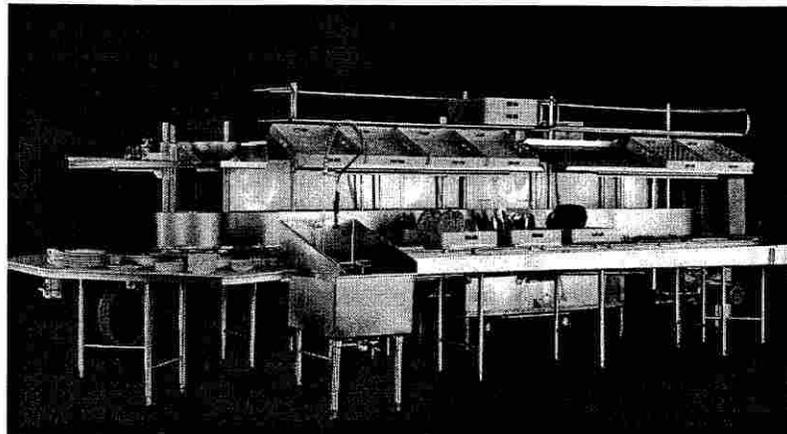




# INSTRUCTION & PARTS MANUAL

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## SYSTEMATIC



**STERO**  
Dishwashing Machines



# **The Stero Company**

## **WARRANTY POLICY**

*This warranty is in lieu of all other warranties, expressed or implied, including without limitation any implied warranty of merchantability, fitness for a particular purpose or non-infringement, and of any other obligation or liability on the part of Stero, whether in contract, strict liability, tort or otherwise.*

*The Stero Company warrants this equipment to be free from defects in material and workmanship, under normal use and operation, for a period of one (1) year from the date of initial start up or eighteen (18) months from the date of shipment from the factory, whichever comes first. This warranty is conditioned upon the customer's maintenance and care as outlined in the service manual and upon return of the warranty registration card. Repairs will be performed during Stero's authorized service agencies' normal business hours. If the customer requires after hours service the customer will be responsible for the overtime premium.*

*Machine is warranted only for the initial place of installation. Removal of machine automatically terminates the warranty.*

*Stero shall have no liability under this warranty unless the customer promptly notifies Stero or its factory authorized service agent of any alleged defects. All defective parts become the property of Stero and must be returned to Stero, or its agent, at Stero's expense, within thirty (30) days from the date of the part's replacement. Parts replaced within the warranty carry only the unexpired portion of the machine's warranty. Not covered by this warranty are changes (parts and/or labor) necessitated by or damage resulting from: water conditions, accident, alteration, improper use, abuse, tampering, improper installation or failure to follow operating and maintenance procedures. Examples of the foregoing, but without limitations are: (1) Damage to the machine resulting from excessive concentrations of chlorine or delimiting acid solutions; (2) Use with utility service other than designated on the rating plates; (3) Improper connection to utility service; (4) Inadequate or excessive water and/or steam pressure; (5) Leaks caused by faulty installation; (6) Component failures caused by water leaks due to faulty installation; (7) Failure to comply to local building codes; (8) Failures due to deposits resulting from water or steam conditions, detergents, chemicals, or improper cleaning; (9) Resetting breakers, overloads, or safety thermostats; (10) Adjustments of thermostats after 90 days of operation; (11) Improper opening of utility supply valves; (12) Cleaning drain valves, line strainers, rinse nozzles, etc.; (13) Improper installation or malfunction of chemical dispensing equipment supplied by others; and (14) Failure to provide regular maintenance and daily cleaning as outlined in the service manual. In no event will Stero be liable for loss or damage to or loss of use of facilities or other property, additional labor costs, loss of revenue, loss of anticipated profits, or other damages of any kind what so ever, whether direct, indirect, incidental or consequential.*

## **UL 73 Grounding Instructions:**

**This Appliance must be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the appliance.**

# SYSTEMATIC TROUBLE SHOOTING GUIDE

PROBLEM	LOOK FOR	CORRECTION
<p>MACHINE WILL NOT COME UP TO TEMPERATURE</p> <p>(ELECTRIC TANK HEAT)</p>	<ul style="list-style-type: none"> <li>(1 TRIPPED CIRCUIT BREAKER.</li> <li>(2 TANK HEAT SWITCH</li> <li>(3 BLOWN FUSE.</li> <li>(4 TRIPPED HIGH LIMIT.</li> <li>(5 CHECK LINE VOLTAGE.</li> <li>(6 CHECK AMPERAGE</li> <li>(7 LIME BUILD UP ON ELEMENTS.</li> <li>(8 THERMOSTATS OUT OF ADJUSTMENT.</li> <li>(9 VENT DAMPERS INCORRECTLY SET.</li> </ul>	<ul style="list-style-type: none"> <li>(1 RESET CIRCUIT BREAKER.</li> <li>(2 CHECK TO INSURE TANK HEAT SWITCH IS ON.</li> <li>(3 TEST FUSE'S ON TANK HEAT CONTACTORS.</li> <li>(4 RESET HIGH LIMIT.</li> <li>(5 CHECK LINE VOLTAGE WITH VOLTMETER.</li> <li>(6 CHECK ELEMENTS FOR PROPER AMPERAGE DRAW.</li> <li>(7 DELIME TANKS.</li> <li>(8 ADJUST THERMOSTATS, REPLACE IF NECESSARY.</li> <li>(9 ADJUST DAMPERS.</li> </ul>
<p>MACHINE WILL NOT COME UP TO TEMPERATURE</p> <p>(STEAM TANK HEAT)</p>	<ul style="list-style-type: none"> <li>(1 STEAM SUPPLY VALVE CLOSED.</li> <li>(2 STEAM RETURN VALVE CLOSED.</li> <li>(3 DEFECTIVE STEAM VALVE.</li> <li>(4 DEFECTIVE STEAM TRAP.</li> <li>(5 LOW STEAM PRESSURE.</li> <li>(6 THERMOSTATS OUT OF ADJUSTMENT.</li> <li>(7 LIME BUILD UP ON COILS.</li> <li>(8 FILL VALVES STAYING OPEN.</li> <li>(9 VENT DAMPERS INCORRECTLY SET.</li> </ul>	<ul style="list-style-type: none"> <li>(1 OPEN STEAM SUPPLY VALVE.</li> <li>(2 OPEN STEAM RETURN VALVE.</li> <li>(3 CHECK FOR PROPER OPERATION.</li> <li>(4 CHECK FOR PROPER OPERATION.</li> <li>(5 15 TO 40 LBS PRESSURE.</li> <li>(6 ADJUST THERMOSTATS, REPLACE IF NECESSARY.</li> <li>(7 DELIME TANKS.</li> <li>(8 CHECK FILL VALVES AND AUTO FILL FLOAT SWITCHES.</li> <li>(9 ADJUST DAMPERS.</li> </ul>
<p>FINAL RINSE WILL NOT COME UP TO TEMPERATURE</p> <p>(STEAM BOOSTER)</p>	<ul style="list-style-type: none"> <li>(1 STEAM SUPPLY VALVE CLOSED.</li> <li>(2 STEAM RETURN VALVE CLOSED.</li> <li>(3 DEFECTIVE STEAM VALVE.</li> <li>(4 DEFECTIVE STEAM TRAP.</li> <li>(5 LOW STEAM PRESSURE.</li> <li>(6 THERMOSTATS OUT OF ADJUSTMENT.</li> <li>(7 WATER TEMPERATURE AT INLET LOW.</li> <li>(8 FINAL RINSE FLOW PRESSURE SET INCORRECTLY.</li> <li>(9 DEFECTIVE FINAL RINSE VALVE.</li> <li>(10 CHECK MIXING VALVE.</li> <li>(11 BOOSTER LIMED UP.</li> <li>(12 RUPTURED BOOSTER.</li> </ul>	<ul style="list-style-type: none"> <li>(1 OPEN STEAM SUPPLY VALVE.</li> <li>(2 OPEN STEAM RETURN VALVE.</li> <li>(3 CHECK FOR PROPER OPERATION.</li> <li>(4 CHECK FOR PROPER OPERATION.</li> <li>(5 15 TO 40 LBS PRESSURE.</li> <li>(6 ADJUST THERMOSTATS, REPLACE IF NECESSARY.</li> <li>(7 WATER AT INLET SHOULD BE 140° F.</li> <li>(8 FLOW PRESSURE SHOULD BE 15 TO 20 LBS. ADJUST PRV. VALVE.</li> <li>(9 CHECK FOR PROPER OPERATION.</li> <li>(10 ADJUST MXING VALVE.</li> <li>(11 CLEAN OR REPLACE BOOSTER.</li> <li>(12 REPLACE BOOSTER.</li> </ul>

# SYSTEMATIC TROUBLE SHOOTING GUIDE

PROBLEM	LOOK FOR	CORRECTION
PUMP MOTOR KICKING OUT	<ul style="list-style-type: none"> <li>(1) CHECK MOTOR ROTATION.</li> <li>(2) CHECK LINE VOLTAGE.</li> <li>(3) BROKEN GLASS, DISH, SILVER, ETC. IN PUMP HOUSING.</li> <li>(4) PLUGGED MANIFOLDS.</li> </ul>	<ul style="list-style-type: none"> <li>(1) CHANGE MOTOR ROTATION.</li> <li>(2) CHECK WITH VOLTMETER.</li> <li>(3) REMOVE PUMP MOTOR &amp; CLEAN PUMP HOUSING. CHECK INTAKE &amp; DISCHARGE SIDE OF PUMP.</li> <li>(4) REMOVE AND CLEAN UPPER AND LOWER MANIFOLDS.</li> </ul>
CONVEYOR WON'T RUN	<ul style="list-style-type: none"> <li>(1) TRIPPED CIRCUIT BREAKER.</li> <li>(2) CHECK CONVEYOR DRIVE MOTOR.</li> <li>(3) CHECK GEAR BOX.</li> <li>(4) LOSE V-BELTS.</li> <li>(5) CHECK POSITION OF CONVEYOR REVERSING SWITCH.</li> <li>(6) CHECK CONVEYOR MOTOR CONTACTOR.</li> <li>(7) CHECK TENSION ON CONVEYOR DRIVE ASSEMBLY.</li> <li>(8) CHECK DRIVE DOG ASSEMBLY ON CARRIERS.</li> <li>(9) JAMMED CARRIER.</li> </ul>	<ul style="list-style-type: none"> <li>(1) RESET CIRCUIT BREAKER.</li> <li>(2) RESET OVERLOAD.</li> <li>(3) CHECK GEAR BOX FOR PROPER OPERATION. CHECK OIL LEVEL.</li> <li>(4) TIGHTEN V-BELTS.</li> <li>(5) MOVE SWITCH TO FORWARD POSITION.</li> <li>(6) CHECK OPERATION OF CONTACTOR.</li> <li>(7) ADJUST TENSION ON CONVEYOR DRIVE CHAIN ASSEMBLY.</li> <li>(8) ADJUST OR REPLACE WORN DOGS.</li> <li>(9) LOCATE AND FREE CARRIER.</li> </ul>
MACHINE RUNS FOR A FEW SECONDS THEN SHUTS OFF	<ul style="list-style-type: none"> <li>(1) CHECK LOW WATER CUT-OFF FLOAT SWITCHES.</li> <li>(2) OPEN DRAIN VALVE.</li> <li>(3) CHECK SETTING ON SHUT DOWN TIMER.</li> </ul>	<ul style="list-style-type: none"> <li>(1) CHECK OPERATION OF LOW WATER CUT-OFF FLOAT SWITCHES.</li> <li>(2) CLOSE DRAIN VALVE.</li> <li>(3) RESET TIME ON TIMER.</li> </ul>
MACHINE IS NOT WASHING PROPERLY.	<ul style="list-style-type: none"> <li>(1) PLUGGED MANIFOLDS.</li> <li>(2) PUMP MOTOR KICKED OUT.</li> <li>(3) CHECK WASH TEMPERATURE.</li> <li>(4) EMPTY DETERGENT CONTAINER.</li> <li>(5) LOW WATER LEVEL IN TANK.</li> </ul>	<ul style="list-style-type: none"> <li>(1) REMOVE AND CLEAN UPPER AND LOWER MANIFOLDS.</li> <li>(2) RESET OVERLOAD ON MOTOR.</li> <li>(3) ADJUST WASH TEMPERATURE. 150 TO 185F.</li> <li>(4) REPLACE CONTAINER.</li> <li>(5) ADJUST FILL FLOAT SWITCH.</li> </ul>
MACHINE IS NOT RINSING PROPERLY	<ul style="list-style-type: none"> <li>(1) PLUGGED FINAL RINSE SPRAYERS.</li> <li>(2) UPPER &amp; LOWER FINAL RINSE PIPES OUT OF ALIGNMENT.</li> <li>(3) DEFECTIVE FINAL RINSE VALVE.</li> <li>(4) LOW FINAL RINSE PRESSURE.</li> <li>(5) CHECK FINAL RINSE TEMPERATURE.</li> <li>(6) CHECK FINAL RINSE RAKE FOR PROPER OPERATION.</li> </ul>	<ul style="list-style-type: none"> <li>(1) REMOVE AND CLEAN.</li> <li>(2) ADJUST UPPER &amp; LOWER SPARY PATTERN.</li> <li>(3) CHECK &amp; REPLACE IF NECESSARY.</li> <li>(4) FLOW PRESSURE SHOULD BE 15 TO 20 LBS. ADJUST PRV. VALVE.</li> <li>(5) ADJUST BOOSTER THERMOSTAT, CHECK INCOMING WATER TEMP. TO BOOSTER FRIST. (140 F)</li> <li>(6) ADJUST RAKE AS NEEDED.</li> </ul>

# SYSTEMATIC TROUBLE SHOOTING GUIDE

PROBLEM	LOOK FOR	CORRECTION
MACHINE WILL NOT FILL	<ul style="list-style-type: none"> <li>(1 CLOSED WATER SUPPLY VALVE.</li> <li>(2 PLUGGED LINE STRAINER.</li> <li>(3 DEFECTIVE FILL VALVE.</li>   <li>(4 DRAIN VALVE OPEN.</li>   <li>(5 DEFECTIVE FILL RELAY.</li>   <li>(6 DEFECTIVE FILL SWITCH.</li>   <li>(7 DEFECTIVE FLOAT SWITCH.</li> </ul>	<ul style="list-style-type: none"> <li>(1 OPEN SUPPLY VALVE.</li> <li>(2 REMOVE AND CLEAN SCREEN.</li> <li>(3 CHECK OPERATION OF VALVE, REPLACE IF NECESSARY.</li>   <li>(4 CHECK SEAT FOR FOOD PARTICLES "O" RING BROKEN OR OUT OF PLACE.</li>   <li>(5 CHECK TO INSURE RELAY IS ENERGIZING WHEN FILL SWITCH IS PUSHED INWARD.</li>   <li>(6 CHECK CONTACT BLOCKS ON FILL SWITCH TO INSURE THEY ARE CLOSING.</li>   <li>(7 CHECK OPERATION OF FLOAT SWITCHES ADJUST AS NEEDED.</li> </ul>
MACHINE WILL NOT HOLD WATER	<ul style="list-style-type: none"> <li>(1 FOOD PARTICLES HOLDING DRAIN VALVE FROM SEATING.</li> <li>(2 DRAIN NOT CLOSING.</li>   <li>(3 DEFECTIVE DRAIN O RING.</li> </ul>	<ul style="list-style-type: none"> <li>(1 CHECK DRAIN VALVE SEAT.</li>   <li>(2 ADJUST DRAIN LINKAGE BETWEEN DRAIN VALVE BODY AND FOOT LEVER.</li>   <li>(3 REPLACE O RING.</li> </ul>
MACHINE OVERFILLS	<ul style="list-style-type: none"> <li>(1 DEFECTIVE FILL VALVE.</li> <li>(2 DEFECTIVE FILL FLOAT SWITCH.</li> <li>(3 COLD WATER AQUASTAT VALVE OPEN.</li> <li>(4 FINAL RINSE VALVE STAYING OPEN.</li> </ul>	<ul style="list-style-type: none"> <li>(1 CHECK OPERATION OF VALVE, REPLACE IF NECESSARY.</li> <li>(2 CHECK OPERATION OF FLOAT SW. ADJUST AS NEEDED.</li> <li>(3 CHECK TEMPERATURE IN SCRAPER TANK.</li> <li>(4 CHECK FINAL RINSE VALVE AND FINAL RINSE RAKE FOR PROPER OPERATION.</li> </ul>
MACHINE WILL NOT START.	<ul style="list-style-type: none"> <li>(1 TRIPPED CONTROL CIRCUIT BREAKER.</li> <li>(2 SAFETY SWITCH.</li> <li>(3 BLOWN CONTROL FUSE.</li> <li>(4 DEFECTIVE DOOR SAFETY SWITCH.</li> <li>(5 DEFECTIVE DOOR SAFETY SWITCH CONTROL RELAY.</li> <li>(6 LOW WATER LEVEL IN TANKS.</li> <li>(7 DRAIN VALVE OPEN.</li> <li>(8 CHECK LOW-WATER CUT-OFF FLOAT SWITCHES. (WASH &amp; RINSE TANKS)</li> </ul>	<ul style="list-style-type: none"> <li>(1 RESET CONTROL CIRCUIT BREAKER.</li> <li>(2 TURN SWITCH TO ON POSITION.</li> <li>(3 TEST FUSE REPLACE IF BLOWN.</li> <li>(4 CHECK DOOR SWITCHES.</li> <li>(5 CHECK TO INSURE CONTROL RELAY IS ENERGIZING WHEN DOORS ARE CLOSED.</li> <li>(6 CHECK WATER LEVEL IN TANKS, WATER SHOULD BE 1/2" BELOW OVERFLOW BELL.</li> <li>(7 CHECK SEAT FOR FOOD PARTICLES "O" RING BROKEN OR OUT PLACE.</li> <li>(8 CHECK OPERATION OF LOW WATER CUT-OFF FLOAT SWITCHES, ADJUST OR REPLACE IF NECESSARY.</li> </ul>

## INFRARED SECTION ADDENDUM

### INSTALLATION INSTRUCTIONS

1. Set the machine in place.
2. Level the machine from side to side, and front to back.
  - a. Place a level on turned out lip or tank.
  - b. Adjust level of machine by screwing adjustable feet in or out as necessary.
3. Dish tables can now be set in place.
  - a. The dish table(s) lip or turndown **MUST** be sealed with silicone or similar sealing compound. This compound must be applied so that it is compressed between the table lip and the machine tank. Be generous with this compound, this is a vital part of the installation to prevent leaks.
  - b. The dish table lip must be tightly secured to the vertical edge of the machine tank. This is to allow maximum area for clearance. If the tables interfere with any mechanical parts, it will cause premature wear of the machine and will **NOT** be covered under the machine warranty.

### **PLUMBING CONNECTIONS**

1. Make all plumbing connections as indicated by the tags fastened to the machine connections points.

NOTE: Make as many clean outs as possible in the drain line using tee's with pipe plugs in each tee instead of elbows, as it is very important to keep the lines cleaned out.

**COMPLY WITH ALL LOCAL PLUMBING CODES.**

### **ELECTRICAL CONNECTIONS**

1. Make all electrical connections as indicated on the tags fastened to the outlets on the machine. All electrical inter-connecting is done on the machine at the factory.

This ware washing unit has been thoroughly tested under actual operating conditions with hot water, steam (when used), gas (when used), and the electrical, all working properly. When the unit has been reassembled properly and all systems connected, one of the most important things to remember is the **FINAL ELECTRICAL CONNECTIONS** to the main power supply. When connecting it to a single or three phase system, and when the electrician turns on the equipment for the first time, the electrician should check to see that the motors are running in the proper direction. If not, then the electrician should switch two of the leads, re-check rotation, secure connections making sure they are **TIGHT AND INSULATED**. The various pump units, valve circuits, etc. have all been phased out and checked out at the factory and should need no attention.

**COMPLY WITH ALL LOCAL ELECTRICAL CODES.**

### **INFRARED GAS HEAT CONTROL SYSTEMS**

1. The infrared gas tank heat option on your machines will include a RESET button on the main electrical control box or panel. This feature is on the infrared machines only. The purpose of the RESET is to "stage" the control circuit for operation. In the case of a power outage or interruption, the control is locked out and ***will not operate*** until the circuit is reset by depressing the RESET button. This is a safety feature, and must not be bypassed.

Note: All of the infrared gas heated machines use a 120v control circuit regardless of the voltage of the machine voltage.

**ALWAYS DISCONNECT OR TURN MAIN POWER SUPPLY OFF TO MACHINE BEFORE PERFORMING ANY MAINTENANCE OR SERVICE ON YOUR STERO EQUIPMENT.**

## INFRARED GAS VENTING INSTRUCTIONS

Your Stero dishwasher equipped with infrared gas tank heat will be supplied from the factory with a stainless steel exhausting system which terminates approximately 5-1/2" above the hood of the dishwasher, always in the rear of the machine. Since your Stero dishwasher with infrared gas tank heat is not intended to be directly connected to a ventilation system, an air gap must be provided. Do not make a sealed connection to the machine exhaust stack system. Refer to Stero drawing no. C20-1384 for factory recommended venting. Also, always refer to the National Fuel Gas Code book for venting requirements.

All venting must be made to the atmosphere.

### COMPLY WITH ALL LOCAL VENTING CODES.

## ADJUSTMENTS AND TESTS

1. Water and steam lines must be bled before final connection to the machine in order to remove any soil and dirt which may have accumulated.
2. When steam heat exchanger is supplied, the trap on same must be bled.
3. When infrared gas heat exchanger is supplied, you must make sure that you have sufficient gas pressure in the lines for proper operation. Natural gas manifold pressure must be 3" water column. LP gas must be 8" water column. Measure the manifold pressure at the 1/8" NPT pressure taps on the gas valves with a manometer.
4. Check inlet and outlet water temperatures to meet the following requirements, in order to assure satisfactory operation.

cold water - inlet line to fill valve of scrapper tank, and for cold water aquastat when supplied.

140°F - inlet line to fill valve of wash tank.

140°F - inlet line to heat exchanger (when supplied).

180°F - outlet from heat exchanger (when supplied).

180°F - final rinse measured at the dish.

180°F - inlet to power wash and power rinse fill valve (when supplied)

5. The motor(s), heat exchanger(s), gas regulator(s), orifice(s), and all other adjustable parts are connected and set at the factory and should need no further adjustments.

## CONVEYOR MACHINE OPERATING INSTRUCTIONS

1. Close all drain valves, install curtains, strainer pans, and close all doors. The door safety switches will prevent the machine from operating with the doors open.
2. Turn on the circuit breakers.
3. Turn SAFETY switch to the ON position.
4. Depress the RESET button (if equipped with the infrared gas tank heat option), this will stage the control circuit.

Note: If there is a power outage or an interruption to the power supply, the control is manually locked out and *will not operate* until the circuit is reset by depressing the RESET button. This is a safety feature, and must not be bypassed.

Operating instructions continued

5. Turn valve on at each gas valve.
6. Push the FILL button. The light will illuminate until all of the tanks fill to their proper level with 140°F - 150°F water.  
6a. If your machine is not equipped with automatic fill, manually open the fill valves until the water reaches the overflow level, then close the valves.
7. Push the BOOSTER button (if equipped), and the light will illuminate.
8. Push the TANK HEAT button. The light will illuminate.

Note: Tank heat will not operate until all of the tanks are filled. Wait a sufficient amount of time to let the tanks reach the desired operating temperatures.

9. After the tanks are heated to the proper operating temperatures, push the START button (if equipped). Pumps and conveyor drive will operate. If your machine is equipped with automatic start, the start up of the machine is activated by placing a rack into the load end of the machine. The machine will stop automatically when the shut down timers pre-set time expires. The time is reset when another dish rack is inserted.
10. When the dish rack reaches the final rinse, it will trip the final rinse lever and the final rinse will spray sanitizing water over the ware.
11. The temperature gauges measure the temperature of water flowing through the manifolds. The pumps must be operating before a valid reading can be obtained. Verify that temperature readings comply with the ranges on the gauges.
12. The final rinse flow pressure should be adjusted to 20 psi for correct rinse flow over the ware.
13. An optional table limit switch will stop the conveyor drive and pump motors when a dish rack approaches the end of the clean dish table.
14. Turn the TANK HEAT switch(es) off before draining the tanks.
15. Turn the SAFETY switch off at the end of the operating period, or before cleaning or servicing the dishwasher.
16. Clean the machine in accordance with the daily maintenance procedures. Remember, *you cannot get clean, sanitized ware from a dirty machine!*

## PREVENTIVE MAINTENANCE

It is surprising how many future repairs will be prevented by completing regular maintenance.

1. Pump motor(s): All of the pump motors are fitted with grease sealed ball bearings, and do not require grease or oiling for the life of the motor(s).
2. Gear box: The motor gear unit also has sealed bearings and does not require grease or oiling for the life of the motor. However, an inspection of the oil level in the gear box should be made at least once a year. We recommend a good brand of SAE90 gear oil be used.
3. Line strainers: Hot and cold water lines to the machine are equipped with line strainers, and are easily recognized. They are located close to the solenoid valves. Before the final rinse connection is made, these lines should be blown out so as to clear out any scale or sediments from lodging in the equipment which they are connected to. As it becomes necessary to clean the strainers, remove the plug at the bottom of the strainers, clean, and reinstall.

Preventive maintenance continued.

4. Conveyor system: On the drive mechanism which moves the conveyor bar(s), all moving parts should be regularly greased with a good multi purpose lithium grease, and/or the use of a good lubricating oil such as WD-40 is recommended on all moving parts of the machine to aid in the life of the machine.
5. Electrical switches: Some of the switches such as the TANK HEAT, FILL, BOOSTER, use lights internal to the switches. If the bulb fails, immediate replacement is recommended. The face of the switch unscrews for easy replacement of the bulbs. These switches are illuminated for the purpose of safe operation of the equipment.
6. Infrared burners and system: Even though the system is protected by the frame of the machine, and sheet metal surrounding the blower(s), periodical inspection of components for damage or blockage is recommended. The blower intake area should be checked for obstructions and wiped free of dirt and oils on a regular basis.
7. Rinse savers: The rinse saver pan located in the final rinse area of your dishwasher should be checked regularly for obstructions in the pipes, and proper adjustment of the flapper to allow for flow of final rinse water not to exceed 2 gallons per minute in the wash tank(s).
8. Wash arms: All wash arms should be checked regularly for obstructions and securely kept in place with all end caps attached.
10. Drain valve(s): All of the drain valves should be checked for obstructions and proper operation. A leaking seat on a drain valve can cost you in unnecessary water, soap, and energy consumption.
11. Curtains: All of the curtains should be cleaned regularly and checked for wear and tear. Replace if necessary.
9. Leaks: All leaks should be fixed whenever they occur.

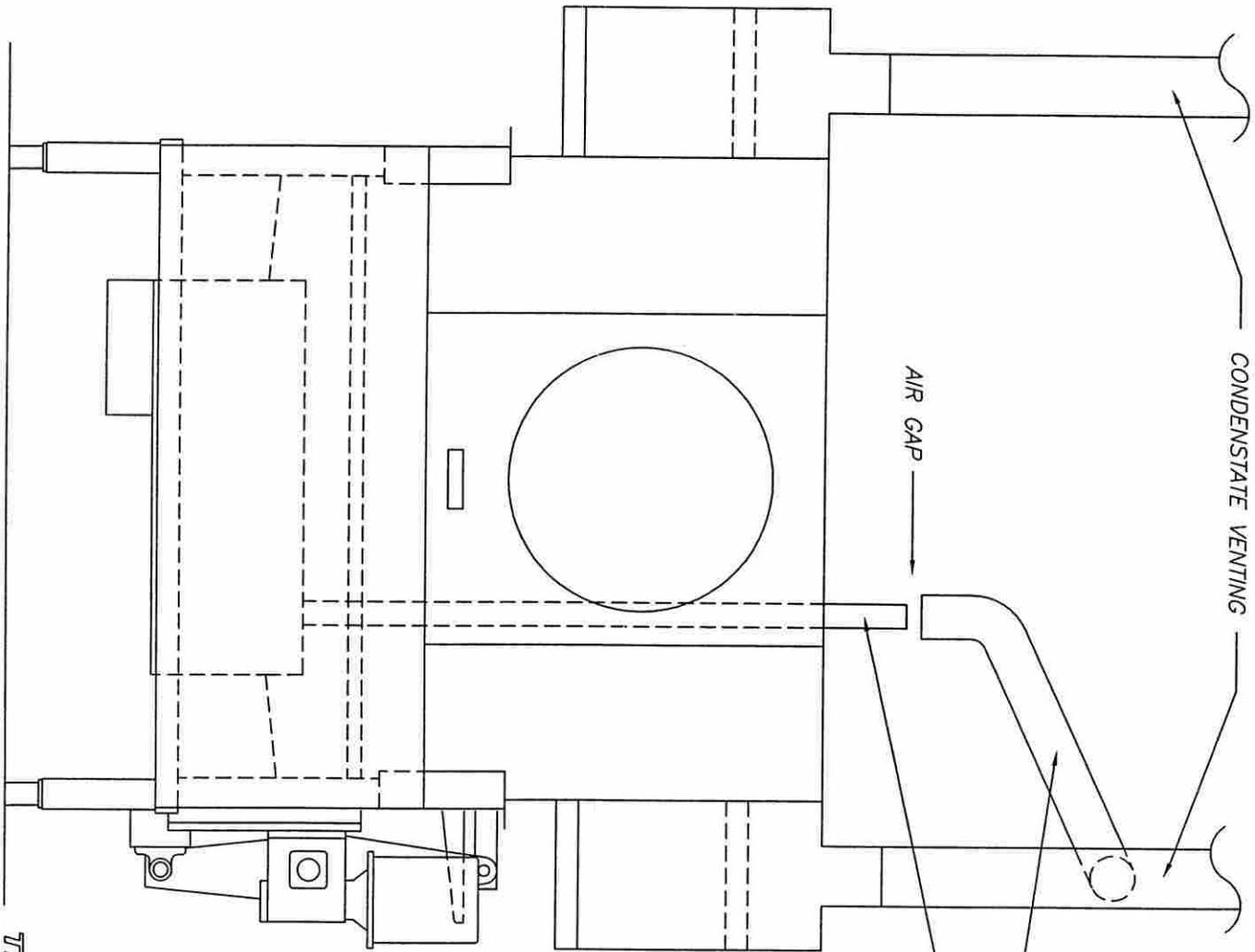
## DAILY MAINTENANCE

Cleanliness is one of the most important things in any scullery. Clean equipment prevents repair problems, and most important of all, it gives you *clean, sanitary ware*. This is best accomplished by establishing a daily procedure, and by selecting a supervisor, if possible, to see that it is properly done.

At the end of each shift or washing period, the following steps will insure proper results from your Stero dishwasher.

1. **SHUT OFF ALL POWER TO THE MACHINE BEFORE CLEANING OR SERVICING.** If the machine is steam heated, turn off the steam supply to the machine. If gas heated, turn off the gas supply to the machine.
  2. Drain the machine.
  3. Open all doors and remove wash arms, scrap screens, and curtains. The wash arm end caps should be removed and the wash arms should now be cleaned in a sink, or flushed out with a hose.
  4. Wash, scrub, and rinse down the inside of the machine. All refuse in the bottom of the tanks should be flushed down the drain(s). Remove any foreign matter that might remain between the drain poppet and the seat of the drain(s).
  5. Clean the exterior of the machine with a good, acceptable stainless steel cleaner. Lemon oil may be used.
  6. The floor around the base of the machine and under the table should also be cleaned to prevent soil accumulation.
  7. All interior components removed from the machine should now be reinstalled. Leave all the doors open to allow the interior of the machine to air dry.
- Always remember, a clean machine is a well maintained machine. You can't get clean, sanitized ware from a dirty machine!*

ALL DIMENSIONS ARE IN DECIMAL INCHES UNLESS STATED OTHERWISE  
 BREAK ALL SHARP EDGES.



NOTE: ALL FABRICATION BY OTHERS FOR VENTING MUST MEET OR EXCEED ALL LOCAL CODES. AS A BY PRODUCT OF OUR VERY HIGH EFFICIENCIES, SOME CONDENSATION IS PRESENT IN THE EXHAUST. ALL STERO COMPONENTS FOR EXHAUSTING THE I.R. HEATERS ARE FABRICATED OUT OF 304 18-8 STAINLESS STEEL.

INTEGRAL DRAFT HOODS ARE NOT RECOMMENDED FOR OUR SYSTEMS BECAUSE OF THE LOW EXHAUST TEMPERATURES AND THE LOW STACK DRAFT.

FACTORY RECOMMENDED EXHAUST TIE-IN TO CONDENSATE VENTING - INDIRECT CONNECTION. COMPLY WITH ALL LOCAL CODES AND FABRICATING REQUIREMENTS.

TYPICAL 1 5/8" DIAMETER STAINLESS STEEL EXHAUST STACK.  
 TYPICAL FLUE TEMPERATURES - 125-145° F  
 TYPICAL FLUE DRAFT - +.1" W.C.

TYPICAL SINGLE BURNER CONVEYOR DISHWASHER

**THE STERO COMPANY**  
 3200 LAKEVILLE HIGHWAY PETALUMA, CALIFORNIA 94954 PHONE: (707)762-0071  
 TITLE: RECOMMENDED VENTING, I.R. GAS DISHWASHER  
 MATERIAL: NOTED  
 DATE: 5/27/1999  
 DRAWN BY: LN  
 DIMENSION TOLERANCE: FRAC. ± 1/64" DEC. ± .005"  
 SCALE: 1 = 12  
 SHEET # 1 OF 1  
 T #  
 A.W. # A20-1384



## FINAL RINSE BOOSTER

The final rinse booster supplied with the equipment is sized so as to supply adequate gallonage of 180°F to 195°F water per minute to the final rinse. To do this it should have an incoming water supply of 140°F of at least 20 to 25 psi flow pressure. If the booster is steam heated, it should also have an adequate steam supply of at least 15 to 40 psi. Water and steam lines to the booster should be sized as indicated on the drawings or called for in the specification. The electrical power supply to the booster should be of the required voltage and phasing as called for in the drawings or specifications.

The temperature in the final rinse is controlled by a FENWALL thermostat unit. If it becomes necessary to adjust the final rinse temperature, refer to the thermostat section for the proper procedure. The tank heat in the power wash and power rinse tanks are also controlled by a thermostat. If it becomes necessary to adjust these temperatures, please refer to the thermostat section which contains the needed information as how to adjust them.

