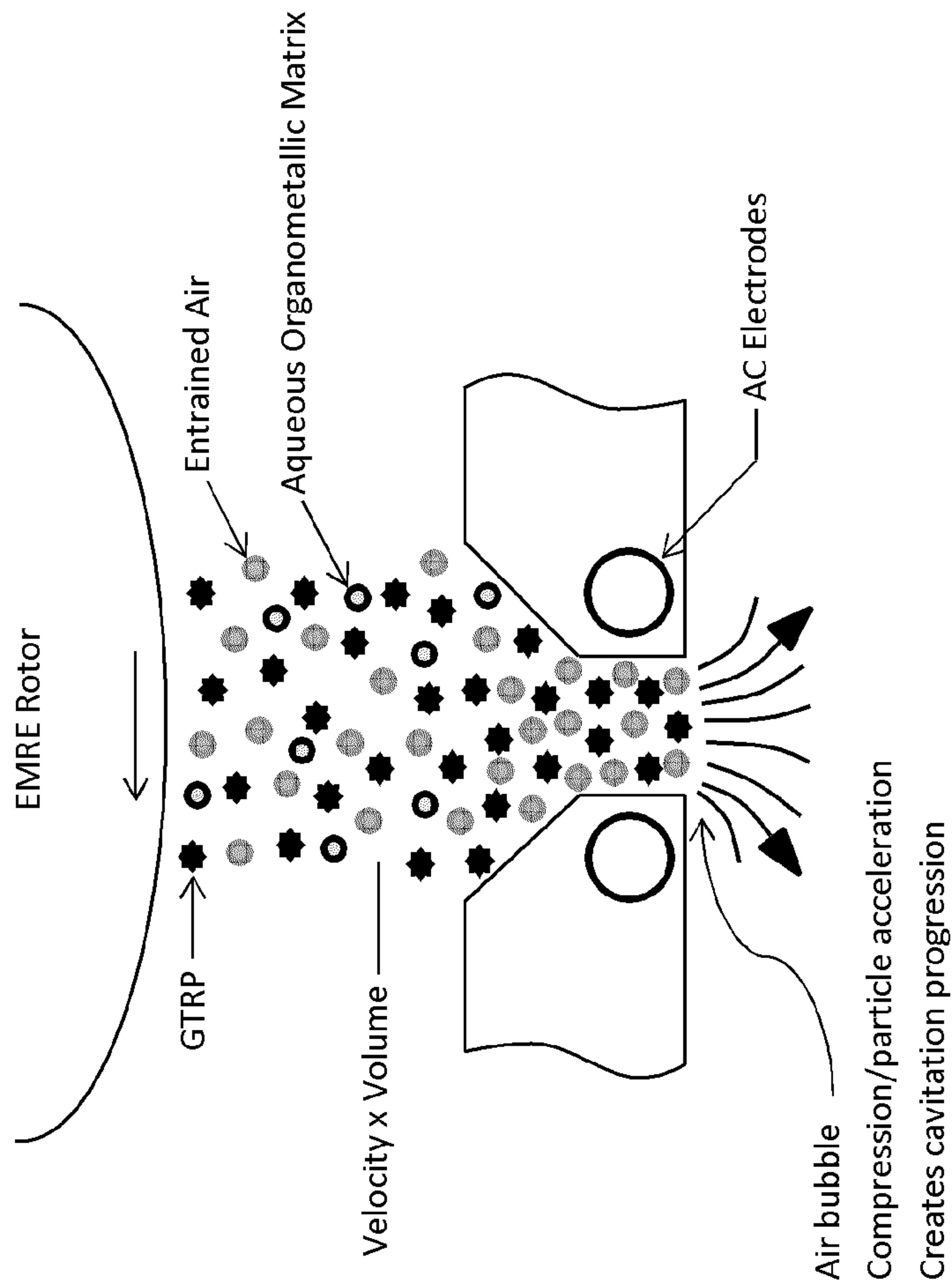


FIG. 2

ELEMENT FOUR: Engineered, Cavitation-Induced, Acoustic Shockwave.



Changing rotation speed of EMRE Rotor and/or slurry viscosity and/or stator gap allows manipulation of energy “leverage” within “Phase Space” .

As slurry exits, lower pressure completes cavitation cycle with implosion of air cavity.
Extreme temperature and pressure differential excursion within cavitation cone in range of:
Temperature: $10^2 - 10^{15}$ °F
Acoustic Wave Velocity: 60 – 180 m/sec
Time Interval: $10^3 - 10^8$ (sec⁻¹)

