ROTO-FLEX OVEN

INSTRUCTOR'S WORKBOOK

WORKBOOK

ROTO-FLEX OVEN

I. FUNCTION

The Roto-Flex oven will bake quality products (pizza and sandwiches) when properly operated and maintained.

II. HOW IT FUNCTIONS

A. THE ROTO-FLEX is a gas-fired oven which provides heat from an open flame, much like a common home oven.

B. THE MAIN COMPONENTS of the oven system are the gas supply, gas valve, blower, burner unit, oven chamber, thermostat, rotating baking shelves and sliding oven door.

C. THE OVEN FUNCTIONS AS FOLLOWS:

1. The gas valve takes natural gas from the gas main supply pipes and regulates the flow of gas to the blower unit.

2. The blower unit is simply a fan which mixes air with the gas from the gas valve prior to burning. This premixing of gas and air will yield a much hotter flame and can be compared to supercharging of automobiles.

3. The premixed gas mixture flows on to burners which are arranged in a "U" shape at the bottom of the oven chamber. A pilot light ignites the gas mixture as it is fed through the burners.

4. Heat from the burner flame is directed upwards into the oven chamber by a cone-shaped heat deflector. In addition, a system of vents and a flue act to keep hot air circulating within the oven chamber.

5. The actual temperature is regulated by a thermostat.

   a. The thermostat is able to sense the temperature within the oven chamber by means of a thermocouple, and control the gas valve.

   b. A thermocouple, in simple terms, is able to turn heat into an electrical impulse.

   c. The thermostat is set at the desired temperature. When this temperature is reached a portion of the thermocouple within the oven chamber sends a message to the thermostat which, in turn, sends a signal to close the gas valve. Gas stops flowing to the burners and the flame stops.

   d. When the oven chamber temperature drops, the thermocouple sends a message to the thermostat to have the gas valve open. With the gas valve open, gas once again flows to the burner and the flame heats the oven chamber again. This process continues as long as the thermostat is on.

6. The product is actually baked on shelves which are located within the oven chamber.

   a. The shelves are round and rotate within the oven chamber to insure even baking and provide easy accessibility.

   b. A sliding glass door in front of the oven allows viewing of the baking product or shelves without heat loss due to an open door. Quartz lamps illuminate the oven chamber.

   c. The door slides downward to allow placing product on the baking shelves or removal of baked product as the shelves rotate the product into reach.

III. OPERATION

A. OPERATION OF THE ROTO-FLEX OVEN can be divided into two areas - turning the oven on and off and the actual use of the oven to bake product.

B. CONTROLS FOR STARTING and shutting down the oven are located on the front of the oven.

1. The control panel to the left of the oven door has three rocker switches. The left switch activates the thermostat, the middle switch activates the oven chamber lamps and the right switch activates the rotating shelf motor.

2. The thermostat is located to the right of the oven door. It has a temperature dial with a selector knob. This is turned to select the desired oven temperature (from 450^{o} to 550^{o} F). A needle on the same dial shows the actual oven temperature.

3. The oven is started by simply pushing the left thermostat switch and turning the thermostat to the desired temperature.

   Note: The thermostat may be set to the desired temperature and left there. Turning on the oven would then involve pushing on the control panel switch only.

4. The oven light and rotating shelf may be turned on when the oven has reached baking temperature and the day's business is to begin. Allow approximately forty-five minutes for oven warmup.

5. Oven shutdown simply requires pushing each of the three rocker switches on the control panel to the "off" position. Once again, the thermostat control need not be moved once set.

C. ONCE THE OVEN HAS REACHED BAKING TEMPERATURE, operation involves placing product into and removing product from the oven shelves.

1. Pizza is constructed on a makeup peel which is used to place the pizza on the shelf of the oven.

2. The oven door is pulled down and the front portion of the makeup peel is placed directly onto the oven shelf.

3. By gently pulling the makeup peel out from under the pizza, the pizza is transferred from the peel to the shelf. The rotation of the shelf helps pull the pizza from the peel.

   NOTE: Cornmeal placed on the peel prior to pie construction enables the pizza to slide easily from the peel to the shelf.

4. The glass door and illuminated oven chamber enable the cook to monitor the cooking of the product.

5. A baked product is removed by pulling down the oven door and as the pizza rotates toward the operator and within reach, an oven peel is slid under the pizza and lifted up and out.

6. The oven door is left in the up, closed position at all times other than putting in or taking out product or tending to baking product such as popping bubbles.

D. THE OVEN SHOULD BE SHUT DOWN NIGHTLY, at the close of the business day and restarted at the beginning of each business day in order to conserve energy.

E. THE ROTO-FLEX OVEN IS EQUIPPED with several safety features and a backup system.

1. This oven is provided with an adjustable high limit switch. It should be set about 10^{o} F above the normal baking temperature. Should the primary thermostat stick in the closed position, the high limit switch will take over and provide temperature control until the thermostat can be repaired. This switch is often located on top of the oven above the primary thermostat dial.

2. A secondary thermostat is provided should the primary fail completely. It is located behind the control panel and can be reached by unscrewing the control panel and swinging it open on its hinge. It is engaged by simply turning the temperature dial from "off" to the desired baking temperature.

3. A sail switch is built into the blower unit. A "sail" shaped lever attached to the switch extends into the air stream of the blower. When the blower is operating properly and providing the correct amount of air flow to the burners, the sail switch closes and allows electrical current (power) to flow to the thermostat, gas valve and other electrical components of the oven. If the air flow from the blower is insufficient, gas may pool beneath the oven creating a potential fire or explosion. The sail switch prevents this by not allowing the thermostat or gas valve to operate. Insufficient air flow does allow the sail switch to close and no power reaches the thermostat or gas valve.

4. The shelf rotation motor is protected by a gear release and a circuit breaker.

   a. The rotation gear release is located at the bottom-front of the oven and is reached by removing the kickplate. Pushing it in engages the rotation gears; pulling it out disengages the gears.

   b. The circuit breaker is a white button located on the control panel. This button will pop out if the circuit overheats and may be reset after allowing the circuit to cool. The circuit may overheat if foreign matter should jam the rotation gears or if the shelf should be jammed by an oven peel or bubble popper.

5. NOTE: Older model ovens may not be equipped with all these features. Also, if older models have been updated with features such as a high-limit switch or secondary thermostat, they may be located in different areas of the oven.

IV. CLEANING

Maintaining a regular cleaning schedule is essential to safe and efficient operation of the Roto-Flex oven.

A. DAILY CLEANING SHOULD BE DONE AS FOLLOWS:

1. The oven door glass should be cleaned with oven cleaner and a single-edge razor blade when the door is cool.

2. The oven shelves should be swept out continually throughout the business day to prevent contamination or compromise of product quality.

3. At the end of each business day the shelves can be cleaned by placing a damp towel over the oven brush and brushing the shelves. The steam created by the hot shelves will help prevent greasy buildup.

Note to Instructor: Do not use excessive moisture or ice to steam clean shelves as cracked or warped shelves may result.

4. Clean the blower daily by brushing and/or vacuuming. The blower is accessible by removing the front oven kickplate.

B. AT LEAST WEEKLY (more often if necessary) the cone should be swept or vacuumed to prevent buildup and possible fire hazard.

NOTE: This cleaning is best done while the oven is cool.

1. Remove the front oven panel (stainless steel) and kickplate.

2. Remove the bottom oven plug to gain access to the cone and burner unit.

3. Turn on the rotating shelf until the access door or panel of the oven cone comes into reach.

4. Clean out the buildup of waste materials thoroughly. This build-up of soot, oven sweepings and other such debris is a primary cause of oven fires (along with greasy buildup in the plenum).

5. Clean the burner area (sweep or vaccuum) as well as the floor beneath the oven.

C. A MINIMUM OF EVERY SIX MONTHS THE AIR VENT PLENUM area and air vent pipes leading to the roof exhaust fans must be cleaned.

1. The plenum area is located immediately above and behind the oven door and is reached by removing the panel above the oven door.

2. The plenum vent helps keep air circulating over the door to keep it cool and to provide an air shield to help prevent heat loss when the door is opened.

3. Heat transfer from the oven chamber to the plenum area is great. If the air circulation should be insufficient through the plenum vents and a greasy buildup is present, the result may be a serious fire.

4. Note that many areas require documentation of oven and vent cleaning and fireproofing by a qualified service company on a regular basis (every six months minimum).

V. MAINTENANCE

A. OVEN MAINTENANCE may require relighting the pilot light. The pilot lighting procedure is as follows:

1. Remove the front oven panel (stainless steel) and kickplate.

2. The gas cock dial acts as a control of gas to the main burner and a reset mechanism for the pilot light. It is located on the main gas valve on the lower middle of the oven.

3. Turn the control switches to the "OFF" position.

4. Partially depress and turn the gas cock dial to the "OFF" position.

5. Wait sufficient time to allow gas which may have accumulated to escape (at least three minutes).

6. Turn the gas cock dial to the "PILOT" position.

7. Depress and hold the gas cock dial while lighting the pilot. The pilot is located at one end of the "U"-shaped main burner. Most ovens are equipped with an electric starter which provides a spark to light the pilot. This spark may be operated by a separate button or switch located near the main gas valve or by simply turning the burner switch located near the main gas valve on the front control panel to "ON". With the gas valve in the "PILOT" position, this switch acts as the pilot spark.

8. Allow the pilot to burn approximately thirty seconds before releasing the gas cock dial.

   NOTE: If the pilot does not remain lighted, repeat the lighting procedure and allow a longer period of time before releasing the gas cock dial.

9. With the pilot lit, turn the gas cock dial to the "ON" position.

10. The oven is now ready for operation.

B. AN EFFECTIVE PREVENTIVE MAINTENANCE PROGRAM for the Roto-Flex oven consists of a regular cleaning schedule as outlined above and a regular lubricating schedule.

C. A REGULAR LUBRICATION SCHEDULE for weekly, monthly and semi-annual service of the oven parts is as follows:

1. The two door bearings should be lubricated each week with a high-temperature grease. (High-temperature grease may be ordered from Roto-Flex. Using grease other than that from Roto Flex may void warranty.)

   a. The bearing lubrication nipples are located on the upper front of the oven - one on each side of the oven door.

      NOTE: The lubrication nipples may be color coded red on some ovens.

   b. Use a grease gun to give each point two pumps of grease.

      NOTE: Each Roto-Flex was provided with a grease gun, lubricants and cleaners upon installation.

2. The two door chains should be lubricated weekly with chain oil. Bel Ray is the brand name recommended by Roto-Flex.

   a. The door chains run over sprockets located on each side of the oven door at the top of the oven.

   b. Saturate the chains by using an oil can above each sprocket as the oven door is lowered and raised.

3. The main bearing for the rotating shelf shaft should be lubricated each month with high-temperature grease.

   a. The lubrication nipple for the main bearing is reached at the front center of the oven by removing the kickplate.

   b. Give the main bearing three pumps from the grease gun.

4. The shelf rotation gears should be lubricated every six months with a gear shield aerosol type lubricant.

   a. The rotation gears are reached by removing the front kickplate and are at the bottom center of the oven.

   b. Spray the gears with aerosol lubricant while the shelf rotates one complete revolution.

5. The top main rotating shelf bearing is a teflon type and requires no lubricant. It is located directly above the flue in the center of the oven.

   a. As this bearing wears, a rumbling noise may develop. The operator will be able to push back and forth on the top shelf to determine if there is play between the center shaft and the top main bearing.

   b. To prevent this from happening, every six months the four hex nuts should be tightened to "snug" by using a 9/16" wrench.

6. The blower motor should be lubricated every six months with a light machine oil.

   a. The motor is reached by removing the front oven kickplate.

   b. Give the motor shaft three drops of machine oil.

D. IT IS IMPORTANT TO REEMPHASIZE that carefully following the previously described cleaning and lubricating schedules will provide the best preventive maintenance possible.

Note to Instructor: Other maintenance procedures are given below in the troubleshooting section. These are special cases, however, and are not needed regularly or often - especially if the equipment is well kept.

V I. TROUBLESHOOTING

A. SOME COMMON PROBLEMS with the Roto-Flex and some solutions are given below.

1. If the oven will not light initially, check to see if a circuit breaker has tripped or a fuse blown. The oven will not light without power.

   a. Check to see if the pilot light is lit. If not, relight and start oven.

   b. Check the blower to see if it is working and the sail switch is functioning. If the motor runs but the sail switch does not operate, an air regulator panel on the side of the blower can be opened slightly until the air flow is sufficient to operate the sail switch and allow the oven to come on.

   NOTE: This regulator panel also adjusts the burner flame. The inner blue flame should be 1/2 to 3/4 inch high for the most efficient flame.

   c. Should these steps fail, try the secondary thermostat system. This would point to a faulty primary thermocouple or thermostat.

   d. Check gas supply. Do not check for gas by lighting a match! The local gas company will usually provide this service at nominal or no charge.

2. Should the oven shut down during operation, check first for power failure.

   a. Check pilot light and restart oven.

   b. The thermostat thermocouple or heat sensor may be malfunctioning. Try secondary thermostat system.

3. If the shelf fails to rotate either initially or during operation, check the motor overload breaker first. This is the white button on the control panel. Trip is in the out position. Allow a few minutes for the motor to cool, then push the button in and re-start shelf.

   a. Check for power loss at the circuit breaker box.

   b. Remove front kickplate and check for disengaged gears between motor and shelf. A red bar type handle extends from the motor gears to the front of the oven. With the motor off, push the handle to the rear to reengage gears, then start shelf.