## INFRARED BURNER SYSTEM AND OPERATING SEQUENCE

Your Stero dishwasher equipped with the infrared gas heaters is based on a simple operating premise and parts, when coupled together with good maintenance, will provide long reliable service. The following parts make up the "system". Refer to the exploded isometric views further on in this manual for part identification and relation to assembly.

1. Adjustable gas regulator(s).
2. Electromechanical gas valve(s).
3. Silicon carbide hot surface igniter(s).
4. Flame sensor(s).
4. Air blower(s).
5. Electromechanical air switch(es) with air line(s) connected to the blower(s).
6. Controller(s).
7. Gas lines from valves to mixing chamber(s).
8. Orifice(s).
9. Cylindrical infrared gas burner(s).
10. Stainless steel heat exchanger(s).
12. Heat recirculation box(es) and exhaust tube(s).
13. Gaskets, fasteners, and brackets.

All of the components require simple tools for disassembly and reassembly and are generally straight forward. 1. The gas plumbing connections should be made with a good acceptable pipe compound to eliminate leakage. This includes the plumbing to the machine common gas line(s), the regulator(s), gas valve(s), gas line(s) from the valve to the mixing chamber(s), plumbing connection(s) to the infrared gas burner(s). Never over tighten the connections for this may cause undue breakage or premature part failures.

Your Stero dishwasher should require no initial adjustments, however, upon initial installation, servicing or replacement of parts consider the following operating sequence for proper operation. The system(s) are designed to run on both *natural*, and *LP gas*. All of the components will be preset at the factory. Upon part replacement or servicing, the system may need to be readjusted to meet the original factory specifications.

## SEQUENCE OF EVENTS

After machine is installed to the manufacturers specifications and to all local and state codes, the *INFRARED GAS TANK HEAT SYSTEMS* will operate in the following sequence.

### I. DISHWASHER WITH AUTO-START OPTION.

1. Turn the main power supply to the dishwasher on.
2. Switch the gas valve(s) to the **ON** position.
3. Turn the **SAFETY** switch located on the main electrical control box or panel to the **ON** position.
4. Depress the **RESET** button located on the main electrical control box or panel, which will "stage" the control circuit.
5. Fill the machine with water to the proper level(s).
6. Depress the **TANK HEAT** button(s) located on the main electrical control box or panel, and if the thermostats, high limits, and low water cutoff float switches are satisfied, the following should take place:

a. The blower(s) will start, and the **BLOWER** light located on the main electrical control box or panel will illuminate indicating operation.

b. The air switch(es) will then read the blower pressure and complete the circuit.

c. The igniter(s) will then heat up to temperature.

d. The gas valve(s) will then open and start the mix of air/fuel in the burner(s), and the **BURNER** light located on the main electrical control box or panel will illuminate indicating operation.

e. Ignition of the burners will then take place, and the system(s) should run smoothly and quietly.

To turn the burner(s) off, depress the illuminated **TANK HEAT** button(s), and the system(s) will turn off.

### II. DISHWASHER WITH MANUAL-START OPTION.

1. Turn the main power supply to the dishwasher on.
2. Switch the gas valves to the **ON** position.
3. Depress the **RESET** button located on the main electrical control box or panel, which will "stage" the control circuit.
4. Fill the machine with water to the proper level(s).
5. Depress the **TANK HEAT** button(s) located on the main electrical control box or panel, and if the thermostats, high limits, and low water cutoff float switches are satisfied, the following should take place:

a. The blower(s) will start, and the **BLOWER** light located on the main electrical control box or panel will illuminate indicating operation.

b. The air switch(es) will then read the blower pressure and complete the circuit.

c. The igniter(s) will then heat up to temperature.

d. The gas valve(s) will then open and start the mix of air/fuel in the burner(s), and the **BURNER** light located on the main electrical control box or panel will illuminate indicating operation.

e. Ignition of the burners will then take place, and the system(s) should run smoothly and quietly.

To turn the burner(s) off, depress the illuminated **TANK HEAT** button(s), and the system(s) will turn off.

## INSTALLATION INSTRUCTIONS

1. Set the machine in place.
2. Level the machine by adjusting the feet as required.
3. Make all plumbing connections as indicated on the tags fastened to the machine.

*( Note: Make as many cleanouts as possible in the drain line, using tees with pipe plugs in each tee instead of elbows, as it is very important to keep the lines cleaned out. )*

4. Make all electrical connections as indicated on the tags fastened to the outlets on the machine. All electrical inter-connecting is done on the machine at the factory.

## ADJUSTMENT AND TESTS

1. Water and steam lines must be bled before final connection to the machine in order to remove any soil and dirt which has accumulated.
2. When Steam Heat Exchanger is supplied the trap on same must be bled.
3. Check inlet and outlet water temperatures to conform to the following requirements , in order to assure satisfactory operation.

Cold water — inlet line to fill valve of scrapper tank (Stero-Systematic)  
140° F — inlet line to fill valve of scrapper tank (when supplied)  
140° F — inlet line to fill valve of wash tank  
140° F — inlet line to Heat Exchanger (when supplied)  
180° F — outlet from Heat Exchanger (when supplied)  
180° F —inlet to final rinse  
180° F —inlet to power rinse fill valve ( when supplied )

4. The motor , Heat Exchanger , and all other adjustable parts are connected and set at the factory and need no further adjustment.

# DAILY MAINTENANCE

Cleanliness is one of the most important things in any scullery. Clean equipment prevents repair problems, and most important of all, it gives you CLEAN, SANITARY WARE.

This is best accomplished by establishing a daily procedure, and by selecting a supervisor, if possible, to see that it is properly done.

***At the end of each shift or washing period, the following steps will insure proper results.***

1. REMOVE RACKS FROM DOLLIES. Run dollies through machine to clean. (*STERO-SYSTEMATIC only.*)
2. SHUT OFF POWER TO THE MACHINE. If machine is steam heated, turn off steam supply.
3. WASH DOWN CONVEYOR TABLE AREA AND REMOVE REMAINING FOOD SOIL. (*STERO-SYSTEMATIC only.*)
4. OPEN ALL DOORS AND REMOVE WASH MANIFOLDS, SCRAP SCREENS, AND CURTAINS (If curtains are soiled.) The manifold end caps should be removed and manifolds should now be cleaned in a sink, or flushed out with a hose. It is not necessary to use a brush. All of the manifolds are alike and all are interchangeable.
5. WASH, SCRUB, AND RINSE DOWN THE INSIDE OF THE MACHINE. All refuse in bottom of tanks should be flushed down the drain valves. When tanks are clean, inspect the drain valves. Remove any foreign matter that might remain between the poppet and the seat of the valve.
6. CLEAN THE EXTERIOR OF THE MACHINE WITH A GOOD ACCEPTABLE STAINLESS STEEL CLEANER. Lemon oil may be used.

# DAILY MAINTENANCE

continued

7. THE FLOOR AROUND THE BASE OF THE MACHINE AND UNDER TABLE MAY ALSO BE CLEANED TO PREVENT SOIL ACCUMULATION.
8. ALL INTERIOR COMPONENTS REMOVED FROM THE MACHINE SHOULD NOW BE REINSTALLED.
9. LEAVE ALL THE DOORS OPEN TO ALLOW THE INTERIOR OF THE MACHINE TO DRY.

***ALWAYS REMEMBER— A clean machine is a well maintained machine.***

***YOU CAN'T GET CLEAN WARE OUT OF A DIRTY MACHINE!***

# PREVENTATIVE MAINTENANCE

*Previously, daily maintenance has been recommended. It is surprising how many future repairs will be prevented by this. Under this section, let's consider a few points.*

1. **PUMP MOTORS** : All of the pump motors are fitted with grease sealed ball bearings ,and do not need to be oiled or greased for life.
2. **GEAR BOX** : The motor gear unit also has sealed in bearings and does not need to be greased. However ,an inspection of the oil level in the gear box should be made at least once a year.
3. **STRAINERS** : Hot and cold water lines to the machine are equipped with line strainers ,and are easily recognized. They are located close to the solenoid valves. Before the final rinse connection is made ,these lines should be blown so as to clear out any scale or sediments from lodging in the equipment to which they are connected. As it becomes necessary to clean the strainers ,remove the plug at the bottom of the strainers ,clean and reinstall .
4. **SOLENOIDS** : The maintenance and care of these is covered in another section of this manual. By observing these simple rules ,it will prevent maintenance trouble and reduce maintenance repairs to the solenoid.
5. **RACK DOLLY WHEELS** : The dishes are conveyed in baskets or rack dollies ,and as noted ,each rack dollie is equipped with four ball bearing wheels. The wheels and bearings are stainless and need no lubrication ,and are kept clean by being washed every time they pass through the various sections of the machine. Some of the rack dollies are equipped with wipers. The purpose of these wipers is to keep the table section clean of refuse. These are also flushed and cleaned every time they pass through the machine and need no maintenance. (*STERO-SYSTEMATIC only.*)

# PUMP MAINTENANCE

*Under this section, we are concerned with the centrifugal pump. After a certain length of time, sometimes many years, it may be necessary to replace a pump seal. These are ceramic seals. Proceed as follows :*

- A. The pump unit is held on to the pump housing by four screws. Remove same. The pump unit should now come off.*
- B. Remove cap screw in end of impeller shaft. If the unit has been in use for a long time, it may be necessary to use a puller. This exposes the seal. It is not necessary to take the motor apart to remove the seal.*
- C. Work the entire seal ring out with a screw driver, and clean the seal housing thoroughly.*
- D. Reinstall new seal in same way as the old one was removed. (If necessary, refer to exploded view in the Motor section of this manual.)*
- E. After seal is properly installed in the housing ;*
  - 1. Remount impeller on shaft.*
  - 2. Clean mounting surface on pump housing and end bell.*
  - 3. Remove old gasket, if damaged.*
  - 4. Install new gasket.*
  - 5. Remount motor and pump housing.*
  - 6. Tighten all four screws evenly and securely.*

**UNIT IS READY FOR USE**

# ELECTRICAL

This warewashing unit has been thoroughly tested under actual operating conditions with hot water, steam (when used), and the electrical all working properly. When the unit has been reassembled properly and all systems connected, one of the most important things to remember is the FINAL ELECTRICAL CONNECTION to the main power supply. When connecting it to a single or three phase system, and the electrician turns on the equipment for the first time, he should check to see that the motors are running in the proper direction. If not, then he should switch two of the leads, re-check rotation, secure connections making sure they are TIGHT and INSULATED. The various pump units, valve circuits, etc., have all been phased out and checked out at the factory and need no attention.

Each service is also protected by overload devices. These are also located in the panel box as are all the contactors and relays. Whenever a problem arises with the electrical system, *this examination should be made by a competent electrician.*

Often it is assumed that a major problem exists, and it is usually only a temporary overload, tripping the overload device.

*Always refer to the wiring diagram before removing or installing, or doing any work on the electrical system.*

## FINAL RINSE BOOSTER

The final rinse booster supplied with the equipment is sized so as to supply adequate gallonage of *180° to 190°* water per minute to the final rinse. To do this, it should have an INCOMING water supply of *140° F* of at least *20 to 25 pounds* flow pressure. If booster is steam heated it should also have adequate steam supply of at least *5 to 50 pounds*. Water and steam lines to the booster should be sized as indicated on drawings or called for in the specifications. The electrical power supply to the booster should be of the required voltage and phasing as called for in the drawings or specifications.

The temperature in the final rinse is controlled by a *Fenwall Thermoswitch* unit. If it becomes necessary to adjust the final rinse temperature, refer to the *Booster* section for procedure. The tank heat in the power wash and power rinse tank is also controlled by a thermo-switch. If it becomes necessary to adjust these temperatures, please refer to the *Booster* section which contains the needed information as to how to correct.

## SERVICE

This **STERO** warewashing system has been manufactured so as not only to give good warewashing results, but also is a sturdy piece of equipment, designed with the idea in mind to give trouble-free service. However, if from time to time, problems are experienced, service should be kept down to a minimum if proper installation instructions and cleaning procedures have been followed.

To insure good washing and rinsing, correct temperature, as indicated on the various **thermometers** located on the top of the machine, should be maintained. The temperature in the various tanks such as power wash and power rinse are maintained through **thermostats**. These have been set by the manufacturer under operating conditions. The same is true of the final rinse booster. If the correct water temperature supplying the booster is maintained, good results should be obtained.

A good commercial detergent of the **non-sudsing** type should be used, and if a recognized wetting agent is used in the final rinse, clean, dry ware will result.

## CONVEYOR DRIVE

*The conveyor drive system is located on the under-side of the straight section of the table.*

The belt tension has been adjusted at the factory to protect the rack dollie system from being damaged in case of a jam caused by trying to wash an object too large to go through the machine, or from a rack not seated properly on the dollie.

*If the belt is adjusted too tight, it may damage the system by not slipping. If it is adjusted too loose it will not drive the loaded racks through the machine.*

To adjust the drive belt, should it become necessary, the conveyor motor is raised or lowered. RAISING the motor LOOSENS the belt tension. LOWERING the motor TIGHTENS it.

The proper tension of the system should be judged by the rack dollie system as pressure is applied against the line of travel on one of the dollies so that it stops moving by a strong backwards pull against the line of travel. This can be done by holding back on one of the rack dollies.

### *THE SYSTEM IS NOW READY TO OPERATE*

*Should a jam occur within the unit, shut off conveyor immediately!*

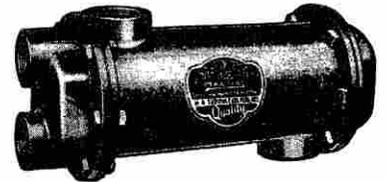
NEVER try to pry object loose with a crow-bar or any other such tool. If the object cannot be removed by hand, loosen the conveyor motor drive belt enough to enable pulling the rack dollies backwards by hand. REMOVE OBJECT BY HAND.

*Inspect machine for damage. If no damage has occurred re-adjust the belt until the proper tension as described above is obtained.*

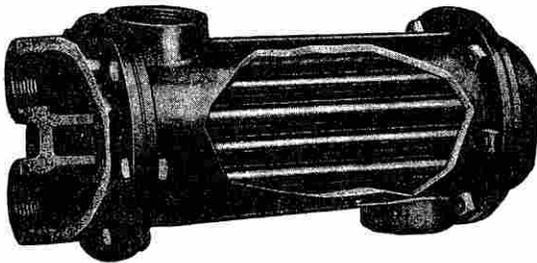
# HEAT EXCHANGERS

## FOR BOOSTING TEMPERATURE OF RINSE WATER IN DISHWASHING MACHINES EFFICIENT AND LASTING SERVICE

These are efficient heat exchangers and have a number of uses on many different types of applications. One of the more common uses is the application to automatic dish and glass washing machines. Heaters are constructed of heavy cast iron shells and headers, with straight copper tubes for fast heat transfer. The liquid being heated passes back and forth 4 times through straight copper tubes resulting in low pressure drop and quick heating. These Heaters are suitable for up to 150 lb. water pressure in tubes, headers or shell, and a maximum of 50 lb. steam pressure in shell. If steam pressure is over 50 lbs. it should be reduced with a steam reducing valve.



Pat. No. 2180620



STRAIGHT COPPER TUBES

### REMOVABLE HEADERS • EASY TO CLEAN

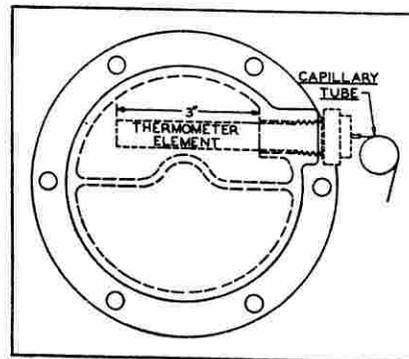
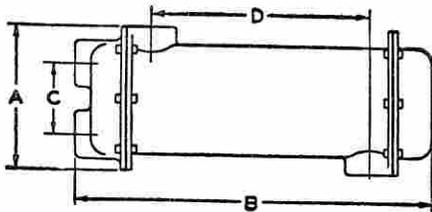
At left is shown a cut-away view of header and shell. Removable headers makes visual inspection possible and cleaning easy, if ever necessary. No acids are needed if tubes require cleaning. Special steel wire cleaning brushes are available at nominal cost. Inlet and outlet at opposite ends of shell assure uniform steam distribution. Note webbing of headers which creates 4 way water travel through straight tubes.

### HORIZONTAL DESIGN SAVES SPACE

A very important feature of Heat Exchangers is horizontal design. Where the heater is to be incorporated in the structure of the dishwasher, space may be at a premium. Overall length is also important. Check the A and B dimensions in the specification table at right with the dimensional drawing below.

### SPECIFICATIONS — THRUSH WATER HEATERS

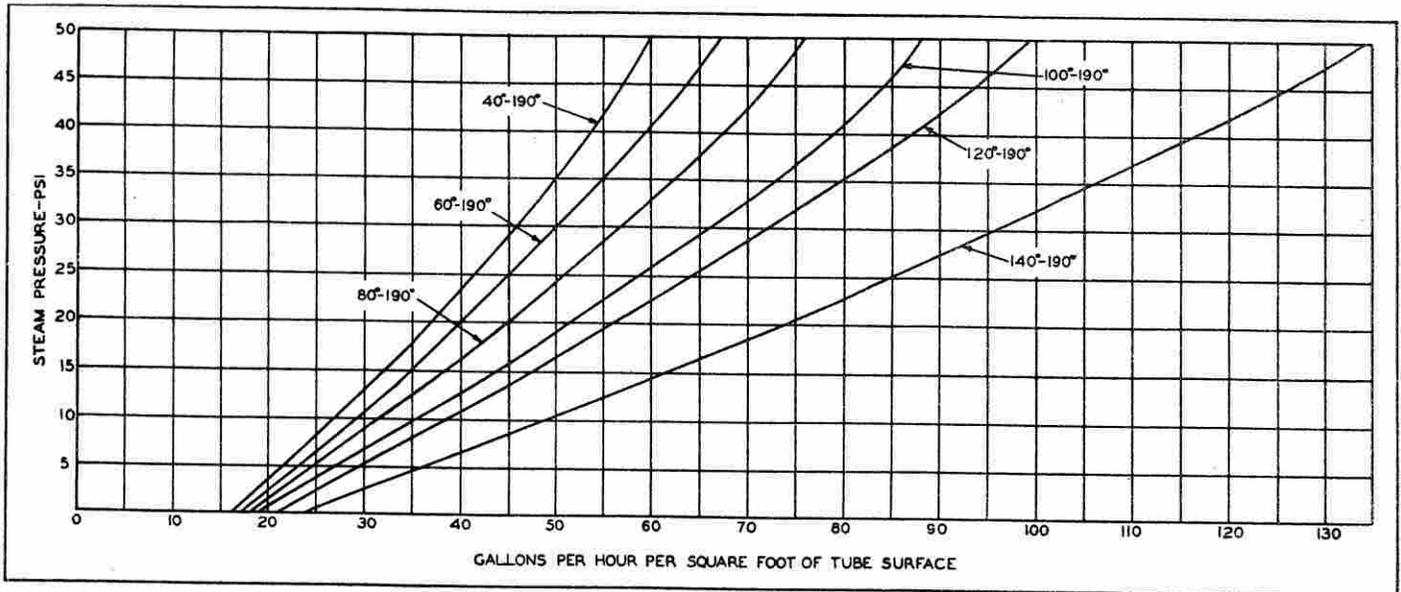
Heater No.	Shipping Weight Pounds	Pipe Connections		Dimensions			
		Boiler, Inches	Tank, Inches	A Width and Height, Inches	B Length, Inches	C Center to Tank Conns., Inches	D Center to Boiler Conns., Inches
150	51	2	1 1/2	7 7/8	21 9/16	4 3/8	13 3/4



FOR TECHNICAL DATA SEE OTHER SIDE

# CAPACITY FACTORS OF WATER HEATERS

AT VARIOUS STEAM PRESSURES AND VARIOUS INITIAL WATER TEMPERATURES



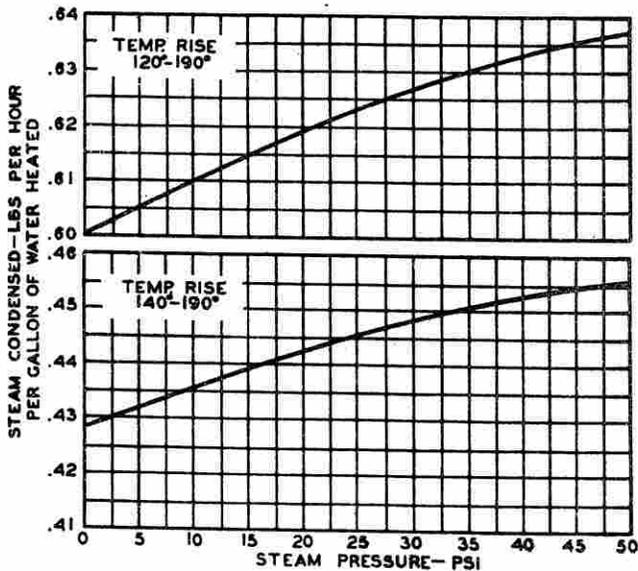
## SQUARE FEET TUBE SURFACE THRUSS WATER HEATERS

No.	Sq.Ft.	No.	Sq.Ft.
72	2.50	180	6.25
86	3.01	240	8.35
96	3.34	300	10.40
120	4.18	360	12.50
150	5.20	420	14.60

## HOW TO SELECT THE PROPER HEATER

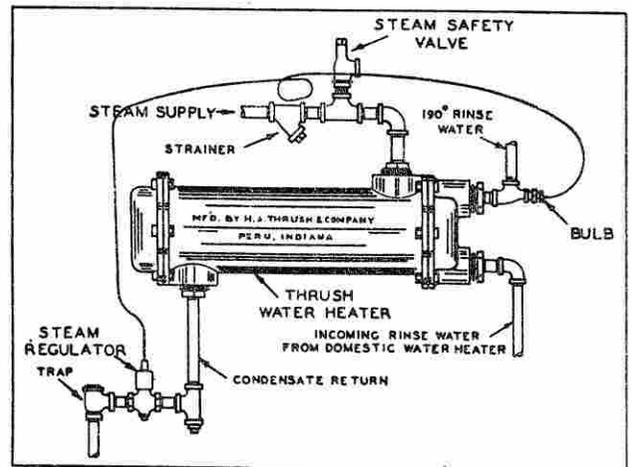
An instantaneous heater should be sized to deliver the correct number of gallons of water per hour on a continuous draw basis regardless of length of rinse period or number of cycles per hour. Example: Rinse cycle is 1 minute every other 2 minutes at 5 GPM, 140°—190° rise with steam pressure at 10 psi. Heater should be sized on basis of 300 GPH draw rather than actual draw of 100 GPH. Referring to chart above (140°—190°) it is found that 50 gallons of water per hour is delivered per sq. ft tube surface with steam at 10 psi. Therefore a Heater with at least 6 sq. ft. of tube surface is required. Referring to table at left, the No. 180 ThruSS Water Heater, having 6.25 sq. ft. of tube surface, should be specified in this instance.

## STEAM CONSUMPTION CHARTS



Steam consumption must be known to size steam supply to heater. Charts above show pounds of steam required per hour, per gallon of water heated at two different incoming water temperatures and various steam pressures. Example: 300 GPH 140°—190° with steam at 10 lbs. will condense .435 lbs. of steam per hour per gallon of water heated  $\times$  300 = 130.5 lbs of steam required.

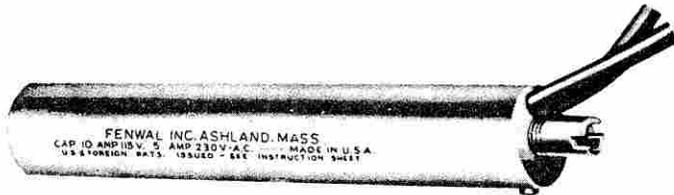
## TYPICAL INSTALLATION



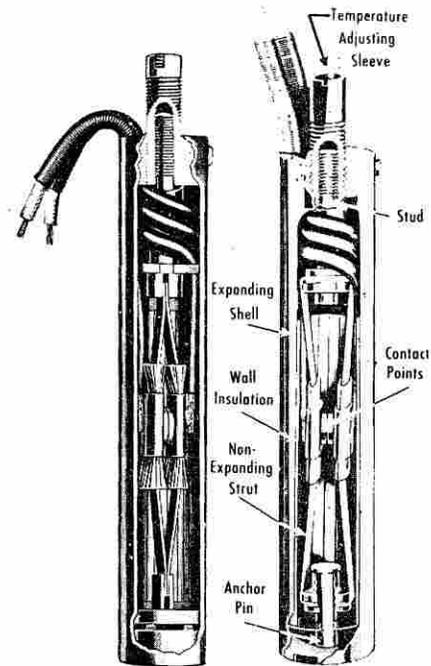
Installation detail above is typical. Several different methods of control are used depending upon machine characteristics.

Note compactness of installation and minimum number of fittings required.

INSTRUCTIONS FOR  
FENWAL  
DIFFERENTIAL EXPANSION  
THERMOSWITCH UNITS



CONTACTS CLOSE ON:  
INCREASING TEMPERATURE      DECREASING TEMPERATURE



Compression Type shown to left;  
Tension to right.  
EITHER AVAILABLE WITH CON-  
TACT ACTIONS SHOWN.

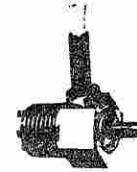
**PRINCIPLE OF OPERATION:**

The Thermoswitch Control is constructed with two silver contacts mounted on, but electrically insulated from, curved struts of low expansion coefficient. This assembly is mounted under tension or compression in a seamless drawn brass or stainless steel tube. Changes in temperature cause the shell to expand or contract, which exerts more or less tension or compression on the struts, causing the contacts to make or break.

**BASIC TYPES**

The shell of the Thermoswitch Control contains information regarding electrical rating, temperature range, and contact action. Should the shell of the unit be inserted, immersed, or otherwise obscured in such a manner as to make reference to this information impossible, general operating characteristics may be quickly determined if the catalogue number of the device is known. If the 5th digit of the catalog number is even (or zero), the contacts close on decreasing temperatures. If the 5th digit of the catalog number is odd, the contacts close on increasing temperatures. Reference to the fourth digit will quickly determine whether the unit is tension or compression operated. Should this digit be "2" or "7", the unit is compression operated, should it be other than "2" or "7", the unit is tension operated. Tension operated units may be subjected to momentary temperature exposure of 100° F above their set point. They also may be subjected to any temperature below their set point without danger. Tension operated Fenwal Thermoswitch units may be set below 0° F but compression operated units are recommended if rapid temperature changes in excess of 100° F or extreme temperature overshoots are to be encountered. Fenwal compression operated units may be exposed to a temperature of 100° F indefinitely, and to temperatures 400° F above their set temperatures for short periods of time. The limits of exposure being subject to many application variations. When in doubt, the factory should be consulted.

THE HEX HEAD OR THREADED TYPE can be installed like any pipe fitting. Avoid applying undue torque to the unit. Torque in excess of 35 foot pounds for the standard size (5/8" diam. shell) or 70 foot pounds for the heavy duty (13/16" diam. shell) will offset the control calibration. If threaded units are installed in a pipe tee, the tee should be large enough to allow adequate circulation of the fluid around the temperature sensitive section of the unit.



HEX HEAD OR THREADED TYPE

### DON'TS

- Do not handle the unit with pliers or force it into position either by hand or with tools, or apply excessive torque in tightening threaded units.
- Do not subject unit to deformation of the shell.
- Do not thermally shield unit from medium it is to control.

### TESTING & ADJUSTING

The arrow on the head of THERMOSWITCH units indicates direction in which adjusting screw should be turned to increase the temperature setting. Each full turn of the adjusting screw will change the temperature the approximate number of degrees indicated by the table

After the THERMOSWITCH unit has been installed, final adjustment can be made by allowing the unit to operate for several cycles to permit the controlled system to stabilize and then adjust to desired temperatures. The system should then be cooled to ambient temperature, reheated and stabilized to check the setting.

Where extremely accurate temperature control is desired, several readjustments may be necessary to stabilize the THERMOSWITCH Control after which the adjustment will be maintained.

### CAUTION

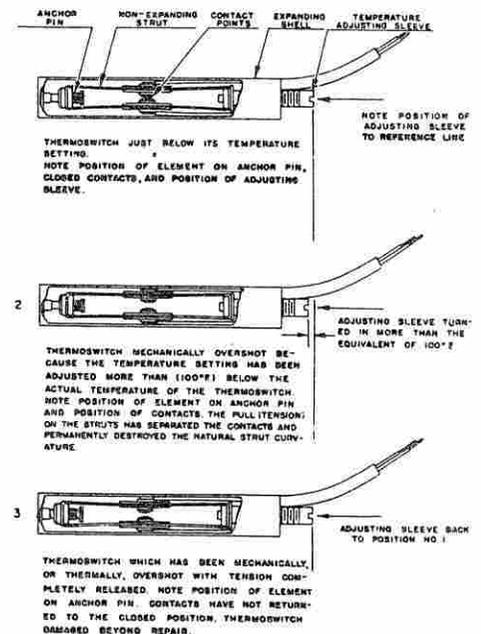
DO NOT turn the adjusting screw in any further than is necessary for operation. Do not remove adjusting screw from unit as this voids the Standard Guarantee. Incorrect replacement or over adjustment will permanently damage the element assembly. See diagrams on back page for effect of mechanical overadjustment or severe thermal overshoot.

CURRENT RATINGS are stamped on the shell of the THERMOSWITCH unit.

### CONTACT PROTECTION

Capacitors are not required under average conditions. For smoother control at small loads, or to prevent contact bounce due to vibration use: MFD = .28 ÷ line voltage to arrive at the value of the capacitor to be used. For exceptional vibration, increase above value 5 - 10 times. When used, wire capacitors in parallel with the switch.

### EFFECT OF MECHANICAL OVERADJUSTMENT OR SEVERE THERMAL OVERSHOOT ON TENSION OPERATED THERMOSWITCH UNITS.

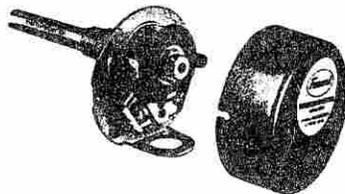


### ADJUSTMENT RATES Tension Operated\* THERMOSWITCH UNITS

Thermoswitch Catalog Number	Approximate Degree F. Change Per Full Turn Of Adj. Screw
17000	90
17001	90
17002	110
17003	110
18000	80
18001	80
18002	100
18003	100
13150	200
13121-1	1000
15050	125
15051	125
16050	125
16051	125

### JUNCTION BOX TYPES

IMMERSION JUNCTION BOX THERMOSWITCH has a clamp plate under the dial that permits the conduit outlet to be placed in any desired position after the pipe connection is firmly secured in place.

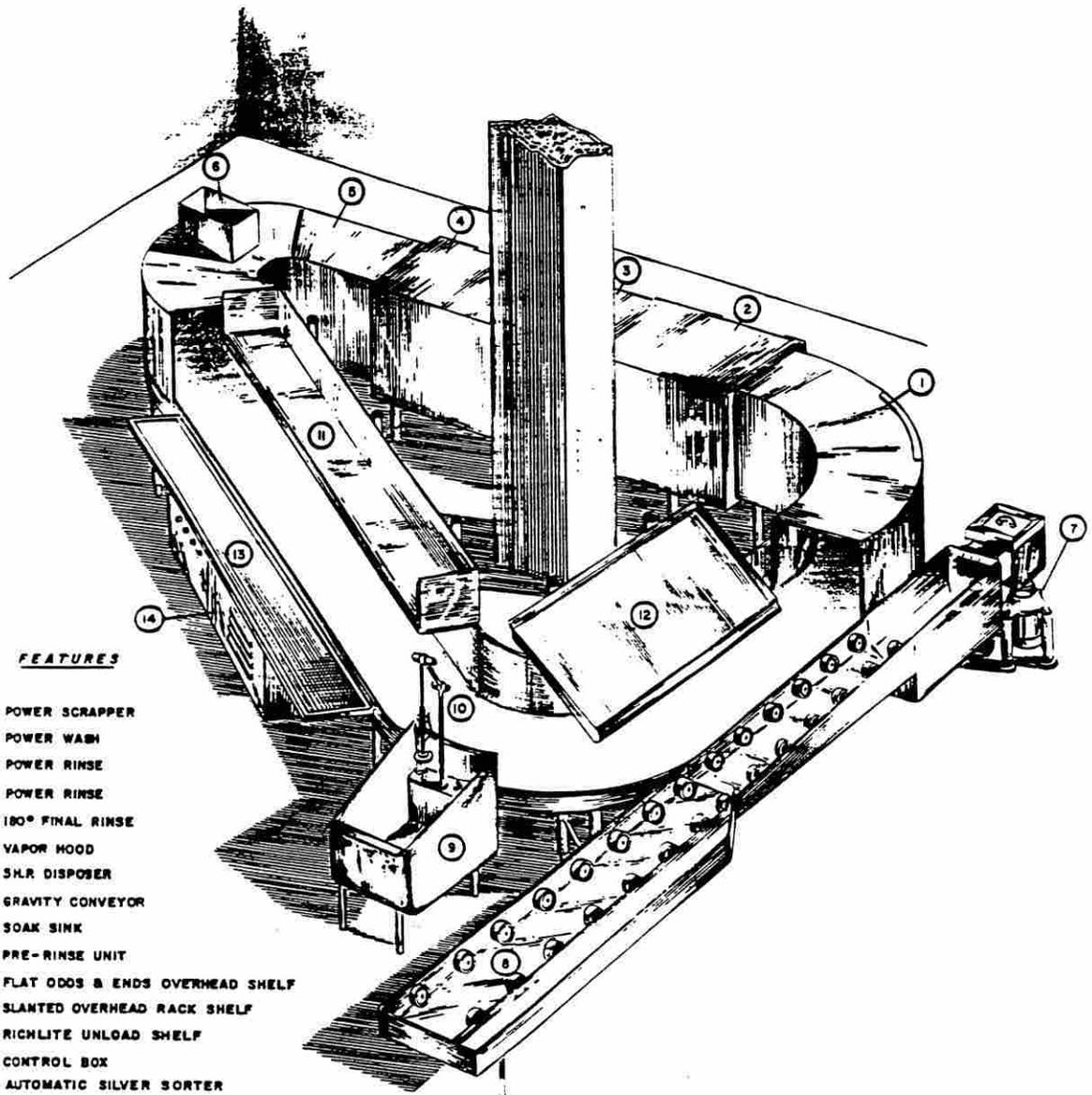


Remove cover by loosening the two side screws. Turn dial to stop pin. Loosen the two set screws in the knob and remove knob. Remove screws from support bracket to remove dial assembly. Then loosen the screws on the clamp plate and rotate the conduit box to the desired position. To replace assembly re-tighten screws and replace parts in reverse order from which they were removed.