FIG. 4A

GTRP SLURRY & EMRE PROCESS
CONTROL VARIABLES

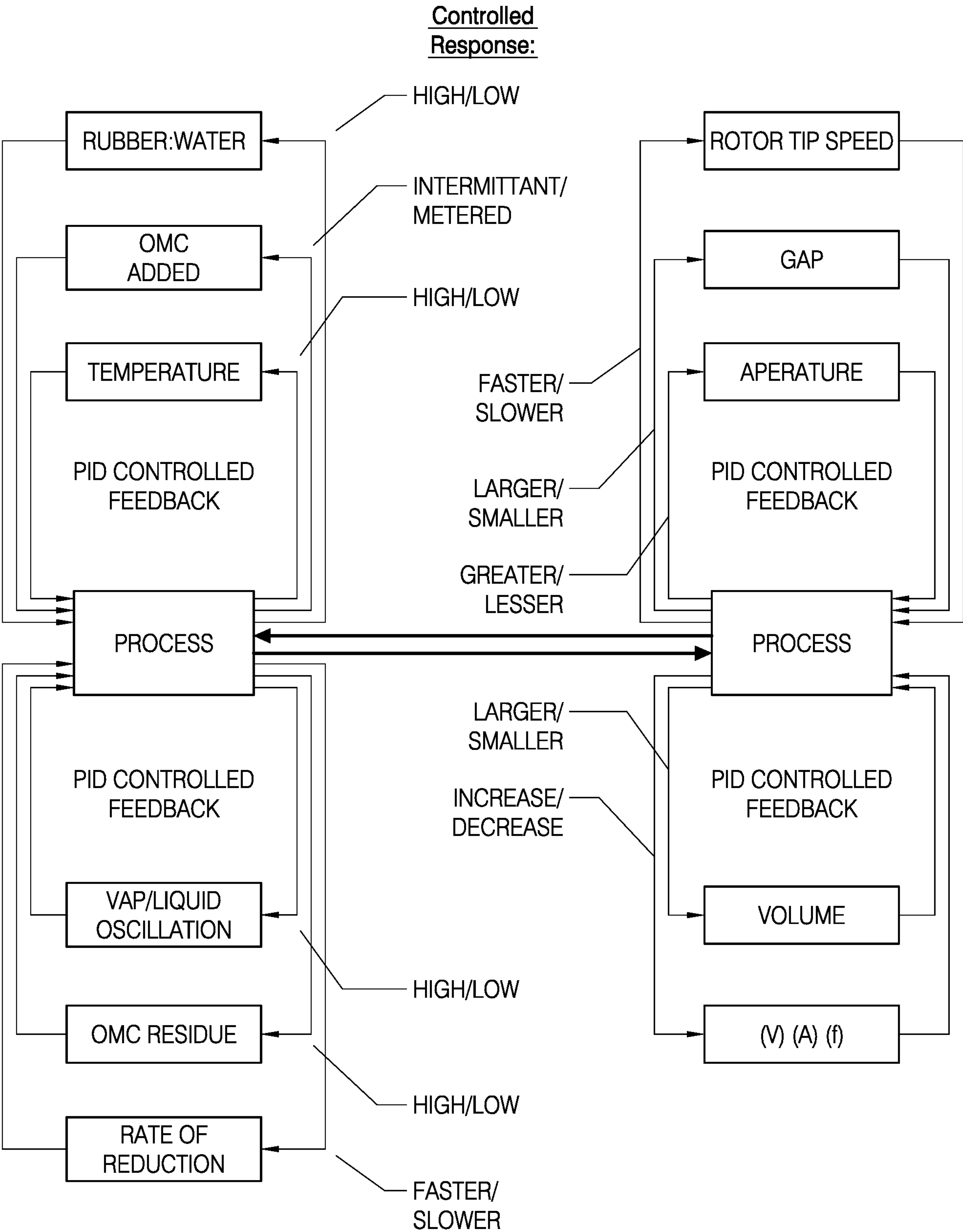


FIG. 4B

COMPONENT	METHOD OF CONTROL	ABBREV.	FIRST ORDER RESULT		DATA GATHERING HARDWARE
RUBBER-TO-WATER DENSITY	PRE-BATCH RECIRCULATION RESERVOIR MIX	R:W	HIGHER: LOWER:	INCREASE PHASE SPACE TUNNEL PARTICLE COLLISION LOWER REACTOR YIELD; MORE PRECISE END PRODUCT/ENERGY	BATCH MASS;VOL PROGRAMMABLE ELEMENT VISCOSITY DELTA OUPUT
CHEMICAL (OMC) SEQUENCE	INTERMITTANT BULK ‘DROPS’ OR METERED	OMC ADDED	INTER-MITTANT; METERED:	FASTER BATCH TIMES W/ LARGER FINAL PARTICLE SIZE EFFICIENT-TARGETED OMC METATHESIS	METERING PUMP CONTROLLED BY APP
SLURRY TEMPERATURE	RECIRCULATION RESERVOIR JACKET TO HEAT &/or COOL	TEMP.	HIGHER: LOWER:	INCREASE OMC COORDINATION COMPLEX FUNCTION; PLUS PENETRATION OF AQUEOUS MEDIUM TO PARTICLE CORE DEFER PHASE SPACE PARTICEL MANIPULATION TO CAVITATION EFFECT & PHOTON BLOCKADE	MULTI-POINT SENSORS TO CORRELATE W/ OTHER SENSOR INPUT FOR INTEGRATED OPTIMIZATION
SLURRY PRESSURE ACHIEVED WHERE SLURRY PUMPED THROUGH (PCMR) IN-SERIES	PARALLEL CONTINUOUS FLOW MICRO-SYNTHESIS REACTOR 2ND STAGE SERPENTINE PIPE MODULE WHERE SLURRY TEMPERATURE: PRESSURE MANIPULATE VAPOR/LIQUID PHASE OCILLATIONS	VAPOR LIQUID OCCILATION	HIGHER: LOWER:	AUGMENTS PHOTON BLOCKADE PRESERVES ENTROPY LOSS W/ MORE PARTICLE SIZE REDUCTION/UNIT OF INPUT ENERGY DEFERS PHASE SPACE PARTICLE MANIPULATION TO ELECTROMAGNEICS OF DUAL ELECTRODE ELEMENT IN STATOR SLOT	TEMPERATURE & PRESSURE SENSORS PLUS IRIS VALVE CONTROLS TO SET NUMBER OF PRESSURE GRADIENT CHANGES DURING PCMR PASSAGE TIED TO MASTER PROGRAM
POST REACTOR PARTICLE DE-WATERING SELECTION	FILTER-PRESS THEN DEHYDRATE OR FULL DEHYDRATION	OMC RESIDUE	HIGHER: LOWER:	REMAINING REACTIVE OMC ASSISTS IN HIGH SHEAR COMPOUNDING INTO MACRO-STRUCTURE BY DRY METATHESIS OF ‘ORPHAN’ BONDS REDUCES OMC DEMAND IN SUBSEQUENT BATCH; FASTER POST REACTOR PROCESS TIME	MONITOR X LINK DENSITY; TENSILE STRENGTH AND RESILIENCE PROPERTIES OF COMPOUNDED RUBBER MACRO-STRUCTURE THEN CORRELATE FOR EFFICACY