4. The quartz lamps which provide illumination for the oven compartment should last up to 2000 hours but will require replacement occasionally.

   a. These lamps have screw-in bases and may be replaced from the outside of the oven by first opening the control panel, then twisting the lamp mounting base counter-clockwise and withdrawing to the front of the oven.

Note to Instructor: On some older-model ovens it is necessary to remove the glass panels inside the oven (when it is cool) in order to replace the lamps.

   b. Never allow your fingers or any other oily substance to contact the lamp as contamination will shorten the life of this type of lamp a great deal. The lamps are provided with a paper cover which should be left in place until the lamp is screwed in place.

   c. Note that the 7/32" x 3 1/8" x 3 7/8" tempered glass panels on the inside of the oven are to both protect the quartz lamp and prevent heat loss. They may be removed or replaced when the oven is cool by simply sliding them towards the top and out. On older model ovens, these panels must be removed in order to replace burned out quartz lamps.

5. Roto Flex glass doors fall out like a transom for cleaning or repair.

   a. Three layers of 7/32" x 23" x 23" tempered glass are held into the frame by asbestos strips and angle iron with nine screws.

   b. The top strip of asbestos is supported by the side strips and held in place by silicone sealant. When replacing, however, do not allow the sealant to bond to the glass itself as the glass must be able to expand and contract with the heat changes.

B. PROBLEMS OTHER THAN THE SIMPLE ONES described should be left to a competent serviceman. In most cases simply following the prescribed cleaning and maintenance schedules will prevent the need for troubleshooting.

VII. CONCLUSION

The Roto-Flex oven can be a highly efficient, trouble-free piece of equipment when understood and maintained regularly. As with most of our equipment, abuse or misuse due to ignorance is the foremost problem.

VULCAN HART DECK OVEN

PARTICIPANT'S WORKBOOK

WORKBOOK

VULCAN HART OVEN

I. FUNCTION

The function of the Vulcan Hart oven is to bake quality Shakey's products.

II. HOW IT FUNCTIONS

A. THE VULCAN HART and similar gas-fired deck ovens work much like a normal home gas oven.

1. One or more rows of gas burners are used to heat the oven shelf (or deck) and compartment.

2. A door gives access to the oven compartment and the food to be cooked is placed directly on the oven shelf.

B. THE OVEN TEMPERATURE is controlled by a thermostat.

1. As with a home oven, a pilot light remains burning constantly to provide ignition for the burners.

2. A thermostat is used to sense heat within the oven and to control the flow of gas to the burners in order to maintain a constant oven temperature.

III. OPERATION

A. THE OPERATING CONTROLS are located on the front, right side of the oven.

1. The gas cock service valve is at the topmost portion of the control panel.

2. The red *RESET* *BUTTON* for relighting the pilot light is in the middle of the panel.

3. The *THERMOSTAT* *TEMPERATURE* selector dial is at the lower portion of the panel.

B. THE STEPS FOR STARTING THE OVEN and cooking product are as follows:

1. Turn the thermostat dial to the desired temperature. The recommended range for cooking is *450° F - 550° F*.

2. Turn the gas cock service valve to light the burners and allow *TWENTY* to *TWENTY-FIVE* minutes for the oven to preheat.

3. If the oven's shelf is the brick, an additional ten to fifteen minutes may be necessary to allow the temperature to stabilize throughout the oven before baking. This is due to brick being thicker than coreplate-type composition shelves.

4. When the oven is up to temperature, pizza may be placed directly on the oven shelf by first opening the oven door. The door is balanced by means of counterweights and will remain in either the open or closed positions until moved by the operator.

5. With the door open, a makeup peel with pizza may be set onto the shelf and the pizza transferred from the peel by gently sliding the peel out from under the pizza leaving it on the oven shelf. Close the oven door.

6. Cooking time is from eight to ten minutes, depending upon the cooking temperature and type of pizza being cooked.

7. Note that "hot spots" may occur in some ovens which will require that pizzas be moved front to back or side to side in the oven to give an even bake. This is caused by the number of burners. Older models have a single burner and are particularly susceptible to this problem.

C. AT THE END OF THE BUSINESS DAY, shut down by turning off the gas valve and clean the oven in preparation for the next day's use.

IV. CLEANING

A. THE INTERIOR OF THE OVEN should be kept clean at all times.

1. An *OVEN* *BRUSH* should be kept on hand to sweep out cornmeal buildup and other debris after each pizza is removed from the oven. This will prevent pizzas from being contaminated with burned cornmeal and make nightly cleaning easier.

2. Each night a damp towl placed over the oven brush should be used to clean the hot shelf. The steam action created will help keep the oven clean. Ice or excessively wet towels should not be used as the shelf may crack due to the extreme temperature change.

3. Coreplate shelves should be turned over each week. The direct flame against the coreplate bottom will burn it clean.

   a. To turn the coreplate, remove the two side liners on the right and left interior sides of the oven (when it is cool).

b. Slide the coreplate out, turn it over and slide it back in. Replace the side liners.

c. Firebrick shelves are caulked in and are not easily turned.

4. The *CRUMB* *COLLECTOR* should be cleaned nightly as follows:

a. Open the crumb shield door directly below the oven door.

b. Remove the crumb collector by grasping the collector handles and pulling out.

c. The collector may then be brushed out or washed, dried and returned to its place.

C. THE EXTERIOR OF THE OVEN should also be kept clean at all times.

1. If spills or other soils are cleaned as they occur throughout the day, the oven maintains a good appearance to the customer and nightly cleaning is made simple.

2. The exterior should be cleaned thoroughly each night. Hot, soapy water works well in most cases.

3. Nightly cleaning will prevent grease deposits which will later require lengthy scouring.

V. MAINTENANCE

A. SINCE THERE ARE FEW MECHANICAL PARTS to the Vulcan Oven, maintenance deals mainly with the gas and burner sections of the oven.

B. PILOT LIGHT

1. To light pilot burner, first open lower door and remove crumb collector. The pilot burner is located at the center front of the oven.

2. Push the red reset button on the control panel and light the pilot.

3. Hold the reset button for approximately *THIRTY* *SECONDS*, then release. If the pilot goes out, repeat the above procedure until the pilot stays lit. This procedure is very similar to lighting a common home water heater pilot light.

NOTE: The supply of gas to a pilot light is controlled by a thermocouple. A thermocouple has a heat-sensitive bulb which is set near the pilot flame. A tube runs from the bulb to the gas valve. Heat from the pilot flame is sensed by the bulb which signals the gas valve to keep a supply of gas flowing to the pilot burner. If the pilot goes out, the thermocouple cools and signals the gas valve to shut off the gas supply, thus, both saving gas and preventing a potential fire or explosion hazard. Depressing the red reset button simply supplies gas to the pilot burner until the thermocouple bulb can heat up and take over control. If there is difficulty getting the pilot to stay lit, the thermocouple may be worn and need replacement.

4. The pilot burner flame may be adjusted.

   a. Remove the thermostat dial knob, gas cock handle and control panel cover to expose the main gas valve.

   b. The pilot adjustment screw is located directly under the red reset button.

   c. Turn the screw clockwise to decrease the flame and counterclockwise to increase the flame.

   d. The pilot flame will not usually need adjustment.

C. MAIN BURNER AIR SUPPLY ADJUSTMENT

1. Open the lower door and remove the crumb collector to expose the burners.

2. Turn on the burners and turn thermostat dial to get *FULL FLAME*.

3. Adjust the semi-circular shaped air shutters at the front of each main burner until the flame is sharp. The flame color should be *BLUE* with no *STREAKS* of *YELLOW*.

4. For the center burner, turn the thermostat to low or bypass flame.

5. Slide the air shutter adjustment collars to a position which gives a sharp flame like that of the main burners.

D. BY-PASS FLAME (Minimum Burner Flame)

1. The by-pass flame should be adjusted at the time of installation but may be adjusted later as needed.

2. Turn the thermostat to *400° F*, light the burners and allow the oven to come up to temperature.

3. Turn the thermostat dial back to low. This closes the gas valve and only allows by-pass gas to the burners.

4. Remove the thermostat dial. The by-pass adjustment screw is on the valve (sometimes stamped with the letter "B").

5. With a screwdriver, turn the screw counterclockwise to increase the by-pass flame or clockwise to decrease the by-pass flame until the flame over the entire burner is about *1/8"* high. Replace the thermostat dial.

E. THERMOSTAT RECALIBRATION - Recalibration should seldom be necessary and should not be resorted to unless cooking results definitely prove that the control is not maintaining the temperature to which the dial is set..

1. Check the calibration of the thermostat by setting it at *500° F* and lighting the burners.

2. Place an accurate mercury-type thermometer in the center of the oven and allow enough time for the oven temperature to stabilize.

3. If the reading on the thermometer is not within *15° F* of of the dial setting, the thermostat may be adjusted as follows:

   a. Pull the selector dial of the thermostat straight off without turning it.

   b. Hold the calibration plate and loosen the two calibration cock screws until the calibration plate turns independently of the control.

   c. Replace the dial. Turn the dial until the temperature reading on the dial agrees with the actual temperature of the oven as indicated by the thermometer. Pull the dial straight off without turning it. Hold the calibration plate and tighten the two calibration plate screws firmly.

   d. Replace the dial.

   NOTE: If the above adjustment is prevented by the two calibration plate screws coming into contact with the ends of the screw clearance slots in the calibration plate, remove the screws and after turning the calibration plate to its proper location, reassemble the screws in the other tapped holes designed for them.

VI. TROUBLESHOOTING

The Vulcan Hart is a simple gas oven which should rarely have problems. Following are some possible problems along with their possible causes and solutions.

A. AN UNEVEN BAKE with too much bottom heat could be due to a low cooking temperature due to an overactive flue, too low a setting on the thermostat or the thermostat calibration.

B. TOO MUCH TOP HEAT can be caused by insufficient oven ventilation or oven calibration.

C. AN OVEN WHICH IS NOT LEVEL could cause uneven baking from side to side or front to back. A pan of water placed in the middle of the oven can act as a level. The oven legs are adjustable to make the leveling adjustments.

D. DRIED OUT PRODUCT COULD BE CAUSED by too low a temperature setting, too long baking time or thermostat calibration.

E. CONSTANT PILOT OUTAGE MAY BE CAUSED by too low a pilot flame setting, a restriction of the pilot orifice or a malfunctioning safety valve.

1. A malfunctioning safety valve must be replaced.

2. The pilot-limiting orifice may be cleaned by turning off the gas supply to the unit and disconnecting the pilot tubing at the pilot burner body. The orifice is then accessible at the body end of the pilot burner and can be removed for cleaning.

3. Clean the spud, taking care not to enlarge the orifice hole.

4. The pilot body can then be reassembled.

F. POOR IGNITION OF THE BURNERS may require adjustment of the air shutters or cleaning of the pilot orifice.

G. When ovens are stacked two or three high, it is important to have the proper spacers installed on the top corners of the lower ovens to insure the proper functioning of the ovens.

H. SHOULD THE MAINTENANCE PROCEDURES outlined within this lesson fail to correct a problem, a qualified serviceman should be called.

VII. CONCLUSION

Vulcan Hart and similar ovens require only basic understanding and maintenance in order to give good service.

VULCAN HART DECK OVEN

INSTRUCTOR'S WORKBOOK

HENNY PENNY PRESSURE FRYER

PARTICIPANT'S WORKBOOK

WORKBOOK

HENNY PENNY PRESSURE FRYER

I. FUNCTION

The Henny Penny pressure fryer is used to deep fry, under pressure, Shakey's breaded chicken and potatoes.

II. HOW IT FUNCTIONS

A. The HENNY PENNY pressure fryer uses a combination of *PRESSURE*, *HEAT* and *TIME* to cook foods both quickly and efficiently.

B. A KETTLE, OR FRYPOT, forms the cooking chamber.

1. This kettle holds from eighteen to twenty quarts of liquid shortening. You can relate this to the oil used to pan fry chicken at home.

2. A small basket is used to hold the chicken and/or potatoes as they are completely submerged in the shortening (or oil) during the cooking process.

3. A lid is used to close the kettle and form an airtight seal. This is necessary to allow pressure to build, which is an essential part of the frying process.

4. The airtight chamber formed by the kettle and lid traps natural moisture which is in the food being cooked.

   a. The trapped moisture rapidly turns to steam and creates pressure. This pressure is maintained at nine PSI (pounds per square inch) by means of a simple dead weight valve. Any pressure over nine PSI lifts the dead weight valve and releases the excess pressure.

   b. The rapid pressure buildup is what allows the food to retain more of its natural juices than regular pan frying or deep frying.

C. THE SHORTENING IN THE KETTLE is heated by a simple gas burner or by electric heating coils, depending on the fryer model.

1. A *THERMOSTATIC* control regulates the temperature.

2. For Shakey's chicken and potatoes, *325°* F has been determined to be the proper temperature for the P.H.T. balance.

D. THE THIRD FACTOR OF THE FRYING PROCESS - TIME, has been determined to be a range of *EIGHT* to *NINE & ONE-HALF* minutes.

1. A simple timer device regulates the frying cycle.

2. When the timer is set, pressure is allowed to build.

3. At the end of the cycle, the timer goes off which automatically releases the pressure.

4. At this point, the lid is opened, the basket removed and the cooked product served.

III. OPERATION

A. ALL OPERATING CONTROLS are located on the front panel of the fryer.

NOTE: The operation of the gas and electric models is basically the same.

1. The main power switch on the lower center of the panel is a three-way switch with a center "off" position.

   a. Move the switch to power (left) to operate the fryer. A red indicating light to the left of the switch will come on to show that the fryer is getting power and is ready to operate.

   b. Move the switch to pump (right to operate the pump). An amber (or red) indicating light to the right of the switch shows that the pump is in operation.