DO NOT TURN THE ADJUSTING SCREW WHILE THE KNOB IS LOOSE OR REMOVED FROM ADJUSTING SCREW.

AIR JUNCTION BOX THERMOSWITCH UNITS can be directly mounted in position to provide conduit outlet access. Dial adjustments are the same as above.

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<i>BREAKER BOX ASSEMBLY</i>	69
<i>TYPICAL BOX</i>	71
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<i>VARIABLE SPEED CONTROLLER</i>	77
<i>FLOAT SWITCH ASSEMBLY</i>	79
<i>THERMOSTATS</i>	81
<i>TYPICAL ELECTRICAL FITTINGS</i>	83
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<i>TROUGHES</i>	89
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# *STRUCTURAL COMPONENTS*

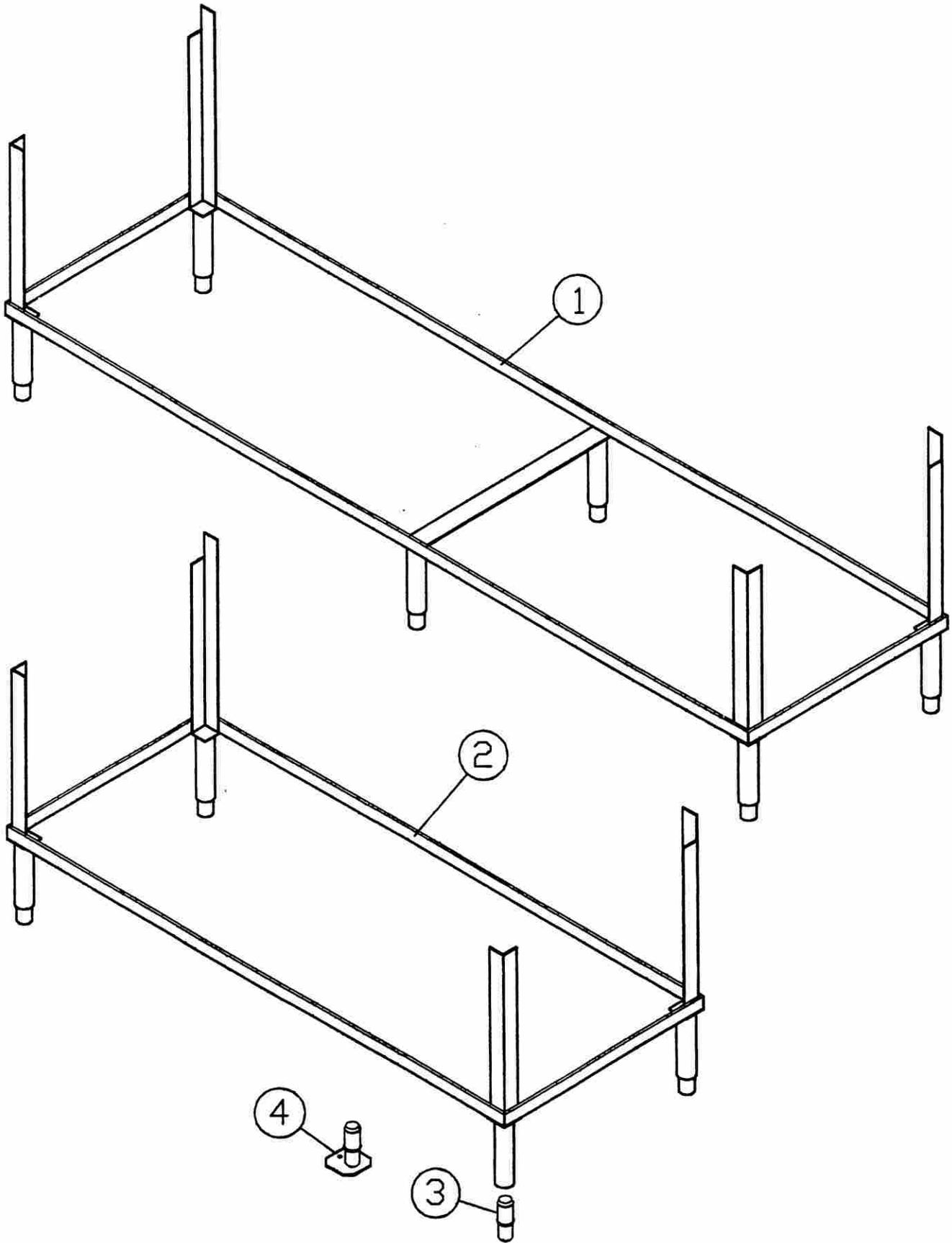
*FRAMES*

*TANKS*

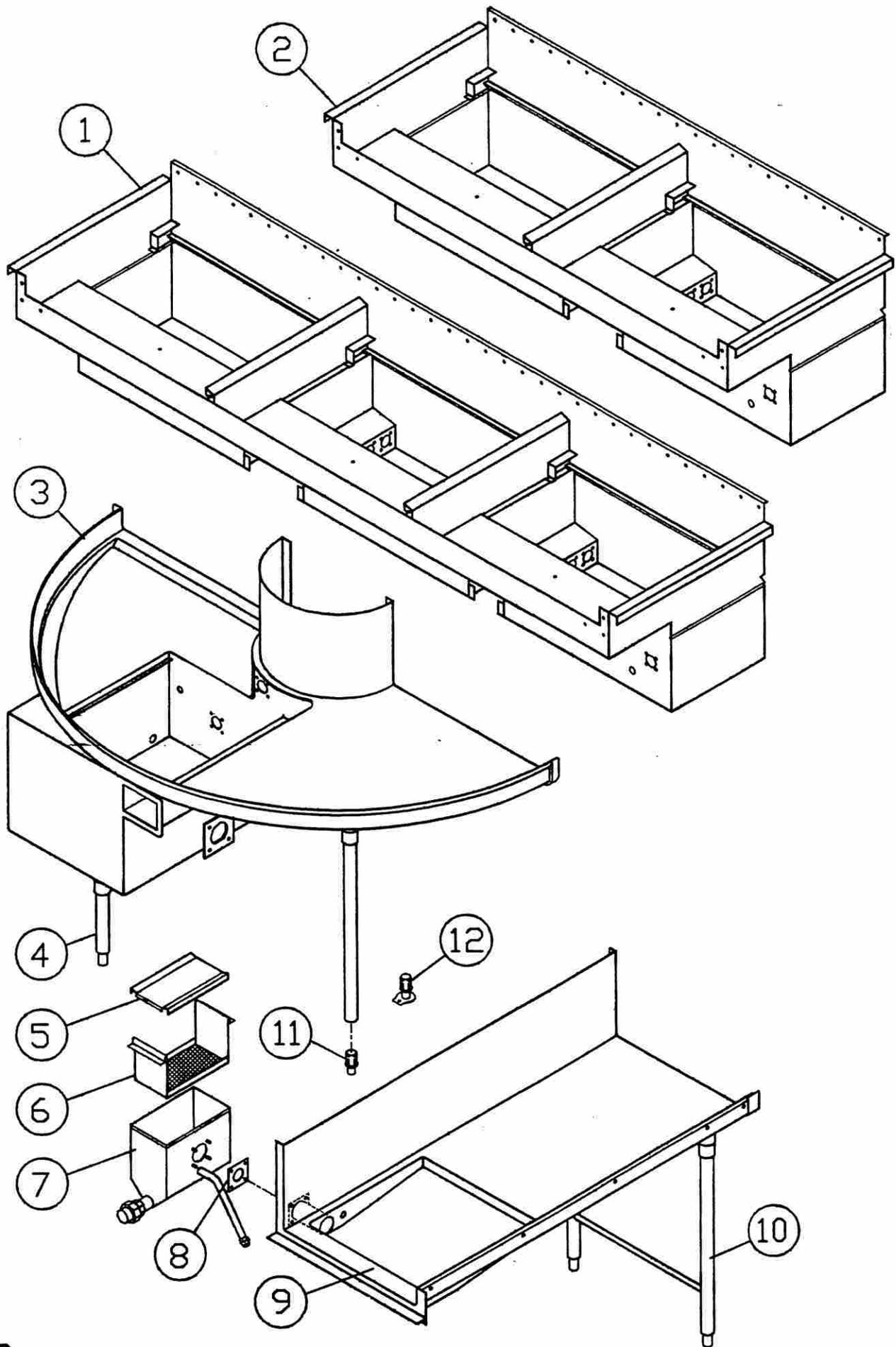
*HOODS*

*CURTAINS*

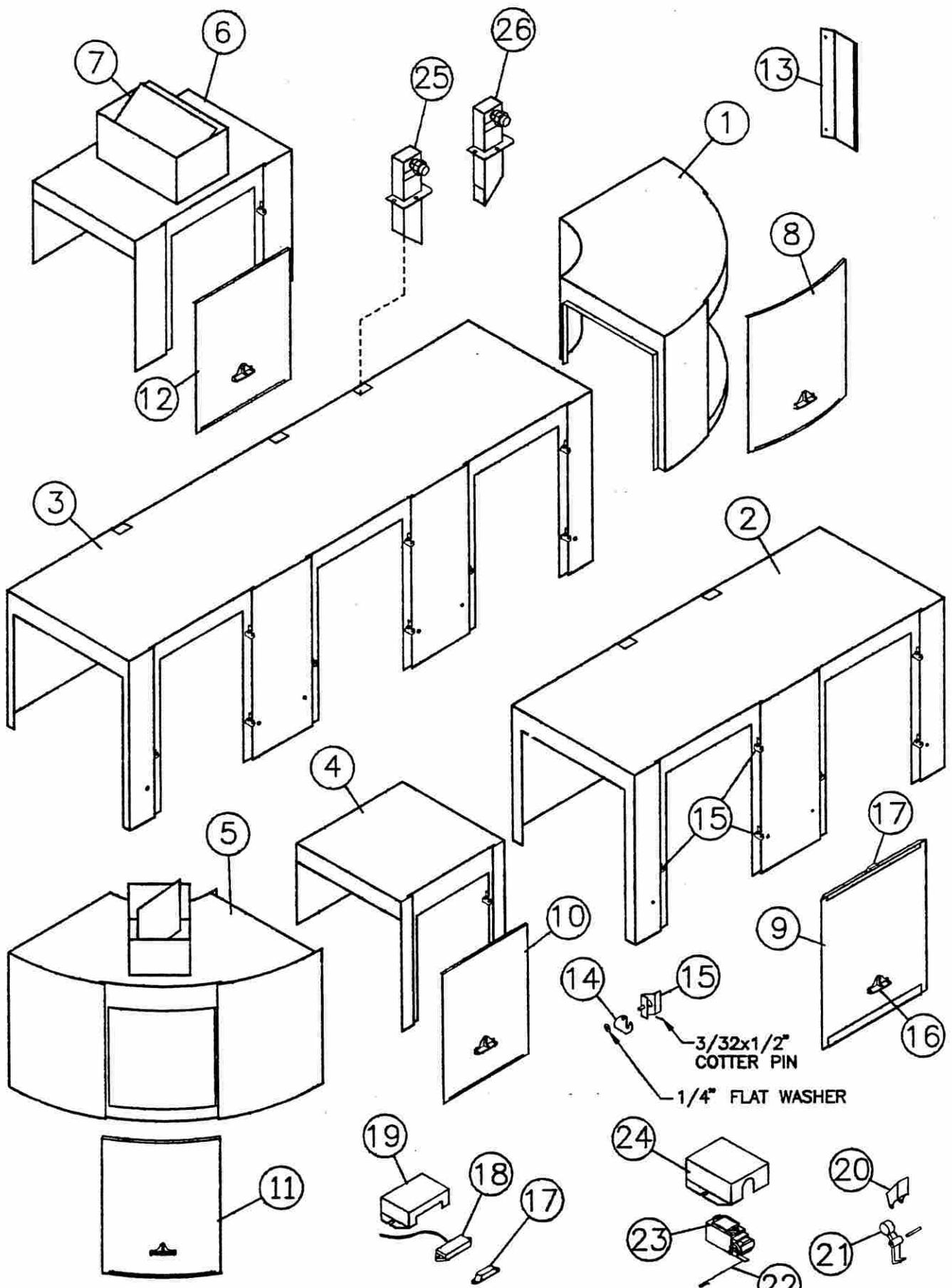
*STRAINER PANS/BASKET*



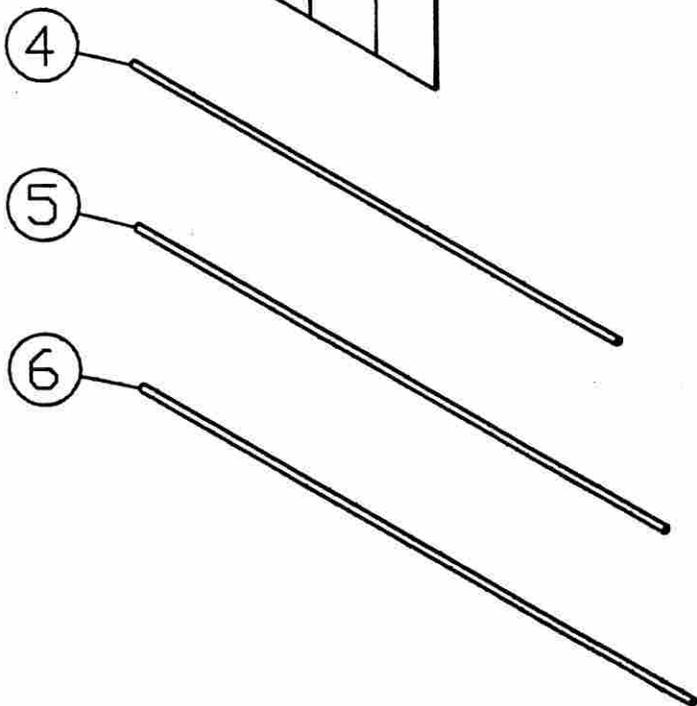
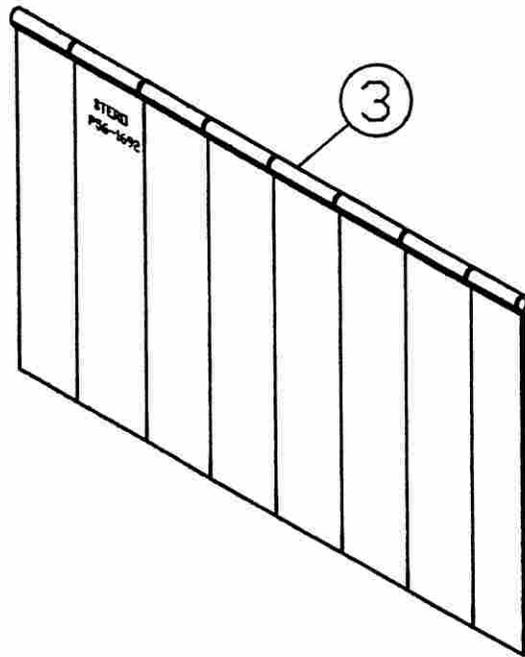
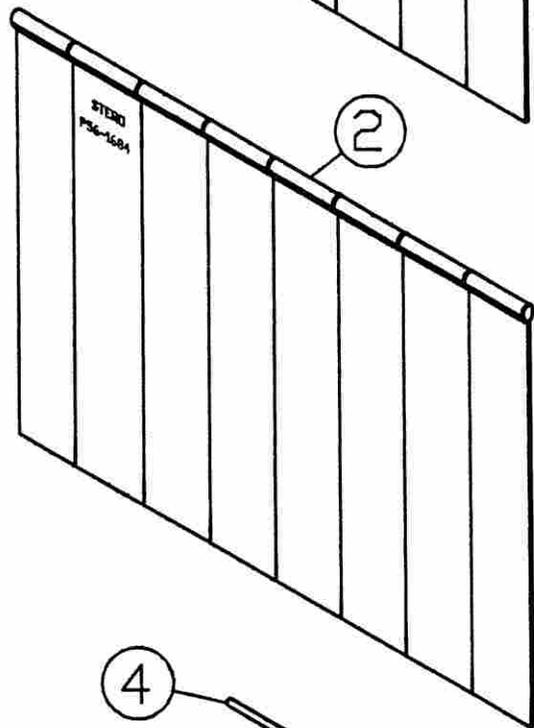
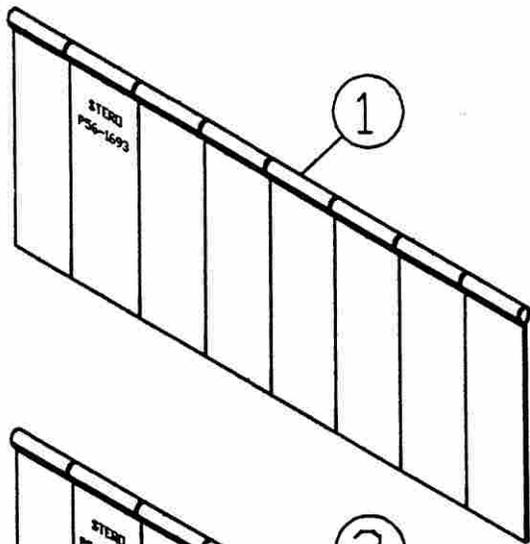