PARTICLE SIZE REDUCTION; AND RATE OF REDUCTION	USE ALL OTHER SYSTEM VARIABLES IN BOTH SLURRY CONTROL AND EMRE CONTROLS	RATE OF REDUCTION	FASTER: SLOWER:	SHORTER BATCH INTERVALS WITH ENERGY ECONOMIES W/O LOSS OF FINAL PURPOSE OF PROCESS REDUCED POST-PROCESSING OF DRY, REACTOR MODIFIED GTRP	SAME AS V. SAMPLING, DURING BATCH W/ PARTICLE SIZE ANALYZER AND PHYSICAL SMEAR TEST OVER 5μ GRATING TO DETERMINE OUTER DIMENSION AVERAGE AND PARTICLE CORE RESILIENCY

FIG. 4C.

COMPONENT	METHOD OF CONTROL	ABBREV.	FIRST ORDER RESULT		DATA GATHERING HARDWARE
SPEED ROTOR TIP RPM	VARIABLE FREQUENCY DRIVE	ROTOR TIP SPEED	FASTER: SLOWER:	MORE DISTORTION REDUCED CAVITATION EFFECT	HARD WIRED, PROGRAM FREQ, RPM, AMP, VOLT: TO MOTOR
ROTOR TIP-TO- STATOR DISTANCE	MECHANICALLY ESTABLISHED PRIOR TO RUNNING	GAP	LARGER: SMALLER:	INCREASE MIXING INGREDIENT & REACTION TIME MAINTAIN PARTICLE VELOCITY & MAXIMIZE CAVIATION EFFECT	CHART RESULT FOR DIFFERENT GAPS VS FINISHED PRODUCT AS DATA ENTRY POINT - PRGM
STATOR GAP APERATURE SHAPE & AREA	ADJUSTABLE, CONCENTRIC DUAL SHELL PLATES SET-UP BEFORE RUNNING OR ADJUSTABLE ON-THE- FLY	APERATURE	GREATER: LESSER:	ACCOMMODATE SMOOTH FLOW OF LARGE PARTICLE AT START OF REACTOR RUN IMPROVE CAVITATION EFFECT OF SMALLER PARTICLE LATE IN RUN	PRE-BATCH FUNCTION TO BE DETERMINED AND ENTERED AS A PROGRAMMABLE ELEMENT/APP
RECIRCULATION RESEVOIR VOLUME	PRE-SET VOLUME FOR SINGLE OR MULTI- STAGE PROCESS TARGET(S)	VOLUME	LARGER: SMALLER:	IMPROVED DIELECTRIC RELAXATION; UNIFORM GROUND STATE HIGHER PHASE SPACE TUNNEL ENERGY RETENTION	PRE-BATCH FUNCTION; CALCULATE AS PROGRAM ELEMENT APP
STATOR APERATURE PASSAGE WAY EMBEDDED, OVAL ELECTRODE GATE WIRED TO HIGH VOLTAGE AC SOURCE	POWER CONTROL MODULE WITH VARIABLE: FREQUENCY, VOLTAGE, AMPERAGE CONTROLS (V) (A) (f) = 3 VARIABLES	(V) (A) (f)	VARIABLE INCREASE: VARIABLE DECREASE:	RAPID PHOTON BLOCKADE INFILL & CAPACITY TO TRIGGER PHASE CHANGE(S) ENHANCE PARTICLE CORE ELECTRON CLOUD REPLUSION; INNER DELAMINATION	VOLT AMP FREQUENCY METERS; TO BE INTEGRATED INTO PROGRAMMABLE APP