      NOTE: Certain conditions must be set prior to operation of the pump and are covered later in this lesson.

2. The thermostat is located on the right of the front panel.

   a. Turn the selector knob to the desired temperature of 325° F.

   b. A red indicating light on the thermostat shows when the shortening is below the temperature set by the thermostat. When it goes "off" the shortening is up to the set temperature.

3. The timer is located on the left side of the panel and controls the _____*SOLENOID*_____ _____*VALVE*_____.

   a. The solenoid valve is located at the upper right-rear corner of the kettle and controls the _____*PRESSURE*_____ buildup and release within the kettle.

   b. Turn the timer knob to move the black arrow on the timer dial to the desired frying time (8 to 9 1/2 minutes).

   c. When the timer on/off switch is moved to the "on" position the solenoid is energized. This closes the valve and allows pressure to build within the kettle.

   d. When the red arrow of the timer dial reaches zero (when the frying cycle is complete) the solenoid is de-energized which allows the valve to open and release the pressure. A buzzer sounds to signal that the frying cycle has ended.

   e. Moving the timer switch to the "off" position shuts off the buzzer and resets the red arrow on the timer dial.

   f. An illuminated red light on the timer shows that the timer is operating and that a frying cycle is in progress.

      NOTE: The controls will operate only when the power switch is in the power position. The timer and thermostat will not operate when the power switch is in the pump position.

B. THE FOLLOWING STEPS ARE FOR START-UP of the fryer, cooking of the product and shutdown of the fryer.

   1. Check to see that all switches are in the "off" position, that the drain valve and pump valves (located below the front panel behind the door) are in the closed position and that the kettle (frypot) is filled to within 1/2 inch of the level indicator line with shortening.

   2. Turn the power switch to "power" (left).

   3. Turn the thermostat selector knob to the desired temperature. (325^{o} F for Shakey's chicken and potatoes)

   4. When the indicating light goes off to show the shortening has reached the set temperature, thoroughly _____*AGITATE*_____ the shortening within the kettle with the basket handle. This will allow the shortening to heat evenly as the shortening at the bottom of the kettle may be slightly cooler.

5. Place the frying basket into the frypot and remove the handle.

6. With the timer and thermostat set at the proper positions, add the food product to the hot shortening in the basket and frypot.

   NOTE: Food should be placed into hot shortening and not placed into the basket and lowered into the shortening. This will cause food to stick or "weld" together as it cooks.

7. Close the lid and press down to engage the safety cover latch. Then tighten the spindle screw clockwise until the lid has sealed and the two red knobs of the spindle and safety latch align. This forms the airtight seal.

8. Turn the timer switch to "on" to begin the frying cycle. Note that the *PRESSURE* *GAUGE* on the top left of the fryer will begin to show a rise to the nine-pound level. Pressure will not rise unless the timer switch has been turned on.

9. When the buzzer indicates that the frying cycle is complete, turn the timer switch off and check the pressure guage.

10. When the pressure gauge indicates *ZERO* it is safe to open the lid.

11. Turn the spindle screw counterclockwise, push down on the lid to disengage the safety catch and open the lid fully. Open it quickly so that the moisture condensation on the inside of the lid will not drop into the shortening, causing splattering of hot shortening and contamination of the shortening. Do not allow the lid to spring back by itself as this will shorten the life of the lid spring or even cause it to break.

12. Place the handle into the basket and remove it from the shortening. A hook attachment on the right side of the basket allows it to rest on the lip of the kettle and allows the excess shortening to drain from the food product prior to serving. Wipe the inside of the lid with a clean towel to remove excess moisture and to help keep it clean.

13. After serving, return the basket to the frypot and *CLOSE* the *LID* to prevent contamination of the frying shortening with flour, dust or other particles.

14. After every *THIRD* *FRYING* *CYCLE* the frying shortening should be drained and filtered.

    NOTE: Filtering procedures are outlined under cleaning procedures. Under extreme conditions the shortening may be filtered every six rounds but do not exceed six rounds.

15. During slow business hours the thermostat may be turned down to *200°* F to extend the life of the shortening.

16. At the end of the business day, drain and filter the shortening and follow the nightly cleaning schedule (cleaning procedures are outlined later in this lesson). Turn the power switch to "off" and make sure the frypot lid is closed.

C. THE FOLLOWING ARE SOME KEYS to safe operation of the pressure fryer.

1. A *HIGH* *TEMPERATURE* *LIMIT* *CONTROL* is built into both the electric and gas model fryers to prevent fire or oil breakdown due to excessive heat.

   a. When the temperature of the shortening in an electric model reaches 450° F, this control shuts off power to the heating coils. When the shortening temperature lowers to 380° F or less, power is restored automatically.

   b. In the gas model a manual switch "opens" when shortening temperature exceeds 440° F.

   c. To reset this manual switch, turn the power switch to "off" and remove the front panel by removing the screws. When the shortening temperature reaches 390° F the red reset button can be pushed and power restored. Replace the front panel carefully and restart the machine.

2. The *DEAD* *WEIGHT* *PRESSURE* *RELIEF* *VALVES* are located at the left-rear corner of the frypot. A pressure gauge attached to the valves indicates the pressure within the kettle.

   a. The right valve is set to bypass at nine P.S.I. in order to build enough pressure to maintain the P.H.T. balanced combination.

   b. The left valve is set to bypass at 14 P.S.I. as a safety feature to avoid a dangerous pressure buildup which might damage the fryer or even cause an explosion. This valve is riveted shut to meet safety requirements (to avoid tampering). The nine-pound valve should be removed for daily cleaning.

3. In addition to the physical safety devices built into the machine, the operator should be aware of safe handling procedures.

   a. Make sure the frypot is filled before switching on the power. Heating an empty frypot may damage the machine or create a potential fire hazard.

   b. Make certain that the power switch is in the "off" position before draining the shortening from the frypot. If left on the shortening may ignite as it drops into the filter pan.

   c. After a frying cycle is completed, make sure the pressure has completely bled off before opening the frypot lid. If pressure remains in the frypot, when the lid is opened hot steam under pressure could cause severe burns to the operator or anyone nearby.

   d. Many areas require an automatic dry chemical fire extinguisher system to be installed in the hood above the fryer. In any case an ABC-type fire extinguisher should be within easy access in the event a fire occurs.

   e. Care should be taken in placing chicken or potatoes into the hot shortening to avoid splattering and possible burns. Also, water or moisture in the frying shortening will cause splattering.

IV. CLEANING

Cleaning the Henny Penny pressure fryer consists of periodic *FILTERING* of the frying shortening during the business day, daily *CLEANING* of the fryer parts and periodic *BOIL-OUT* of the frypot and changing of the shortening.

A. FILTERING THE FRYING SHORTENING is essential to maintain the quality of the cooked product and the frying life of the shortening. The filtering system consists of the filter pan and filter screen assembly, filter connecting union, main drain valve, filter pump and valve. The filtering process is as follows:

   1. Turn thermostat and main power switches to the "off" position. Remove and clean the fry basket.

      NOTE: The best results are obtained when the shortening is filtered at frying temperature.

   2. Use a metal spatula to scrape buildup from the sides of the frypot.

3. Open the drain valve very slowly - half a turn at first, then very slowly to full open position. This will prevent excessive splashing of the hot shortening as it drains into the filter pan.

   CAUTION: The filter pan must be in proper position beneath the drain valve.

4. As the shortening drains from the frypot, use a brush to clean the sides of the frypot and the heating elements (on electric models). If the drain fills with breading, use a narrow bottle brush to push breading into the filter pan.

5. To renew the filtered shortening to the frypot, first close the lid so that the very first surge of shortening will not splash over the top of the frypot. Open the filter valve and close the drain valve. Move the power switch to the pump position. Wait a few seconds, then open the lid to see if the shortening is returning properly.

   NOTE: If a filter rinse hose is available for your fryer, the following procedure may be used in place of Step 5.

6. Attach the filter rinse hose with its quick disconnect fitting to the other half of male fitting inside the door next to the filter valve handle. To do this, slide back the spring ring on the one side (female) of the quick disconnect fitting and let it snap into place over the other half (male) of the fitting. Make sure the hose nozzle is pointed down into the bottom of the frypot. Pull the lid cover down over the nozzle and move main power switch to "pump". Watch the nozzle for excessive splashing.

   a. With the drain valve open, wash down and around the electric heating elements and pot interior, especially the bottom.

   b. After sufficient rinsing and washing with shortening, turn off the pump and close the drain valve.

   c. Detach the hose. Be careful as the hose and fittings will be hot. Raise the fitting end of hose high for a minute to allow the remaining shortening in the hose to drain into the frypot.

7. Pump all the shortening out of the filter pan. When the pump is pumping air only, the shortening in the frypot will appear to be boiling. Close the filter valve first and then turn off the pump switch. This will keep the filter pump and lines from filling up with shortening. A few seconds is sufficient. Any longer may damage the pump.

8. Check the level of the shortening in the frypot and add fresh shortening if necessary. It should reach the level indicator line on the rear wall of the frypot.

9. Approximately eight to twelve filterings can be made with one filter paper, depending on conditions. Filter paper life and filtering efficiency can be increased by removing the filter pan and filter screen assemblies nightly and carefully scraping away the buildup of breading. Take care when removing the hand dairy union, the threaded collar which connects the suction standpipe from the filter screens to the filter pump tubing, as it is likely to be very hot from the filtering process.

10. After completing the filtering operation, check and empty the condensation container located in front of the filter pan.

11. The procedure for changing the filter envelope is as follows:

    a. Move the main power switch to the "off" position.

    b. Remove the condensation container and discard the water.

    c. Disconnect the hand dairy union and remove the filter pan from beneath the frypot.

    d. Lift the screen assembly from the drain pan and discard the used shortening in a safe and approved manner. Wipe shortening and crumbs from the drain pan and clean thoroughly.

    e. Unthread the suction standpipe from the screen assembly. Remove the crumb catcher and clean thoroughly. The filter screen assembly consists of two filter screens which fit within the filter envelope and the crumb catcher screen which fits on top of the two screens and envelope.

    f. Remove the filter clips and discard the filter envelope.

    g. Clean the top and bottom filter screen.

    h. Assemble the top filter screen to the bottom filter screen and slide into a clean filter envelope. Double fold the open end; then fold the corners in and clamp in place with two filter retaining clips.

       NOTE: Be sure that filter screens, crumb catcher, filter clips and suction standpipe are thoroughly dry before assembly of filter envelope as water will dissolve the filter paper.

    i. Replace crumb catcher screen on top of filter paper and screw on suction standpipe assembly. Replace complete filter screen assembly back into drain pan and slide pan back into place beneath the fryer.

    j. Connect hand dairy union. Do not use a wrench to tighten; hand tighten only.

    k. Slide condensate drain pan back into place. The unit is now ready to operate.

B. IN ADDITION TO PERIODIC FILTERING of the shortening during the day, the fryer itself requires daily attention.

1. A clean, damp bar towel should be kept near the fryer during the course of the day to clean the fryer of oils which would otherwise build up to a greasy mess. This "clean as you go" procedure will keep the fryer clean during the course of the day (when it is in view of customers) and make the complete nightly cleaning easier.

2. Each night, as part of the normal kitchen closing duties, the entire fryer body should be thoroughly cleaned of any grease buildup. The fryer area, walls and floor should be cleaned as well. This is to prevent both fire and health hazards. It is also preventive maintenance as most fryer problems start as a result of dirt and grease.

3. Remove the nine-pound dead weight valve by unscrewing the cap and removing the weight. Clean the weight and the inside of the cap thoroughly as a grease buildup may prevent the weight from lifting at the proper nine-pound pressure. Improper frying or a dangerous pressure may result. This must be a nightly duty.

4. On gas models, pour a cup or so of hot water down each exhaust stack nightly. This will help keep the exhaust system free and clear.

5. Empty the condensation pan nightly.

C. THE CLEANLINESS OF THE FRYPOT is essential in maintaining quality product and in maintaining long life of the frying shortening.

1. Foaming, smoking, excessively dark color, off odors and dark fried product are signs of shortening which is past its life and should be changed. Kits are available for various brands of frying shortenings to accurately check the shortening. Check with your purveyor for these kits.

2. Each time the shortening is changed, the frypot should be cleaned thoroughly or "boiled out".

   a. Turn the main power switch to the "off" position.

      CAUTION: The filter pan must be in position under the drain valve to prevent splashing or spilling of hot liquids.

   b. If shortening is present in the frypot, it must be drained by slowly opening the drain valve one-half turn. Allow about half to drain before opening the valve all the way.

      NOTE: The filter screen assembly should be removed from the filter pan prior to draining the shortening.

c. Close the drain valve. Discard the shortening and replace the drain pan (only) back under the frypot, leaving out the filter screen assembly.

d. Fill the frypot to the "level indicator" with hot water. Add four to six ounces of P.H.T fryer cleaner or comparable fryer cleaner to the water and mix thoroughly. The fry basket, if you wish, can be placed inside frypot for cleaning.

NOTE: Always wear protective rubber gloves when cleaning the frypot as the cleaning solution is highly alkaline.

e. Set thermostat to 220° F and turn main power switch to "power" position.

f. When the cleaning solution starts a rolling boil, move the main power switch to "off". If the cleaning solution in the frypot starts to foam and boil over do not try to contain it by closing the fryer lid. Watch cleaning solution constantly to make sure it does not boil over.