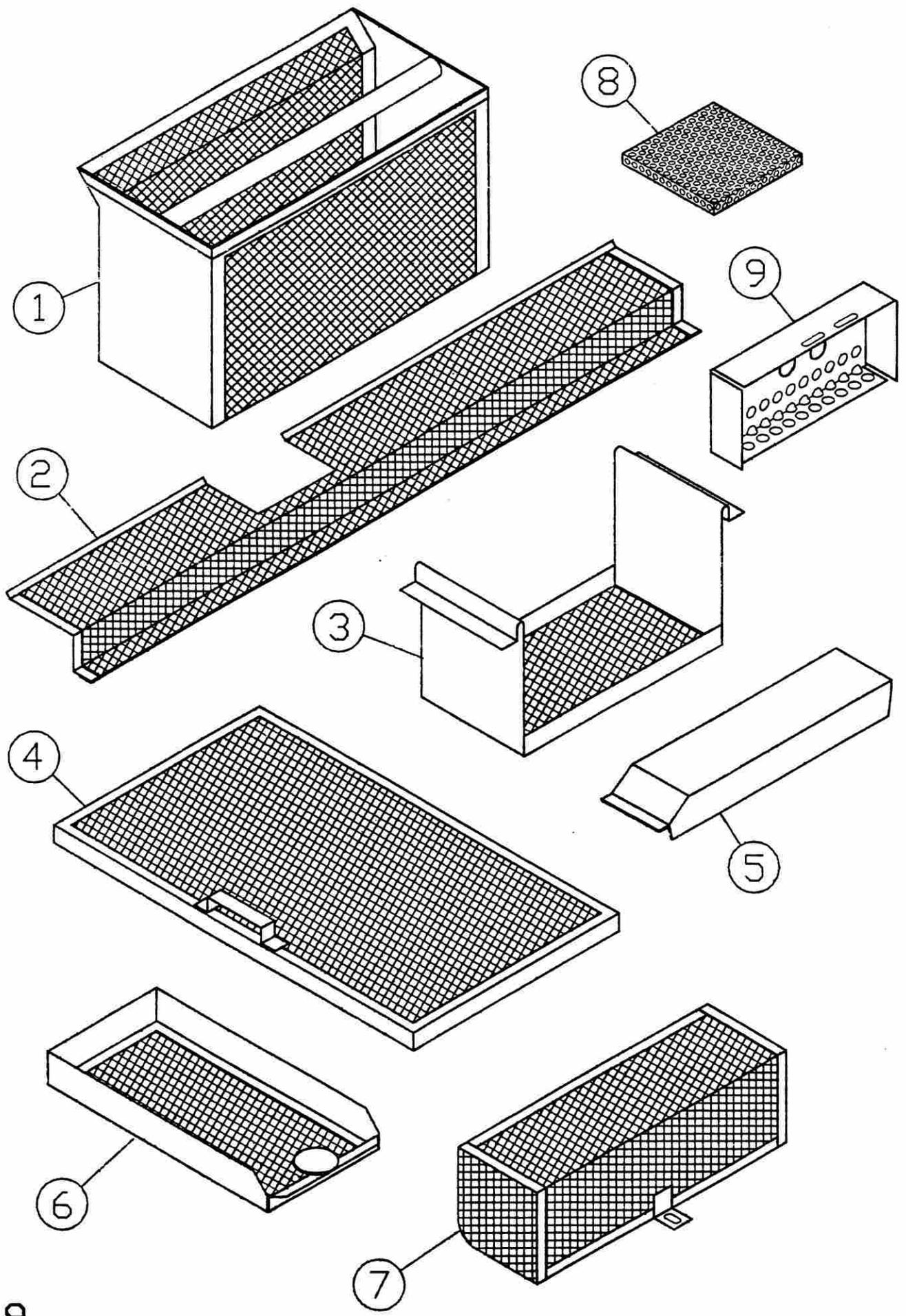














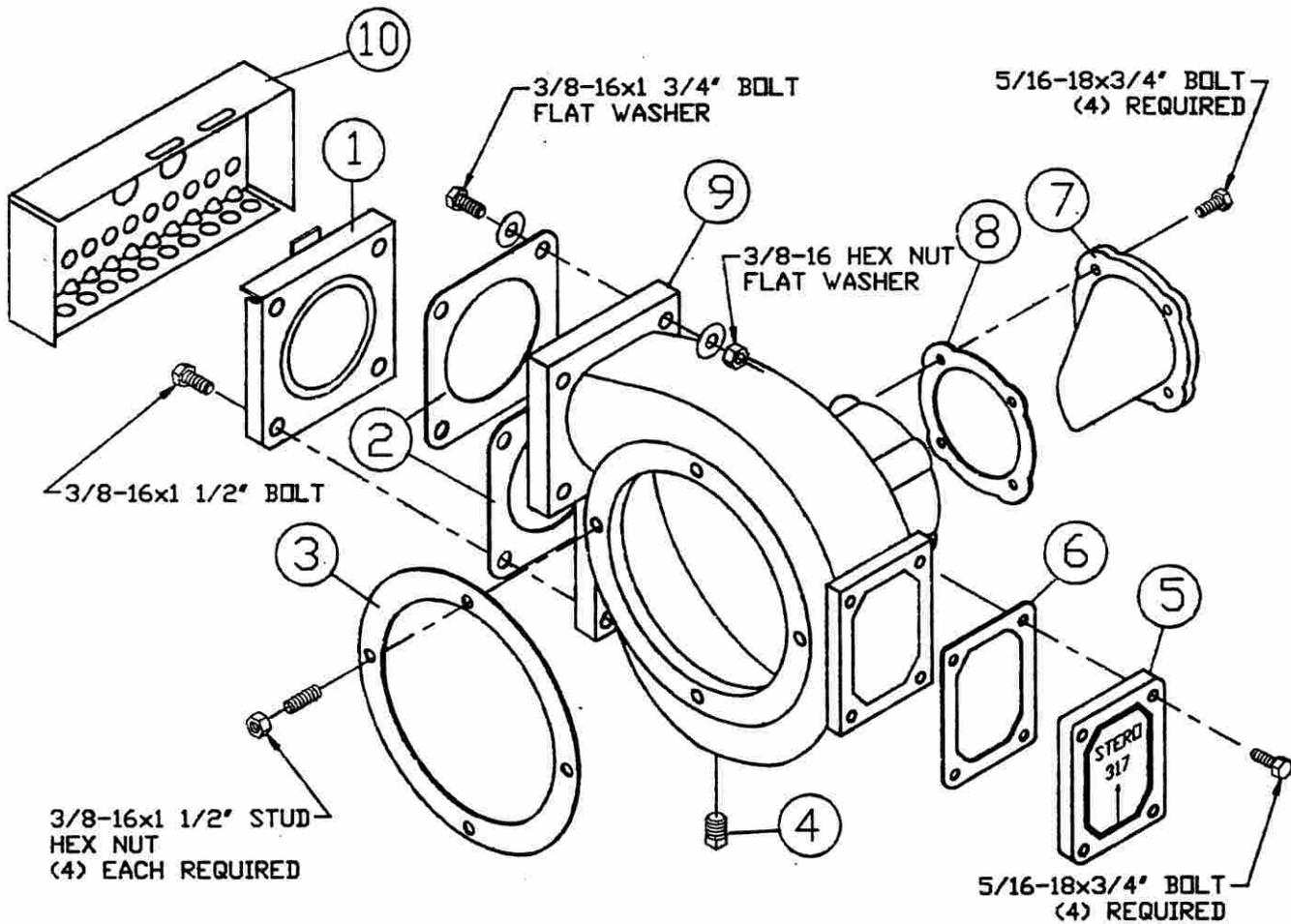
# *PUMPING SYSTEM*

*2HP PUMP ASSY. #368*

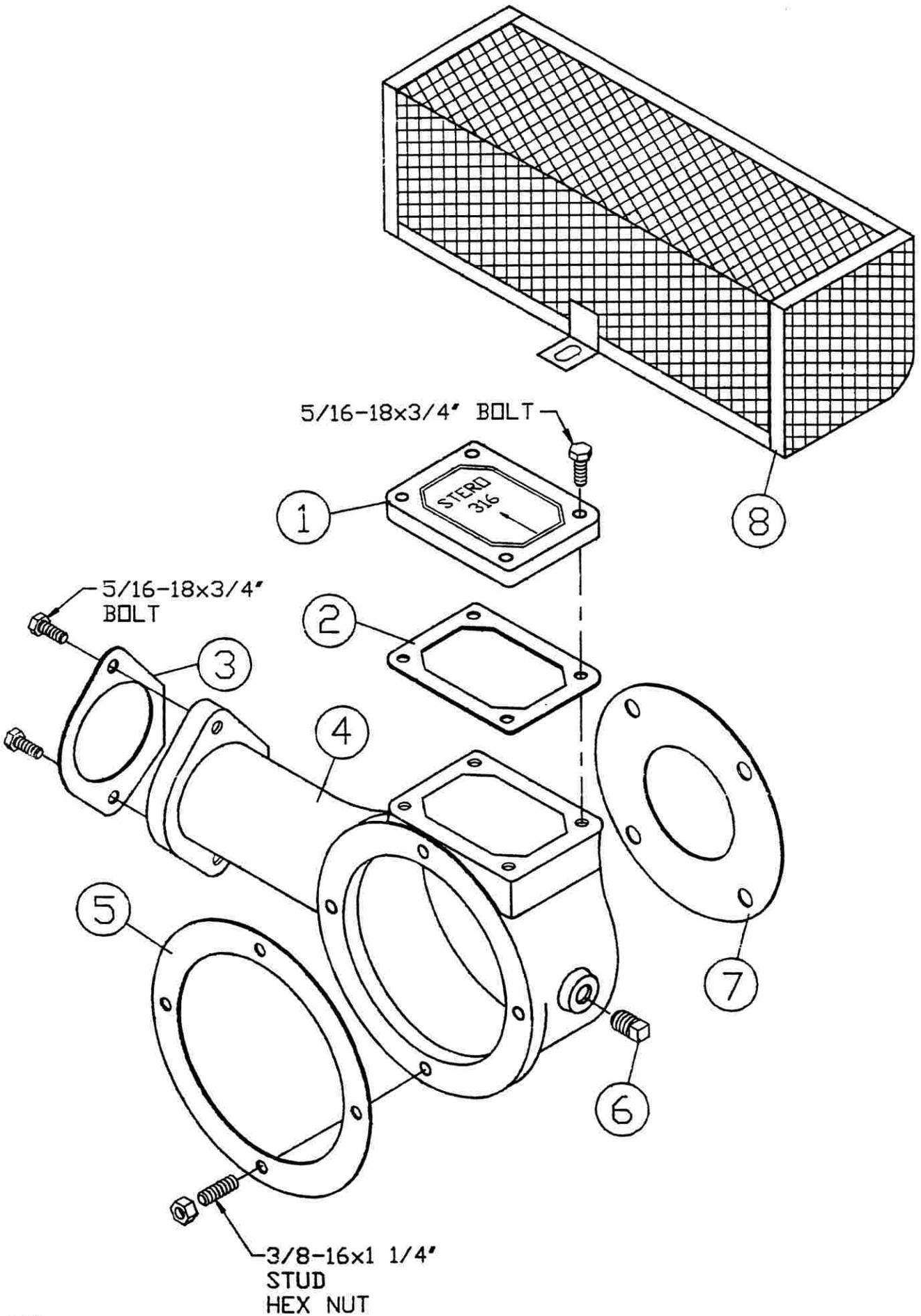
*2HP PUMP ASSY. #321*

*1/4HP LOW TEMP. PUMP  
& MOTOR ASSY.*

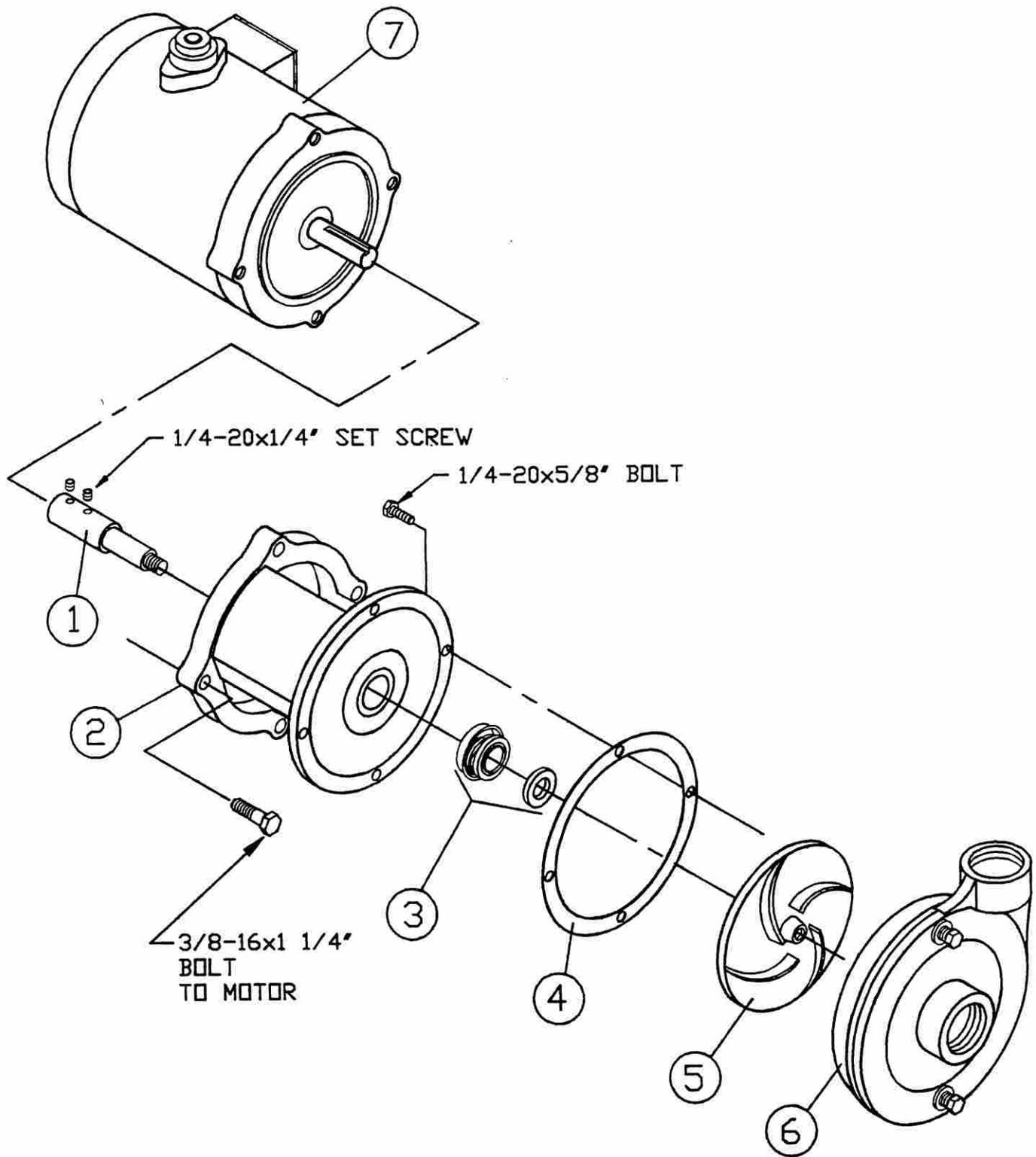
*MOTOR ASSY.*



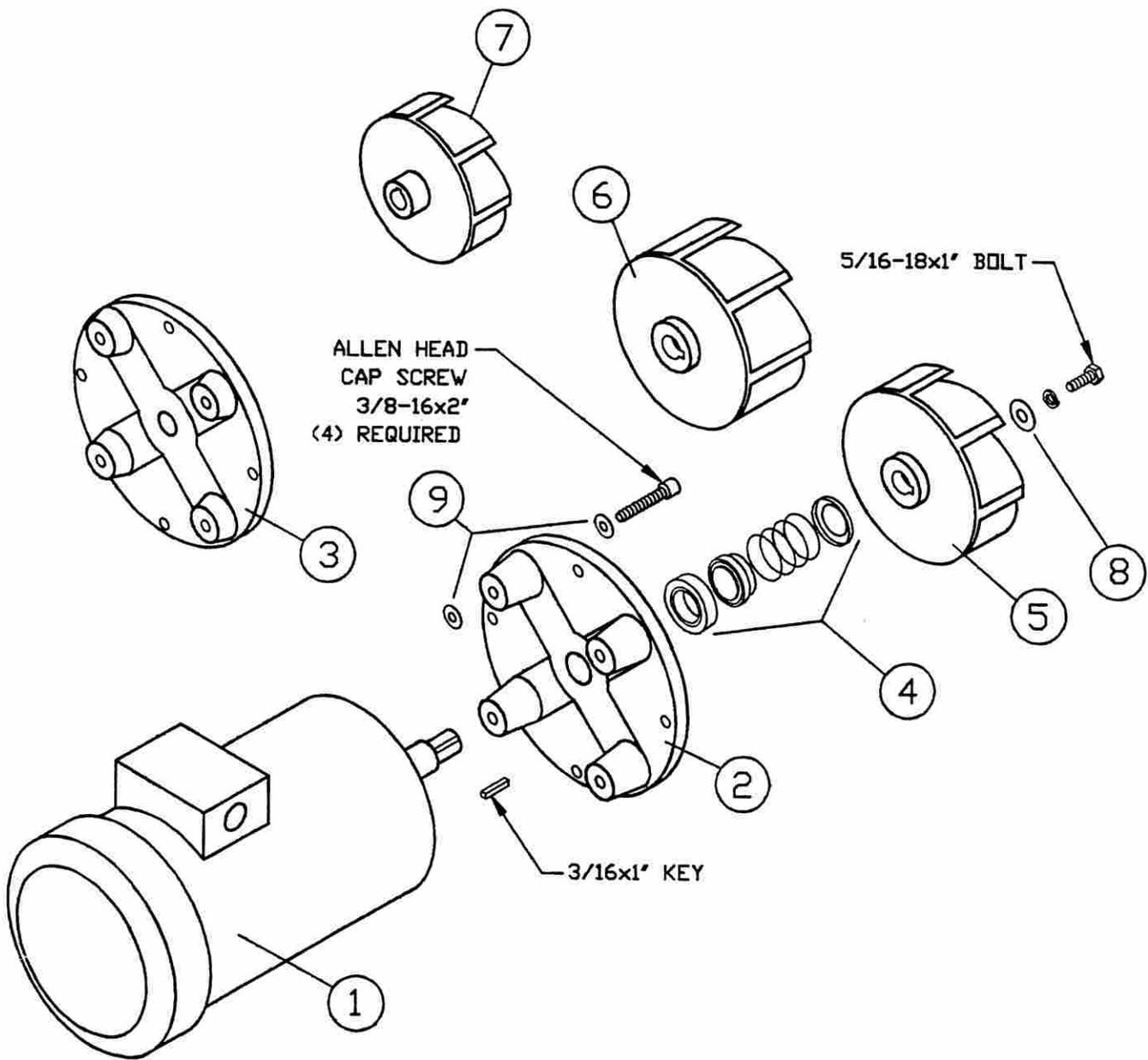














# *DRIVE SYSTEM*

*CONVEYOR DRIVE SYSTEM*

*TRACK ASSY.*

*DOLLY ASSY.*

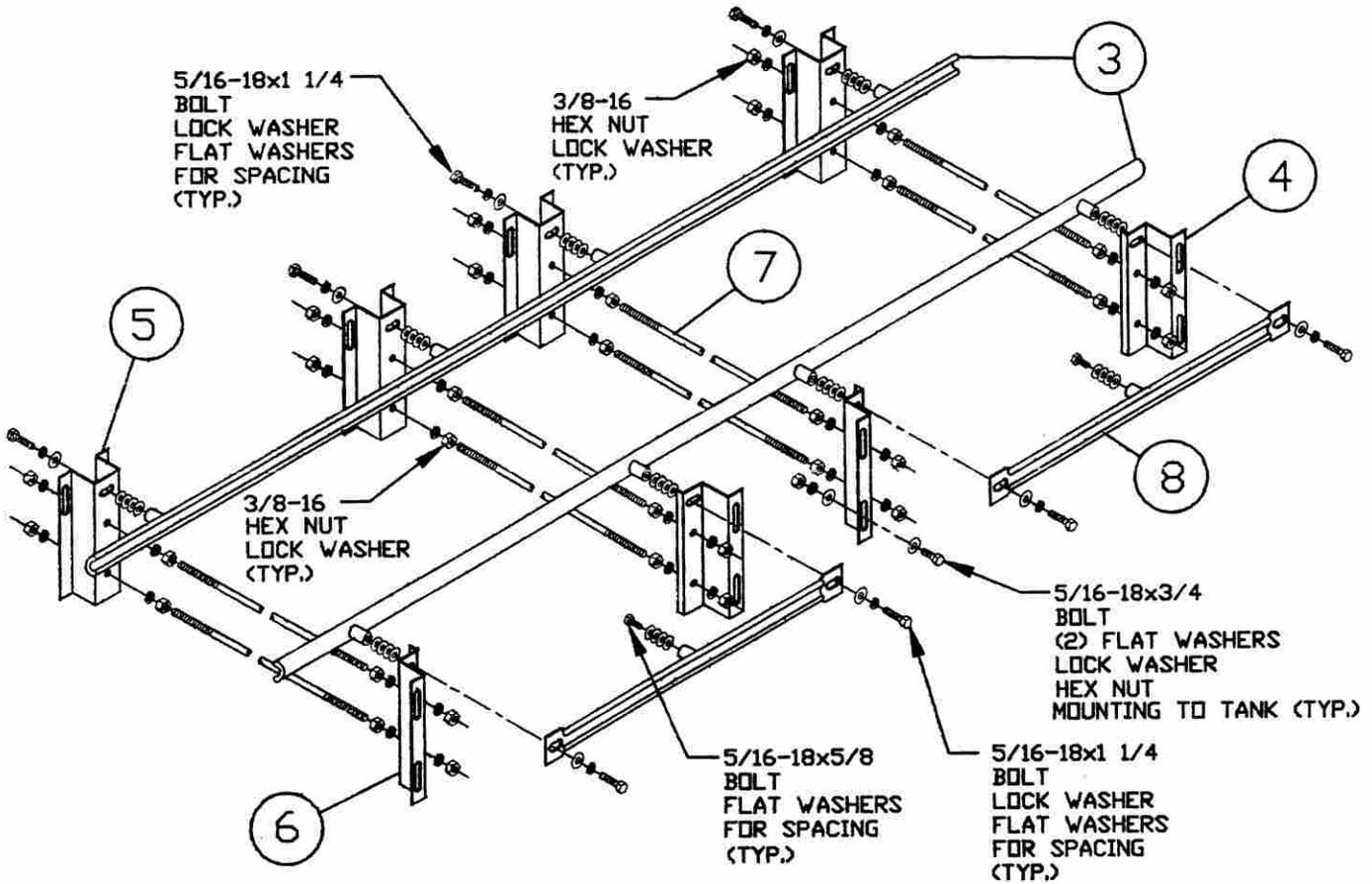
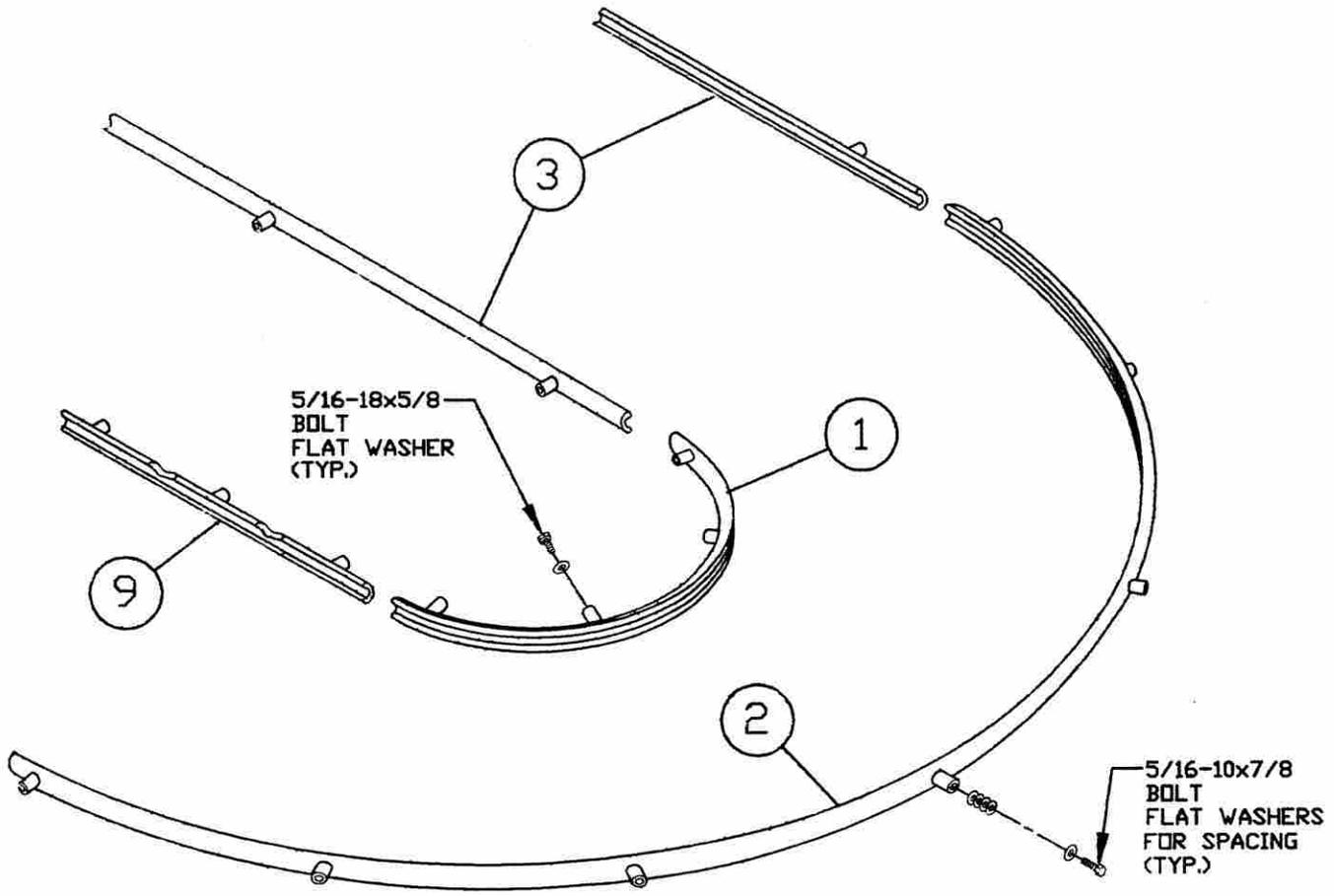
*DISH RACKS*



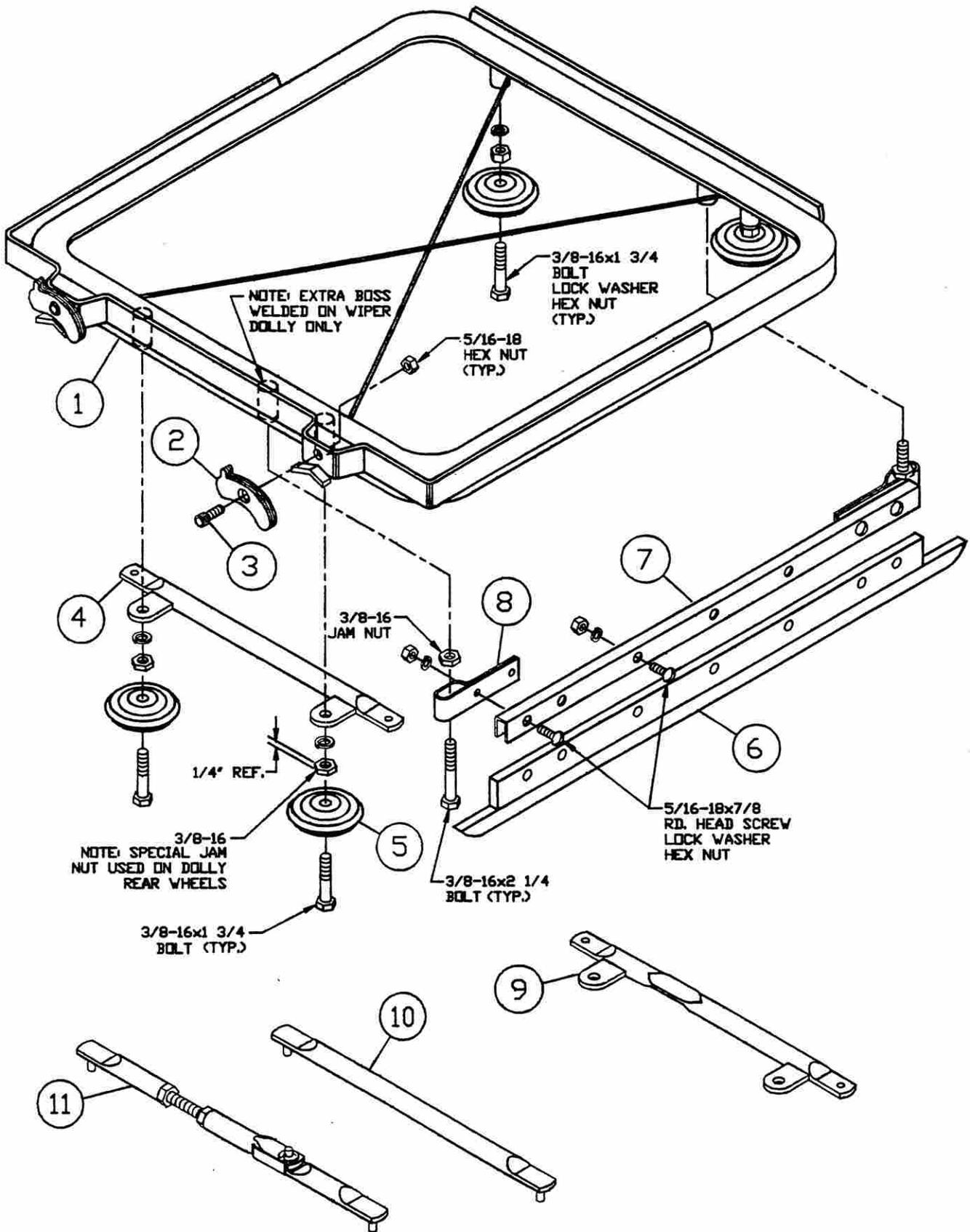
# CONVEYOR DRIVE SYSTEM

ITEM	DESCRIPTION	REMARKS	PART NO.
1	"V" BELT COVER		B10-1653
2	MOUNTING FRAME		B10-1654
3	PULLEY BRACKET		A10-1655
4	DRIVEN PULLEY		A10-1848
5	DRIVE PULLEY SCT-76SM		P66-2277
	DRIVE PULLEY SCT-94SM		P66-1970
	DRIVE PULLEY SCT-120/150SM		P66-2568
6	"V" BELT SCT-76SM		P66-1286
	"V" BELT SCT-94SM		P66-1287
	"V" BELT SCT-120/150SM		P66-1288
7	COVER BOLT		A10-1656
8	BRACE W/LOCKWASHERS AND NUTS		A10-1657
9	MOTOR MOUNT BRACKET RIGHT HAND		A10-1658
10	MOTOR MOUNT BRACKET LEFT HAND		A10-1779
11	SPROCKET ADAPTER		A10-1075
12	SPACER BUSHING		P59-1211
13	SPROCKET		B10-1327
14	NEEDLE BEARING		P66-1208
15	ALLEN HEAD CAPSCREW		P67-1212
16	PHENOLITE SHIELD		B10-1688
17	DRIVE SHAFT		A10-1766
18	CHAIN MOUNTING PLATE 50" SECTION CW		B10-1791
	CHAIN MOUNTING PLATE 50" SECTION CCW		B10-1792
	CHAIN MOUNTING PLATE 38" SECTION CW		B10-1793
	CHAIN MOUNTING PLATE 38" SECTION CCW		B10-1794
19	ADJUSTING LUG		A10-1692
20	IDLER WHEEL		A10-1693
21	IDLER WHEEL BEARING		P66-1207
22	IDLER RETAINER		A10-1694
23	MASTER LINK (FOR CHAIN)		P66-2029
24	GREASE FITTING		P66-1221
25	ALLEN HEAD SET SCREW		P67-1282
26	UPPER PULLEY BRACE		B10-1778
27	DRIVE CHAIN 50" SECTION 84" LONG S.S.		A10-3474
	DRIVE CHAIN 38" SECTION 64" LONG S.S.		*
28	CHAIN COVER		B10-2867
29	GEAR BOX, 73:1 LEFT HAND		P58-1216
	GEAR BOX, 73:1 RIGHT HAND		P58-1215
	GEAR BOX, 60:1 RIGHT HAND		P58-1333
	GEAR BOX, 60:1 LEFT HAND		P58-1334
	GEAR BOX, 50:1 LEFT HAND		P58-1336
	GEAR BOX, 50:1 RIGHT HAND		P58-1335
30	MOTOR, 1/4 HP 1725 RPM TRI-VOLT. 208/230/260V		P41-2218
	MOTOR, 1/4 HP 1725 RPM 115/230V.		P41-1330
	DC MOTOR, 1/2 HP VARIABLE		P41-1213
	DC MOTOR, 1 HP VARIABLE	**	P41-1214
	** USED ON MACHINES OVER 20'		
	PULLEY SPROCKET ASSEMBLY ITEMS 4,11,12,13,14,17,25		B10-1846