FIG. 4D

ELEMENT FIVE. Chemotactic sulfidic-bridge-tether-effect (SBTE)

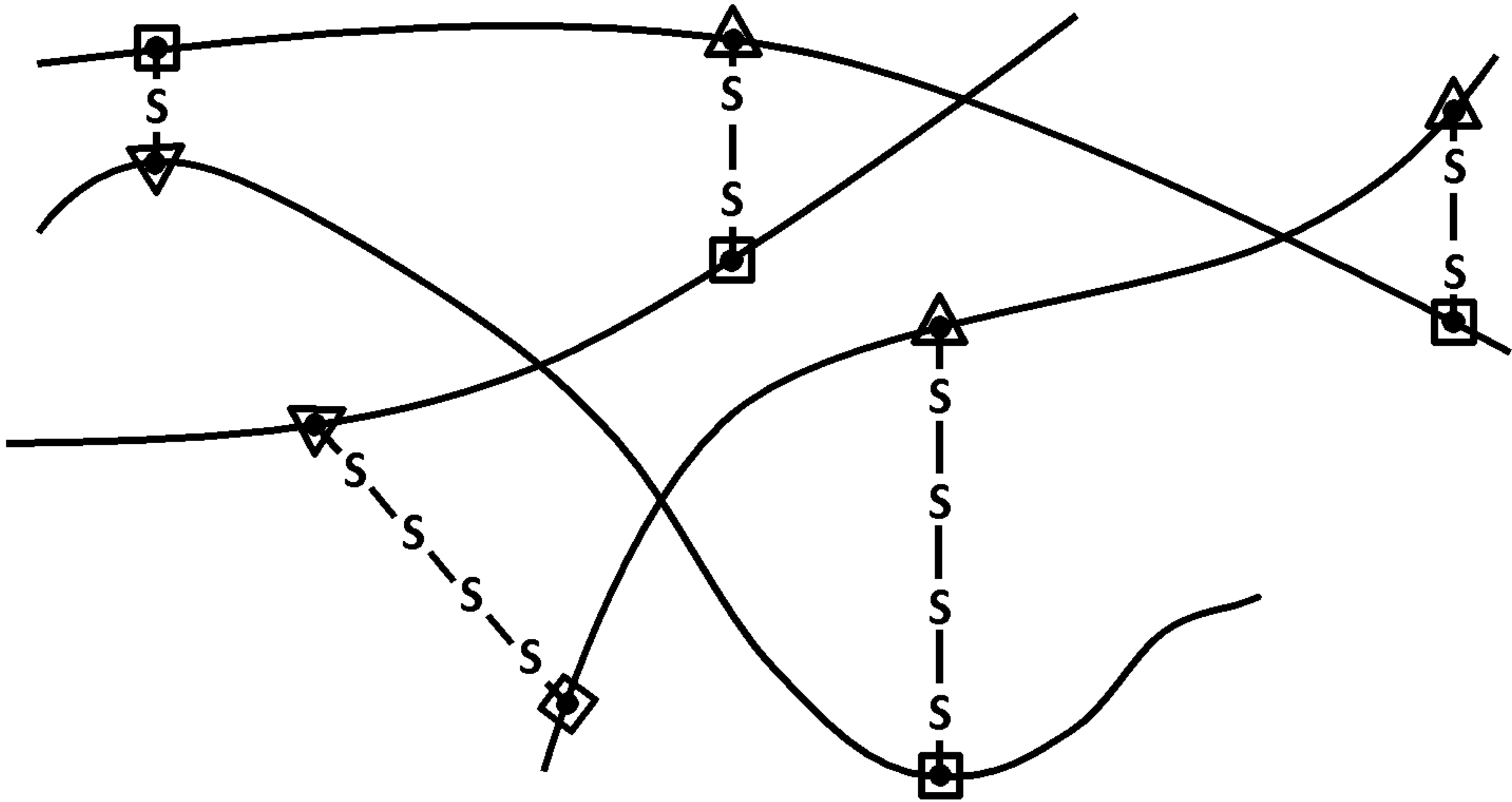


FIG. 5A

- ▣ Pendant vulcanizate precursor @ predominant methyl carbocation (originally forms @ ~140°C)
- ▴ Completed vulcanization @ allylic carbocation (subsequently forms @ ~160°C)