NOTE: Pour a cup of hot cleaning solution which is used to clean the fryer pot into each exhaust stack to keep them free and clean. (Gas fryer only)

g. After bringing the solution to boil, at least five times, let the cleaning solution stand for fifteen to twenty minutes. Using the P.H.T fryer brush, scrub the basket and place it in a sink for proper rinsing. Using the same brush (never use steel wool), scrub the inside of the frypot, the lid liner and around the counter top of the fryer.

h. After sufficient boiling and cleaning, shut off the main power switch, open the drain valve and drain cleaning solution from frypot into drain pan and discard.

i. Replace empty drain pan, close drain valve and refill pot with hot water to proper level. Add approximately eight ounces of distilled vinegar and bring solution to a boil. Again, using a clean brush, scrub the interior of pot and lid liner. This procedure is to neutralize alkaline left by cleaning compound.

j. Drain vinegar, rinse water from fryer and discard.

k. Rinse down frypot and other parts using hot, clear water. Allow the drain pan, filter screen assembly and interior of frypot to thoroughly air dry to prevent contamination. Make sure the inside of the pot, drain valve opening and all parts that will come in contact with new shortening are as dry as possible.

NOTE: All traces of cleaner must be removed as any soap or cleaner remaining will cause immediate breakdown of the shortening. On gas models be sure to rinse exhaust stacks with the vinegar solution as well.

1. Replace the drain pan with complete filter parts assembled. Refill fryer with fresh shortening.

D. TO RE-EMPHASIZE, regular cleaning procedures are essential to safe and sanitary operation and quality products.

V. MAINTENANCE

Although the Henny Penny pressure fryer requires no maintenance or lubrication other than the normal cleaning schedules already given, some occasional maintenance may be required to keep the fryer operating at its peak efficiency.

A. IT MAY BE NECESSARY TO RE-LIGHT THE *PILOT LIGHT* occasionally (on gas models). The lighting procedure is as follows:

1. The gas cock dial acts as a control of gas to the main burner and a reset mechanism for the pilot light. It is located on the main gas valve just above the main drain valve handle.

2. Turn the main power switch to the "off" position or turn the operating thermostat to the "off" position.

3. Partially depress and turn the gas cock dial to the "off" position.

4. Wait sufficient time to allow gas which may have accumulated in the burner compartment to escape (at least three minutes).

5. Turn the gas cock dial to the "pilot" position.

6. Depress and hold the gas cock dial while lighting the pilot. The pilot flame is located behind the gas valve. It can be reached by moving a match underneath and to the rear of the gas valve. Allow the pilot to burn approximately thirty seconds before releasing the gas cock dial.

   NOTE: If the pilot light does not remain lighted, repeat steps five and six allowing a longer period of time before releasing the gas cock.

7. Turn the gas dial to the "on" position.

8. The pilot and burner are now ready for operation. Turn the thermostat dial to the desired temperature and make sure that the main power switch is "on".

B. SHOULD THE *LID* *COVER* fail to seal properly, allowing steam to escape around the gasket during the frying operation, the lid should be adjusted as follows:

1. Turn the main power switch to the "off" position.

2. Close the lid cover and tighten the spindle screw to the sealing position.

3. Align the red knob on the spindle with the red knob on the cover latch. It may be necessary to unscrew knobs on the spindle and change their positions in order to align the knobs.

4. Loosen the allen set screw on the top ring of the limit stop (the collar immediately beneath the spindle). Turn the top ring down, clockwise, about one-half inch by holding the bottom of the limit stop (with the allen wrench) and turning the top.

5. Tighten the spindle screw 1/4 turn, clockwise, and then adjust the limit stop to fill the space between the center cross bar and the bottom wheel hub of the spindle.

6. Tighten the allen set screw in the limit collar.

7. This lid limit stop in proper adjustment will prevent unnecessary tightening of the lid cover and will greatly extend the life of the gasket.

C. THE LID *GASKET* will wear with time, causing a poor seal. It is reversible, however, and both sides may be used before replacement is necessary. The following steps are for reversing or replacing the lid gasket.

1. There are two lid liner screws on either side of the lid cover. Back these four screws out about one-half inch.

2. Using a thin-blade screwdriver, carefully pry out the gasket starting at one corner.

3. Clean the gasket and the gasket seat of the lid with hot water and detergent.

4. Install the gasket with the good side facing out. When both sides have been used, replace the gasket. Tighten the four screws.

D. SHOULD YOU SUSPECT that the actual temperature of the shortening differs from the setting on the thermostat knnob you may simply have to *RECALIBRATE* the thermostat. The following steps are for checking and resetting the thermostat calibration:

1. Turn the main power switch to "power" position.

2. Turn thermostat knob to 250° F setting.

3. Allow fryer to pre-heat for not less than fifteen minutes or until indicator light goes "off".

4. Thoroughly agitate the shortening in frypot and take a temperature reading in the shortening using an accurate mercury tube-type thermometer.

5. To take proper temperature reading, first remove fry basket from shortening and stir the shortening thoroughly with the basket handle. Insert the deep fat thermometer in the shortening at about the center of frypot to a depth of approximately three inches below the level of the shortening. Stir the shortening slowly with the thermometer, allowing a few moments for the mercury to rise and then take a reading. When taking a reading hold the thermometer as vertical as possible. (Readings within 5 degrees of the temperature setting on the thermostat may be expected at times due to the thermostatic action and are considered acceptable.)

   CAUTION: In the event that the thermometer is accidentally broken and if the mercury contents and/or glass get into the shortening or if it is a possibility that they might have, discard the shortening and clean the frypot thoroughly as the thermometer bulb contents are very poisonous.

6. If temperature is within 5 degrees of the temperature setting on the thermostat, increase the thermostat setting approximately 25 degrees. Wait until indicator light goes off; again, check temperature of shortening.

7. If temperature is too far out of range (over or under 10° difference), remove the thermostat knob by pulling out and off of stem. Using a small, fine-blade screwdriver, turn the adjusting screw located inside the hollow stem to change the temperature setting on the control. Turn the screw "clockwise" to decrease temperature setting. Turn the screw "counterclockwise" to increase temperature setting.

8. Replace thermostat knob on stem and check that temperature setting on dial corresponds with temperature of shortening.

E. NOTE THAT SERIOUS FRYER PROBLEMS should be left to a qualified serviceman.

VI. TROUBLESHOOTING

The following is a troubleshooting guide with several common problems found in fryer operation. The possible causes of these problems are given along with some possible solutions.

A. THE SHORTENING FOAMS OR BOILS OVER:

CAUSE	SOLUTION
1. Water in shortening	1. After the frying cycle ends, wait until the guage needle reaches one PSI or less and start opening the cover quickly; but do not bang or throw the cover against the spring hinge. The water that condenses on the cover liner will then flow to the drain trough at the bottom of the lid liner and run into the catch basin at the right corner of the pot where it then runs out the condensation line. If the cover is raised with an intermittent or slow motion, the condensation will drip into the hot shortening and within a short time will cause boiling and foaming.
2. Condensation line stopped up	2. If the condensation line that runs from the bottom of the steam exhaust stack is clogged, accumulation of grease and condensation will back up and flow back into the shortening. This can be checked by opening the door on the front of the fryer and see if the condensation line is open and draining into the small condensation tank in front of the filter drain pan.
3. Improper or bad shortening, improper filtering	3. Shortening that is not recommended has a higher moisture content and will break down rapidly. Poor filtering and cleaning of breading crumbs from the bottom of the frypot will cause breakdown.
4. Improper rinsing after cleaning	4. Clean and neutralize the frypot. Rinse with vinegar to remove the alkaline left by cleaning compound.

B. THE PRESSURE DOES NOT EXHAUST FROM THE FRYPOT (Gas model only):

CAUSE	SOLUTION
1. Exhaust line from solenoid	1. Release pressure: a. Move "power" switch to "off" position. b. Bleed off steam pressure by slowly turning spindle 1/4 turn. Steam will bleed off from the sides and back of the lid. c. When pressure drops to zero, open the lid. 2. Remove, clean and re-install line.

C. THERE IS A PRESSURE LOSS:

1. Not enough product for fryer or product not moist	1. Fryer must have enough moist product to generate steam.
2. Solenoid valve leaking	2. Repair or replace. After a period of time it is possible that the valve seat and/or plunger may wear with use and let pressure escape during the frying cycle. Check this by placing hand on the exhaust pipe that leads away from the valve at the beginning of the frying cycle. If the pipe gets warm or hot, pressure is escaping. Also, the core and plunger may be corroded with shortening, not permitting them to properly function. Clean and disassemble as required.
3. Dead weight valve leaking	3. Repair. Caused by an accumulation of shortening and/or carbon on the weight seat (valve orifice) on inside valve cap. Other possibilities are; leaking around connections of pipes and fittings, a defective pressure gauge may indicate an improper pressure reading, "O" rings on dead weight valve caps may be worn.

	CAUSE	SOLUTION
4.	Lid gasket defective	4. An adjustment of the limit stop will correct this unless the gasket is worn out.
5.	Limit stop not properly adjusted	5. Adjust
6.	Defective spindle bearing	6. Replace
7.	Defective spindle acme nut	7. Replace

D. THE FILTERING SYSTEM DOES NOT WORK PROPERLY:

1.	Shortening solidified in pipe lines	1. If possible, heat the lines to liquify the shortening.
2.	Connections not tight	2. Tighten
3.	Paper on screens improper	3. Replace
4.	Pump plugged	4. Remove and clean
5.	Motor burned out	5. Replace
6.	Coupling on motor or pump shaft slipping	6. Replace
7.	Filter valve not open	7. Open valve
8.	Paper plugged with crumbs	8. Replace
9.	Motor hums but does not pump	9. Pump clogged. Gear loosened from shaft.
10.	Pump fills frypot very slowly	10. Loose connections. Clean breading from filter pan.
11.	Pump switch on; motor does not start.	11. Motor shorted out. Switch defective.

E. THE PRODUCT COLOR IS NOT CORRECT:

	CAUSE		SOLUTION
1.	Too dark	1.	Thermostat out of calibration or defective. Shortening is old or dirty. Product breaded for too long a time before being used. Temperature set too high.
2.	Too light	2.	Shortening temperature too low. Not enough gas to burner. Low voltage.

F. THE HEATING OF THE SHORTENING IS TOO SLOW (Electric Fryer):

1.	Low voltage or improper voltage	1.	Use meter and check voltage and amperage. Check incoming voltage reading and frequency against unit data plate.
2.	Weak or burned our elements	2.	Replace
3.	Set of points bad on contactor	3.	Replace contactor
4.	Wires loose	4.	Tighten

G. THE HEATING OF THE SHORTENING IS TOO SLOW (Gas Fryer):

1.	Low gas pressure	1.	Check and have pressure increased
2.	Too small gas line	2.	Replace with proper size
3.	Valve not operating properly	3.	Replace
4.	Restriction of air fow to burner	4.	Remove air flow obstruction
5.	Dirty frypot	5.	Clean frypot
6.	Improper ventilation system	6.	Refer to installation manual for correct ventilation requirements.

H. WHILE THIS TROUBLESHOOTING GUIDE is not meant to turn Shakey's employees into repairmen, it may aid in preventing needless service calls or save time a serviceman must spend with a unit by isolating the problem area before the service call is made.

VII. CONCLUSION

The Henny Penny pressure fryer is an efficient piece of equipment and will produce high quality Shakey's product when properly maintained and operated.

HOBART MIXER

INSTRUCTOR'S WORKBOOK

WORKBOOK

HOBART MIXER

I. FUNCTION

The mixer is used to prepare dough for Shakey's pizza. It is sometimes used to prepare Shakey's sauce as well. Grinding or chopping attachments can also be used with the mixer to grind cheese and meat products.

II. HOW IT FUNCTIONS

A. THE HOBART MIXER works in much the same way as a common home electric mixer.

1. A mixing bowl is held firmly in place and contains the ingredients to be mixed.

2. An *AGITATOR* (or beater attachment) is attached to a shaft and placed within the bowl and performs the mixing action.

3. An electric motor supplies the power to drive the agitator.

B. THE HOBART MIXERS for Shakey's use have a much greater mixing capacity and are more powerful than simple home mixers.

1. Common Hobart mixers in Shakey's have sixty or eighty-quart mixing capacities while a home mixer may handle one quart or less.

2. Hobart mixers are driven by heavy duty electric motors which operate off of 220 volt current.

   NOTE: Normal home appliances operate from 110 volt current.

C. TO HANDLE THE HEAVY LOAD of large capacity mixing, a *GEAR-DRIVEN* *TRANSMISSION* and *PLANETARY* are used to drive the agitator.

1. The transmission is used to change the mixing speeds of the Hobart.

   a. A home mixer changes speeds by regulating the current to the motor, which changes its speed and the speed of the agitator connected directly to it.

   b. The motor of the Hobart operates at full speed all the time in order to generate the power needed to mix heavy loads. The transmission acts much like an automobile transmission as gear ratios are selected to give the desired mixing speed.

2. The planetary is a system of gears which takes the rotating motion of the motor and transmission and translates it into a figure eight motion.

3. The agitator is connected to the planetary and uses this figure eight motion to mix product held in the mixing bowl.

V. OPERATION

A. THE MAIN DIFFERENCE BETWEEN the Model 800 and Model 600 mixers is the mixing bowl capacity. The operating procedures are the same for all mixers.

1. The Model 800 series denotes an 80-quart mixing bowl capacity.

2. The Model 600 series denotes a 60-quart mixing bowl capacity.

3. Each model may or may not be equipped with an automatic timer mechanism.

B. THE FOLLOWING STEPS ARE FOR OPERATING THE MIXER:

1. Lower the bowl support completely by turning the *HANDWHEEL* on the right side of the machine counterclockwise.

2. Fit the *MIXING* *BOWL* in place on the bowl support of the mixer.

   a. Make certain that the mixing bowl is fitted over the bowl-locating studs on the left and right arms of the support arms.

   b. A *FLANGE* at the rear of the mixing bowl must fit under the lip at the rear of the bowl support.

   c. Move the *CLAMP* *ARMS* at the left and right locating studs to hold the mixing bowl firmly in place.

   d. These steps keep the mixing bowl from shifting during the mixing process.