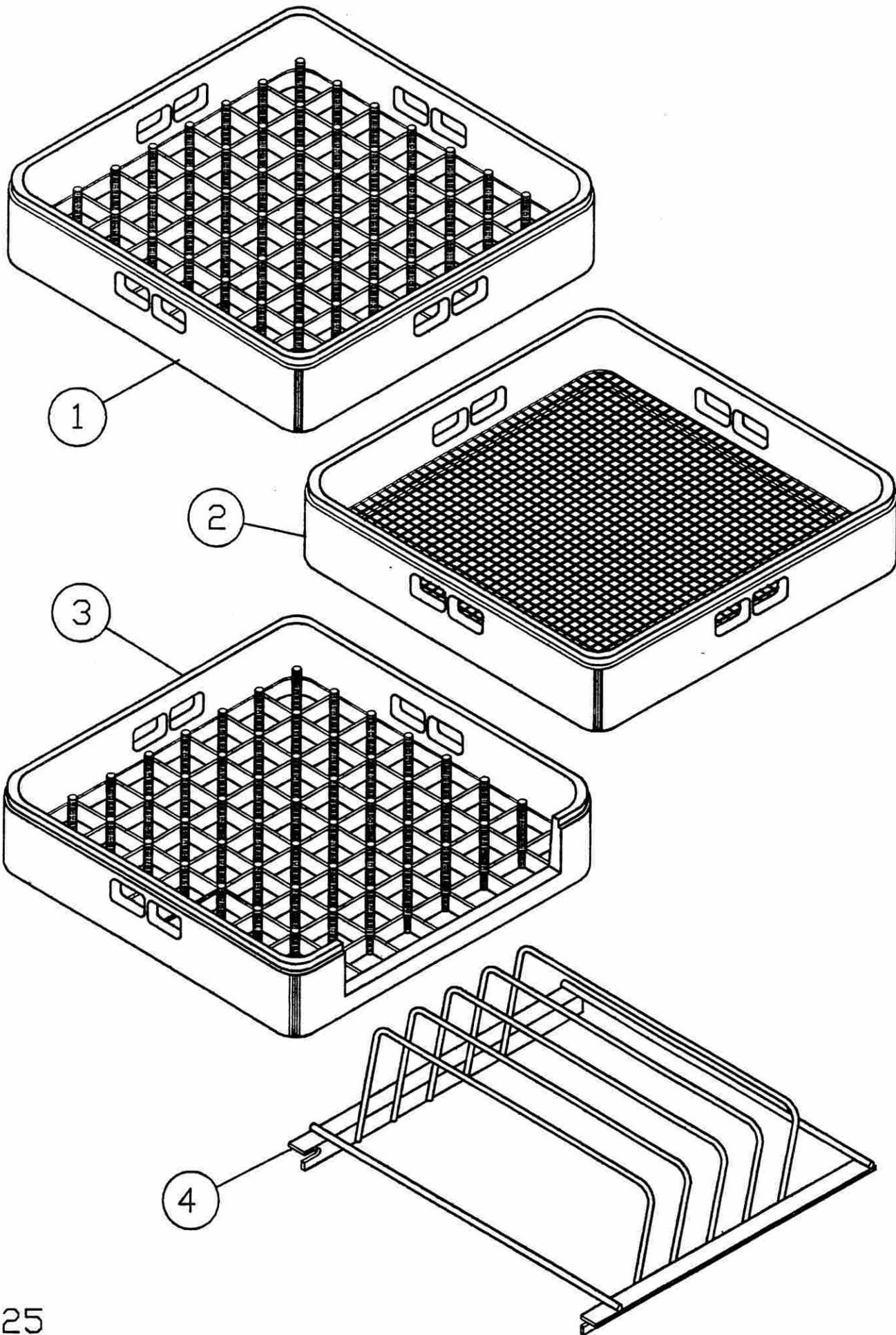
\* TO ORDER SUPPLY MACHINE MODEL AND SERIAL NUMBER













# *SPRAYING SYSTEMS*

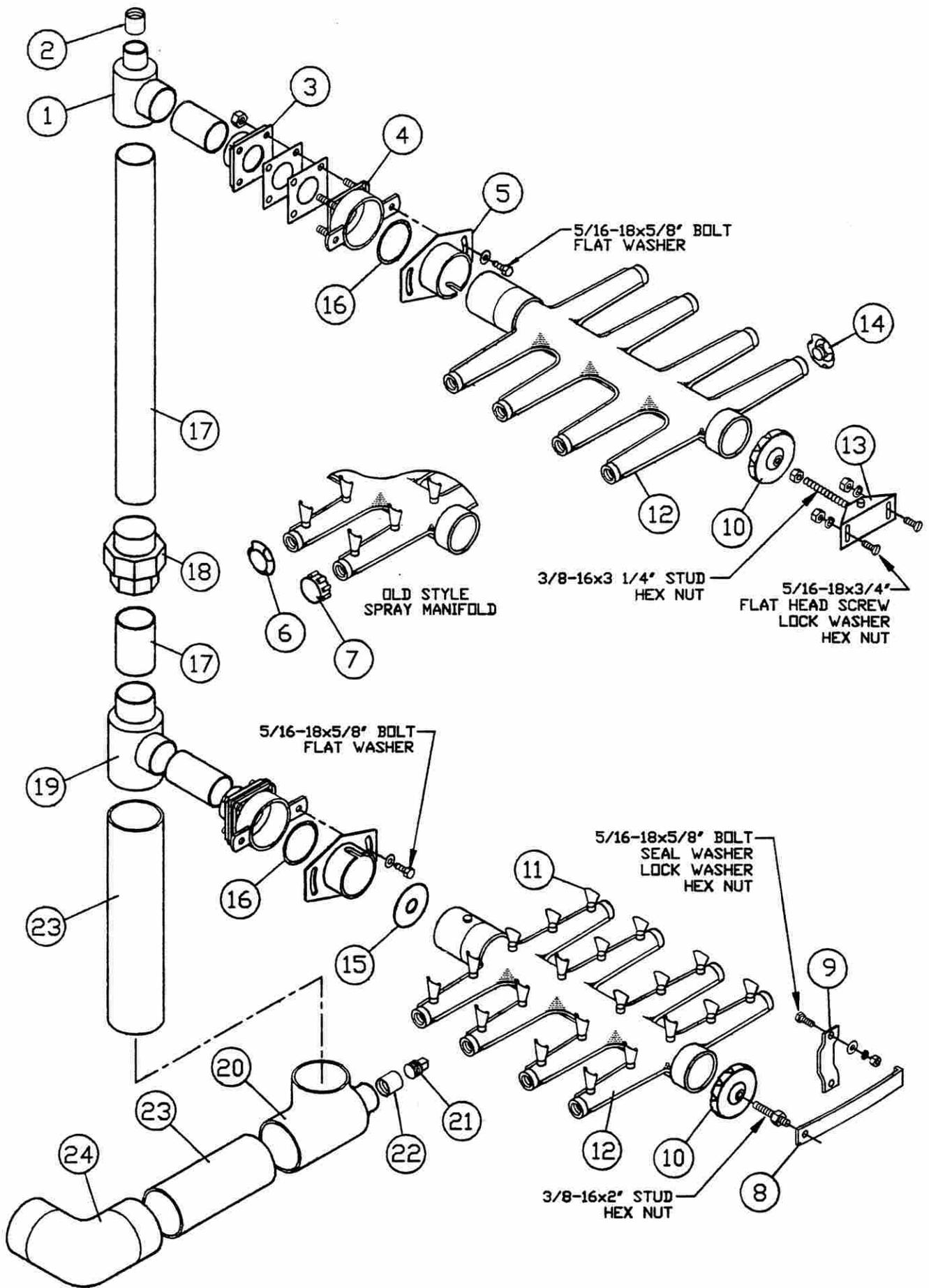
*SCRAPPER ASSY.*

*WASH/RINSE ASSY.*

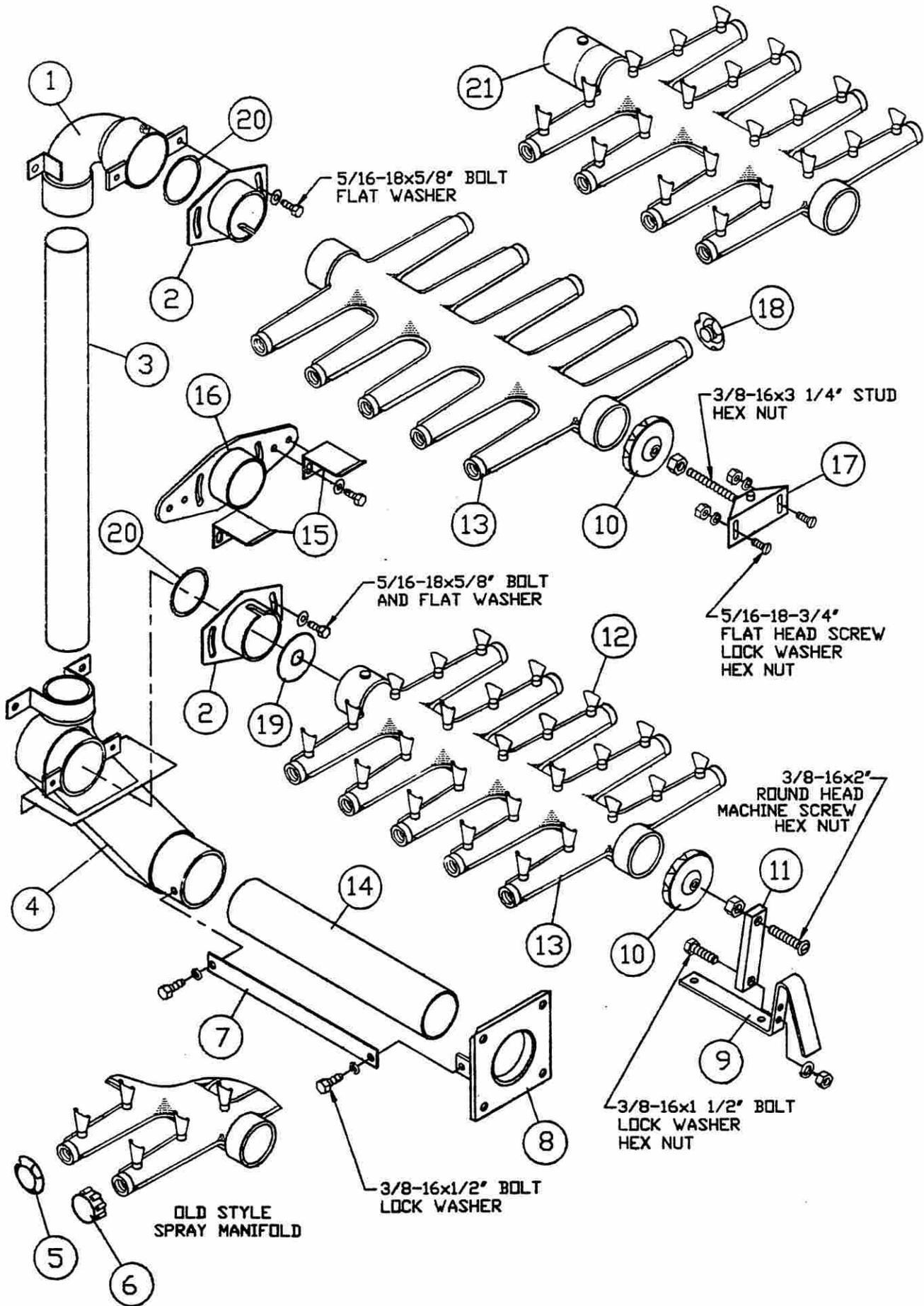
*FINAL RINSE HI-TEMP.*

*FINAL RINSE LOW-TEMP.*

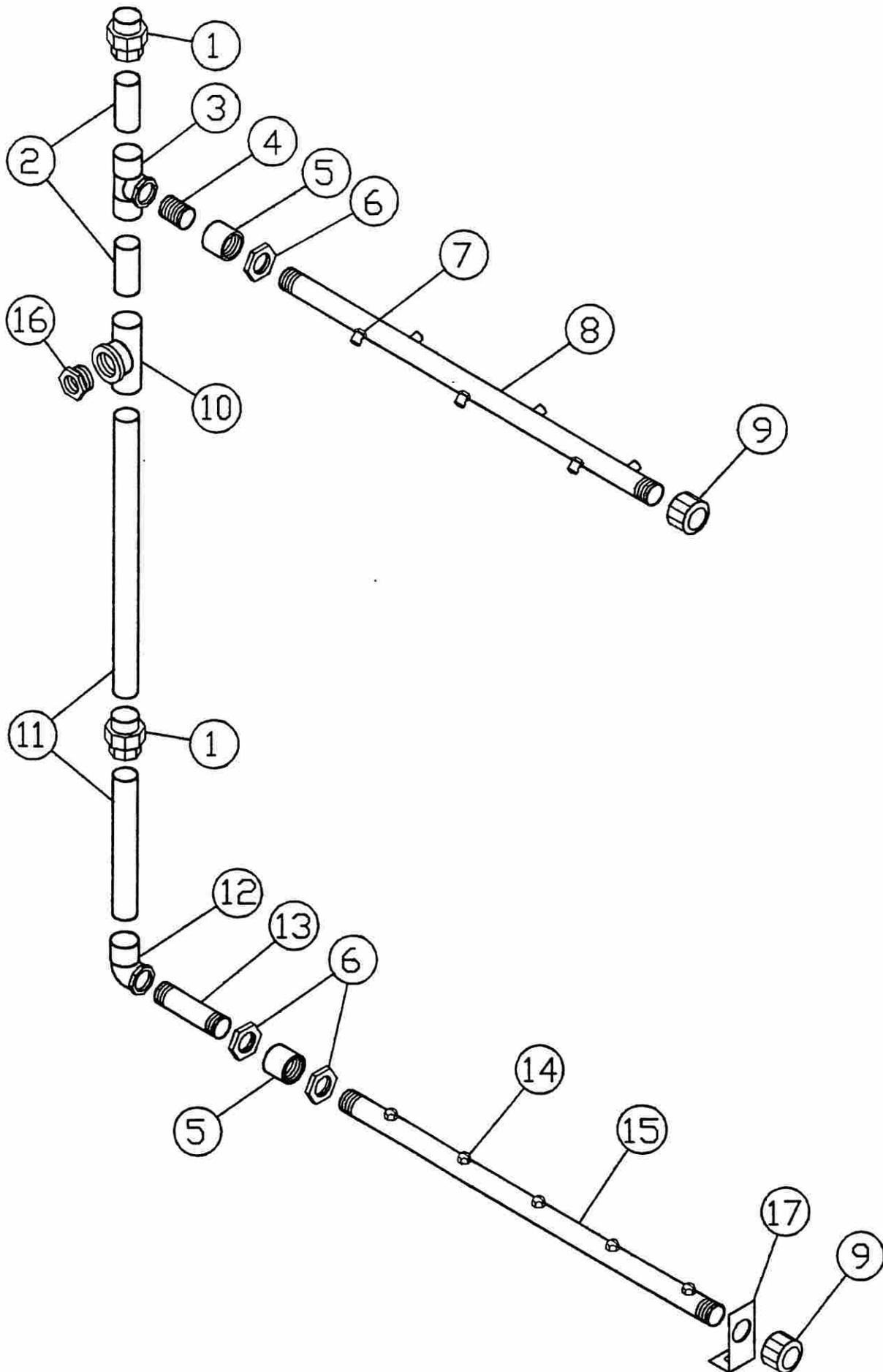
*RINSE RAKE ASSY.*



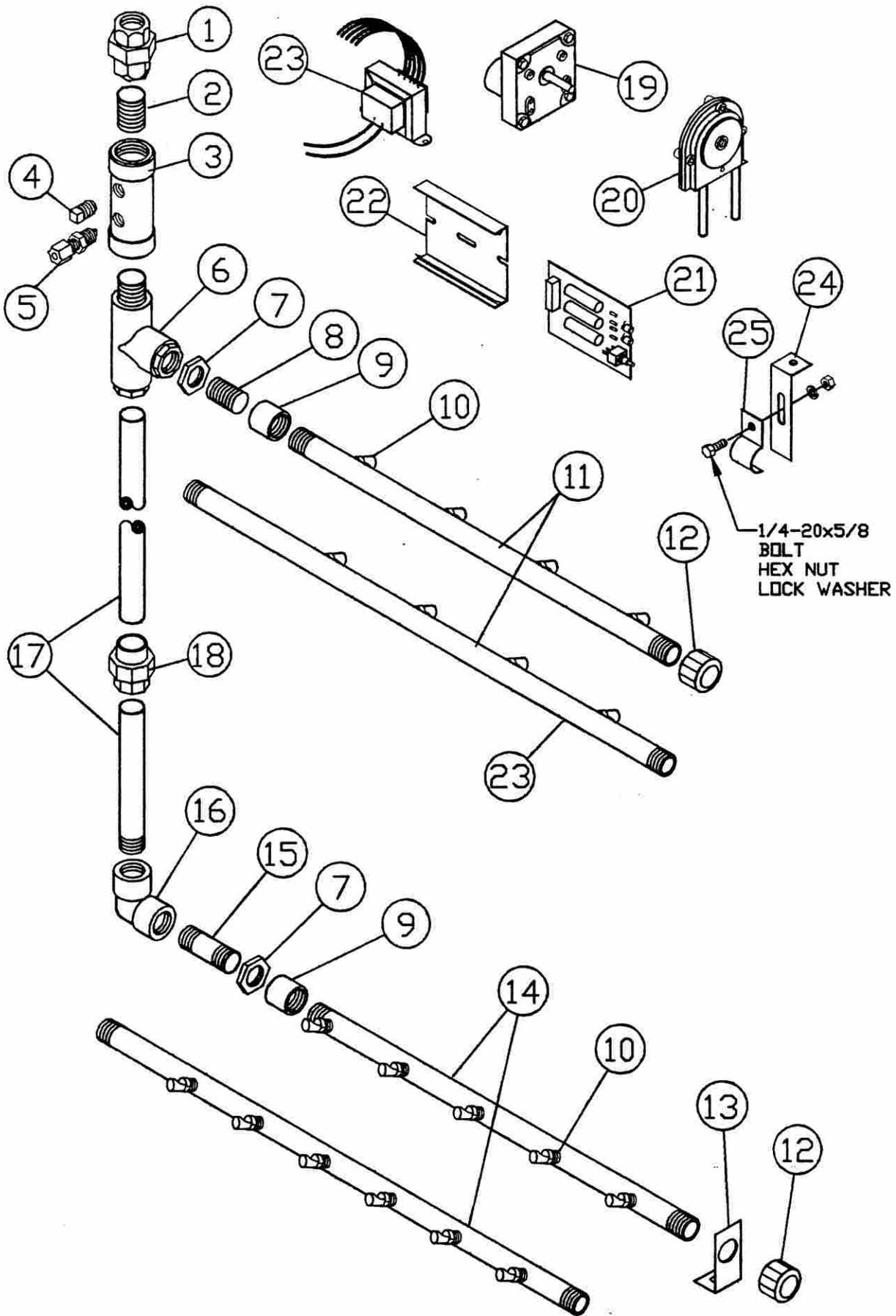




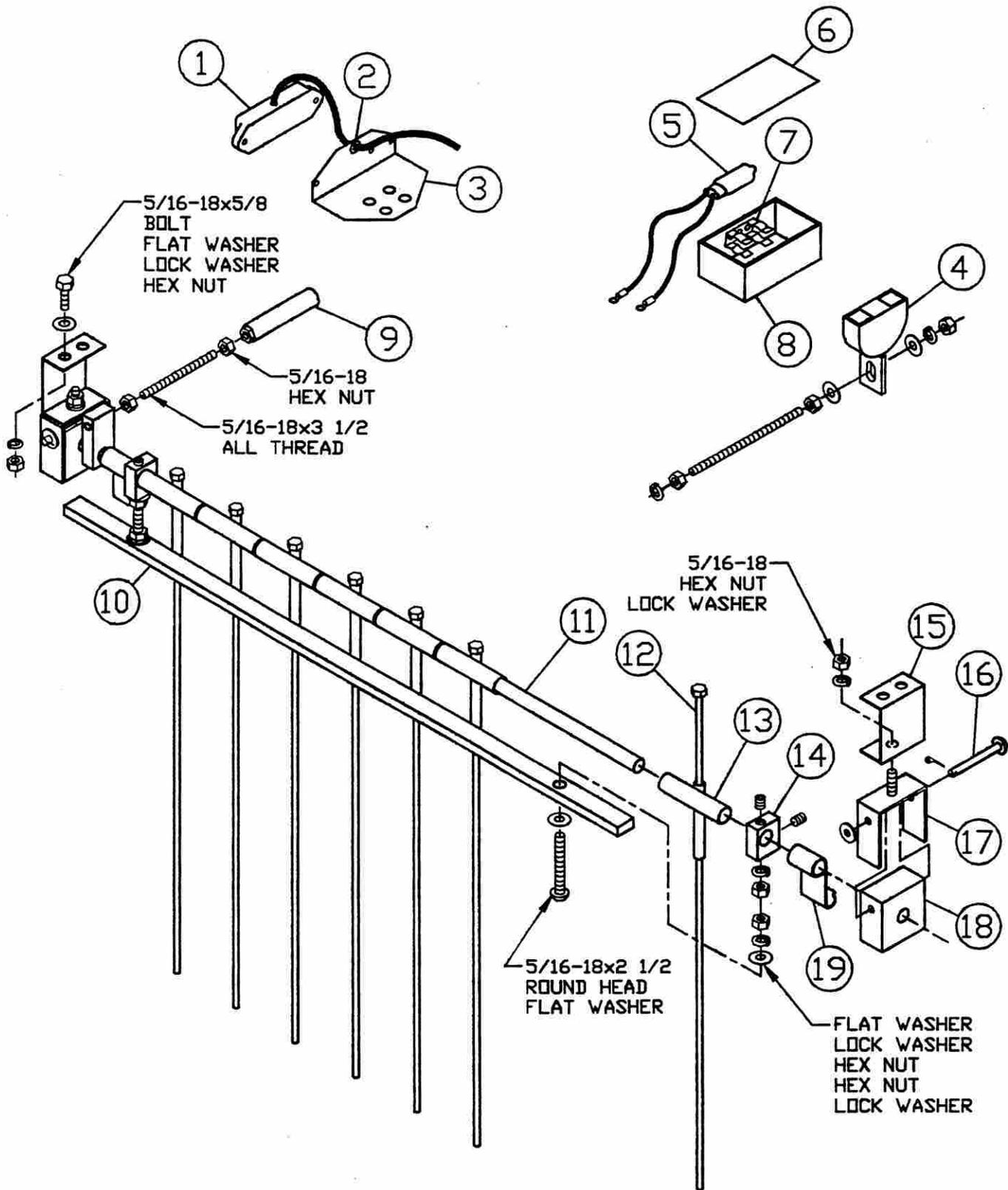












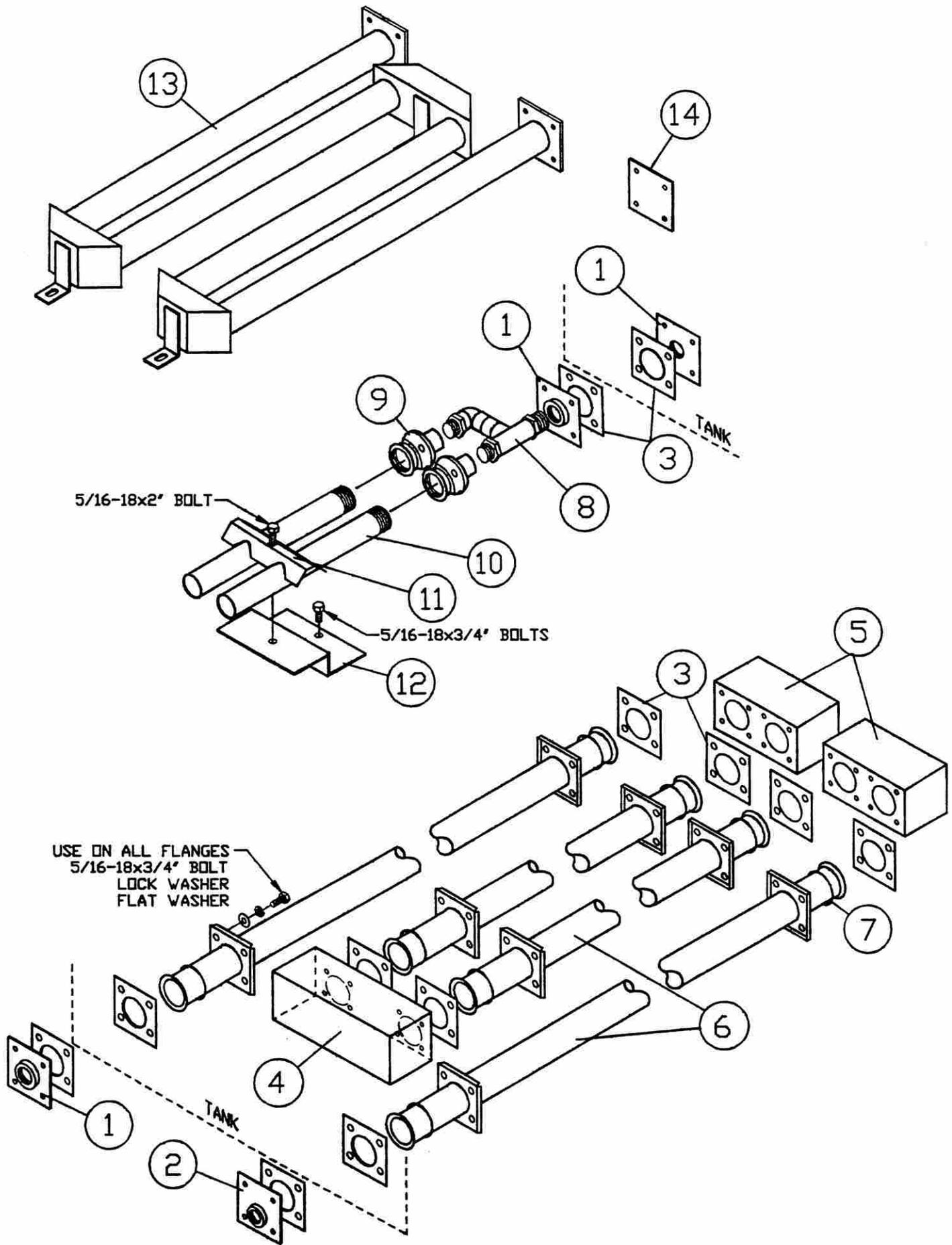


# *HEATING COMPONENTS*

*STEAM COILS & INJECTORS*

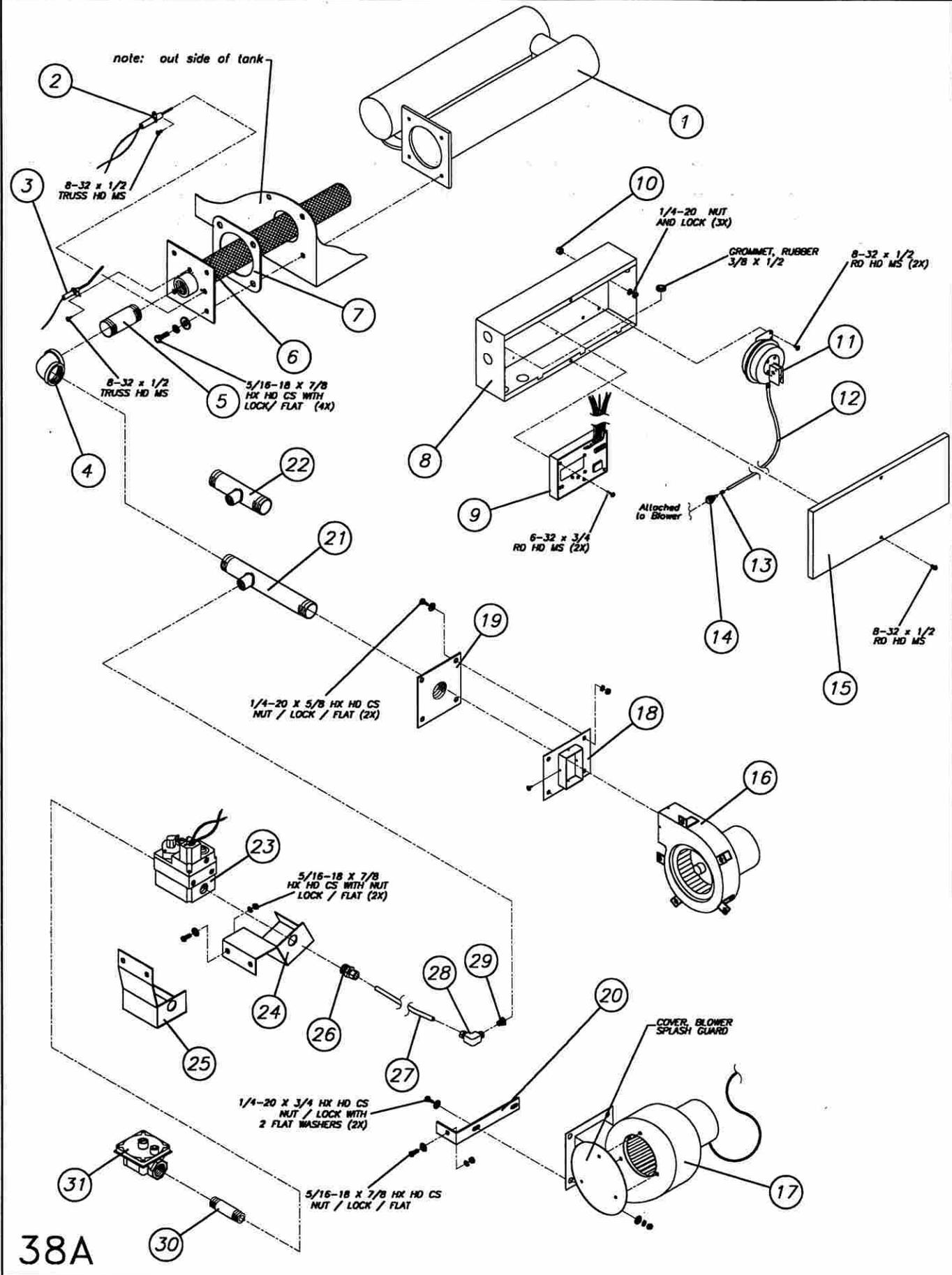
*ELECTRIC HEAT*

*BLOWER DRYER ASSY.*





TANK HEAT ASSEMBLY-SINGLE BURNER  
INFRARED TANK HEAT

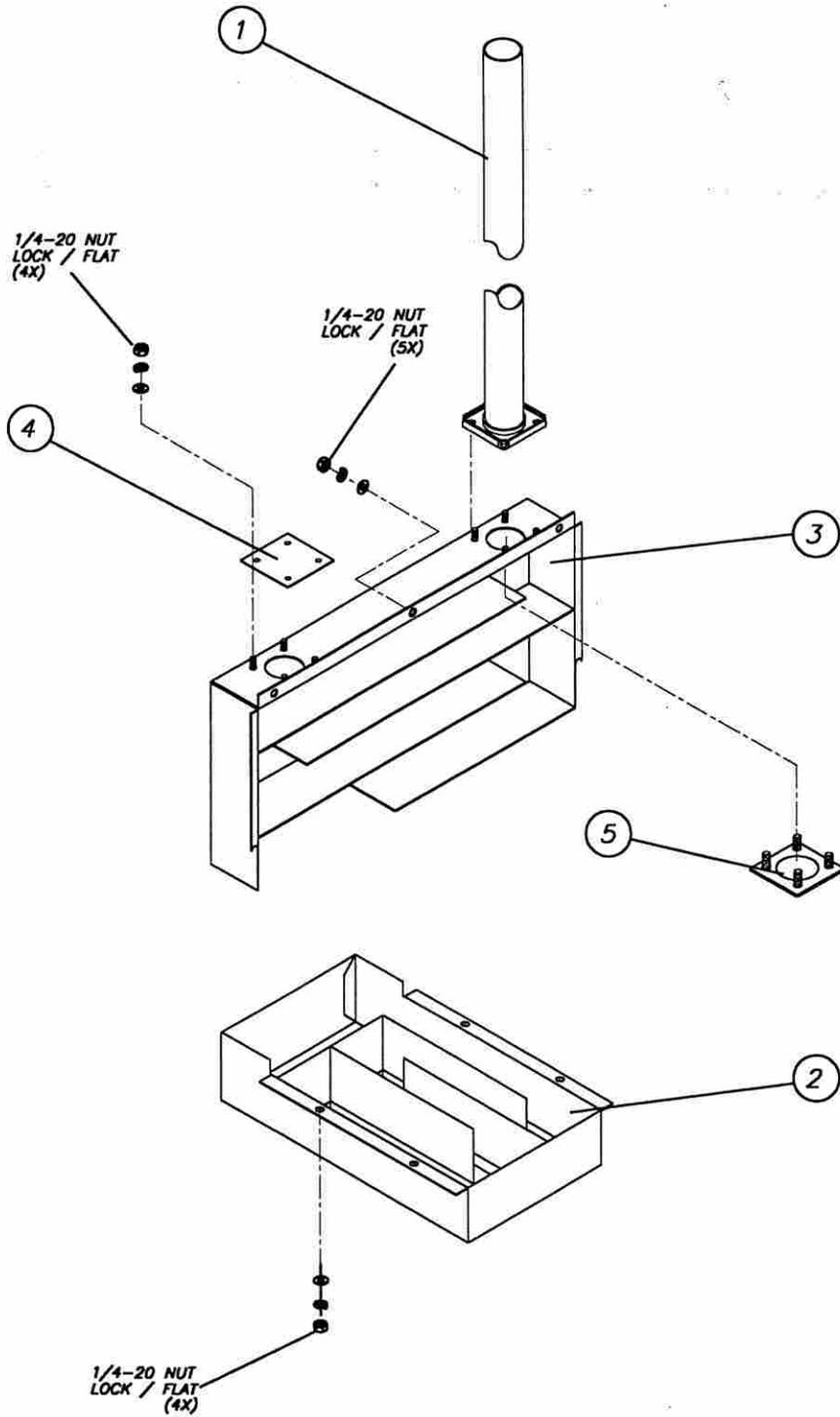


TANK HEAT ASSEMBLY—SINGLE BURNER  
INFRARED TANK HEAT

ITEM	DESCRIPTION	REMARKS	PART NO.
1	ASSEMBLY, BURNER TUBE		**
2	IGNITER		P49-5798
3	SENSOR, FLAME		P49-6037
4	ELBOW		P68-1622
5	NIPPLE		P68-1638
6	BURNER		P55-5792
7	GASKET		B57-1757
8	BOX, 14" GAS CONTROL		C10-5956
9	CONTROL MODULE		P42-5944
	SET, CONTROL MODULE	CTL.BOX & HARNESS	P42-5794
10	BUSHING,	3 REQ.	A50-1556
11	SWITCH, DIAPHRAGM		P49-5795
12	TUBE, CLEAR DIAPHRAGM SWITCH		P51-5829
13	RESTRICTOR, AIR		A10-5831
14	FITTING, DIAPHRAGM SWITCH TUBE		A10-5822
15	COVER, 14" GAS CONTROL BOX		B10-5957
16	BLOWER, DAYTON		P41-6082
17	BLOWER, FASCO		P41-5793
18	ADAPTER, BLOWER		A10-6052
19	PLATE, BLOWER		A10-6009
20	BRACKET, BLOWER MNTG.		A10-5809
21	MIXING CHAMBER-8 1/2"		A10-6001
22	MIXING CHAMBER-5"		A10-5821
23	VALVE, GAS		P54-5796
24	BRACKET, GAS VALVE MNTG.		A10-5810
25	BRACKET, GAS VALVE MNTG.		A10-5808
26	FITTING, TUBE COMPRESSION		P68-5830
27	TUBE, COPPER		P51-2013
28	FITTING, ORIFICE		A10-5832
29	ORIFICE		A10-5827
30	NIPPLE		P68-1654
31	REGULATOR, GAS (Natural Gas System Only))		P54-5828