CARBOCATION STABILITY

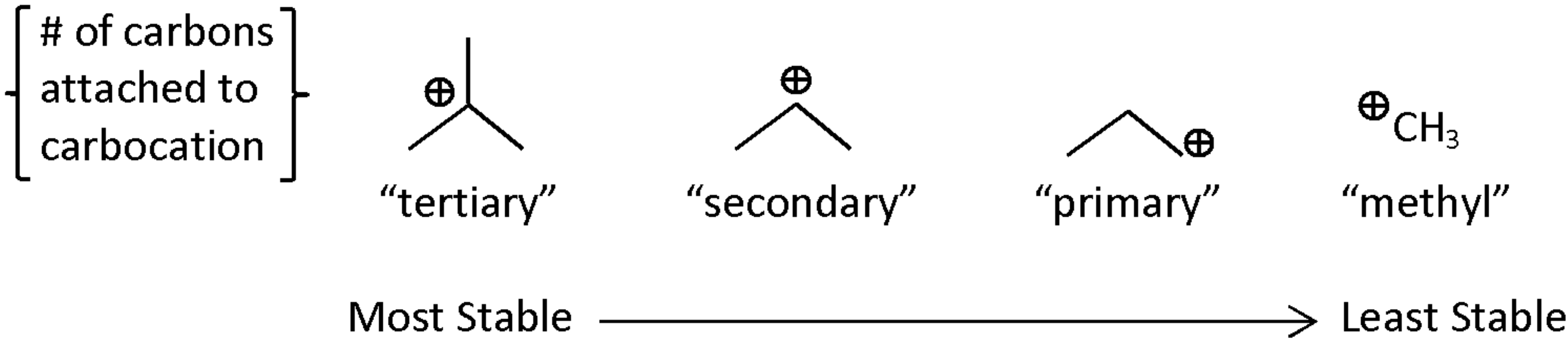


FIG. 5B

ELEMENT SIX: Chemical Reaction Products and Timeline

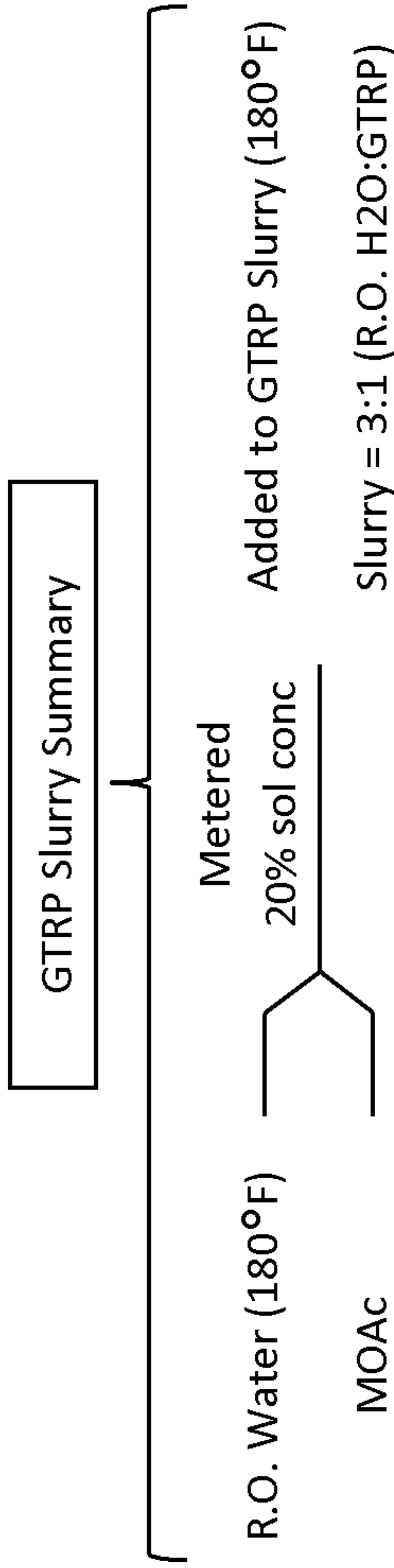


FIG. 6A

Organometallic compound dissolved in water develops ligands, including transient, aquo metal formations.