3. Slip the *DOUGH* *HOOK* (agitator) over the planetary shaft and give a twist until the drive pin reaches the end of the L-shaped slot in the dough hook shaft.

   NOTE: The bowl must be in the fully-lowered position in order to attach any agitator.

4. Add the ingredients to be mixed to the mixing bowl using the instructions given in the food preparation manual.

5. Raise the mixing bowl completely by turning the handwheel clockwise. The wheel will slip slightly when the upper portion of the travel is reached.

6. Move the speed selector handle in line with the desired speed.

   a. *SPEED* *ONE* is required for Shakey's products.

   b. Speeds two, three and four are faster speeds used for whipping other food products and are not recommended for Shakey's.

   c. If the selector dial or lever is between speeds, the mixer will not operate.

7. On timer-equipped models, turn the timer switch to the desired mixing time and press the start button.

   a. This switch is equipped with a thermal overload protector with an automatic reset. Should the circuit overload and become too hot, the machine will stop. After a few minutes of cooling, pressing the start button will re-start the mixer.

   b. With the timer set at "zero" the start button becomes a "jog" button which permits inching of the planetary and agitator. As soon as the button is released, power to the motor is shut off.

8. The *BRAKE* is actuated by the stop button. This button has two sets of contacts. When it is first depressed, the power is cut off from the motor; when pushed all the way down, the brake is applied and remains on until the button is released. This safety feature allows the immediate stoppage of the agitator in mid-stroke should it be necessary.

9. Timers on these models are *SPRING* *OPERATED*. At present there is no adjustment possible and a timer which is no longer accurate must be totally replaced.

10. Models without timers have simple start and stop buttons with no braking mechanism.

11. When the timer has run its course, the mixer will shut off automatically. Non-timer models must be turned off manually.

12. Lower the mixing bowl completely and remove the dough hook or agitator attachment. This will prevent possible injury by accidental starting of the machine while removing product from the mixing bowl.

13. The mixing bowl may be removed from the supports if desired to aid in removing the product.

    NOTE: The mixing bowl filled with product is very heavy. Remove dough from the bowl rather than trying to pick up the entire bowl.

14. Clean the bowl, dough hook and machine.

C. A GRINDING HEAD ATTACHMENT is available for this machine.

1. An *ATTACHMENT* *HUB* is located on the front portion of the machine.

2. The grinder throat fits into the hub of the mixer and is held in place by tightening the thumbscrew.

3. Make sure any agitator attachments are removed from the shaft as the planetary cannot be disengaged and will turn while grinding is taking place.

4. Speeds two and three simulate the speed of the Hobart 4822 free-standing meat chopper.

IV. CLEANING

A. THE MIXER SHOULD BE CLEANED after each use. Cleaning involves the mixing bowl, dough hook or other agitator and the mixer body.

1. Most mixing bowls are made of *ALUMINUM* alloy. As a result, special care must be taken in keeping bowls clean.

   a. To prevent metal discoloration and pitting of tinned surfaces, scrub the bowl with hot water, mild detergent and a soft bristle brush after each usage.

   b. Never use anything in the bowl that may *SCRATCH* the interior coating of the bowl.

   c. Make sure the bowl is rinsed thoroughly and dried immediately to prevent oxidation (rusting) of the bowl interior.

      NOTE: Bowls made of stainless steel are also available. It is recommended to use stainless steel bowls when making sauce to prevent any contamination often present when the acid in tomato comes into contact with an aluminum or tinned surface.

2. When removed from its shaft, the agitator may be cleaned in the same way as the bowl.

3. The mixer body may be brushed first to remove loose flour or dust, then washed with a mild detergent to remove any crusted-on product. The entire body must be cleaned.

B. A CLEAN MACHINE IS ESSENTIAL to sanitary preparation of product and cleaning procedure must be followed.

V. MAINTENANCE

A. NORMAL MAINTENANCE REQUIRES simple lubrication at regular intervals.

B. THE AGITATOR SHAFT BEARINGS are sealed and ordinarily require no attention. A qualified serviceman may remove the seals if greasing becomes necessary.

C. THE BOWL LIFTSCREW AND SLIDEWAYS require lubrication semi-annually.

1. The liftscrew can be reached by removing the stainless steel apron which has screw slots and is held in place by four screws.

2. *"LUBRIPLATE"* is the grease used by Hobart.

3. Rub some grease on the bowl lift slideways while the apron is off.

4. The *HANDWHEEL* *GEARING* which operates the liftscrew should also be lubricated at this time. Disconnect or cut power to the mixer at the circuit breaker to avoid electrical shock. The gearing is inside the pedestal on the handwheel bracket. Remove the top cover (two screws) and wipe some grease on the gear teeth.

5. The handwheel shaft may be oiled through an oiler on the handwheel bracket. This should be done at the same time gears are lubricated.

D. SHOULD MOISTURE CONDENSE in the planetary due to moist climates or the type of work being done, the *DRIP* *CUP* will prevent it from reaching the mixing bowl.

1. The drip cup is a stainless steel collar around the planetary and is held in place by two screws.

2. Occasionally remove the drip cup and simply wipe it out. How often this is necessary will depend on the area as stated above.

E. THE MOTOR AND MOTOR BEARINGS are pre-greased for the life of the motor and should not require further service.

F. THE OIL IN THE PLANETARY should be changed based upon the usage of the mixer. Heavy usage requires an oil change every *SIX MONTHS*. This would be five or more batches of dough daily. Lower usage requires an *ANNUAL* oil change.

1. To drain and change the oil, first remove the oil drain plug, drain the oil, then replace the plug. The drain plug is a hex nut located on the underside of the planetary.

2. Remove the drip cup.

3. Remove the fill plug in the rim of the planetary. Use a funnel or tube filler to add eight fluid ounces of oil to the planetary. This will be to the level of the bottom of the filler hole. Screw the filler plug in tightly and replace the drip cup.

4. The oil used in both the planetary and the transmission is as heavy as a SAE-30 motor oil but no heavier than a light, all-purpose automotive gear oil.

G. THE TRANSMISSION OIL should be changed every *TWO YEARS*. A qualified serviceman may drain and refill the transmission.

1. The transmission oil level can be checked by an oil gauge located on the handwheel side of the mixer. If the oil level falls below the line of the gauge while the mixer is running, oil must be added.

2. To add oil, first remove the top cover. The front cover support serves as the oil fill plug.

3. Remove the plug and add oil until the level reaches between the center and top of the oil level gauge.

H. THE AGITATOR SHAFT and agitator attachments should be left clean; but do not lubricate! This will contaminate product and will not help in attaching or removing agitators.

VI. TROUBLESHOOTING

A. THE ATTACHMENT DRIVE is protected by a *SHEAR KEY* that will shear if the load becomes excessive. To replace this key it is necessary to remove the square drive sleeve from the attachment hub.

1. The screw that holds the sleeve in place has a left-hand thread. Turn it clockwise to remove.

2. If the sleeve sticks and will not come out easily, insert a standard 3/8" - 16 screw into the right-hand threads. The screw should be long enough to reach out where it can be grasped and used as a puller.

3. After removing the pieces of sheared key, check to see that the square drive sleeve turns freely inside the pinion shank before putting in the new key.

4. Installation is simply the reverse of disassembly.

5. It is a good idea to have a spare shear key on hand if attachments such as the grinding head are used.

B. THE DOUGH PRODUCT MAY COME OUT DISCOLORED.

1. Check the planetary for oil leaks and call a serviceman as required.

2. Check the mixing bowl to make sure it has not been allowed to rust or become *SCRATCHED* and *PITTED*. Refer to the bowl cleaning procedures.

C. SHOULD YOU HAVE DIFFICULTY in raising or lowering the bowl, simple lubrication is probably all that is required. Refer to the maintenance section.

D. WHINING OR GRINDING NOISES along with a slowing of the mixing action means excessive pressure is being placed on the dough hook.

1. Lower the handwheel about one and one-half turns during the last two minutes of the mixing cycle.

2. Another solution would be to mix half batches of dough to reduce the load.

3. A dough hook frozen to the agitator shaft or a broken shaft may result from excessive loads on the hook. A serviceman would be required to remedy these problems.

4. These problems occur more with the smaller 60-quart model than the larger 80-quart model.

5. Check the amount of water in the dough recipe. Too little water may cause binding of the product as it mixes.

VII. CONCLUSION

The Hobart Mixer is a sturdy piece of equipment which is capable of producing quality products for many years when properly operated and maintained.

HOBART CHOPPER

INSTRUCTOR'S WORKBOOK

HOBART CHOPPER

PARTICIPANT'S WORKBOOK

6. On the smaller models the throat attachment must be in place before the feed pan (tray) can be be put into place. With the throat attached, the feed pan can be placed directly on top of the machine with the hole in the pan fitting over the top of the throat guard. The thumbscrew at the front of the pan holds the feed pan in place.

7. The smaller units have throw-type switches located either on the front or rear panels of the chopper body. The larger models have pull-type switches on the front panel of the chopper body.

8. The chopper is now ready for use.

   a. Cut the product to be chopped (ground) into strips small enough to just fit the throat of the chopper and place into the food pan.

   b. Place a container to catch the ground product immediately beneath the throat end.

   c. Turn on the machine and feed the product into the throat opening. If the product has been cut small enough, it will feed easily allowing the operator to use both hands to feed the product.

   d. Should the product bind or not feed down easily, a *FOOD STOMPER* only should be used to help force the product down.

   e. Note that the larger choppers have *FOOD SHIELDS* which fit over the collar of the throat to help direct the ground product downward into the container and avoid spattering the ground product.

   f. After all the product has been ground, turn off the machine immediately. The heat and wear generated by running the machine without product in the chopping end can ruin a plate and knife within a few minutes.

   g. After each use, the chopper should be disassembled, cleaned and sanitized.

WORKBOOK

HOBART CHOPPER

I. FUNCTION

The chopper is used to grind meat and cheese into proper size and form for Shakey's topping.

II. HOW IT FUNCTIONS

A. THE CHOPPER USES A CUTTING ACTION to produce "ground" product such as meat. It is not a true "grinder".

B. THE SAME RESULTS COULD BE OBTAINED theoretically by using a sharp knife and cutting or chopping on a cutting board. But the throat, auger, cutting plate and knife of the Hobart Chopper give a more consistent product more quickly and safely than possible by hand.

1. The *THROAT* or cylinder simply forms a chamber in which product may be fed into the actual cutting devices.

2. The *AUGER* or worm, fits into the cylinder of the throat and pushes the food product into the cutting devices by turning as a screw does.

3. The *CUTTING* *PLATE* and *KNIFE* fit into the end of the throat cylinder and perform the actual cutting or chopping of the product.

C. THE CHOPPING PLATE and knife fit together to form a *SCISSORS-TYPE* cutting effect.

1. The knife is attached to the auger, or worm, and turns along with it.

2. The cutting plate is held firmly in place at the end of the throat.

3. The turning of the knife blades flush against the cutting plate completes the cutting. An electric motor provides the power drive.

4. The *SIZE* of the finished product is determined by the size of the holes in the chopping plate - the smaller the holes, the finer the finished product.

III. OPERATION

A. COMPLETLY ASSEMBLE THE MACHINE PRIOR TO USE.

Note: All parts should be cleaned and sanitized immediately after each use.

1. First attach the *THROAT* to the front of the machine.

   a. On the smaller models (4812, 4822) insert the throat hub into the chopper body and give a slight thrust to the left so that the stop pin of the throat attachment is in contact with the side of the hole that receives it. Then tighten the thumb screw on the upper right-hand corner of the chopper body to keep the throat firmly in place.

   b. On the larger models (4632, 4732), slip the throat over the threaded studs with a twist to the left (counterclockwise). Tighten the nuts firmly with the Hobart tool.

2. Insert the auger (worm gear) into the throat and twist until the square drive of the gear engages with the drive of the chopper body.

3. The four-bladed knife is then placed over the auger with the blade edges facing *OUTWARD*.

4. The proper size chopping plate is placed against the knife. Plates and knives which are purchased as sets should not be mixed with other plates or knives.

   a. The smooth side of the plate and the knife blade edges must form the scissors action. On some plates, either side may be used as both are smooth.

   b. The nipple(s) on the inside of the throat cylinder must fit into the notch(es) of the plate to keep it from turning.

   c. Plate sizes are as follows:

      (1) Cheeses - *1/8"*

      (2) Beef - *1/4"*

      (3) Pork - *3/8"*

5. The threaded *COLLAR* or handwheel, is placed onto the throat to keep the auger, knife and plate assembly in place.

   a. On the smaller models (4812, 4822) tighten to snug or or finger tight only. Excessive tightening will make removal very difficult.

   b. On the larger models (4632, 4732) use the Hobart tool to tighten the collar.

IV. CLEANING

A. REMOVE THE FEED PAN (smaller models) and throat attachment. (Disassembly is the reverse of assembly).

B. AFTER DISASSEMBLY, the feed pan, throat, collar, auger plate and knife can be washed and sanitized separately in the three-compartment sink used for dishwashing and allowed to air dry. A light coating of *VEGETABLE* *OIL* will prevent rust.

C. THE CHOPPER BODY (and feed pan on larger models) should be cleaned with a mild detergent, rinsed and sanitized. Allow the surfaces to air dry.

D. DO NOT RUN ICE THROUGH THE GRINDER to clean the cutting plate holes as this will cause *RAPID* *DULLING* of the knife or even damage the machine. The sudden temperature change could cause a throat and auger assembly that is hot from use to crack.