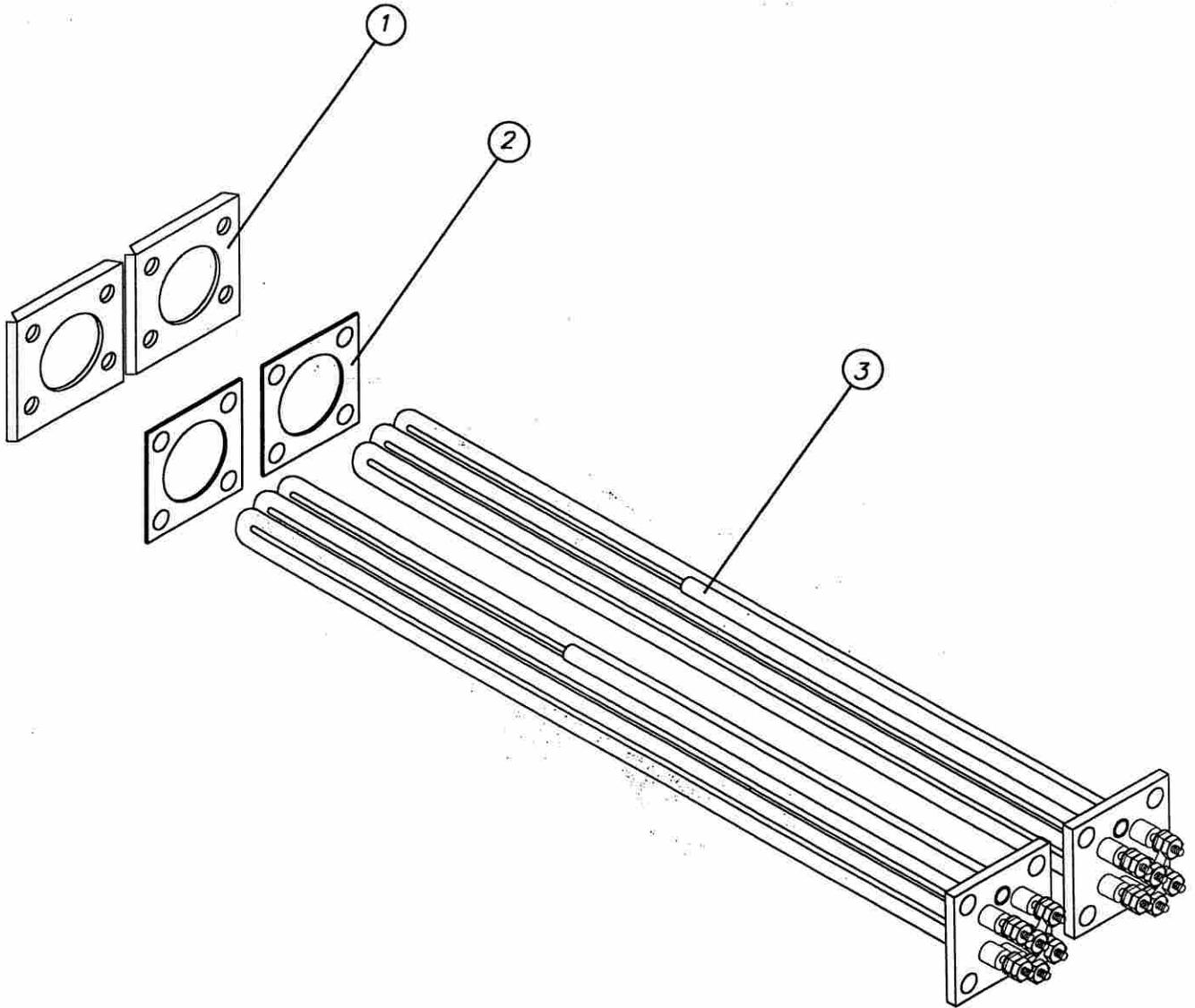
\* TO ORDER - SUPPLY MACHINE MODEL AND SERIAL NUMBER

TANK HEAT EXHAUST ASSEMBLY  
INFRARED TANK HEAT



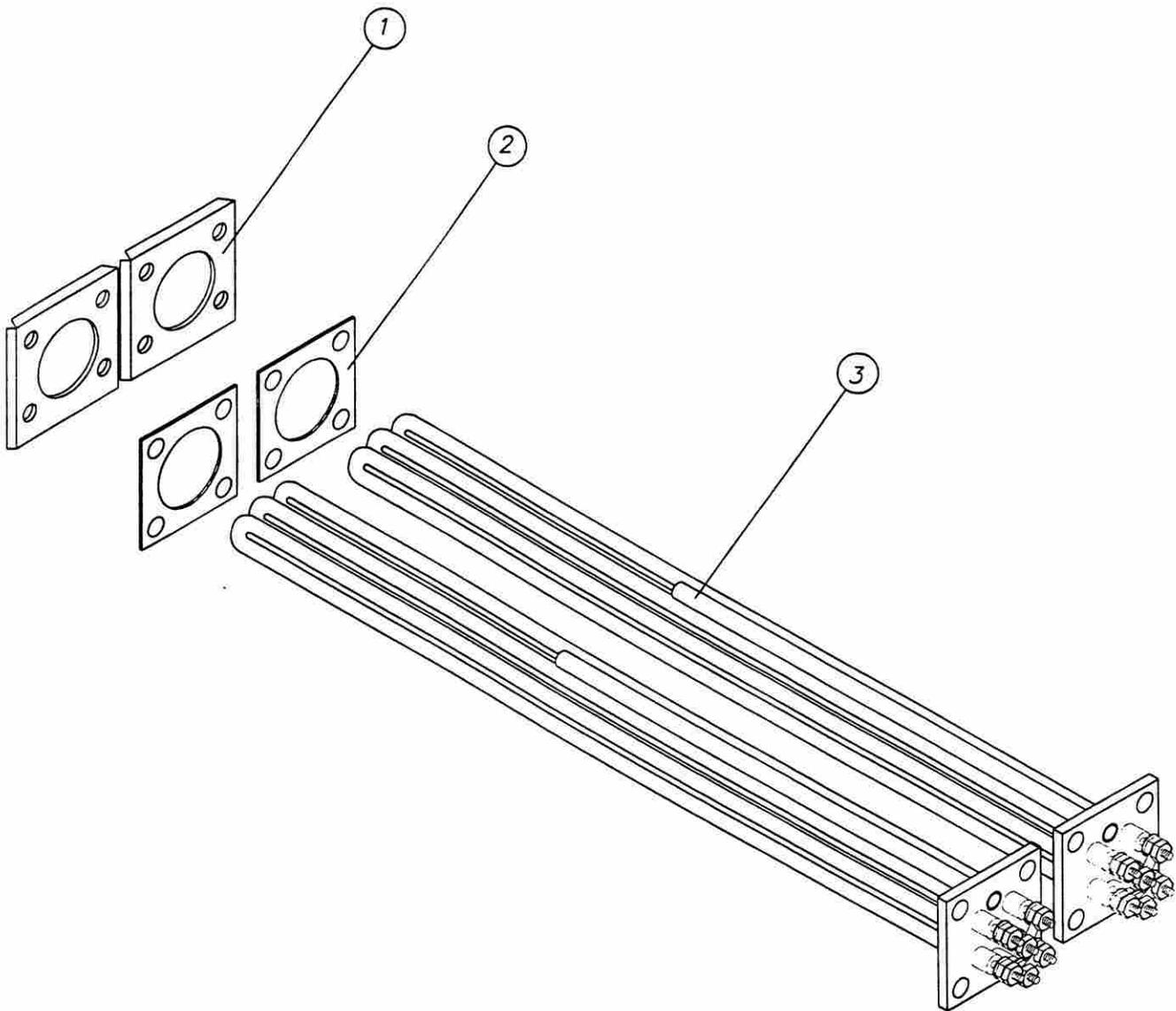


# HEATING COMPONENTS

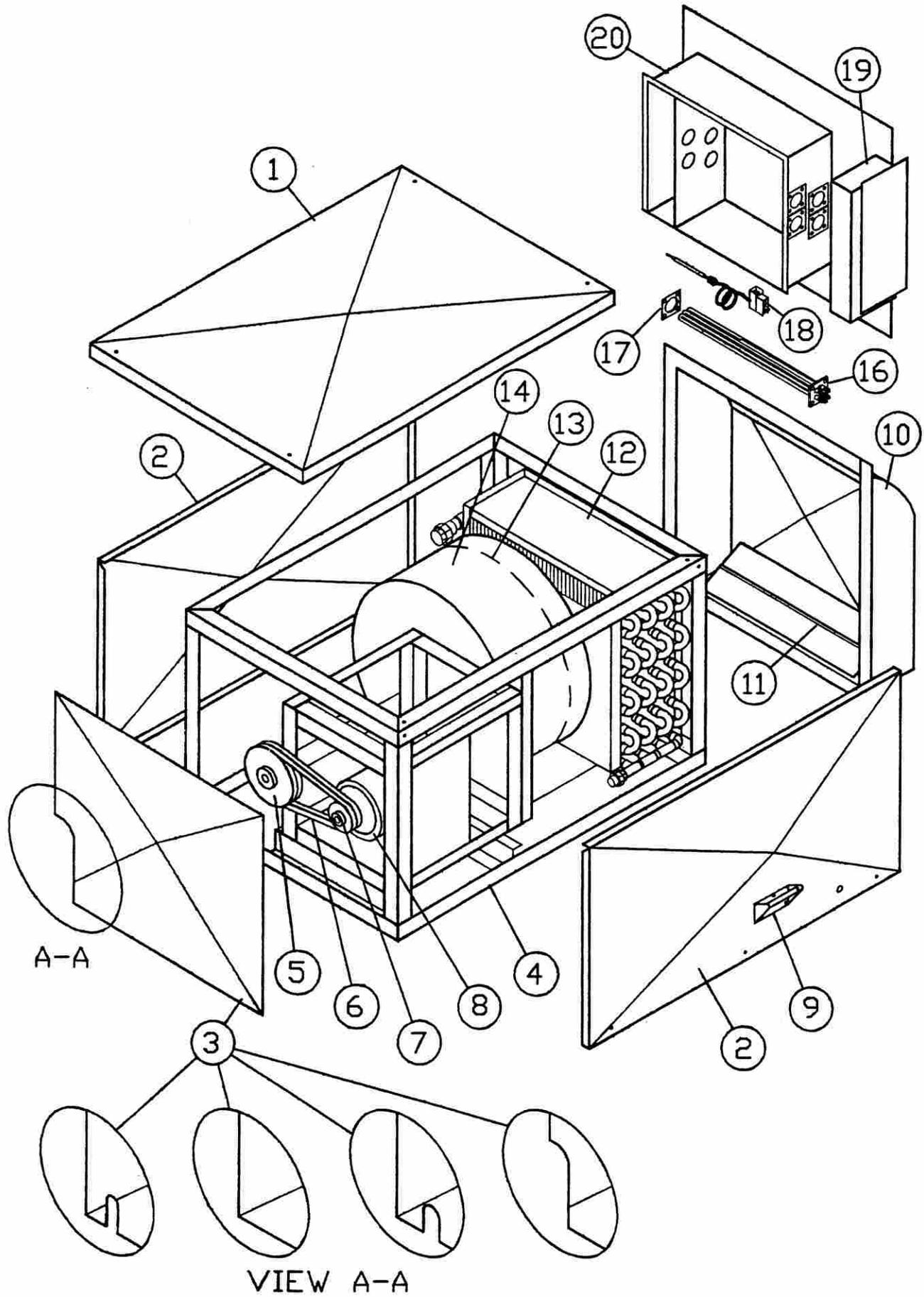




HEATING COMPONENTS









# *PLUMBING COMPONENTS*

*STEAM BOOSTER TYPES*

*SPIREC ASSY.*

*THRUSH ASSY.*

*DOUCETTE ASSY.*

*HATCO ELECTRIC ASSY.*

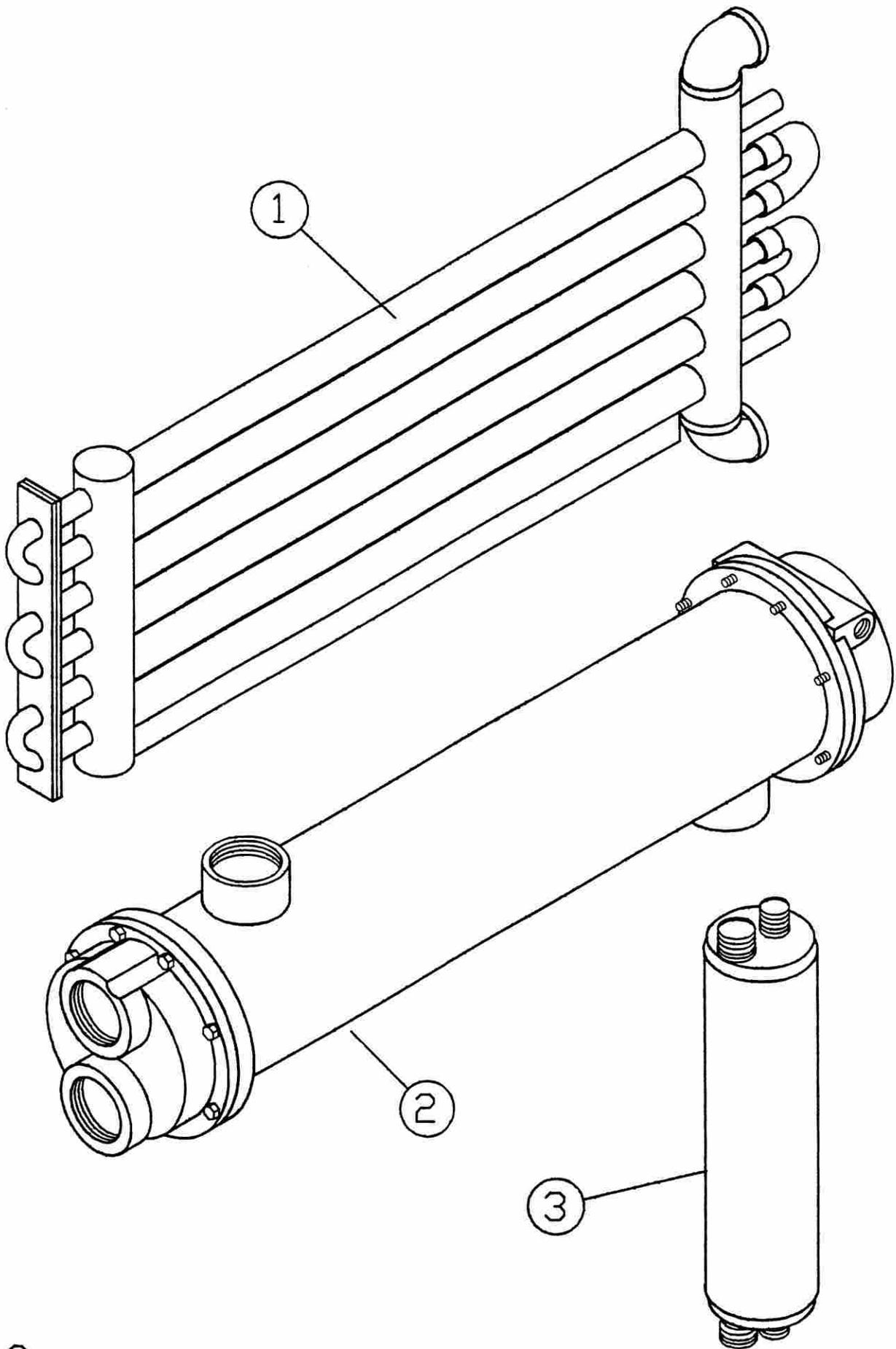
*FINAL RINSE (KIT 55)*

*COMMON PLUMBING PARTS*

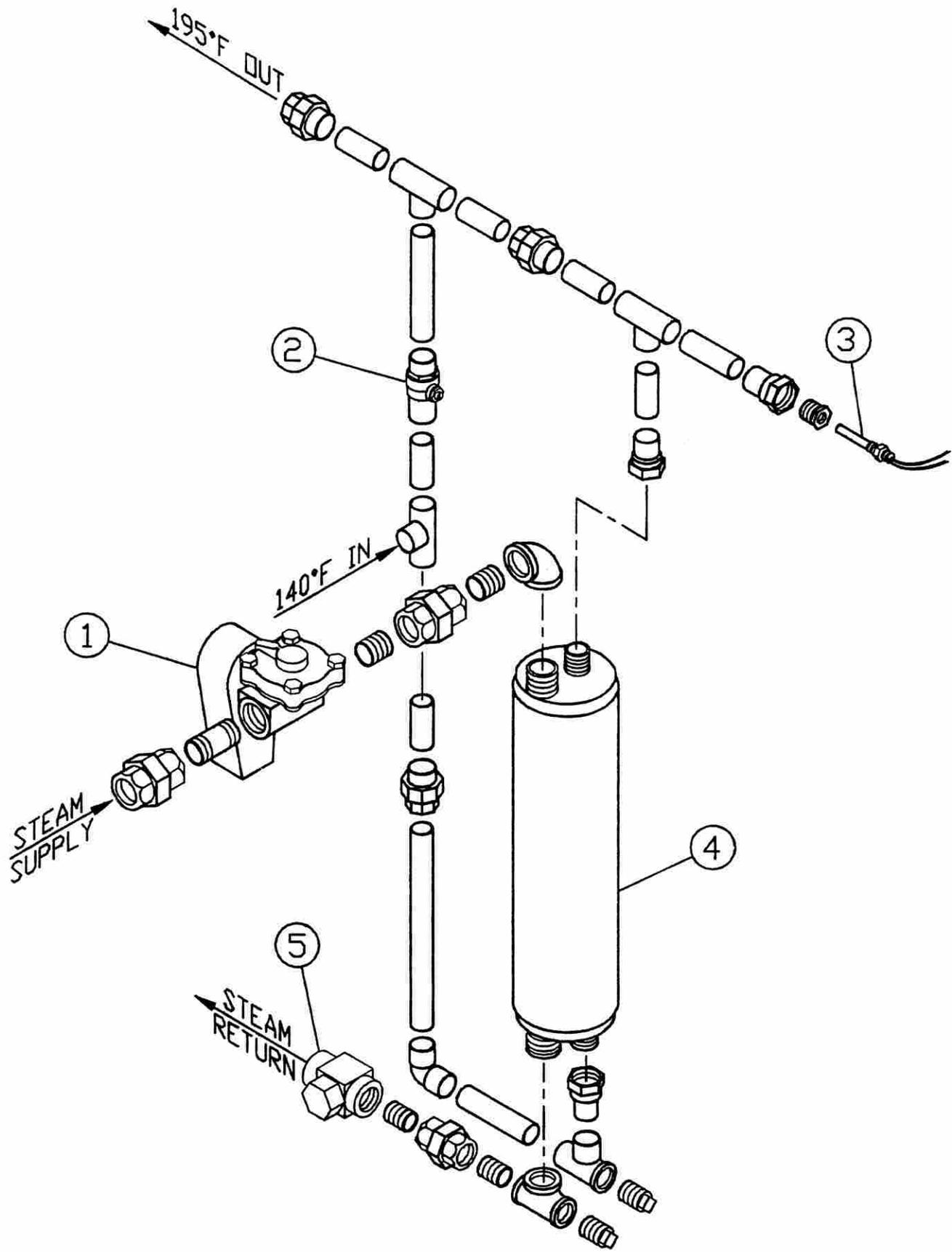
*OVER FLOW ASSY.*

*TEMP. GAUGE ASSY.*

*TYPICAL PLUMBING FITTINGS*

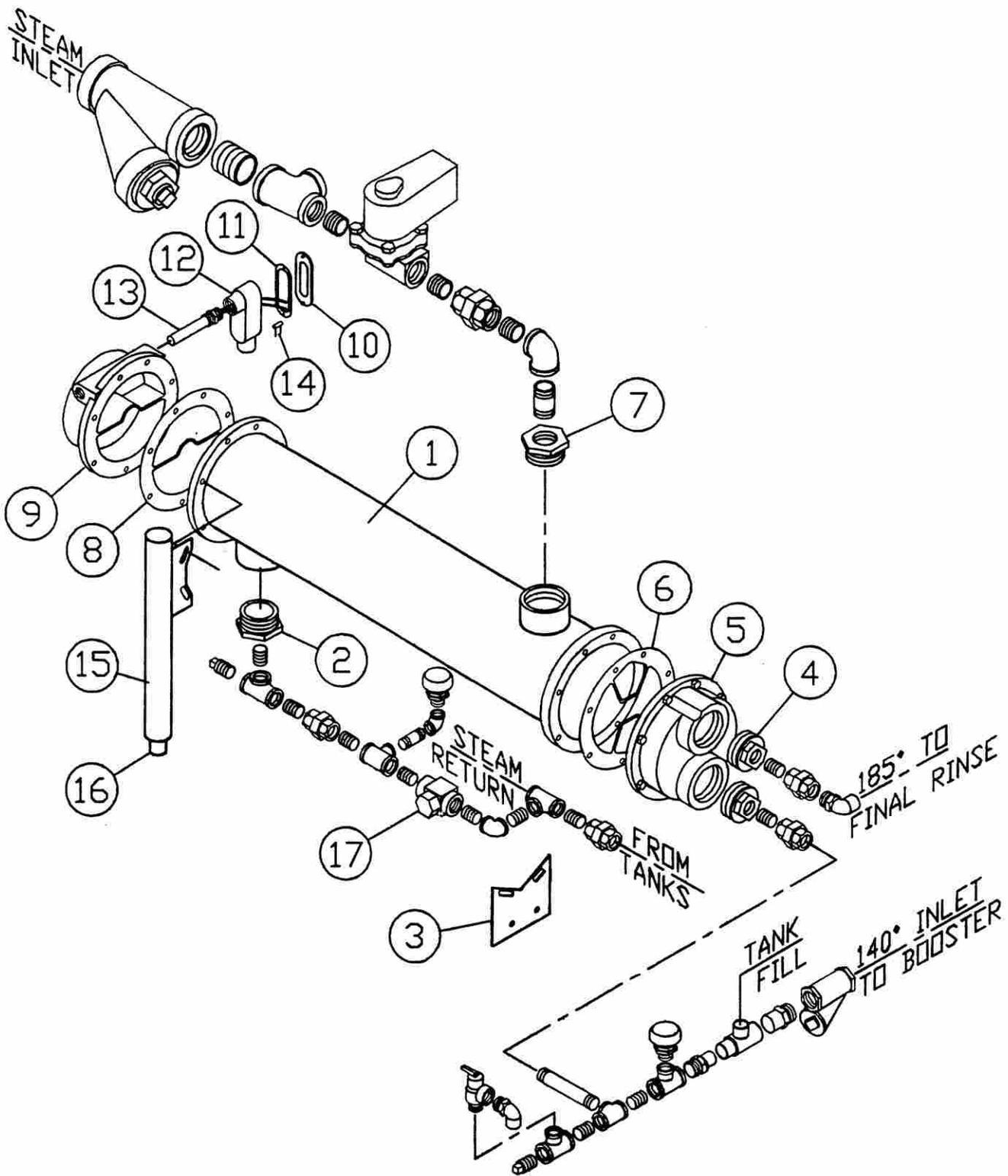






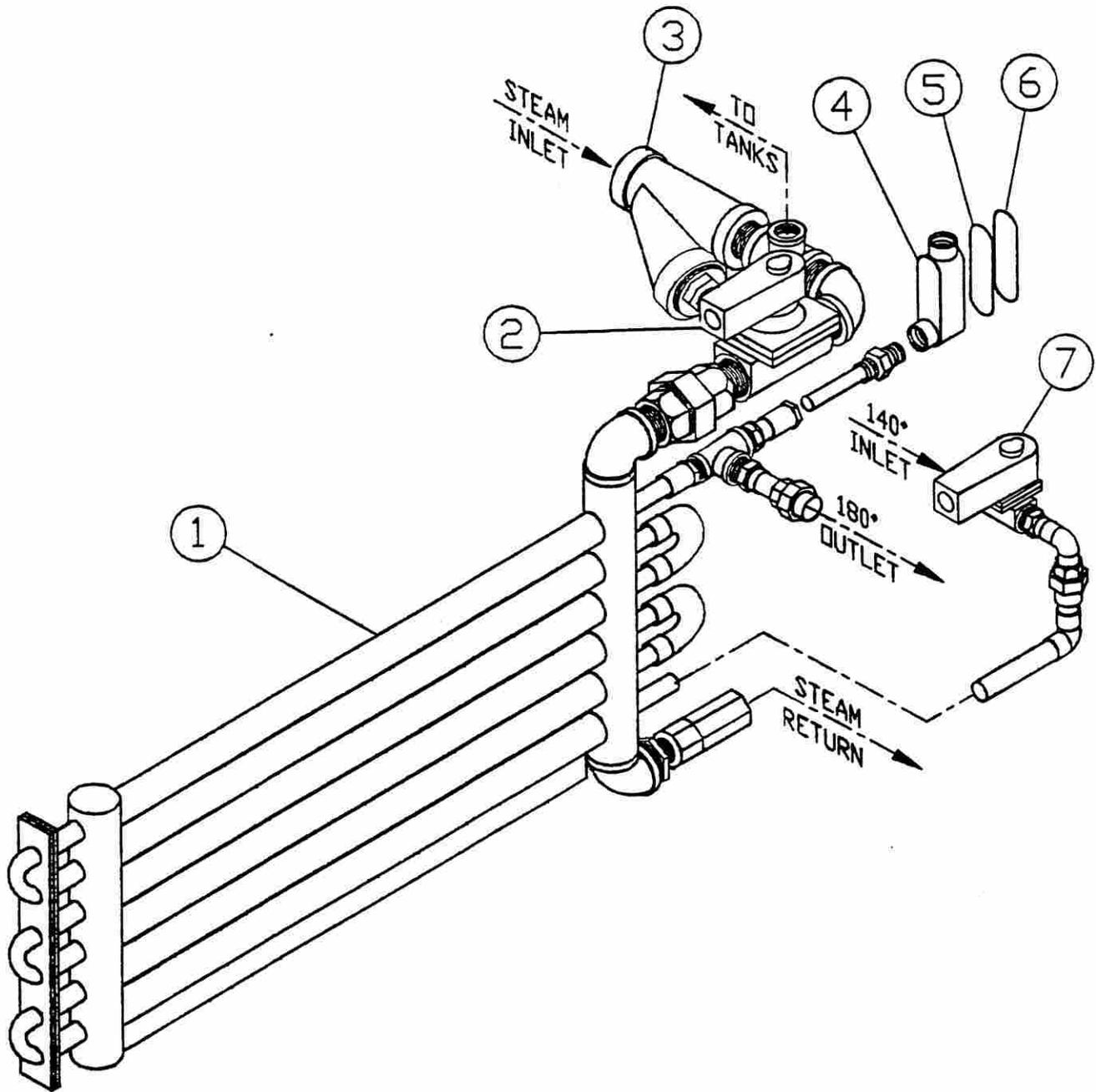
PLUMBING PARTS NOT NOTED  
 WILL BE FOUND IN COMMON  
 PLUMBING PARTS SECTION



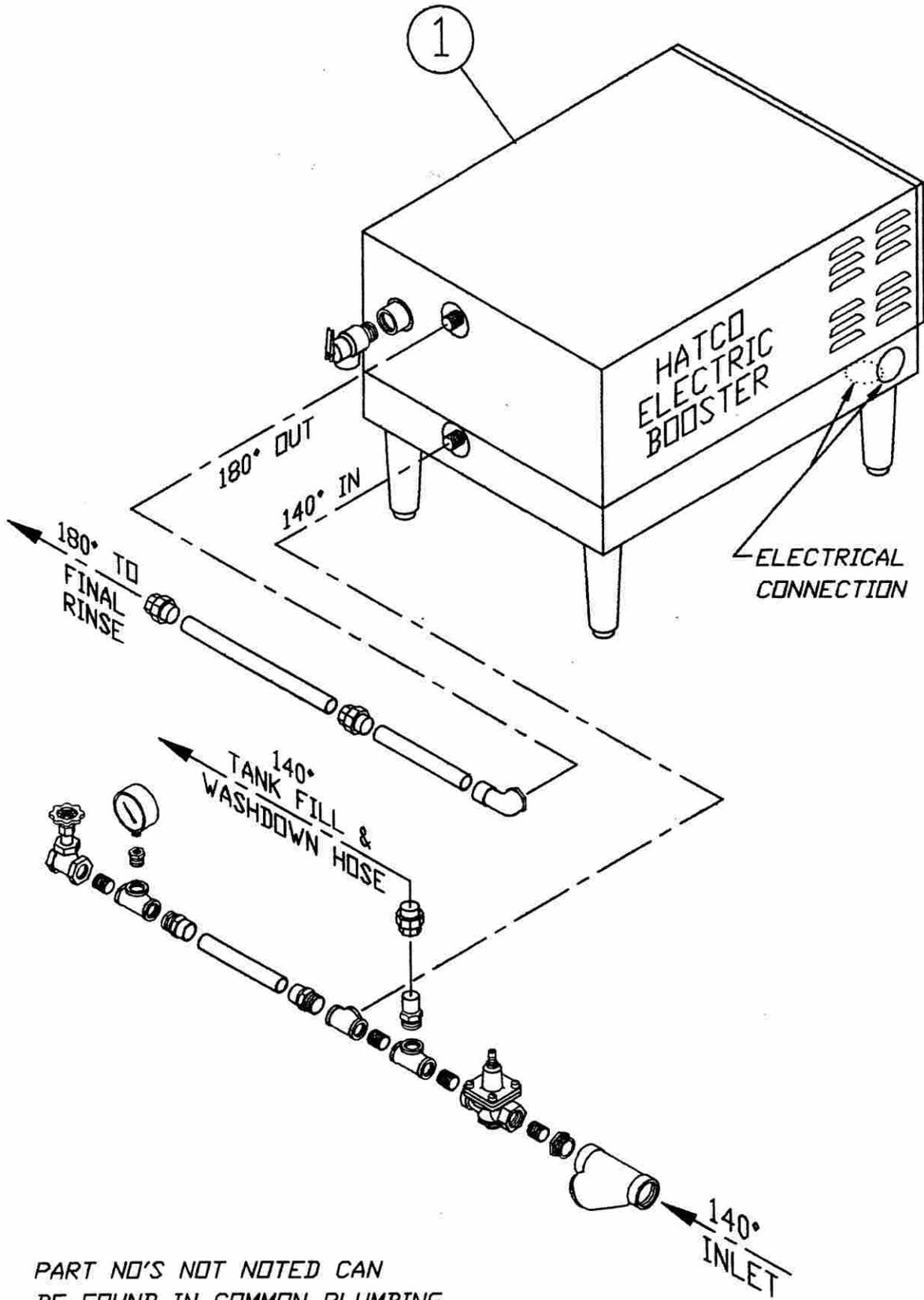


PLUMBING PARTS NOT NOTED  
 WILL BE FOUND IN COMMON  
 PLUMBING PARTS SECTION



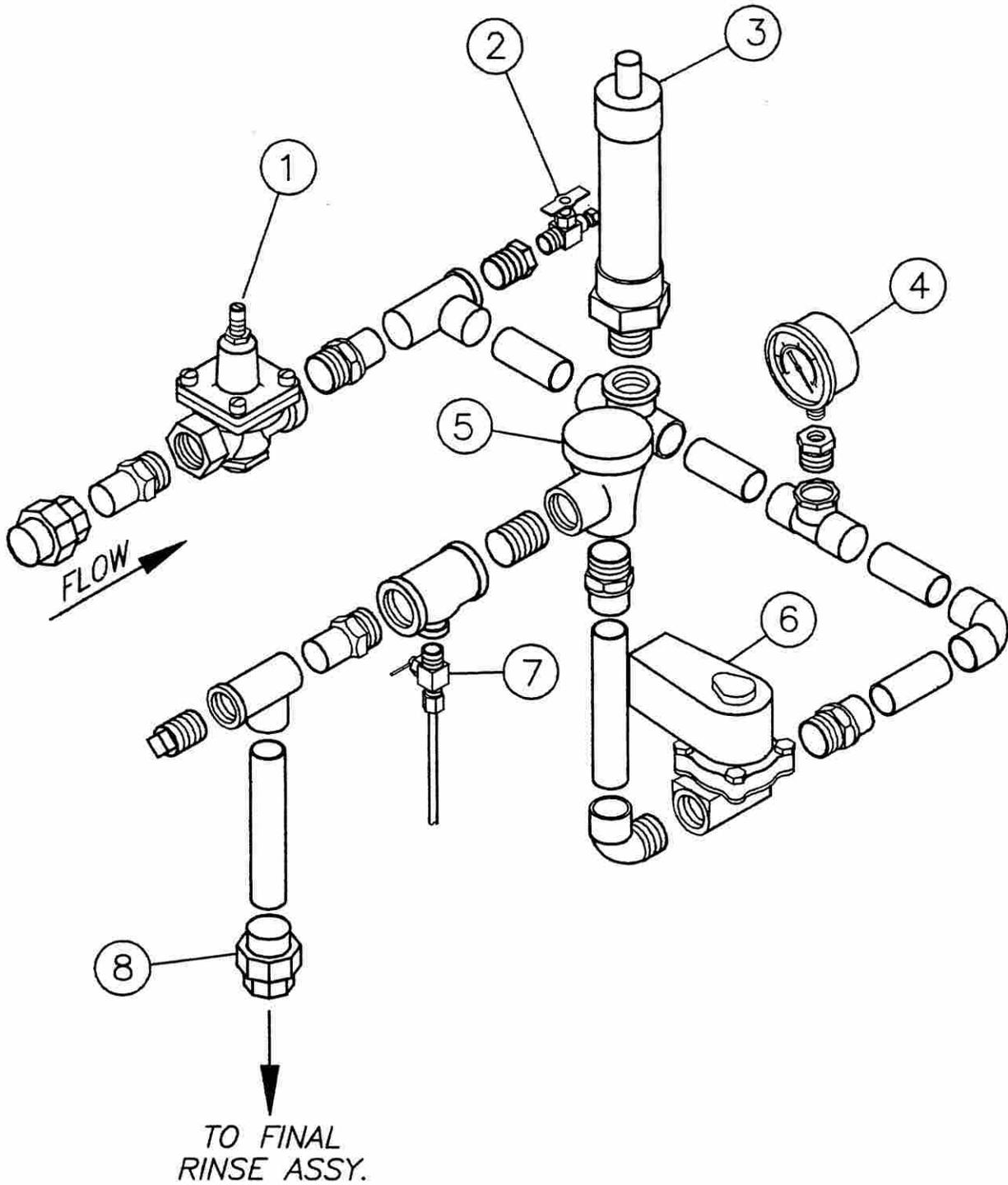




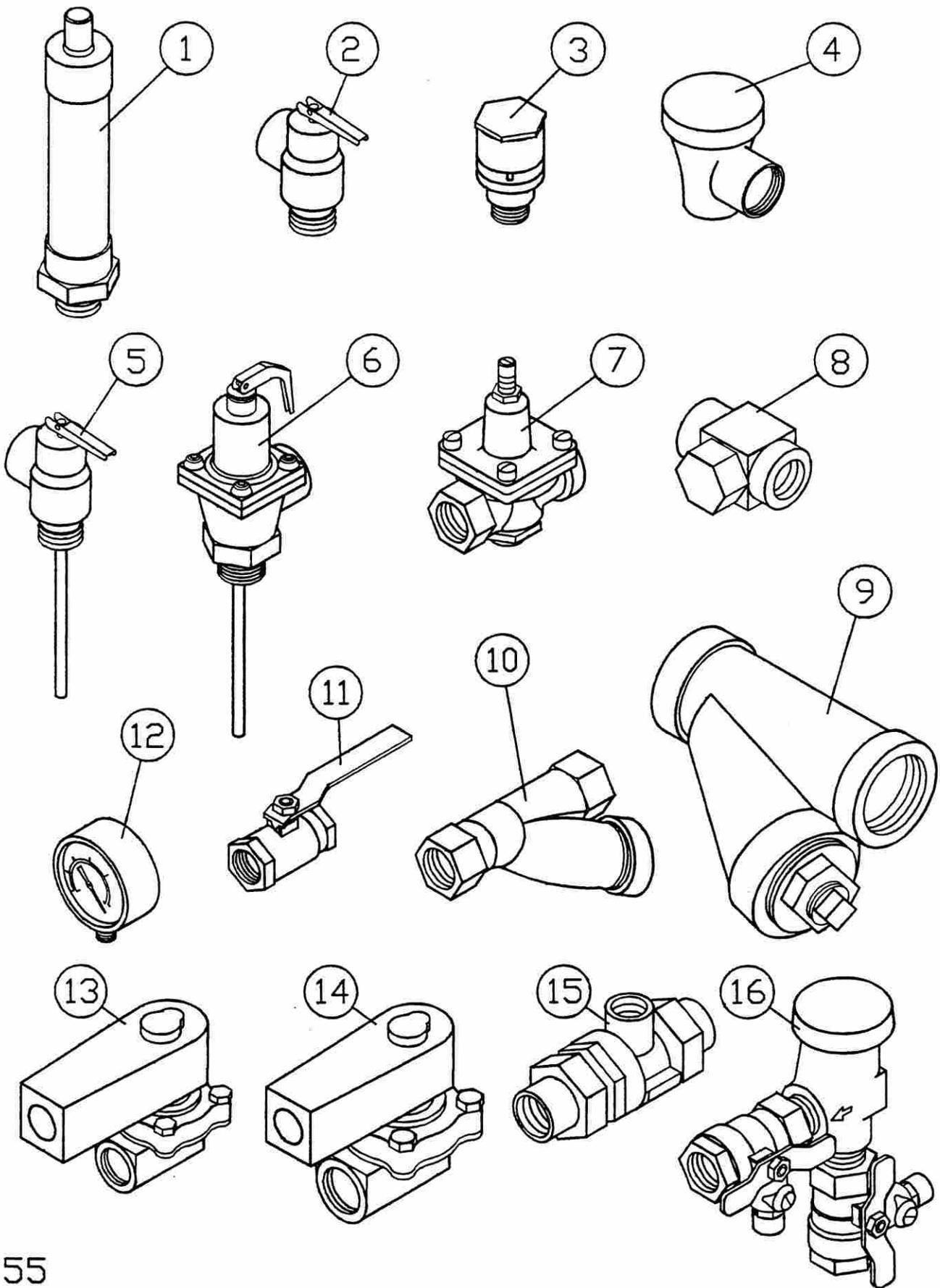


PART NO'S NOT NOTED CAN  
 BE FOUND IN COMMON PLUMBING  
 PARTS OR TYPICAL PLUMBING  
 FITTINGS





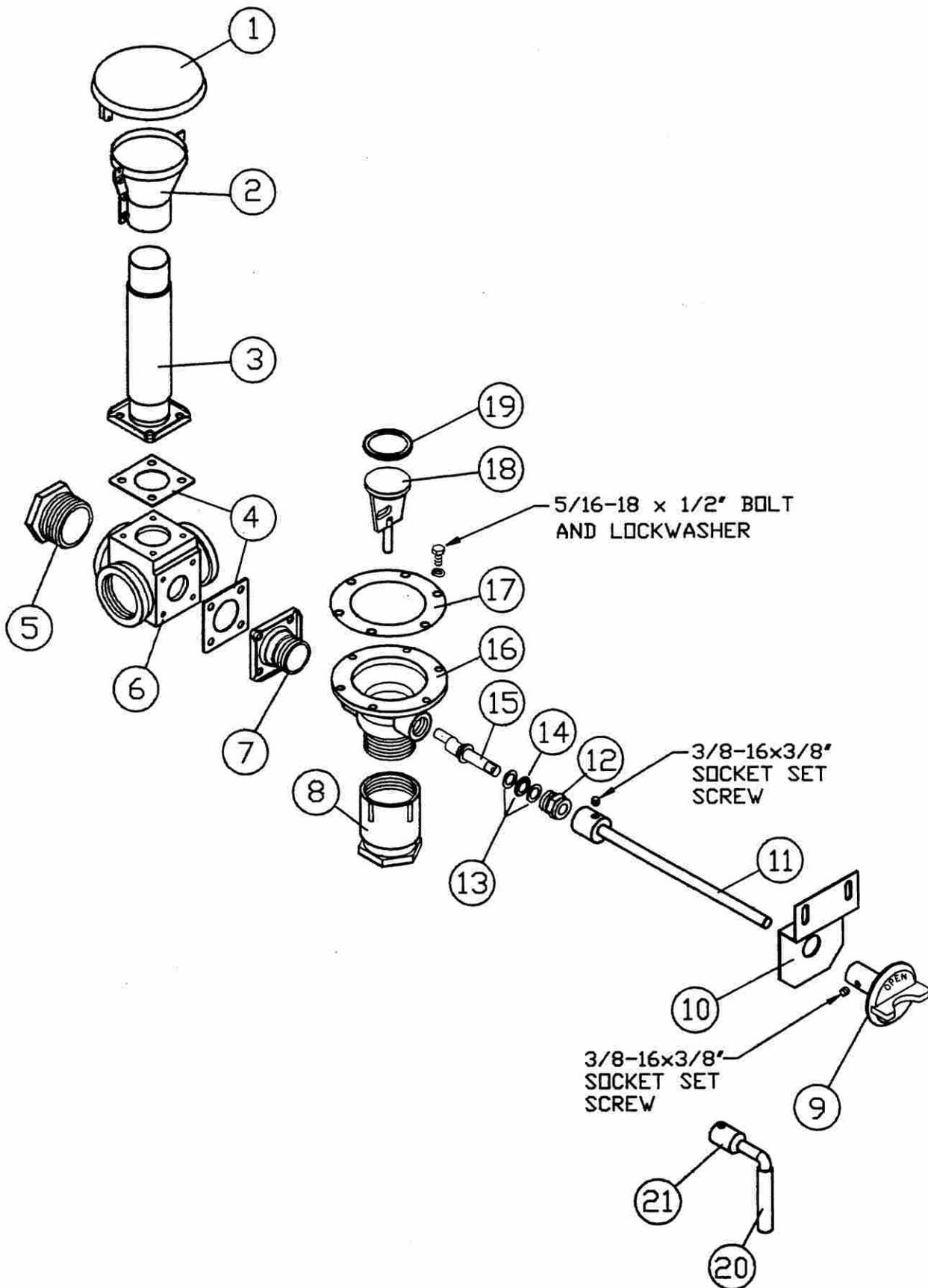




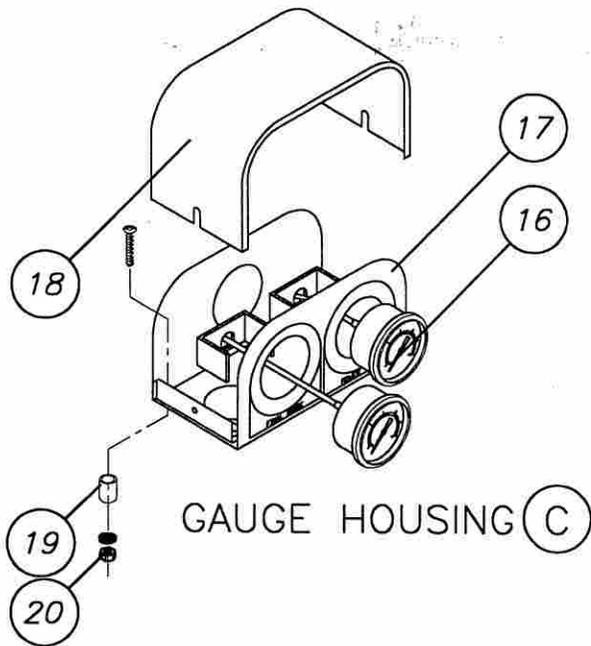
# COMMON PARTS PLUMBING

ITEM	DESCRIPTION	REMARKS	PART NO.
1	SHOCK STOP, 3/4"		P68-2250
2	VALVE, PRESSURE RELIEF # 3L 3/4"		P62-1171
3	VALVE, VACUUM RELIEF 1/2"		P62-1170
4	VACUUM BREAKER, 3/4"	A	P62-1149
5	VALVE, PRESSURE & TEMP RELIEF #100XL		P62-1174
6	VALVE, HI TEMP AND PRESSURE RELIEF #40XL		P62-1173
7	VALVE, PRESSURE REDUCING 3/4"	B	P62-1166
8	STEAM TRAP, 1/2"		P61-1169
	STEAM TRAP, 3/4"		P61-1168
9	LINE STRAINER, BLACK IRON 1-1/4"	C	P63-1159
	LINE STRAINER, BLACK IRON 1"	D	P63-1158
	LINE STRAINER, BLACK IRON 2"	E	P63-1160
10	LINE STRAINER, BRASS 3/4"	F/G	P63-1115
11	BALL VALVE, 1/2"		P68-1182
	BALL VALVE, 3/4"		P68-2453
12	GAUGE, PRESSURE 0-100 PSI		P65-1136
13	VALVE, SOLENOID PISTON 3/4" 120V (ASCO)	H/I **	P54-2815
	VALVE, SOLENOID PISTON 3/4" 208/240V (ASCO)	H/I **	P54-2816
14	VALVE, SOLENOID DIAPHRAM 1" 120V STEAM (ASCO)	J/K	P54-2840
	VALVE, SOLENOID DIAPHRAM 1" 208V STEAM (ASCO)	J/K	P54-2841
15	BACKFLOW PREVENTER, 9D		P62-1918
16	BACKFLOW PREVENTER, REPLACED ITEM 15 ON 3/93		P62-5528
A	REPAIR KIT		P62-1164
B	REPAIR KIT		P62-5518
	REPAIR KIT, OLD STYLE VALVE LENGTH 4 3/8"		P62-1167
C	REPLACEMENT SCREEN 1-1/4"		P63-1162
D	REPLACEMENT SCREEN 1"		P63-1161
E	REPLACEMENT SCREEN 2"		P63-1163
F	REPLACEMENT SCREEN 3/4"		P63-1117
G	REPLACEMENT O RING		P57-1148
H	REPAIR KIT		P54-2821
I	REPLACEMENT COIL 120 VOLTS		P54-2808
	REPLACEMENT COIL 208/240 VOLT		P54-2825
J	REPAIR KIT		P54-2842
K	REPLACEMENT COIL 120 VOLTS		P54-2859
	REPLACEMENT COIL 208 VOLTS		P54-2860
	REPLACEMENT COIL 240 VOLTS		P54-2861
	ASCO STEAM REPLACEMENT COIL 120V 3/4 - 1-1/4"		P54-1074
	ASCO STEAM REPLACEMENT COIL 208V 3/4 - 1-1/4"		P54-1075
	ASCO STEAM REPLACEMENT COIL 240V 3/4 - 1-1/4"		P54-1076
	ASCO 3/4" STEAM REPAIR KIT		P54-1077
	ASCO 1-1/4" STEAM REPAIR KIT		P54-1081
	SKINNER STEAM REPLACEMENT COIL 120V 3/4-1-1/4		P54-1065
	SKINNER STEAM REPLACEMENT COIL 208V 3/4-1-1/4		P54-1066
	SKINNER 3/4" REPAIR KIT		P54-1067
	SKINNER 1-1/4" REPAIR KIT STEAM		P54-1070
	** CAN BE USED STEAM OR HOT WATER		

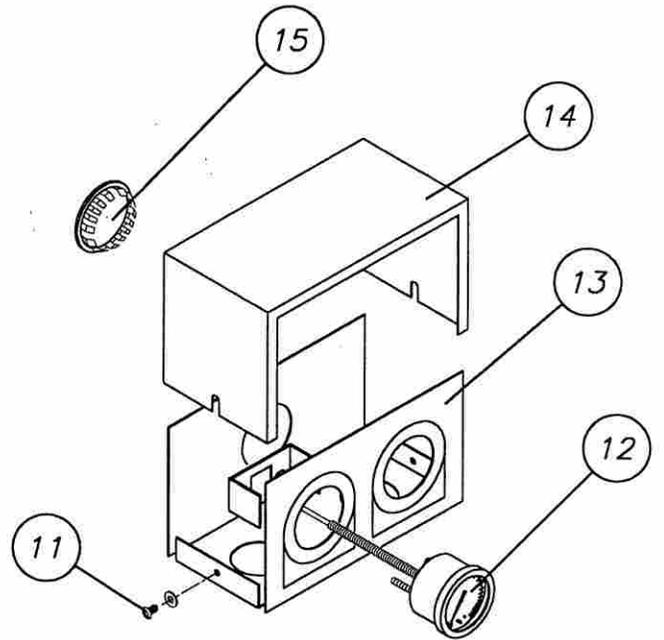
\* TO ORDER SUPPLY MACHINE MODEL AND SERIAL NUMBER



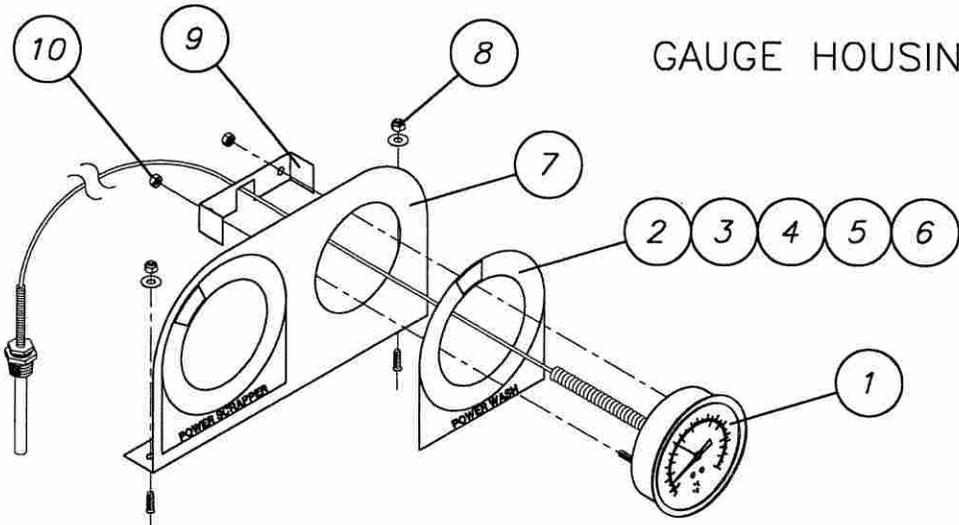




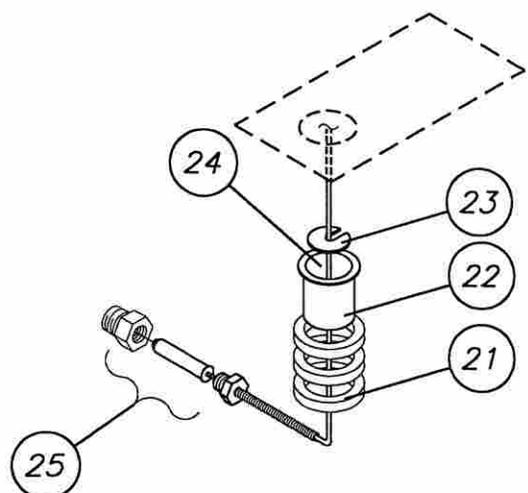
GAUGE HOUSING (C)