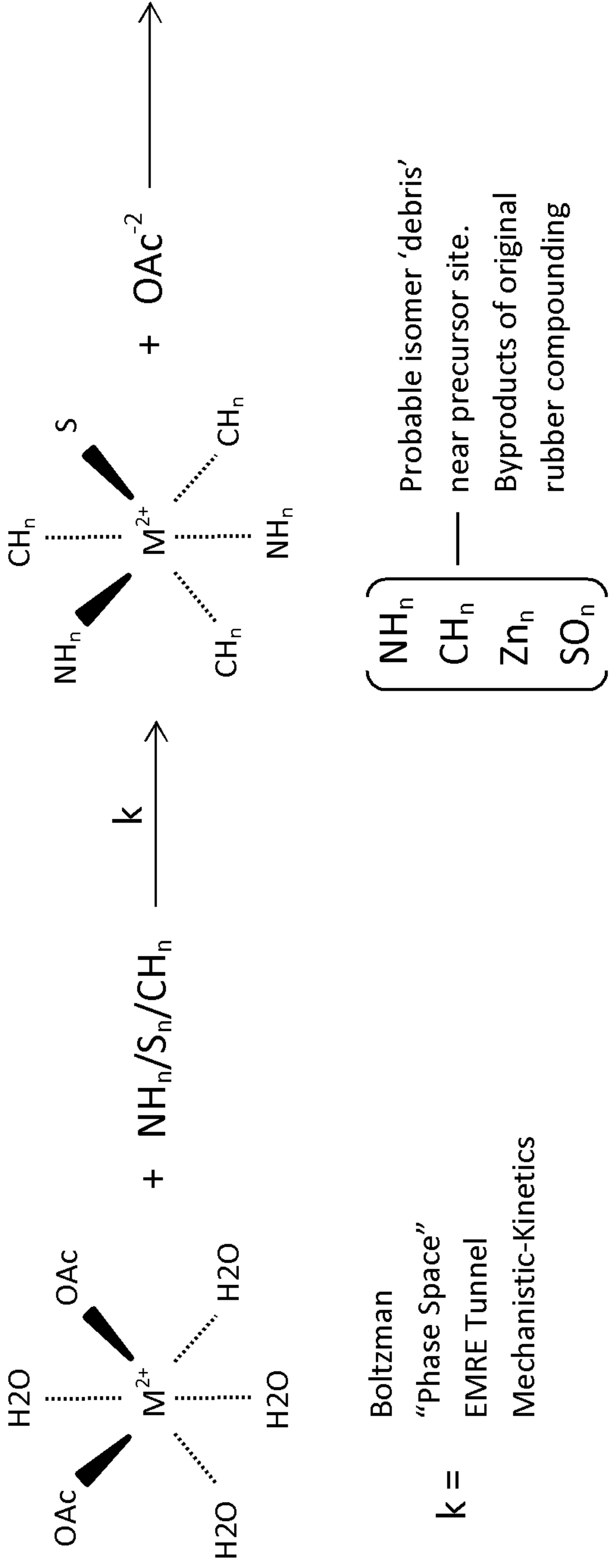


FIG. 6B

- Metal-Acetate Ion
- Dissociative Substitution @ methyl carbocation/
1. disrupts vulcanization precursor
2. insertion forms new functional site at elastomer pendent structure for subsequent sulfidic bridge realignment
3. $\text{O}_2^+ \rightarrow \text{CO}_2$ with "Phase Space" particle charged carbon aggregate
4. strong $\text{M}^{2+} - \text{S}^{-2}$ interaction forms a precipitate
5. liberates rigid sulfidic bridge to 'tether' state bound only at original allylic carbocation