E. WHEN DRY, REASSEMBLE the parts for the next use.

V. MAINTENANCE

A. THE HOBART CHOPPER requires little in the way of regular maintenance and lubrication.

B. THE MOTOR AND TRANSMISSION are pre-greased and sealed and require maintenance only every three to five years. This servicing must be done by a qualified serviceman.

C. THE TRANSMISSION OIL LEVEL of the Models 4632 and 4732 choppers can be checked and refilled if needed.

1. Remove the metal plug on the front panel below the on/off switch.

2. Unscrew the plastic pipe plug and check the oil level. It should be level with the lower portion of the pipe screw threads.

3. Multigear EP-90 automotive oil is the proper lubricant for replenishing the oil supply.

D. A COMPOSITION THRUST WASHER fits over the drive shaft of the auger (worm gear). The shaft and washer should be lubricated with a few drops of tasteless oil before assembly. Mineral oil works well and is rather inexpensive.

E. THE FACE OF THE CHOPPING PLATE needs some preliminary lubrication. Hobart suggests rubbing some tallow over the surfaces before assembly. Vegetable oil will also work.

VI. TROUBLESHOOTING

A. WITH PROPER USE, THE HOBART CHOPPER should be relatively trouble-free. Most problems occur from misuse and are preventable.

B. DULL OR WORN CUTTING PLATES will not give effective results, causing "mushing" of the product. Old plates and knives may be sharpened, although in many areas replacement may be cheaper.

C. A WORN OR MISSING THRUST WASHER may result in "mushing" of the product or other forms of poor product. It is a good idea to have a couple of spares on hand and check the washer with each use. This washer fits over the shalf of the auger against the rear portion of the worm gear.

D. A COMMON PROBLEM is to assemble the throat attachment with the knife in backwards. This prevents the scissors cutting action between the knife and cutting plate and could result in a "mush" product.

E. OVER-TIGHTENING THE HANDWHEEL (collar) will make disassembly very difficult. It is best to have a fellow employee help in loosening an over-tightened collar. Do not use a hammer or other hard object to pound on the collar. This could cause nicking or chipping of the tinning on the pieces leading to corrosion and possible health problems.

F. USING OBJECTS OTHER THAN THE approved food stomper could damage the machine or cause injury to the operator.

NOTE: Safety regulations require that the throat be equipped with a guard to prevent the operator from reaching into the throat.

VII. CONCLUSION

Proper operation and simple maintenance will give many years of trouble-free service and produce quality products.

ANETS DOUGH SHEETER

INSTRUCTOR'S WORKBOOK

WORKBOOK

ANETS DOUGH SHEETER

I. FUNCTION

A. The Anets Dough Sheeter is used to roll Shakey's dough into skin form for the preparation of pizza.

II. HOW IT FUNCTIONS

A. TWO ROLLERS OF EQUAL DIAMETER, powered by an electric motor, in opposite directions.

B. DOUGH IS FED BETWEEN the rollers and is pressed flat - much like the action of an old fashioned washing machine wringer.

C. THE GAP BETWEEN THE TWO ROLLERS is gradually decreased by means of a lever until the desired thickness of the dough is attained.

III. OPERATION

A. PROCEDURE

1. Make sure machine has been *THOROUGHLY* *CLEANED* from previous use.

2. Plug in machine, press "on" button at the left-rear portion of machine. Lift safety bar to insure that it is functioning properly and will shut off machine when lifted.

3. Fill the flour tray located on top of machine with hi-gluten flour. This flour will be used to prevent the dough from sticking to the machine.

4. Set the *ROLLER* *GAP* at the desired width by moving the roller adjustment handle located on the upper portion of the operator's side of the machine. Moving the handle to the right widens the gap; moving it to the left closes the gap. Standing behind the machine, moving the handle towards you widens the gap and moving the handle away from you closes the gap.

5. Place a quantity of dough on the dough slide (the shelf or tray mounted to the rear of the rollers). Turn on the machine and feed the dough into the rollers. At this point the rotating rollers will pull the dough through and the operator acts only to guide the dough. Care must be taken to keep hands and fingers away from the rollers!

   NOTE: The "loaf" of dough must be thin enough to pass under the safety bar or it will cause the bar to lift and shut off the machine.

6. When the dough has passed completely through the rollers it may be picked up and returned to the dough slide.

7. The process of feeding the dough through the rollers and returning it to the tray is repeated.

8. With either type dough - thin or thick, the gap between the two rollers is adjusted by moving the adjustment handle before passing the dough between the rollers.

9. Each time the gap is narrowed, the dough is pressed flatter, wider and longer.

B. SAFETY FEATURES

1. This machine is equipped with a safety shut-off bar. Should an operator's fingers, hand or other foreign object begin to pass through the rollers, the safety bar lifts up which automatically shuts off the machine.

2. A *SAFETY* *GRILLE* which fits over the top of the machine and safety bar and prevents placing a hand or other object into the rollers from over the safety bar, is also available. OSHA may require this grille in many states. It may be ordered from Anets to fit existing machines.

3. While all employees should understand how the machine operates, only *QUALIFIED* and *TRAINED* employees should ever be allowed to actually operate this machine.

IV. CLEANING

A. THE MACHINE SHOULD BE CLEANED daily after each use. Unplug the machine to avoid possible injury.

B. REMOVE FLOUR TRAY

1. Place *EXCESS* *FLOUR* back into storage bin.

2. Clean flour tray thoroughly in pot sink.

C. BRUSH OR VACUUM FLOUR from machine and rolling area.

1. Remove *DOUGH* *SLIDE* and clean completely.

2. Remove back panel for easy access to motor area, brush or vacuum all flour.

3. Remove side panels and brush or vacuum out all flour buildup.

4. Thoroughly clean both *SCRAPER* *BARS* at the front of the machine of any flour or dough buildup.

5. At this point, use a damp towel to remove any clinging flour from the machine parts; the rollers, machine body, etc. Note that the damp towel is a clean towel soaked in a sanitizing solution and well wrung out. A damp towel will serve to pick up and hold onto the tiny flour particles while a wet towel will merely turn the remaining flour on the machine into paste.

D. REASSEMBLE MACHINE FOR NEXT USE:

1. Replace the back motor panel.

2. Replace both side panels.

3. Replace the dough slide.

4. Replace the flour tray.

E. TO RE-EMPHASIZE, *DAILY* cleaning of the entire machine is essential for reasons of sanitation and preventive maintenance.

V. MAINTENANCE

A. DAILY CLEANING WILL PREVENT dirt and sludge buildup (as flour mixes with oil and grease and forms a sticky paste) and extend the life of the motor, speed reducer, chain and sprockets. This buildup also poses a health hazard as it provides a good medium for bacteria growth.

B. IF DAILY USAGE OF THE MACHINE exceeds six hours, the speed reducer must be drained and refilled with Mobil 600w cylinder oil every six months. If usage is under six hours daily, this may be done annually but semi-annual change is recommended.

C. EVERY SIX MONTHS GREASE SPEED REDUCER bearings and upper and lower roller bearings with Mobil grease BRB #4 or equivalent. Application is with a grease gun.

1. Speed reducer grease nipples are reached by removing dough slide.

2. Upper and lower bearings are reached by removing left and right side panels.

3. To prevent contamination of the dough product, never apply grease to the outside plastic roller seals.

D. SHOULD THE MOTOR RUN but the rollers do not turn, a broken, loose or worn V-belt between the motor and the speed reducer may be the cause.

1. Remove the dough slide to gain access to the motor and speed reducer. Increase the belt tension or replace the belt as needed.

2. A broken chain may also be the cause. Remove the side panel opposite the operator's side and check the chain drive. Links may be purchased and replaced without special ordering.

3. The rocker arm and spring are connected to the roller adjustment handle and create the opening and closing of the roller gap. They should move freely. If they do not have free movement, free and lubricate well.

E. THE DOUGH MAY STICK TO THE ROLLERS or wrap around the rollers completely.

1. Check scraper bar assemblies for missing, broken or loose springs. Replace as needed.

2. Check scraper bar assemblies for bent, broken or encrusted scraper blades. Replace or clean as needed.

VII. CONCLUSION

The Anets dough sheeter should give trouble-free service for years with simple preventive maintenance, cleaning and lubricating procedures. Many simple repairs may be done by the operator or qualified serviceman. However, due to possible hazard caused by unqualified persons operating this piece of equipment, only well-trained and competent employees should be allowed to use a well-maintained machine.

NOTE: Regulations may prevent persons under eighteen from operating this or other hazardous equipment.

D. EVERY THIRTY DAYS APPLY OIL TO THE ROLLER CHAIN.

1. Use Mobil 600w cylinder oil (same as speed reducer).

2. Remove right side panel (opposite operator's side) and apply oil directly to entire length of roller chain.

E. THE MOTOR REQUIRES SERVICE every ten years and should be done by a qualified serviceman.

VI. COMMON PROBLEMS/TROUBLESHOOTING

A. WHENEVER MACHINE WILL NOT OPERATE, first check to see that machine is plugged in and circuit breaker or fuse has not blown.

1. Check for frayed or worn spots on electrical cord. If defective replace immediately.

2. If circuit breaker has tripped, reset and start machine. If the breaker trips again, there is a short within the machine or the motor has overheated.

3. If the motor has overheated allow it to cool five minutes, depress the reset button on top of motor and restart.

B. SHOULD THE MACHINE START, run for a few minutes, then stop or run intermittently; check for flour buildup or dirty electrical components. Unplug machine, remove and clean parts. Reassemble and restart machine. Removal and replacement of worn electrical parts and switches may be done in the same manner. If you do not feel confident or qualified to replace electrical parts, do not hesitate to call a qualified serviceman. In any case make sure the machine is unplugged before working with any electrical or mechanical parts.

C. IF THE SAFETY BAR DOES NOT OPERATE it may have simply come loose from the micro-switch which acts as the safety "off" switch.

1. Remove the panels on both sides and tighten the safety bar with an allen wrench.

2. If the bar is not loose, the micro-switch itself may have loose connections or may be defective.

3. Do not wire around a defective switch; replace it immediately.

RONDO DOUGH SHEETER

INSTRUCTOR'S WORKBOOK

WORKBOOK

RONDO DOUGH SHEETER

I. FUNCTION

The Rondo is used to roll dough to form skins for Shakey's pizza.

II. HOW IT FUNCTIONS

A. THE RONDO HAS TWO MOTOR-DRIVEN ROLLERS.

1. The rollers are arranged like those of an old-fashioned washing machine wringer.

2. Dough is fed between the rollers and is pressed out. This is the same action as a home rolling pin, only quicker and more consistent.

3. The gap between the rollers is adjustable in order to gradually thin out the dough each time it is fed through the rollers.

B. THE DOUGH IS FED THROUGH THE ROLLERS by means of conveyor belts.

1. There are two conveyor belts - one on either side of the rollers.

2. The dough is placed on the conveyor which feeds it through the rollers and directly onto the belt on the other side of the rollers which is traveling in the same direction.

3. The direction of the conveyor belt's travel is reversible.

4. After the dough is fed through in one direction, the rollers are adjusted to a smaller gap. The direction of the conveyors and rollers is reversed and the dough is fed through in the opposite direction.

5. In this manner the dough is quickly thinned out into a sheet with little (or no) handling required by the operator.

III. OPERATION

A. THE OPERATING CONTROLS are located on the operator's side of the machine with the conveyor belts extending to each side.

1. The roller gap is adjusted by turning the PISTOL GRIP swing handle.

a. Push in the black portion of the handle and turn until the lower portion of the handle fits snuggly into the desired setting notch.

b. The numbers of the graduated scale indicate the thickness of the rolled dough in millimeters.

NOTE: Every Rondo is adjusted this way and settings given for dough rolling will work on all machines.

2. The dough thickness end stop is a STAR HANDWHEEL (knob) located directly above the pistol grip on top of the roller bearing housing.

a. This feature prevents setting the roller gap too small by accident and ruining an entire sheet of dough.

b. Turn the star handwheel counterclockwise to the end of its travel.

NOTE: For thin crust dough the setting is usually 1 1/4, depending on dough consistency.

d. Turn the star handwheel clockwise until it is FINGER TIGHT. Do not overtighten as this might change the setting when the handle is released.

e. The pistol grip travel is now limited to the lowest desired setting (1 1/4 for thin crust).

f. To cancel the dough thickness end stop, simply turn the star handwheel counterclockwise to the limit of its travel.

3. The operation lever, or handle, controls the "on-off" and speed control of the machine.

a. The lever is located directly below the roller gap pistol grip.

b. When the lever is in the horizontal position, the machine is stopped.

c. Depressing the right side of the lever moves the conveyors in a left-to-right direction. The rollers also pull left-to-right.

d. Depressing the left side of the lever moves the conveyors in a right-to-left direction. The rollers also pull right-to-left.

e. The belts have two speeds. Depressing the lever to its first position operates the normal speed.

f. Further depressing the lever operates the "SYNCHRO" speed which slows the speed of the infeed belt while maintaining the normal speed of the rollers and exit belt. In this way a "drag" effect is created on dough being fed into the rollers which helps to keep the sheet of dough from bunching up and feeding into the rollers too fast and tearing.

NOTE: For thin crust dough the synchro speed should be used for setting 5 and lower.

4. The conveyor belts and safety guards are locked into a raised position when not in use.

a. The operating controls will not function with the machine guards or belts in the raised position.

b. To lower the belts, unhook the retaining lever on one belt and lower the conveyor gently, then the other. Table models have "table rest" levers or feet which the end belt assembly rests on when in the lowered position.

c. With the belts lowered into position, the machine guards (safety guards) can be lowered.

d. The safety guards remain in the upright position by a spring-type action. To lower the guard, push the guard away from the operator side and lower into position.

e. The guards act to keep the operator's hands or other foreign objects away from the rollers. Raising either guard cuts off power to the machine.