GAUGE HOUSING (B)

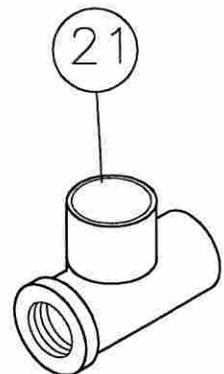
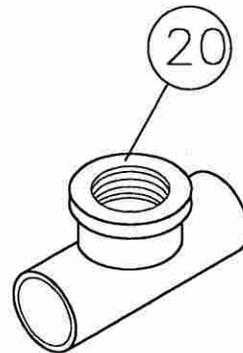
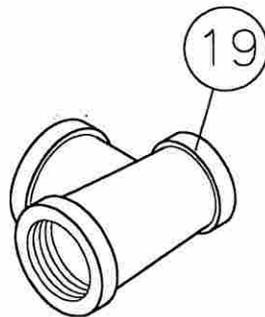
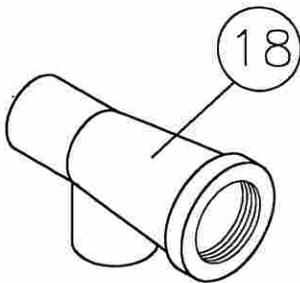
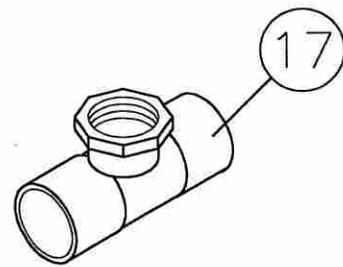
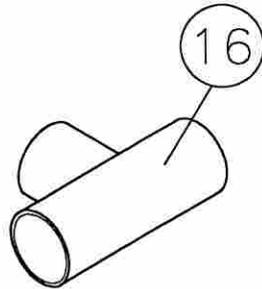
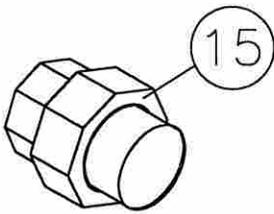
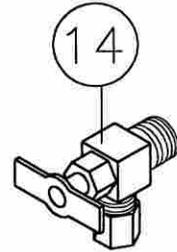
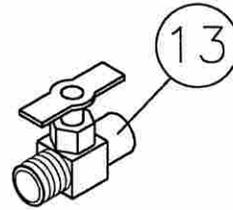
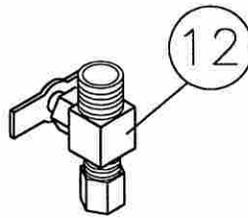
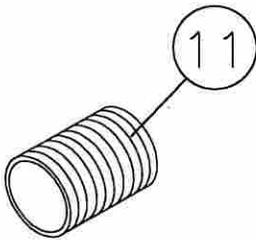
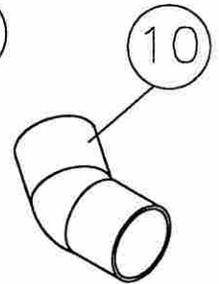
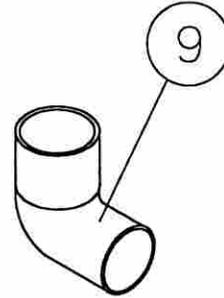
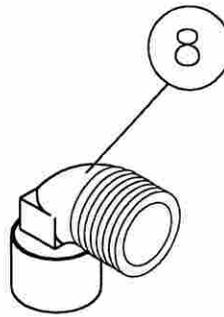
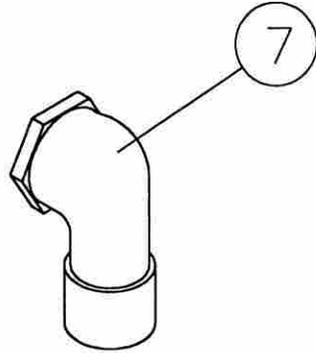
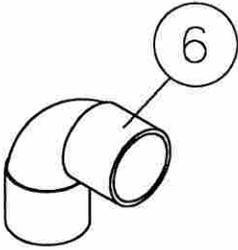
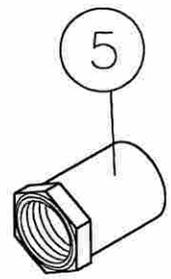
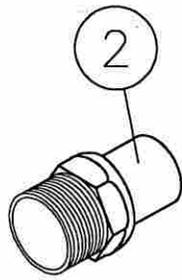
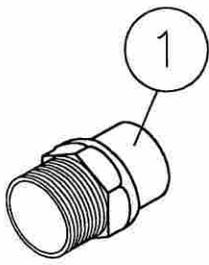


GAUGE ASSEMBLY (A)