ELEMENT 7: Fabricate Monolithic, Rubber Macro-Structure

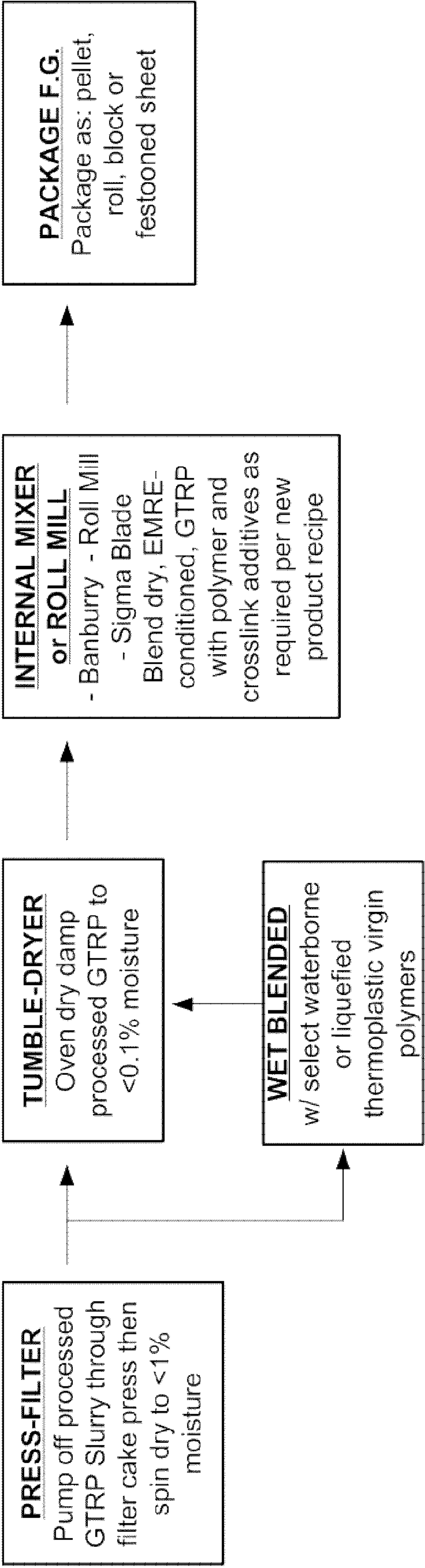


FIG. 7A

STAGE 1: Ground State Vulcanized GTRP

STAGE 2: EMRE-Conditioned GTRP