NOTE: Once the guard is lowered, power is restored.

B. REFER TO THE FOOD PREPARATION LESSON GUIDE for the proper thin and thick crust rolling techniques.

1. The recommended settings for rolling thin crust dough are: 30, 18, 12, 8 - fold in scraps, 18, 12, 8, 5, 3½, 2½, 1 3/4, 1¼.

2. The recommended settings for thick crust are: 8, 5, 3, 2, 1½.

3. A flour bin locks into place directly above the rollers to provide flour to prevent the dough sheet from sticking to itself or the machine.

C. UPON COMPLETION OF THE DAY'S ROLLING the machine is unplugged and cleaned in preparation for the next day's use.

IV. CLEANING

A. CLEANING THE RONDO requires some simple disassembly and removal of flour and dough crust buildup.

1. Unplug the machine and raise the safety guards to their locked positions.

2. Remove the FLOUR BIN by lifting it off and return any unused flour to the flour bin.

3. Remove the conveyor assemblies.

   a. Lift the belt slightly

   b. Push the conveyor belt assembly toward the rear of the machine to disengage the driving dog.

   c. Swing the belt OUTWARDS and toward you to remove it.

   d. Brush the entire belt assembly clean of flour and crust buildup. Repeat the procedure for the other belt.

   e. Turn each belt upright and turn the belt to help remove any flour from the drive and idler rollers.

4. Remove the roller scraper bars.

   a. Pull outward on the scraper lock levers.

   b. Remove the scrapers from the support sleeve guides. Remove one at a time to avoid confusion.

   c. Clean the scrapers with a clean, damp towel. Make sure the towel is well wrung out. A damp towel will act as a dust holder. A wet towel will simply turn flour into a sticky paste.

      NOTE: Do not clean scraper assemblies with hot water or in a sink as this may warp the plastic scrapers or cause the springs in the assemblies to rust.

5. BRUSH or VACUUM the entire machine to remove remaining traces of flour and crust.

6. Reassemble the machine for its next use.

   a. Hang the upper scraper into the upper scraper support sleeve.

   b. Place the lower scraper into lower scraper guides and hold down into position with fingers.

c. Turn the scraper lock levers inward over the lower scraper guides.

d. Engage the rear of the conveyor into the spring-loaded pivot pin in the rear housing.

e. Push the conveyor to the rear against the pivot pin.

f. Swing the conveyor inward until the roller bearing housing slips over the driving dog of the conveyor.

g. Check the proper engagement of the driving dog by pulling on the conveyor belt in its running direction.

h. Lift the conveyors and lock them into their raised positions until next use.

B. EVERY MONTH OR SO, REMOVE THE CONVEYOR BELTS from the drive and idler rollers to remove any flour and dough crust which may have built up there.

1. Remove the conveyor table assemblies from the machine.

2. Back off on the knurled nuts on the belt take-up screws to loosen the conveyor belt.

   NOTE: Back off each side of the belt take-up screws the same number of turns to facilitate reassembly.

3. Slide the conveyor belt off the table sideways.

4. Clean both the inner and outer surface of the belt with a wet brush and hang up to dry.

5. Clean the drive and idler rollers with a stiff brush. Make sure they are free of all flour and dough crust.

6. Replace the belts when they have dried.

   NOTE: Adjusting the belts to the correct tension and tracking is given below under maintenance.

V. MAINTENANCE

A. CORRECT BELT TENSION AND TRACKING is important to efficient operation and increased belt life.

1. The belt tension and the belt tracking, or steering, are adjusted by the KNURLED NUTS on the take-up screws on each side of the conveyor belt table.

2. Tighten the belts in such a manner that they do not run off to one side; this side being the side of lesser tension. Take up on the knurled nut on this side to increase the belt tension or, in some cases, back off on the tighter side to decrease the tension on this side.

3. The belt should only be tigntened enough to give the proper traction. As a guide to proper tension, the belt should give about 1/2" when it is pulled up.

4. The idler and drive rollers should be lubricated with a few drops of tasteless oil each month to prevent wear and squeaking. This is easily done when the belt assembly is off and in the upright position. Mineral oil works well for this.

5. Once again, proper steering and tension will increase the life of the belt.

B. THE OIL IN THE FRONT AND REAR HOUSINGS should be changed annually.

1. Remove the oil-fill plugs on the top of each housing.

2. Remove the oil-drain plugs from the front and rear housings and drain the oil.

3. Wash out each housing by pouring in kerosene and drain well. The kerosene will act as a solvent to clean out all traces of the old oil.

4. Replace the drain plugs and tighten them.

5. Refill the front housing with Mobil Fluid 62. Refill the back housing with DTE Mobil - Heavy Duty. Both housings will take about 1½ pints and show about 2/3 up on the oil level sight glass on the side of each housing.

6. Replace the oil-fill plugs and tighten them.

VI. TROUBLESHOOTING

A. SHOULD THE MACHINE FAIL TO RUN, check the following:

1. Check to make sure that the conveyor tables are engaged and that the safety guards are all the way down.

2. Check to make sure that the plug is in the receptacle properly and that the fuses or circuit breakers are not blown. The machine will not operate with one line of the three-phase circuit dead.

3. Check the reset button on the lower side or rear of the V-belt housing.

4. Have an electrician or qualified serviceman check out plugs for loose connections. Have him check also for limit switches behind the V-belt guard of the rear housing and magnetic contactors for defective contactors or coils.

B. SHOULD THE MACHINE STOP AT TIMES, check the following:

1. Check to make sure the plug is in the receptacle properly.

2. Have an electrician or qualified serviceman check for loose contacts on plugs or machine contacts, a damaged power supply cable or variations in the power supply (low voltage).

C. IF THE BELTS DO NOT PULL ANYMORE or lack power, check the tension of the V-belts in the rear housing of the machine and have them tightened as necessary.

D. IF THE ROLLERS DO NOT CLOSE COMPLETELY, check to make sure that the dough end stop has not been set.

E. A QUALIFIED SERVICEMAN SHOULD BE AVAILABLE to handle other problems which may occur.

VII. CONCLUSION

With simple care and maintenance, the Rondo Dough Sheeter will give many years of trouble-free, dependable service and quality product for the Shakey's system.

HOBART SLICER

INSTRUCTOR'S WORKBOOK

WORKBOOK

HOBART SLICER

I. FUNCTION

The Hobart Slicer is used to prepare sliced meat and vegetables for Shakey's products.

II. HOW IT FUNCTIONS

The slicer is made up of a round knife which is rotated at high speed by an electric motor and a gauge plate, or shelf, on which the product to be sliced is placed. The shelf and the knife are on the same plane and the shelf can be lowered from the knife to create a gap the width of the desired slices. A holding device is used to push the product into the knife. The high speed spinning of the sharp knife edge allows product to be sliced much more evenly and with less force than slicing manually with a chef's knife would allow.

III. OPERATION

A. BEFORE SLICING A PRODUCT, check to insure that the slicer has been cleaned from the previous use. Then follow these steps.

1. Plug the machine into a 110v socket.

2. Put either the CARRIAGE TRAY or FOOD CHUTE in place, depending upon the product to be sliced. Check your food preparation guide for the proper piece. Be careful to tighten the thumb screw only finger tight.

3. With the thickness selector dial at ZERO, place the product in the carriage tray or food chute.

   a. Adjust the FENCE on the carriage tray such that the product will move down easily but will not fall over, shift or bind as the tray moves. Then place the meat grip in place to help the product to feed evenly.

   b. Pack the food chute full enough so that the product will not fall over, but not so tightly that the product will bind and not feed. Place the PUSHER PLATE on top to help the product feed. Do not add extra weight on top of the pusher plate as the extra strain could damage the machine. (Extra strain may break the nylon bushings on the travel rod of the automatic mode.)

4. The knob or dial on the front of the machine adjusts the thickness of the slices. Refer to the Operations Manual for the proper thickness of each product to be sliced. The numbers on the dial do not indicate actual measurements but are helpful in duplicating past performances. Due to play in the dial, turn past the desired setting, then back to it. This will help insure consistent slices each time the machine is used.

5. Turn the switch to the "on" position (make sure the automatic mode is not engaged) and manually move the carriage assembly to make several slices. Check the slices for the proper thickness and adjust the thickness selector dial accordingly.

6. When the proper thickness has been attained, the slicer carriage may be shifted to power drive or automatic mode.

   a. The carriage driving arm operates whenever the slicer motor is running.

   b. Pull the carriage to the front (dial end) of the slicer.

   c. Lift the *ACTUATING* *LEVER*, on the right side of the machine on the carriage assembly, to a point where it is locked in place by the locking clip. This lever lowers a yoke, which will be picked up by an engaging roller, which is part of the automatic mode driving mechanism.

   d. Push the carriage towards the knife about two inches where it will be picked up automatically and operated by power.

   e. Always pull the carriage to the front to the end of its travel before engaging the carriage power drive.

   f. To stop the carriage, either turn off the power or release the power drive by gently tapping the locking clip.

   g. If the locking clip is tapped when the carriage is at the end of its stroke closest to the operator, it will stop instantly. This eliminates carriage coasting which might give an uncertain stopping position.

   h. Many slicers have two speeds for the automatic power drive - a regular and a fast speed. The slicer knife speed remains constant; only the automatic drive speed changes. Pulling out and up on the knob below the selector dial engages the fast speed. The "in" position engages the regular speed. For the products Shakey's uses, only the regular speed is recommended. The fast speed could cause uneven slicing or "tearing" of the product or undue wear to the slicer itself.

7. When the food product has been completely sliced, turn the switch to "off" and *UNPLUG* the machine as a safety precaution against accidental running of the slicer knife during cleaning. Turn the selector knob to the full closed position -zero.

8. Clean and sanitize the machine for the next use.

B. SAFETY FEATURES

1. Guards fit over the face and bottom of the knife in such a way that only the edge facing the product to be sliced is exposed.

2. The meat grip and pusher plate are used to hold the product in place while it is sliced rather than the hands and fingers.

IV. CLEANING

A. THE SLICER SHOULD BE *CLEANED* and *SANITIZED* immediately after slicing a particular product to prevent undue bacteria growth on the slicer itself or cross-contamination of the additional products to be sliced.

B. THE STEPS IN CLEANING AND SANITIZING the slicer are as follows:

NOTE: Exercise extreme caution when cleaning the slicer as proper cleaning will require the knife to be completely exposed. Only qualified, well trained and supervised employees should be allowed to operate and clean the slicer. Also, allow enough time for thorough and unhurried cleaning. Rushing through the cleaning steps is an invitation to injury.

1. Make sure that the selector dial is at *ZERO* (completely closed) and that the slicer is *UNPLUGGED*.

2. Assemble the cleaning materials - stick sponge, clean cloths, detergent solution and sanitizing solution.

3. Wipe off any large scraps of product, using a *STICK SPONGE*.

4. Dip the stick sponge into the cleaning solution and wring it out. Wipe down the entire slicer, taking care around the gauge plate and blade.

NOTE: Emphasize that the gauge plate must be in its fully-closed position (selector dial at zero) throughout the cleaning process for safety.

5. Loosen the two retaining knobs of the top knife guard. One is at the rear of the knife (12 o'clock, looking from above) and the other is at the left edge of the knife (9 o'clock). Rotate the knife guard clockwise to clear slots at the screw heads and unhook from the stud. Lift off the guard.

6. With the top guard removed, the lower guard may be removed by unscrewing the knob on the left underside of the bottom knife guard.

7. These guards may be taken to a sink for cleaning. Do not clean aluminum parts, such as the bottom of knife guard, in harsh detergents as it will cause the parts to oxidize and discolor. Sanitize these parts with a cloth or stick sponge dipped in sanitizing solution and allow them to air dry.

8. Carefully clean both sides of the knife with the stick sponge dipped in cleaning solution. Make sure the knife is completely clean of product, soil and grease.

   NOTE: The terms "knife" and "blade" are essentially the same. Since Hobart refers to this part as a "knife", this term is used throughout the lesson.

9. Rinsing and sanitizing of the entire slicer can be done with a stick sponge dipped in sanitizer and wrung out so that it leaves the machine wet but not dripping. Make sure all surfaces are sanitized and allowed to air dry. Air drying will prevent possible contamination from towels.

10. Reassemble the two guards using the reverse of the disassembly procedure. Once again, take care to avoid injury and to protect the knife from damage when removing or assembling the guards.

11. Allow all surfaces to air dry. Do not wipe.

12. Note that cleaning should include the work area around and under the slicer. The newer model slicers are equipped with a lever-foot to raise the slicer body to aid in cleaning underneath the slicer. This slicer should never be operated in this "up" position. Lower the slicer after cleaning.

V. MAINTENANCE

A. MAINTENANCE OF THE HOBART SLICER consists of *SHARPENING* the knife edge as needed and periodic *LUBRICATION* lubrication of the slicer's moving parts.

B. THE SLICER IS EQUIPPED WITH a stainless steel knife and a sharpening attachment. When not in use, the sharpener should be stored in the slot on the right side of the machine. The steps for sharpening the knife are as follows:

1. Make sure the knife guards are in place and that the knife is *CLEAN*, *DRY* and *GREASE FREE*. Unplug the machine.

2. Remove the carriage tray or food chute and set the slice adjusting dial at 50.

3. Remove the sharpener from its slot. Unscrew the thumbscrew until it slips upward into the slot at the bottom of the gauge plate. Push the sharpener up firmly with the right hand to remove any rocking tendency and tighten the thumbscrew with the left hand. When correctly positioned, the sharpening stone and truing stone will "sandwich" the knife edge.

