

CHAPTER 27

General Service

In presenting this important subject, first is given a "Trouble Analysis Chart" then following is a Cause and Remedy Key.

How to Use the Trouble Analysis Chart.—Classify any general trouble by using this chart, then refer by number to "Cause and Remedy Key" on following pages for correction of trouble.

For instance under **A, Burner Stopped-Safety Off** there is given five possible causes 1 to 5 — look up these causes in the "Cause and Remedy Key" and find various remedies.

TROUBLE ANALYSIS CHART

- A. Burner Stopped, Safety Off.**—
1. Oil failure.
 2. Motor failure.
 3. Ignition failure.
 4. Faulty control operation.
 5. Irregular stack temperature.
- B. Burner Stopped—Safety On.**—
6. No current to burner circuit.

NOTE.—In the preparation of Chapters 27 and 28 on Service, the author has had the kind assistance of Williams OIL-O-MATIC Heating Corp. The valuable service instructions herein given relate not only to Williams burners, but to domestic high pressure burners and the "automatics" in general.

C. Burner Operating—Operation Unsatisfactory.—

7. Burner fails to shut off.
8. Smoke odor and fumes.
9. Burner puffs when starting.
10. Burner short cycling.
11. Improper flame.
12. Burner noises.
13. Excess fuel consumption.
14. Excess electric consumption.

CAUSE AND REMEDY KEY

For "Trouble Analysis Chart" on preceding page.

1. OIL FAILURE.

- a. *Cause:* Storage tank empty.
Remedy: Replenish oil supply.
- b. *Cause:* Nozzle clogged.
Remedy: Remove burner assembly and clean.
- c. *Cause:* Strainer clogged.
Remedy: Clean line strainer.
Clean fuel unit strainer.
- d. *Cause:* Internal by-pass plug may not be in place when installing burner with return line.
Remedy: Install by-pass plug.

- e. *Cause:* Restriction in inlet line other than clogged strainer.
Remedy: With vacuum on line, check inlet line back to tank.
- f. *Cause:* Foot valve in tank leaking permitting oil to drain back during shutdown.
Remedy: Inspect — repairing or replacing as necessary.
- g. *Cause:* Leak in inlet line.
Remedy: Locate and repair leak.

2. MOTOR FAILURE.

- a. *Cause:* By-pass plug installed in fuel unit when used with single pipe system thereby building up excessive pressure and stalling motor. May blow fuses.
Remedy: Remove by-pass plug.
- b. *Cause:* Centrifugal motor switch sticking.
Remedy: Remove motor and bell and examine switch assembly. If remedy be not obvious, replace switch assembly or send motor to factory for repair.
- c. *Cause:* Motor condenser burned out.
Remedy: Replace condenser.
- d. *Cause:* Motor stator shorted or burned out.
Remedy: Replace stator.

3. IGNITION FAILURE.

- a. *Cause:* Transformer terminals not connected.
Remedy: Connect and properly tighten terminals.
- b. *Cause:* Electrodes in burner assembly not set properly.
Remedy: Adjust.

- c. *Cause:* Carbon on electrodes.
Remedy: Clean and check setting.
- d. *Cause:* Fuel difficult to ignite because of high flash point.
Remedy: Have sample analyzed, change oil if necessary.
- e. *Cause:* Weak transformer.
Remedy: Replace transformer.
- f. *Cause:* Nozzle clogged preventing oil contacting electric arc.
Remedy: Clean nozzle.
- g. *Cause:* Electrode grounded on air cylinder.
Remedy: Adjust for correct setting.

4. FAULTY CONTROL OPERATION.

- a. *Cause:* Stack control helix badly sooted.
Remedy: Remove control from flange and clean helix thoroughly
- b. *Cause:* Stack temperature too low because of fire being too small for boiler
Remedy: Increase fire and adjust to fit boiler
- c. *Cause:* Too frequent cycling of thermostat.
Remedy: Refer to explanation of thermostat and adjust.
Check control wiring diagram in control cover.
Check timing of heat safety.

5. IRREGULAR STACK TEMPERATURE.

- a. *Cause:* Change in draught.
Remedy: Install modern type of draught control.

- b. *Cause:* Down draught caused by outside obstruction such as trees or insufficient stack height.
Remedy: Remove obstruction or increase stack height as necessary.
- c. *Cause:* Bad draught due to other openings in same stack.
Remedy: Other openings should be closed.
- d. *Cause:* Fluctuating flame.
Remedy: Check burner operation. Nozzle may be partially clogged, or there may be water in oil.
Remedy: Pressure regulation valve may be set with pressure too low so that oil delivery is not uniform.

6. NO CURRENT TO BURNER CIRCUIT.

- a. *Cause:* Fuse blown.
Remedy: Replace.
- b. *Cause:* Difficulty with power source.
Remedy: Notify Power Company.
- c. *Cause:* Break in wiring or bad connection.
Remedy: Check with test light and repair.
- d. *Cause:* Defective controls.
Remedy: Repair or replace.