STAGE 3: Regenerated Interpenetrating Elastomer Network

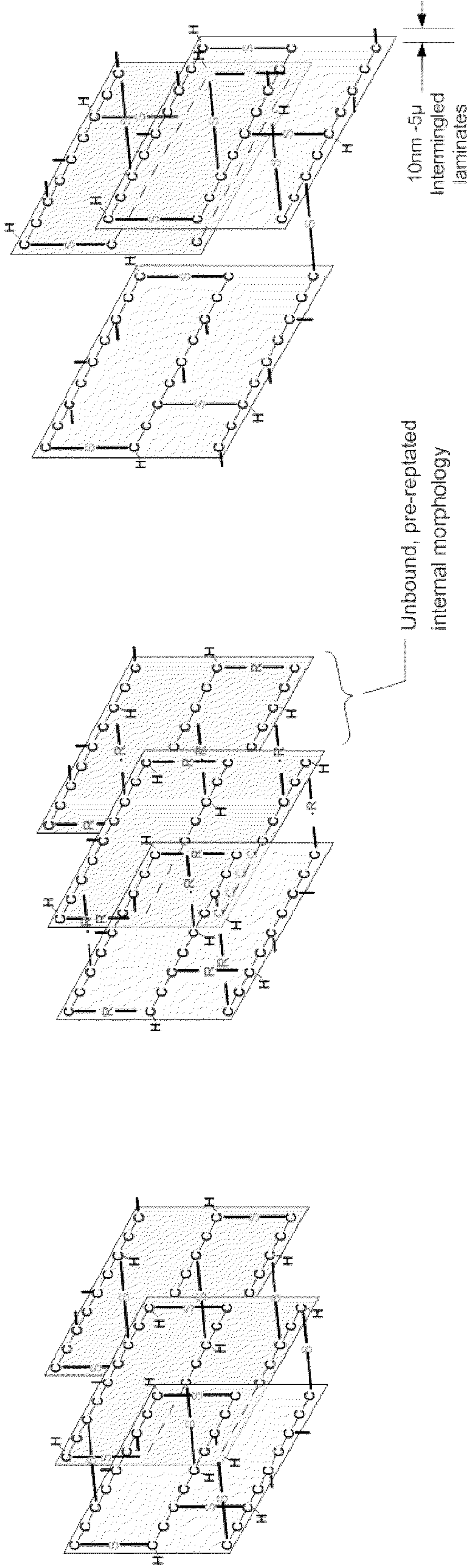


FIG. 7B

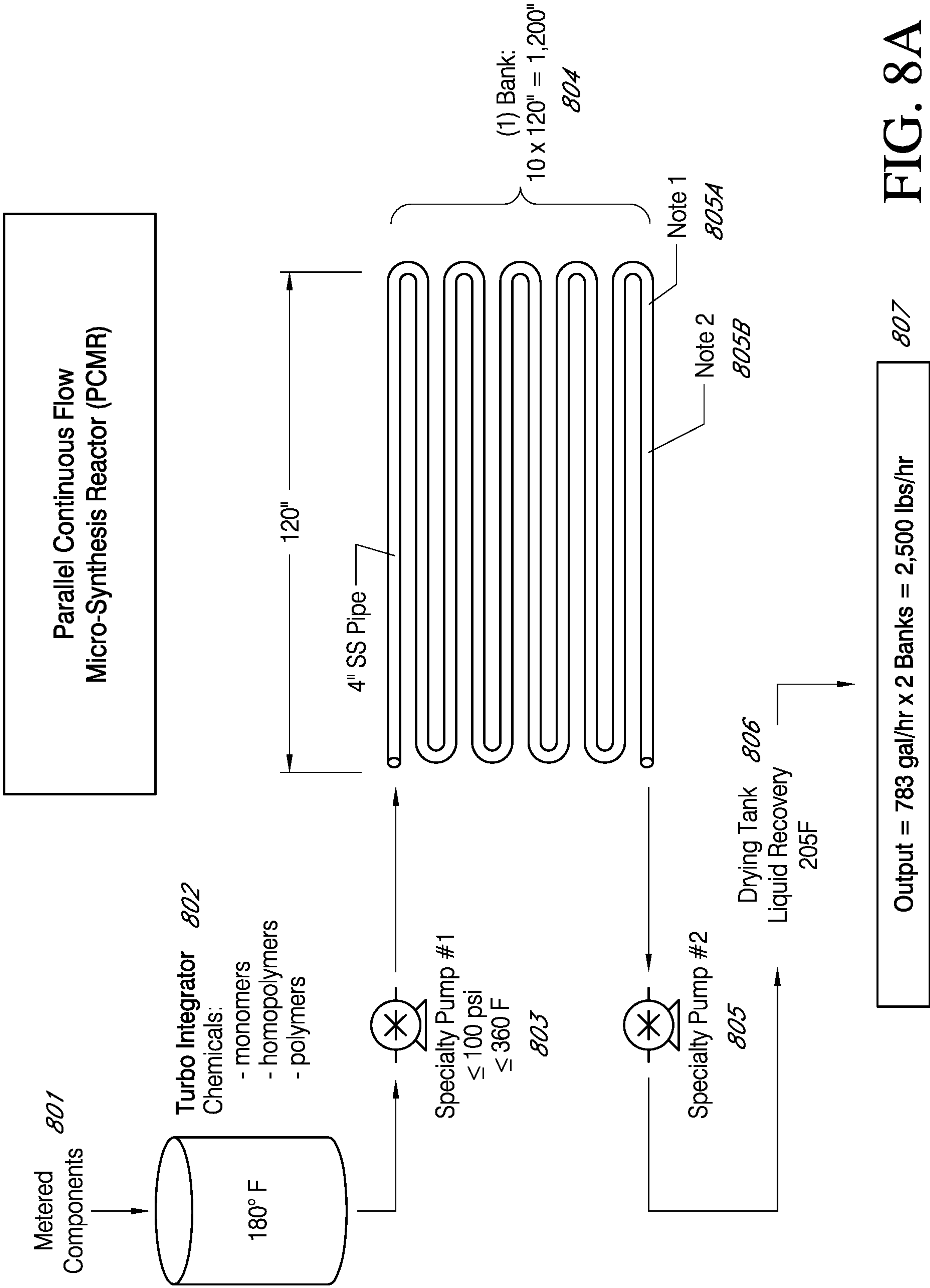


FIG. 8A

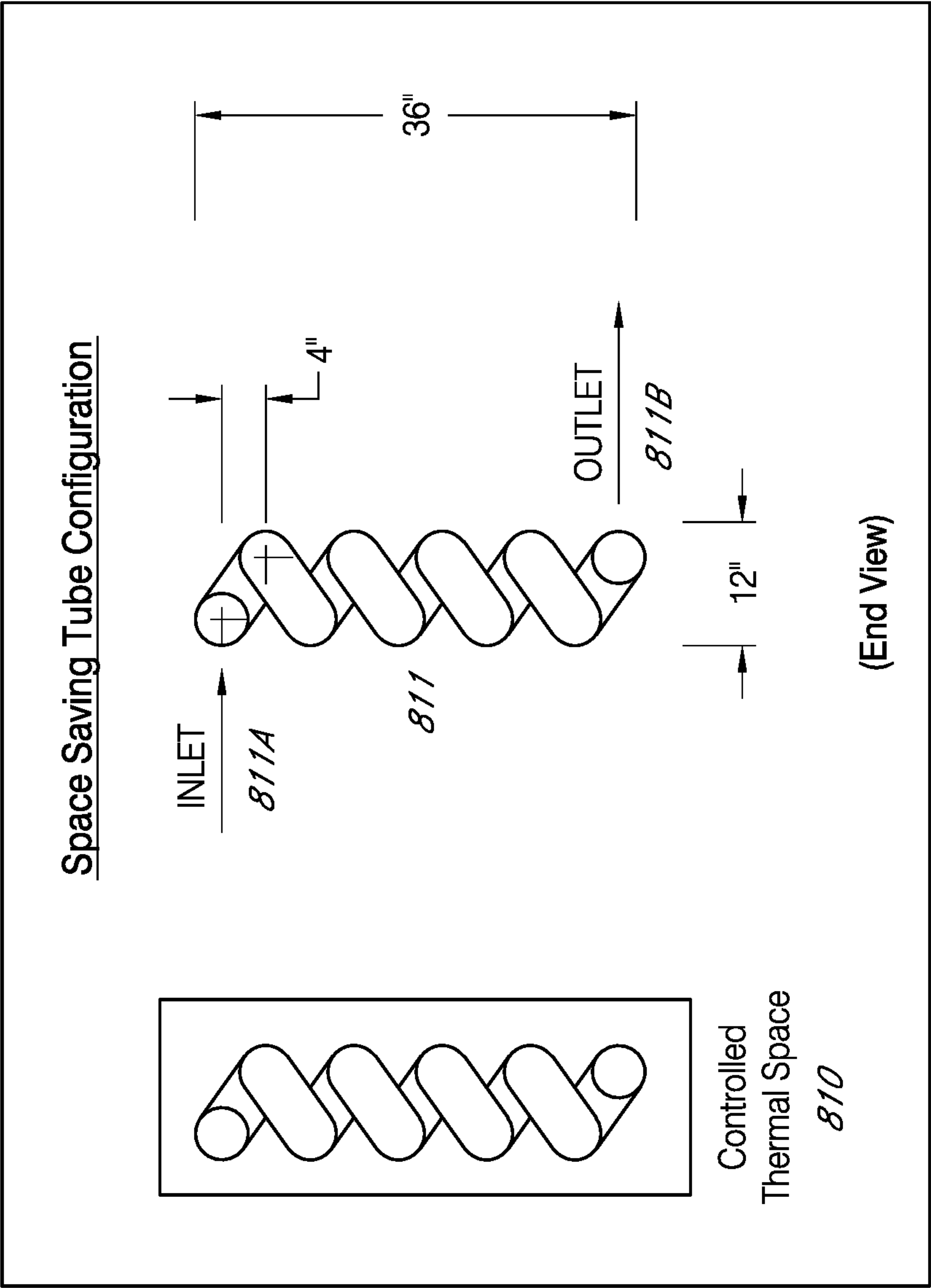


FIG. 8B