GAUGE SUB-COMPONENTS







# *ELECTRICAL COMPONENTS*

*TYP. CONTROL PANEL ASSY.*

*OLD CONTROL PANEL ASSY.*

*CONTROL BOX ASSY.*

*BREAKER BOX ASSY.*

*TYP. BOX ASSY.*

*TYP. BOX ASSY. (U.D.T.)*

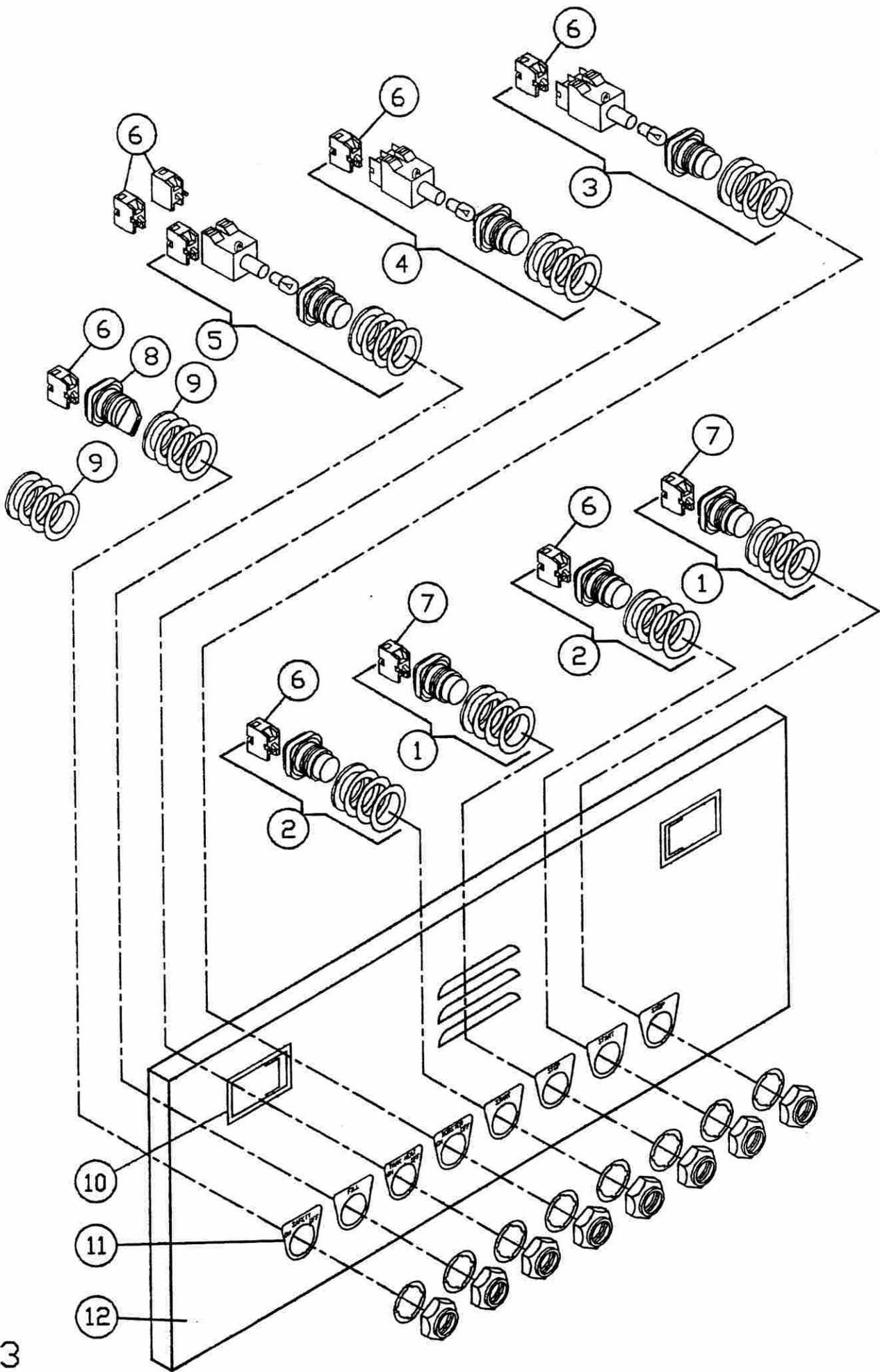
*START/STOP ASSY.*

*VARIABLE SPEED CONTROLLER*

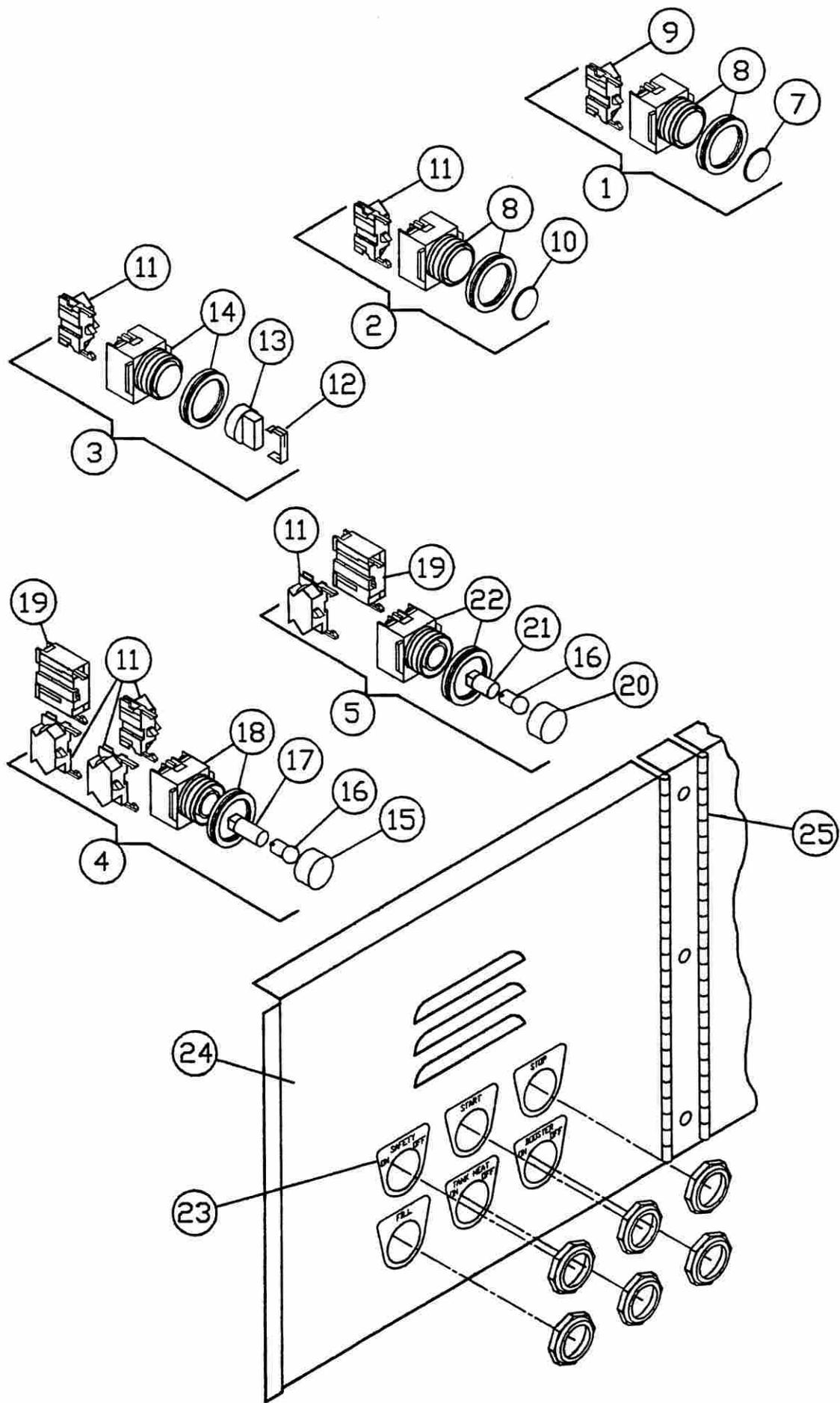
*FLOAT SWITCH ASSY.*

*THERMOSTATS*

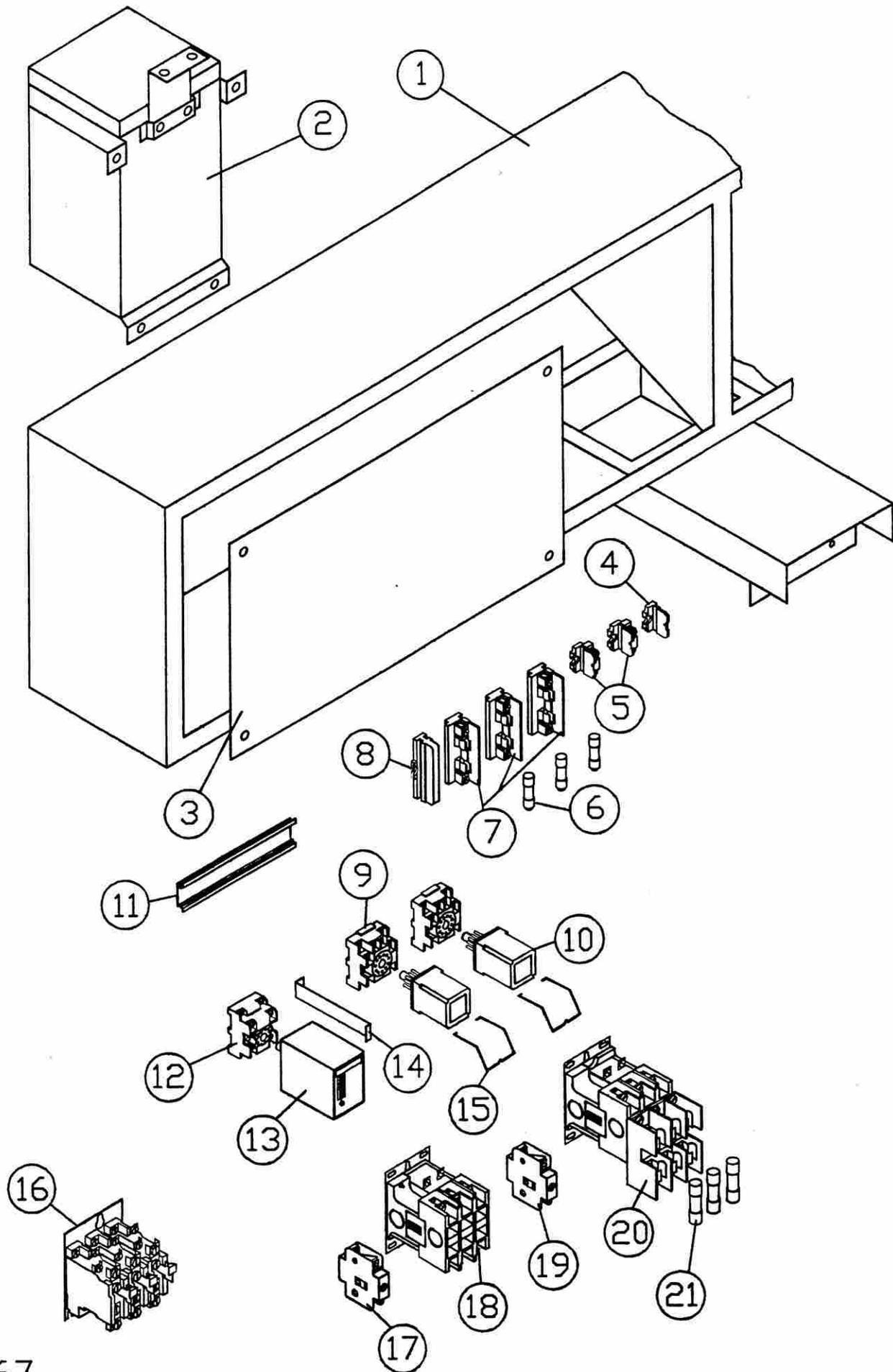
*TYP. ELECTRICAL FITTINGS*



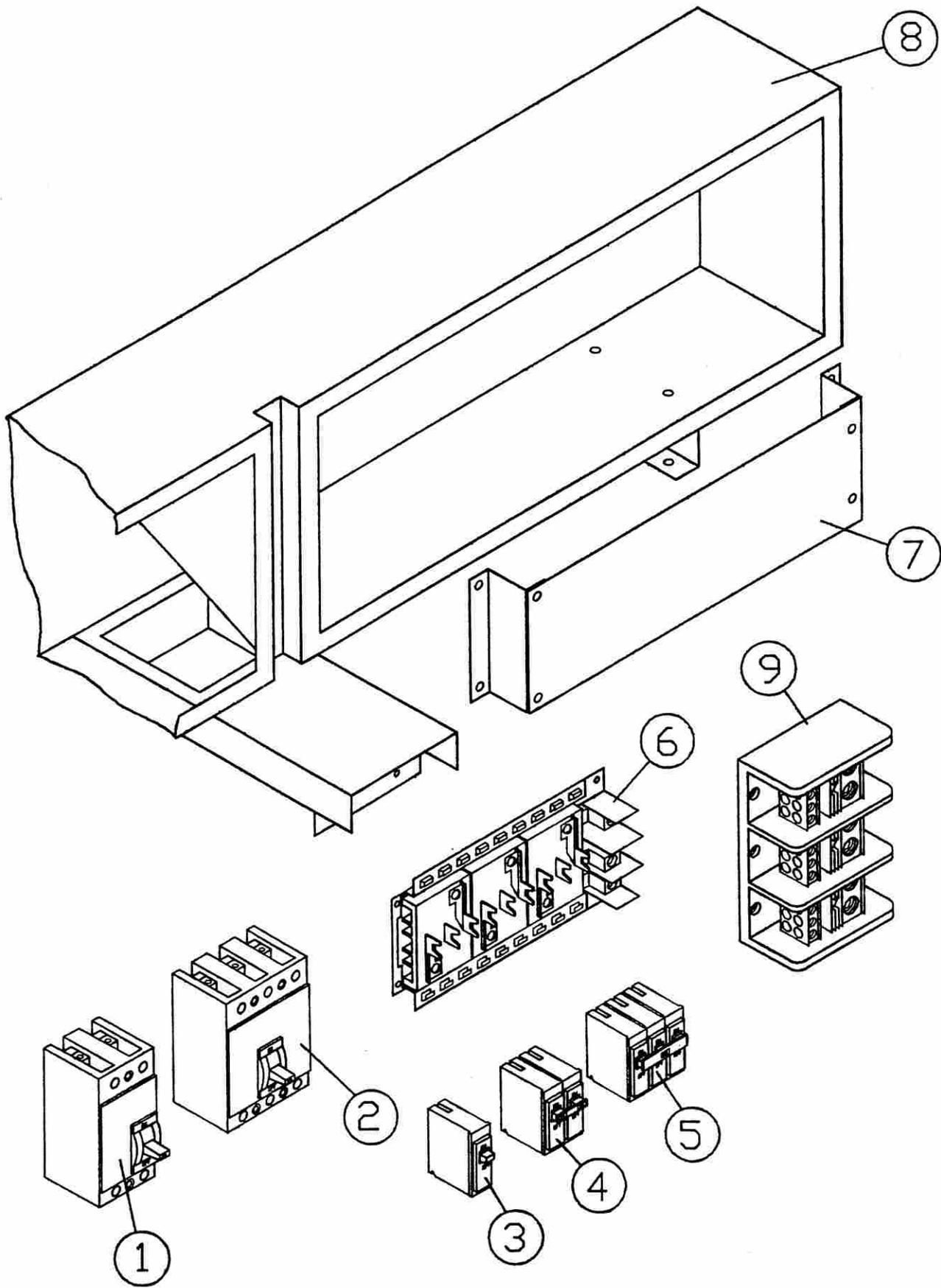




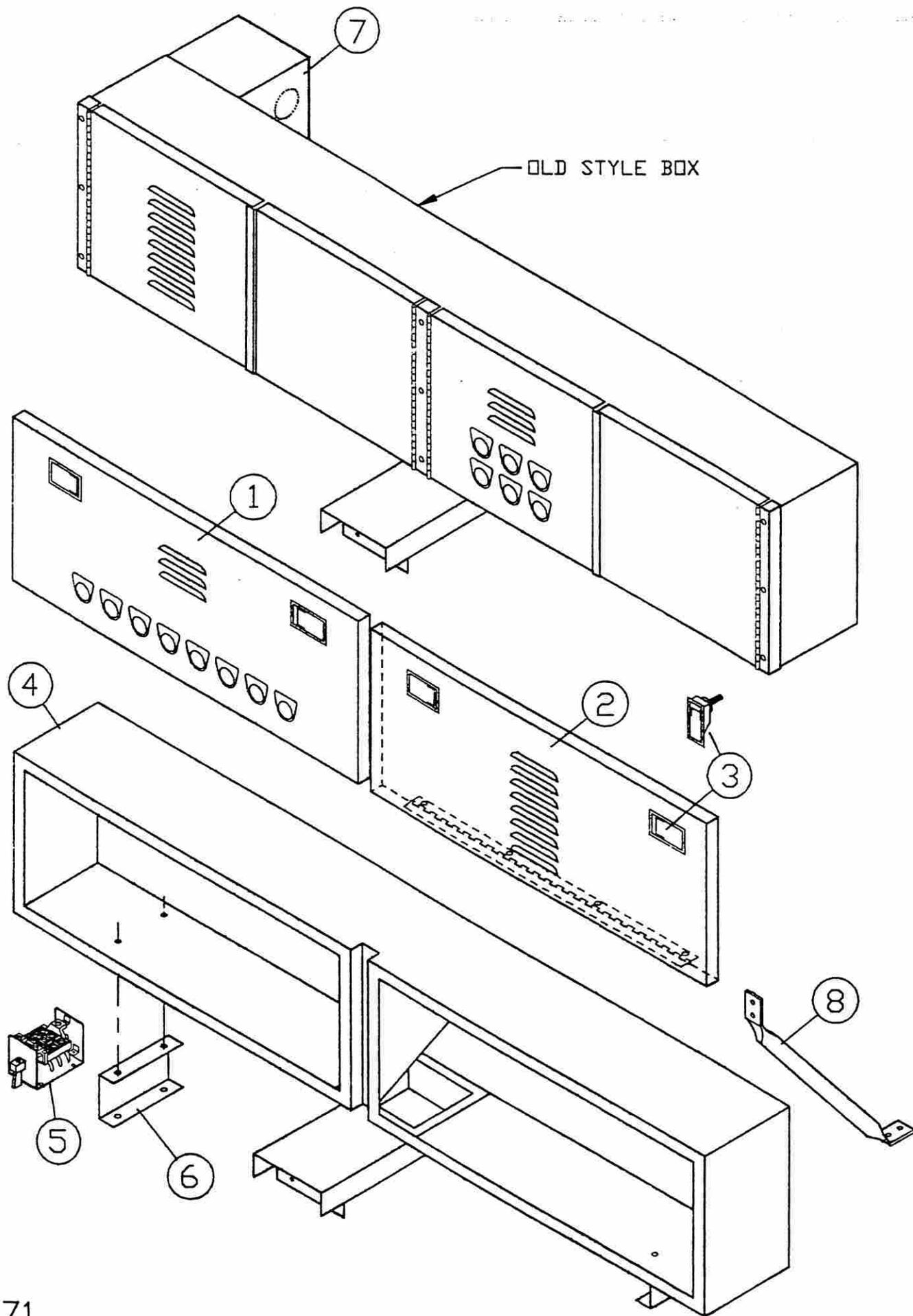




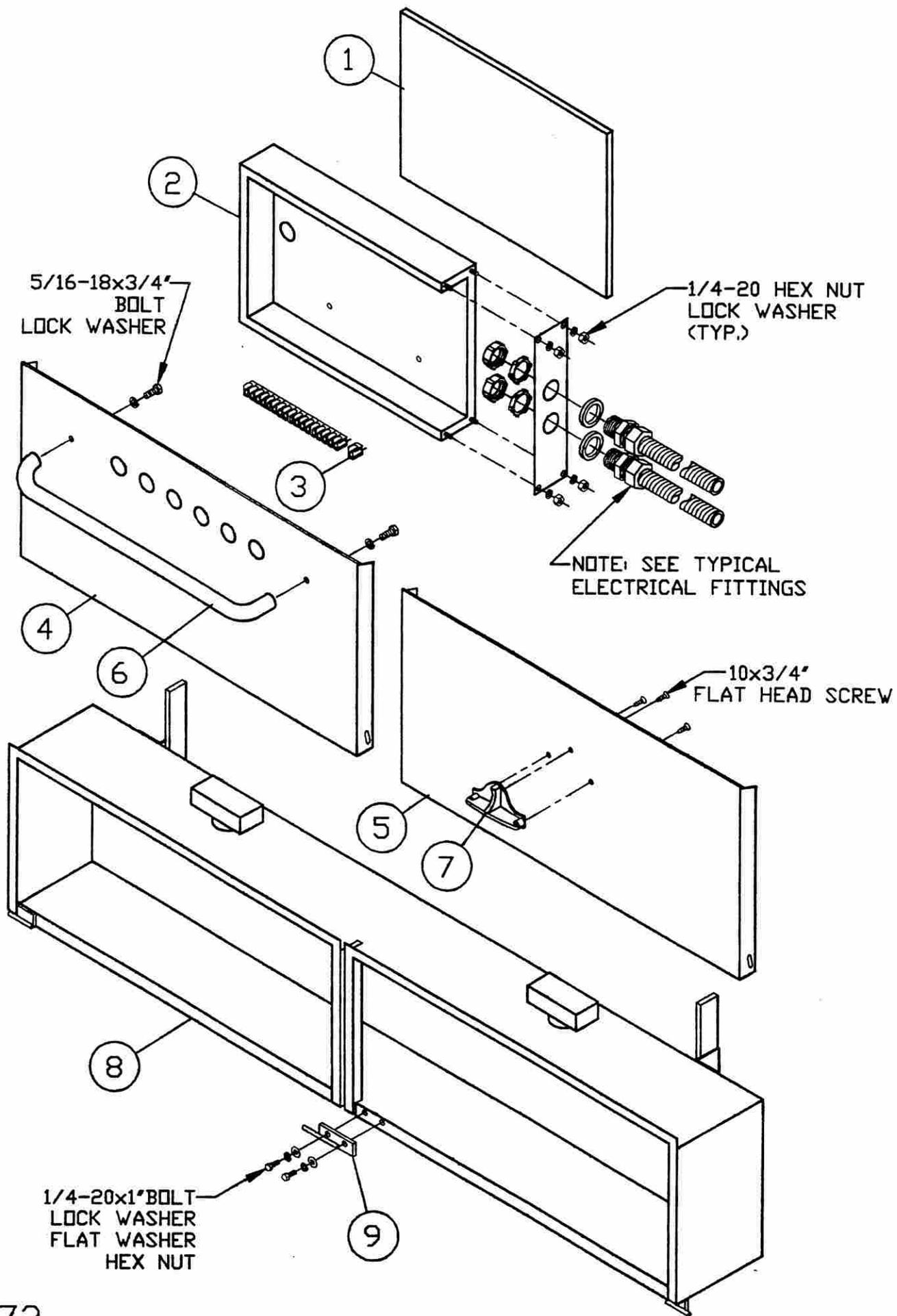




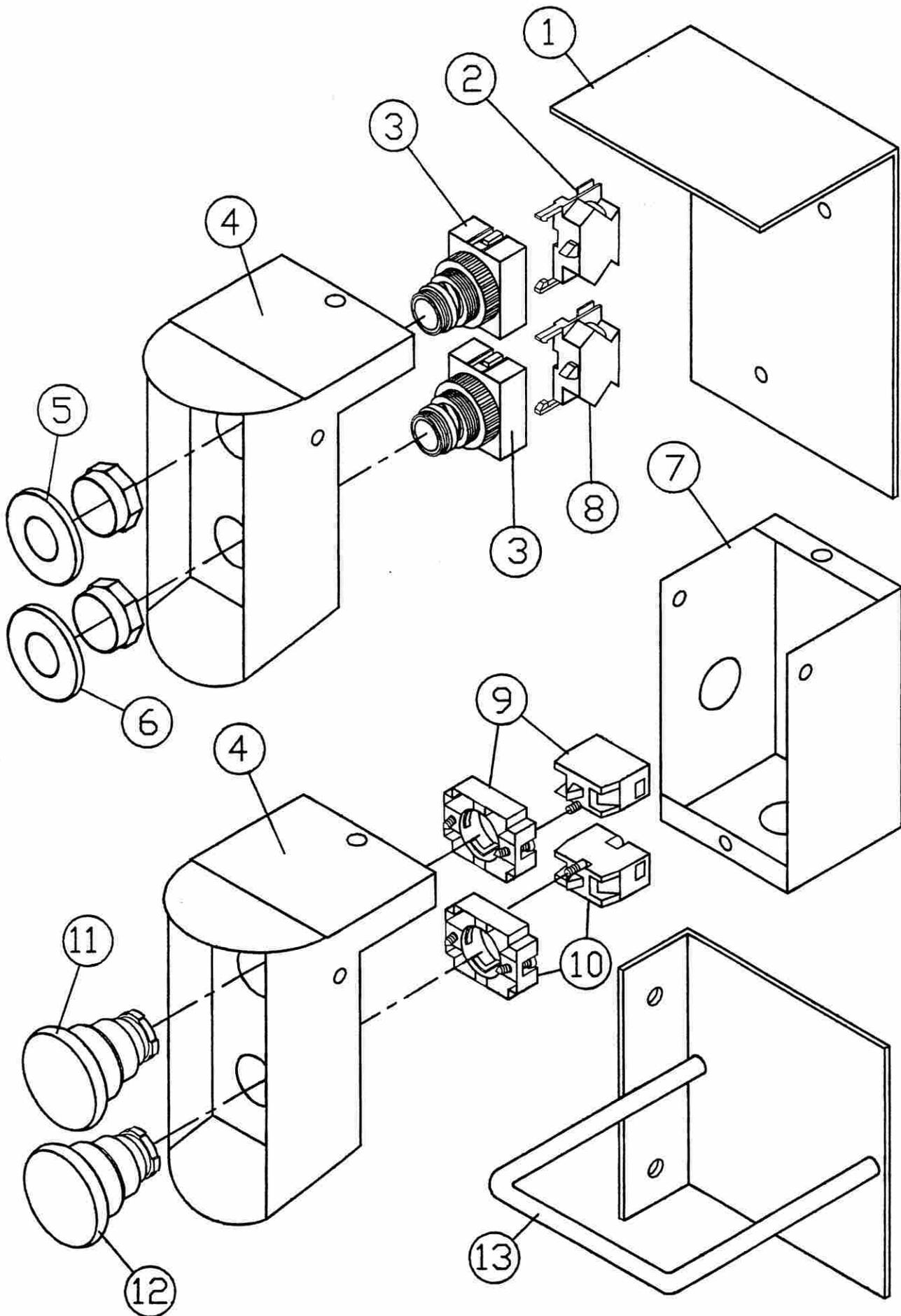




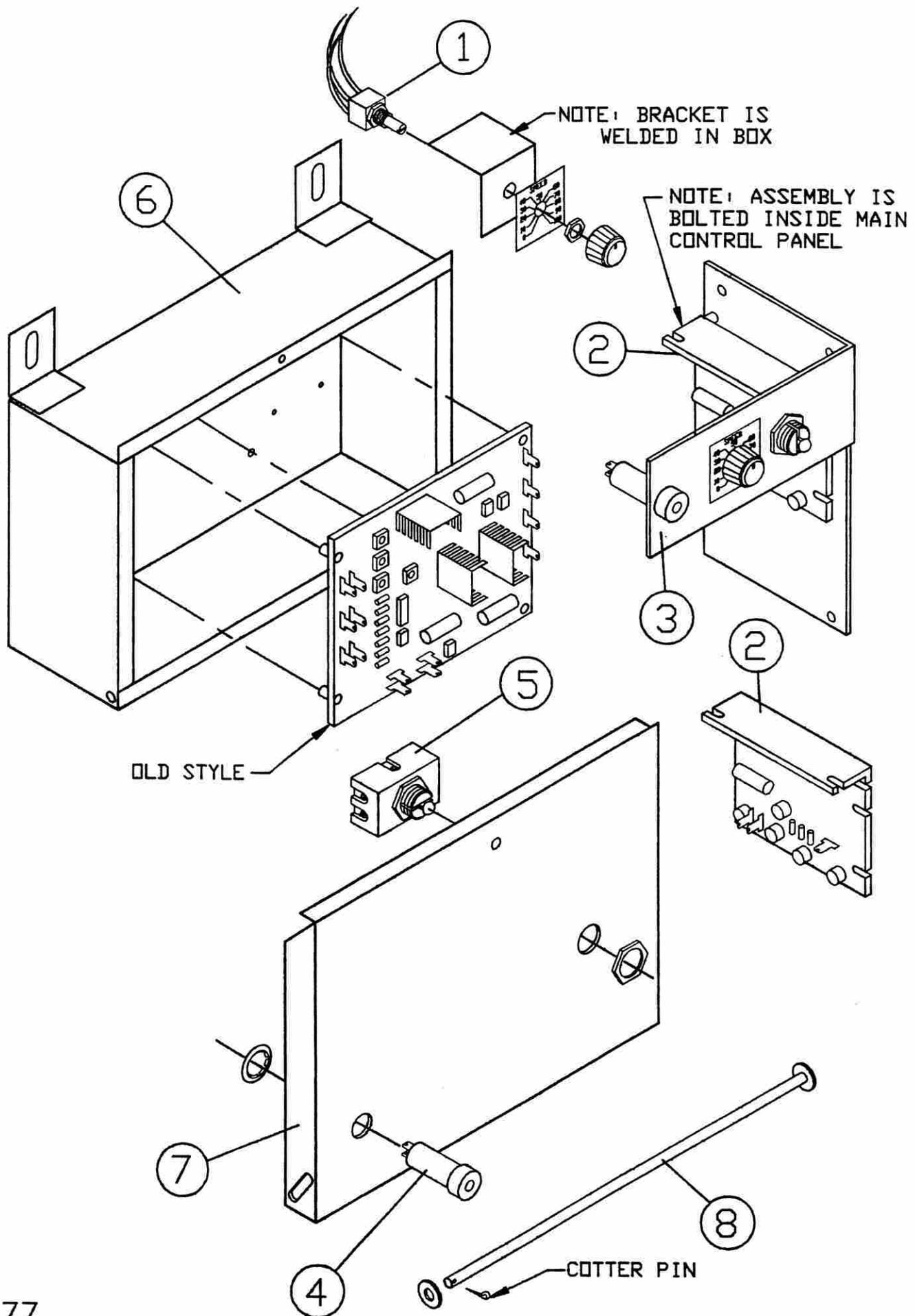




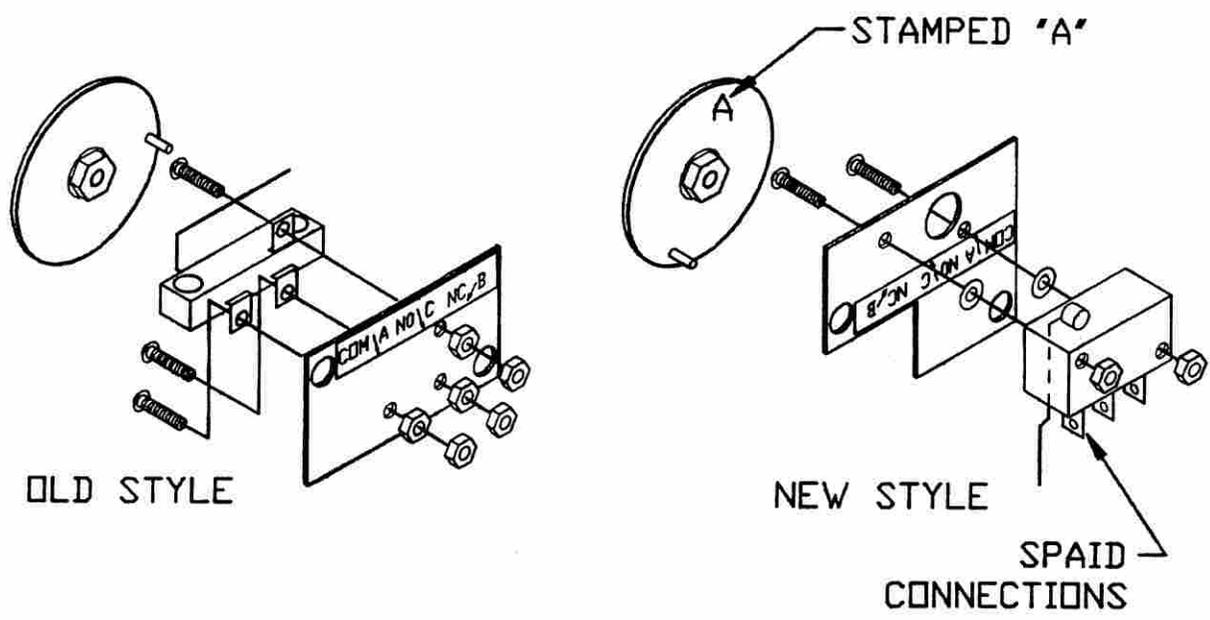
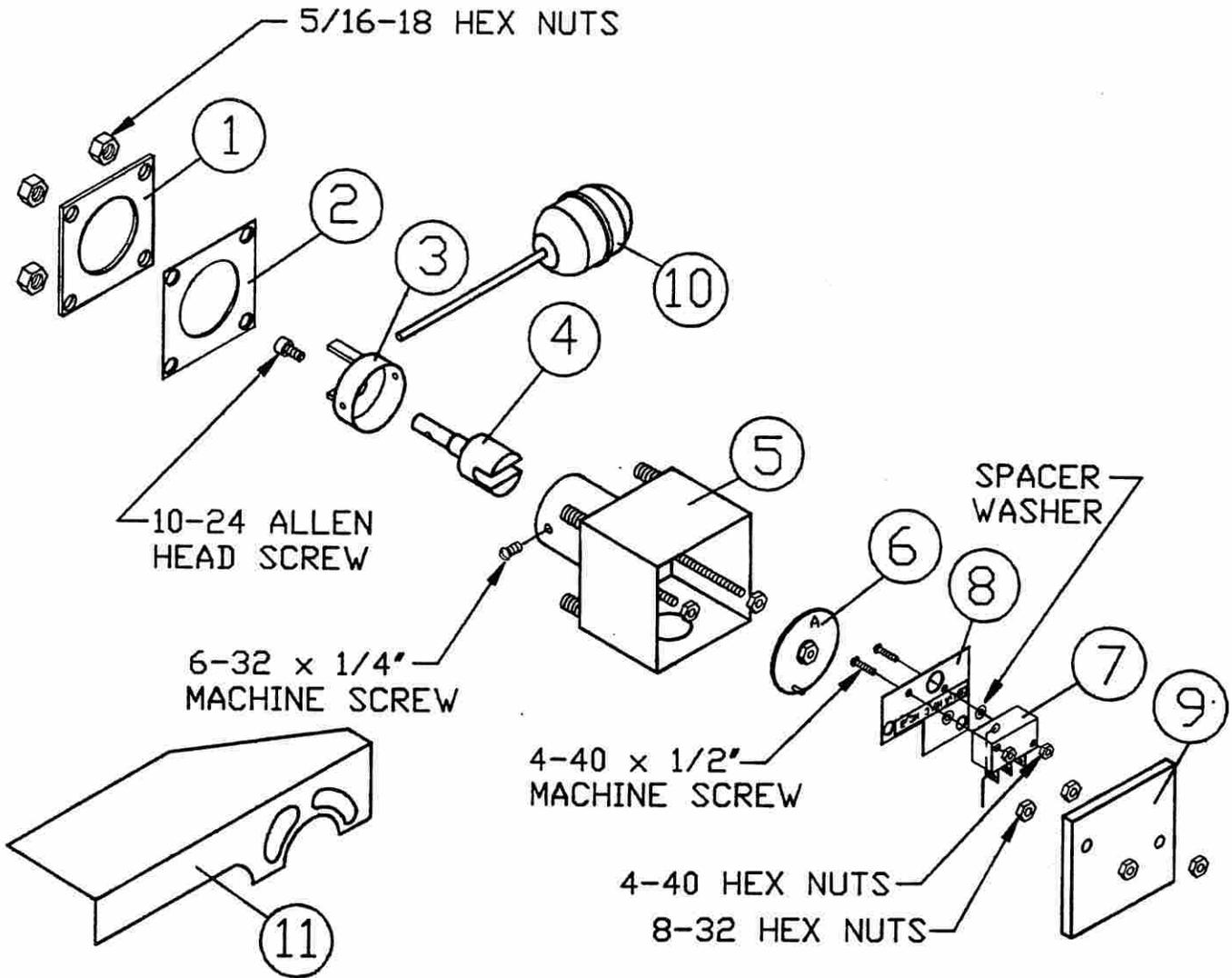




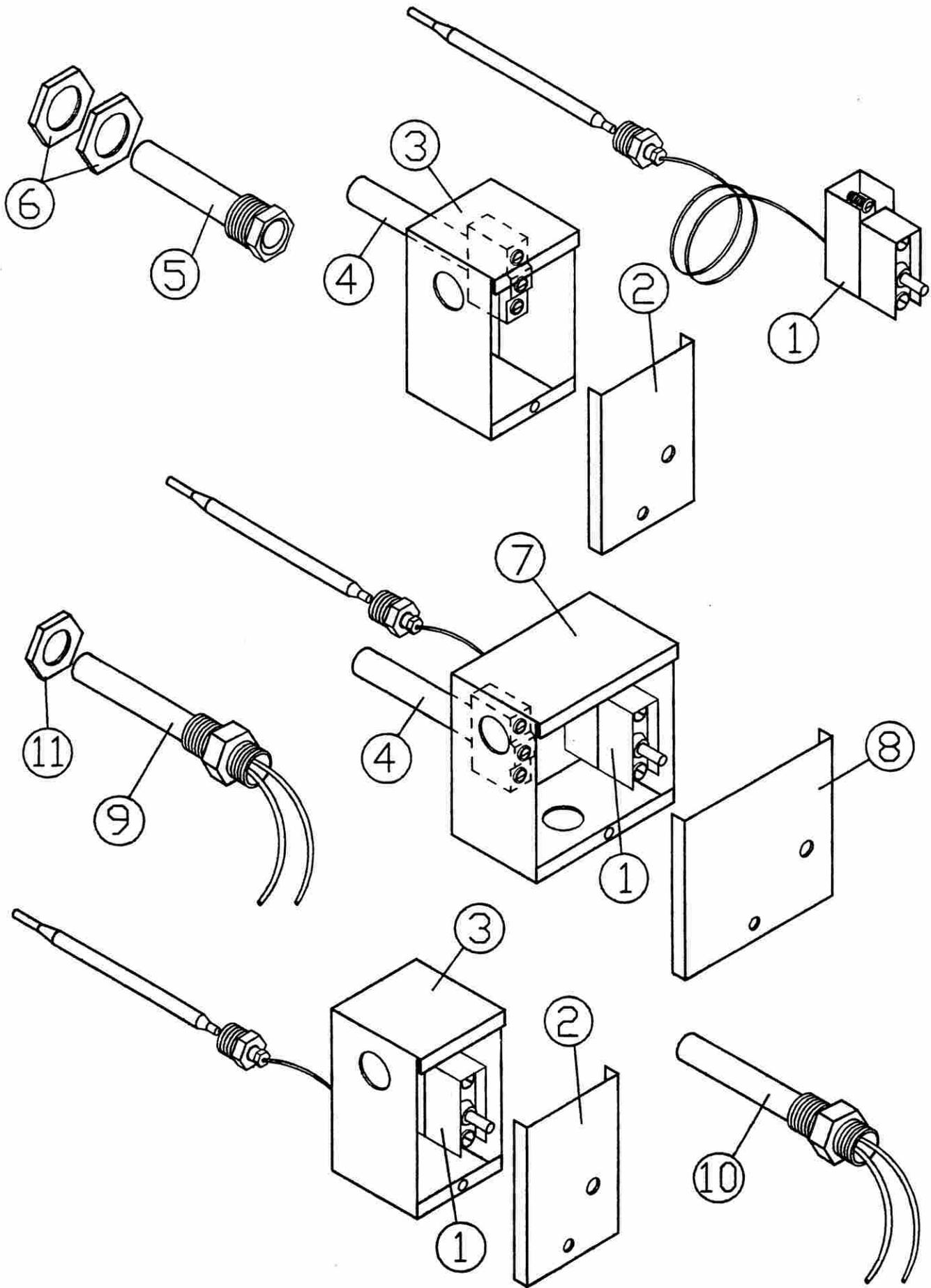




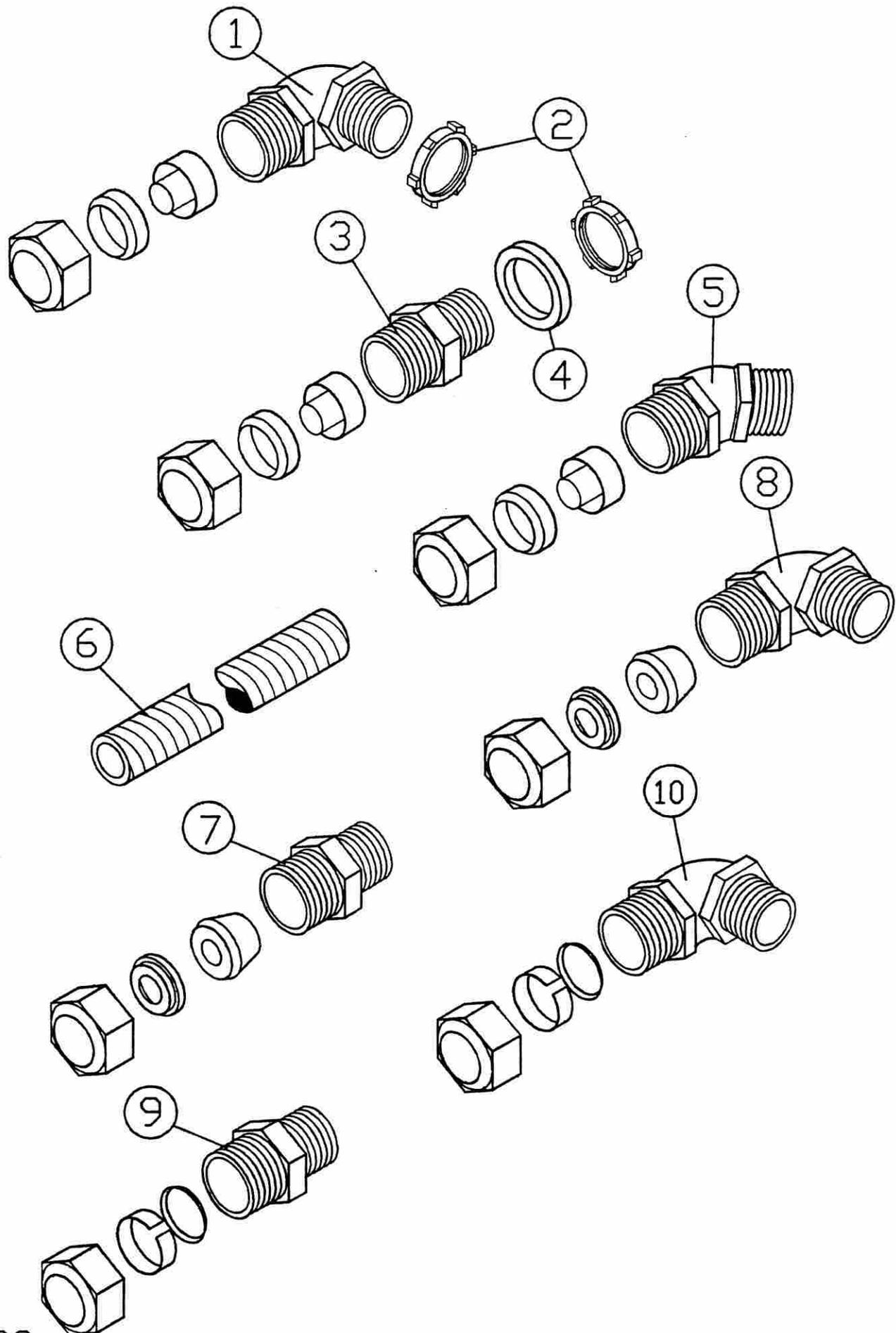














# *ACCESSORIES*

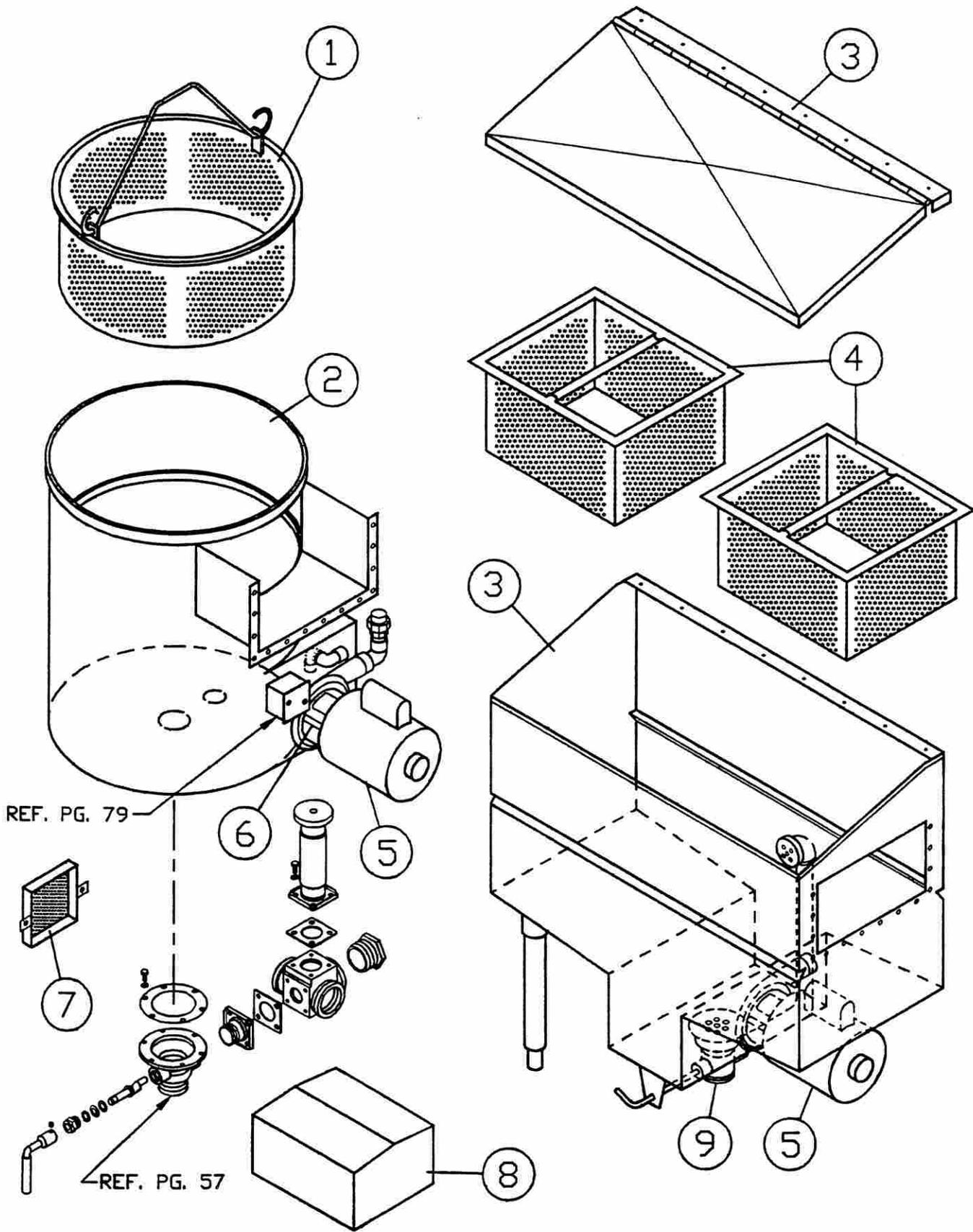
*RECIRCULATING HOMMEL POT*

*SCRAP CATCHMENTS*

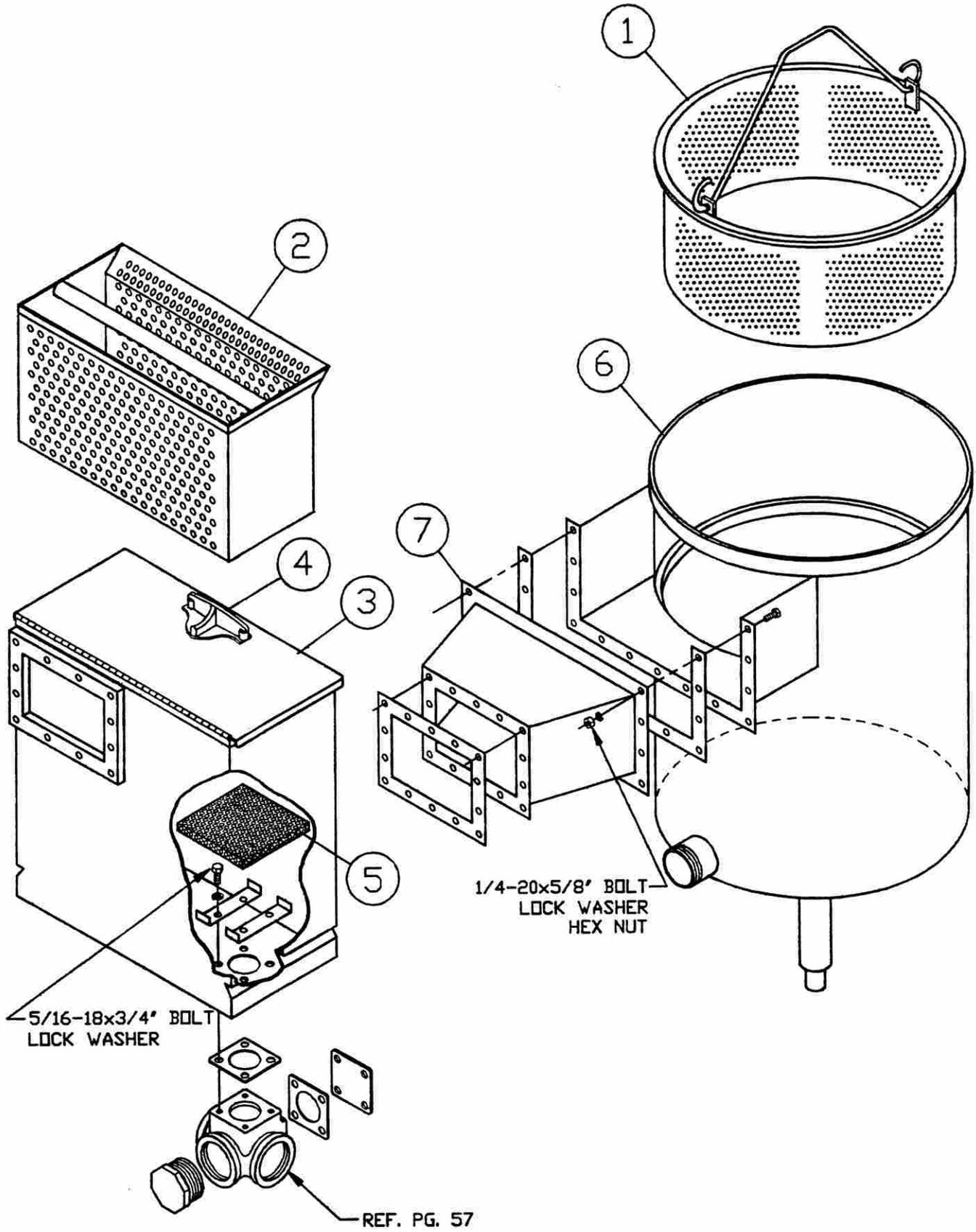
*TROUGH*

*MISC. SHELVING*

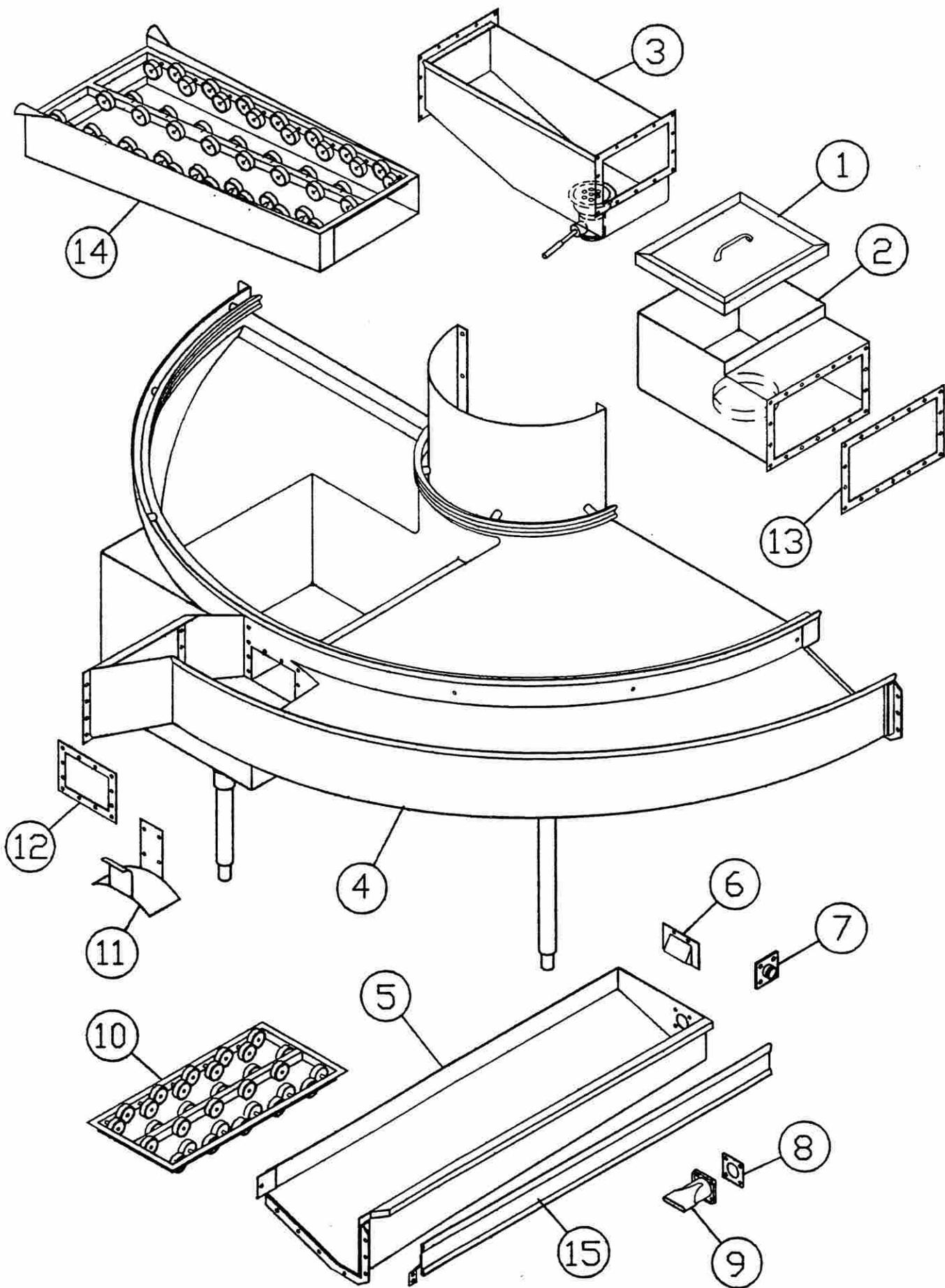
*SINKS*



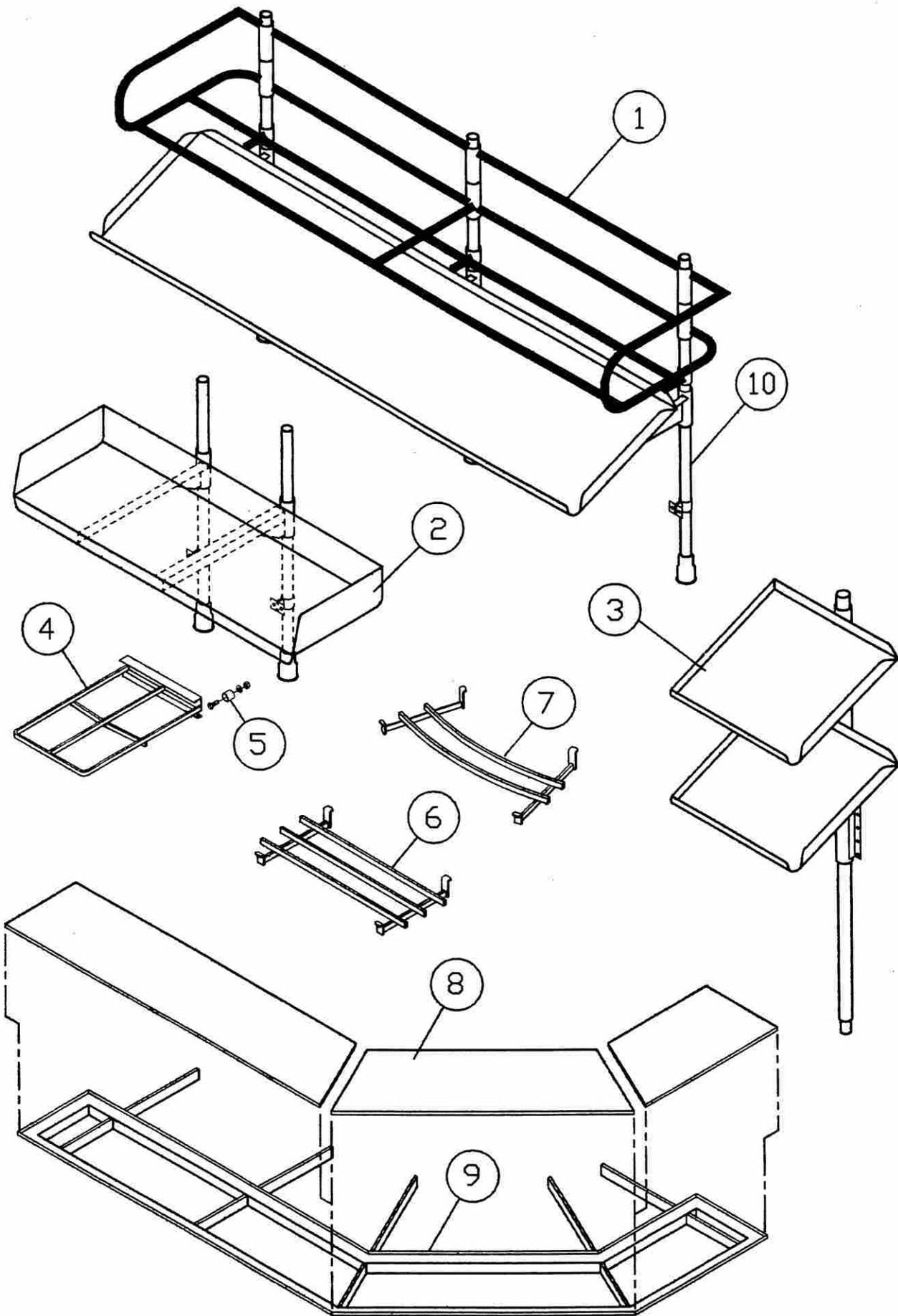




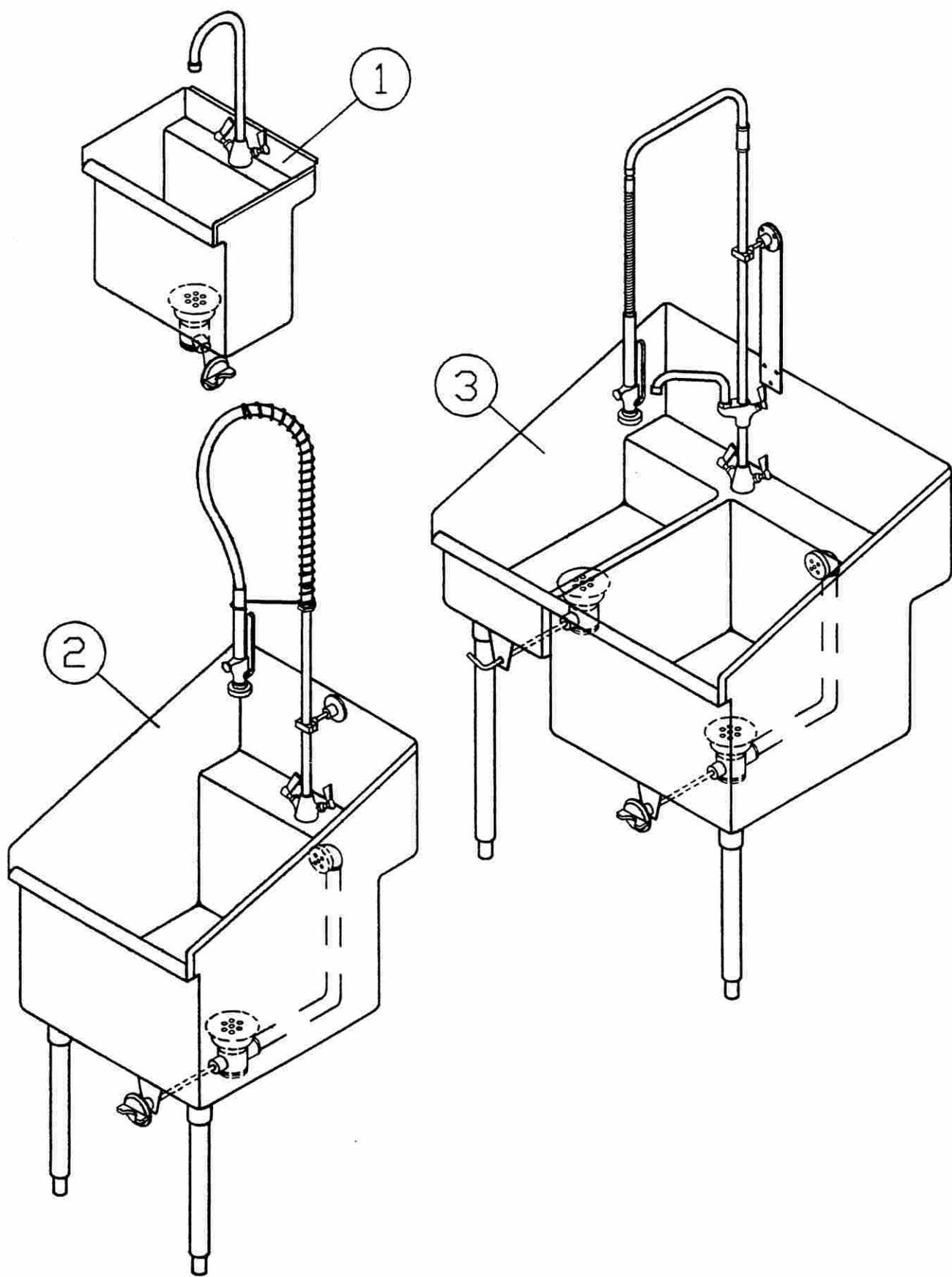


















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