7. BURNER FAILS TO SHUT-OFF.

- a. *Cause:* Controls improperly wired.
Remedy: Check wiring.
Controls must be connected in hot side of electrical circuit to prevent a ground shunting out control.
- b. *Cause:* Thermostat out of calibration.
Remedy: Check with reliable thermometer and adjust thermostat accordingly.

8. SMOKE, ODOR, AND FUMES.

- a. *Cause:* Improper burner adjustment.
Remedy: Check air and oil pressure adjustments.
- b. *Cause:* Bad draught creating pressure in fire box.
Remedy: See Chapter 8.

9. BURNER PUFFS WHEN STARTING.

- a. *Cause:* Electrodes not properly set.
Remedy: Adjust.
- b. *Cause:* Weak spark due to ground in burner assembly.
Remedy: Check and correct.
- c. *Cause:* Weak spark due to defective transformer.
Remedy: Replace transformer.

10. BURNER SHORT-CYCLING.

- a. *Cause:* Limit control cutting off and on.
Remedy: Refer to Chapter 28.
- b. *Cause:* Thermostat differential too close.
Remedy: Adjust differential wider.

11. IMPROPER FLAME.

- a. *Cause:* Oil pressure too low or too high.
Remedy: Adjust to 100 lbs. Set air shutter and draught to give proper CO₂.
- b. *Cause:* Poor draught.
Remedy: Refer to Chapter 8.

- c. *Cause:* Air shutter improperly adjusted.
Remedy: Adjust to produce orange flame with no smoke from chimney and no more excess air than necessary.

12. BURNER NOISES.

- a. *Cause:* Motor drive coupling worn.
Remedy: Replace worn parts. Check alignment.
- b. *Cause:* Rigid electric or oil pipe connections between burner and building.
Remedy: Relieve strain, installing flexible sections next to burner if necessary to break transmission of noises.
- c. *Cause:* Fuel unit taken apart and not properly re-assembled.
Remedy: See assembling instructions.
- d. *Cause:* Tank hum.
Remedy: Install anti-hum valve.

13. EXCESS FUEL CONSUMPTION.

- a. *Cause:* Poor atomization.
Remedy: Adjust flame.
- b. *Cause:* Excessive draught.
Remedy: Re-adjust draught regulator to approximately .02 draught in fire box.
- c. *Cause:* Low CO₂ (high excess air).
Remedy: Eliminate leaks in boiler setting. Adjust draught (See 13-b). Improve flame.
- d. *Cause:* Fire too small for boiler or furnace with resultant low stack temperature.
Remedy: Increase fire to proper size to fit.

e. *Cause:* Fire too large for boiler or furnace causing excessive high stack temperature.

Remedy: Correct the oil input.

f. *Cause:* Improper setting of controls.

Remedy: See Chapter 28.

14. EXCESSIVE ELECTRICAL CONSUMPTION.

a. *Cause:* Fire may be set so low that burner runs all the time to heat boiler.

Remedy: Increase fire to proper size to heat boiler.

b. *Cause:* Bad adjustment with resultant low CO₂.

Remedy: Adjust burner for proper CO₂. See Chapter 9.

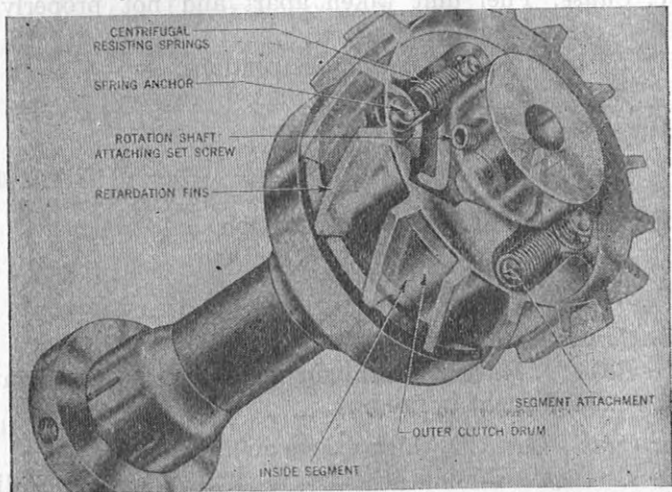


FIG. 1.—Gilbarco "Economy" clutch. *In operation* it starts a flow of air before the flame is ignited, and permits the air flow to continue for several seconds after the flame has ceased. The object of this arrangement is to secure greater cleanliness and reduce the noise of operation. It is claimed to eliminate smoky starts and stops which build up heavy deposits of heat wasting soot. The springs hold the clutch segments from contact with the outer drum except when centrifugal force overcomes the action of the springs. Then of course, the segments engage the clutch drum and the drive is in operation.