   NOTE: Be sure the automatic mode is not engaged or the handle could "hook" the operator's arm when it is turned on and pull it into the exposed portion of the knife.

4. Plug in the machine and turn on the motor. Turn the slice adjustment dial to the right (close) until the grinding wheel contacts the beveled side of the knife edge. *MODERATE* *PRESSURE* for about three to four-second intervals is sufficient.

5. Turn off the machine and allow the knife to come to a complete stop. Unplug the machine and check to see if a *BURR* has developed on the opposite face of the knife. This can be done safely by running an eraser tip lightly across the knife edge. A slight tugging feeling indicates that a burr has developed.

6. As soon as the burr develops, turn on the machine and bring the grinding wheel into contact with the beveled edge of the knife. Depress the truing stone and grind and true simulaneously for approximately three seconds.

7. Release the truing stone and grinding wheel at the same time.

8. Turn off the machine and unplug it. When the knife comes to a complete stop check for the characteristic grind marks on the beveled edge of the knife. A common error is to try to sharpen with a grease-loaded stone which which will not cut. A grease-loaded stone is best cleaned with lemon extract and a towel.

9. Stop the motor, unplug the machine and remove the sharpener and return it to its slot at the side of the machine. Set the dial back to zero.

10. After sharpening, the slicer should be cleaned again to remove any dust or dirt resulting from sharpening.

11. The adjustments on the sharpening stone are factory set for best operation of the machine. A service call may be advisable if these settings change through usage.

C. VERY LITTLE LUBRICATION IS NEEDED to keep the slicer functioning well. These lubrication points, as well as some other parts which may require infrequent service, are given below.

1. The upper and lower *CARRIAGE ASSEMBLY SLIDE RODS* should be lubricated weekly with a few drops of oil (light machine oil or mineral oil will do). These rods are reached from the right side of the machine and are readily visible when looking into the slicer from the right-hand side.

2. Keep the two *GAUGE PLATE SLIDE RODS* lubricated with a drop or two of tasteless oil as required. Hobart supplies a tasteless oil; however, mineral oil will do.

3. Keep the meat grip slide rod of the carriage tray attachment clean but do not lubricate it.

4. The slicer power transmission, including the knife shaft drive and the speed change gears, are lubricated by a medium-weight transmission oil circulated by a gear pump. The transmission was filled to the oil level screw at the time of its installation. Each year, drain the oil by tilting the machine on its side (panel up) and removing the drain screw. Return the machine to level position and the oil will drain out. Refill with a medium-weight transmission oil. A qualified serviceman can perform this task.

5. The motor and motor bearings are permanently lubricated requiring no service.

VI. TROUBLESHOOTING

A. RELATIVELY MINOR PROBLEMS with the slicer may not render this machine totally inoperable but may seriously impair the slicer's efficiency. The result is a waste of time and money in both labor and product dollars.

B. THE MAJORITY OF SLICER PROBLEMS center around the knife.

1. If the knife guards are not fitted properly into place (especially the top guard), they may scrape against the knife causing wear and a loud scraping noise. Simply remove and replace the guards into their positions making sure that the knob of the bottom guard is tightened firmly and that the top guard is fitted snuggly into the two stud slots and tightened down.

2. The carriage slot is fitted with a set screw to adjust the gap between the carriage tray or food chute and the knife and top knife guard. If the carriage tray or food chute attachments should scrape or hit against the knife edge or top guard, simply unscrew the set screw in the carriage slot until there is about 1/16" clearance between the carriage attachment and knife.

C.. A DULL OR DAMAGED KNIFE EDGE is the primary cause of inefficient slicer operation and will be looked at in detail.

1. The knife edge must be ground to a sharp edge - not honed. A grease impregnated stone or a truing stone mistakenly put in place of the grinding stone will not give a proper edge to the knife.

2. Grinding stones wear down with use. If it wears to a point where a ridge is developing on the inside portion of the stone, it is actually taking the edge off of the knife. An extra grinding stone for the sharpener should be kept on hand and worn stones replaced as needed.

3. Unlike most kitchen knives, the knife of the slicer has a single bevel edge. The top of the slicer knife is flat and the bottom portion of the edge only is angled. A common problem is that too much pressure is placed on the truing stone during sharpening which tends to put a bevel on the upper portion of the knife as well as the bottom. This will cut the efficiency of the knife. The purpose of the truing stone is only to remove the burr developed by this grinding stone.

4. The angle of the bevel on the knife edge has been determined to give the most efficient slicing. The angle of the grinding stone was factory set to maintain this angle over time. However, this angle may change. Should this happen, you will notice a second bevel or angle appearing toward the outer edge of the knife edge. The angle of the grinding stone can be adjusted by loosening a set screw on the grinding wheel portion of the sharpening attachment. With the sharpener in place and the set screw loosened, the angle of the stone can be matched to that of the original angle of the knife bevel. Also, Hobart makes a knife template set at the correct knife bevel angle for periodic checking of the knife. Although it is possible to make these adjustments in the parlor, it may be advisable to have a qualified serviceman perform them due to the importance of a well operating slicer for quality preparation of product.

5. After a number of sharpenings, the gap between the knife edge and the gauge plate may increase. If the gap reaches or exceeds about 1/16", the gauge plate should be readjusted.

   a. Loosen the two hex nuts on the lower part of the gauge plate by the gauge plate slides.

   b. Move the gauge plate closer to the knife - about 1/32"

   c. Align the gauge plate in a plane with the knife. A straight edge must lie flat across the knife and gauge plate. Tighten the hex nuts.

6. The minimum diameter of the knife is 11 3/16". When the knife wears beyond this limit it must be replaced.

7. It should be noted that if the slicer operation and maintenance procedures are kept up, these troubleshooting steps may never be necessary or, at the most, infrequently.

VII. CONCLUSION

When all the time spent in food preparation at the the slicer and the amount of product dependent on the slicer for preparation is taken into consideration, the importance of a well functioning slicer is almost beyond exaggeration. Product quality and cost control make it essential that Shakey's employees using the slicer understand its safe operation and maintenance.

HOBART SCALE

INSTRUCTOR'S WORKBOOK

WORKBOOK

HOBART PLATFORM (or Beam) SCALE

I. FUNCTION

This scale is capable of giving accurate weights from one to several hundred pounds. Its accuracy range makes it very practical for checking product weights during the receiving process and weighing product for proper food preparation.

II. HOW IT FUNCTIONS

The beam scale uses the principle of leverage and counterbalance weights to give accurate weights of items. The platform of the scale rests on levers. When an item is placed on the platform, the levers displace an arm, or beam. Counterweights placed on the beam will bring it to level, or balance. The beam is calibrated such that the position of the counterwieght along the arm indicates the weight of the object. Since the scale does not rely on springs or other devices, it is very accurate over the entire range of the scale's capacity.

III. METHOD OF OPERATION

A. PLACE THE LOAD TO BE WEIGHED on the platform with a minimum of *SHOCK* and as close to the *CENTER* as possible.

NOTE: Do not place food product directly on platform. Place the product into an NSF approved container first for sanitary reasons. Weigh the container by itself first. When the product and container are placed on the scale together, you may subtract the weight of the container to give the weight of the product alone.

B. APPLY *COUNTERPOISE* *WEIGHT* (if supplied) to a value greater than the estimated load weight. If the scale is "full capacity" these weights are built into the main beam poise assembly. Loads of up to 100 pounds may be weighed without supplying additional counterpoise weight.

C. OPERATE THE TRIG (beam lock) to release the beam. The trig should always be in the locked position when the scale is not in use.

D. IF THE BEAM DOES NOT RISE, apply additional counterpoise weights until it does. Slide the poise along the beam until it balances horizontally. If the beam does not balance before the poise moves off the graduated scale, additional counterpoise weight is required. When the beam balances, the weight of the load is the value indicated by the counterpoise weights plus the reading on the beam indicated by the poise index(es).

E. EITHER OPERATE THE TRIG TO LOCK THE BEAM, or operate the fulcrum lever handle to lower the lever system.

F. REMOVE THE LOAD.

G. A POISE MAY BE LOCKED at a desired reading by the poise lock screw.

H. THE TRIG, OR BEAM LOCK is a safety device to prevent jarring of the beam when a heavy load is placed on the platform.

IV. CLEANING

A. THE SCALE SHOULD BE KEPT *DRY* and free of *DUST* and *DIRT*.

B. A BRUSH, VACUUM OR JET OF CO_2 may be used to keep the working mechanism clean.

C. A CLEAN, DAMP BAR TOWEL may be used to clean the platform and upper painted portions of the scale.

V. MAINTENANCE

A. FREQUENTLY CHECK FOR *CORRECT* *BALANCE* of the beam with no load and the poise at "zero" with no counterpoise weights.

NOTE: Before doing the following steps, make sure the bubble level is centered in the gauge at the base of the platform.

1. If it does not balance, a set screw located under the cap assembly by the pillar, can be adjusted to bring the beam to balance.

2. Should the beam still not balance, lead shot weight may be added or removed to the counterpoise assembly to bring the beam to balance.

B. KEEP THE BEAM LOCKED at all times until the load has been applied to the platform. This will prevent jarring and possible damage to the mechanism.

C. DO NOT OVERLOAD THE SCALE.

D. DO NOT OIL ANY PART OF THE SCALE.

E. KEEP THE SCALE CLEAN AND DRY AT ALL TIMES.

F. HAVE THE OPERATION OF THE SCALE checked by a qualified serviceman at regular intervals. Usage will dictate how often but every six months to a year may be a good rule of thumb.

NOTE: Some areas may require regular certification of scale accuracy.

VI. TROUBLESHOOTING

If the scale fails to operate after rechecking the operations and maintenance points, a call to a qualified serviceman may be necessary. The simplicity of the unit precludes much in the way of troubleshooting.

VII. CONCLUSION

The beam scale is an extremely important piece of equipment in the implementation of an effective cost control program in the parlor. It will give good service for may years with a minimum of maintenance if it is not abused.

CO_2 SYSTEM

INSTRUCTOR'S WORKBOOK

WORKBOOK

CARBON DIOXIDE (CO_2) SYSTEMS

I. FUNCTION

CO_2 systems are used to propel beer dispensing systems and soft drink syrup and to provide carbonation for soft drinks.

II. HOW IT FUNCTIONS

A. THE CO_2 SYSTEM has a *CYLINDER* and *REGULATOR* which supplies carbon dioxide gas to the soft drink and beer dispensing equipment.

1. CO_2 is a colorless gas with a slightly pungent odor and a slightly acid taste.

2. CO_2 gas is stored in the cylinder under extremely high pressure (from 800 to 1000 psi - pounds per square inch).

3. The regulator controls the flow of CO_2 gas from the cylinder, through lines to the dispensing equipment.

   a. This high pressure regulator *STEPS* *DOWN* the high pressure within the cylinder to a lower pressure usage within the dispensing system.

   b. A second low-pressure regulator is used to further reduce the pressure to properly balance the dispensing unit.

4. CO_2 gas flows through lines to soft drink syrup tanks and beer kegs and to the soft drink carbonator.

   a. The gas *PRESSURIZES* the syrup tank and forces syrup through lines to the soda dispenser head.

   b. The gas pressurizes beer kegs in a like manner to force beer through lines to the dispensing faucet.

   c. A constant flow of CO_2 to the carbonator is used to make soda water needed to mix with syrup at the dispenser head to make soft drinks.

   NOTE: The actual pressures recommended for the different dispensing systems may be found in the "Trouble-shooting" section of this lesson guide.

III. OPERATION

A. ONCE A CO_2 CYLINDER has been attached to the regulator valve, the system is operating. A CO_2 system may then be considered in constant operation.

B. THE KEY IN THE OPERATION of a CO_2 system is the proper handling and connecting of the CO_2 cylinder or tank. The connecting steps for a CO_2 tank are as follows:

1. Turn off valve on empty CO_2 tank completely by turning valve clockwise as far as it will go.

2. If regulator valve has an outlet valve, turn this to the "off" or "closed" position.

3. Remove regulator from the CO_2 tank by unscrewing collar nut. Replace safety cap on used CO_2 cylinder.

4. Remove safety cap from full CO_2 cylinder. Open cylinder valve slightly to blow out any dust, then close valve. Attach regulator by screwing on collar nut using a new fiber washer to prevent gas leakage. Most CO_2 services attach new washers to full cylinders.

5. Open CO_2 cylinder valve by turning counter-clockwise _____ *COMPLETELY* _____.

6. If regulator valve has an outlet valve, turn to the "on" or "open" position. The system is now in operation.

C. SAFETY - Regardless of size, each CO_2 cylinder has 800 pounds or more per square inch of pressure within. The potential danger is explosion or breakage which could turn the cylinder into a destructive torpedo. The following handling procedures are important to safe operation:

1. Heat will _____ *INCREASE* _____ pressure within the cylinder - store all cylinders away from heat sources such as water heaters.

2. CO_2 cylinders are designed to be operated in an upright position. Do not store or use a cylinder on its side.

3. OSHA regulations require that each CO_2 cylinder in use or in storage be held securely in place by a chain connected to a wall. This prevents a cylinder from falling over and injuring someone or breaking the valve which would turn the cylinder into a torpedo or bomb.

4. Caps which screw over the cylinder valve are required by OSHA for each cylinder not in use. This prevents accidental damage to the cylinder valve.

5. If CO_2 cylinders have to be moved from area to area, care should be taken due to the weight of the cylinder and the potential danger of a damaged cylinder. A dolly designed for cylinders is recommended if frequent moving of cylinders is required. When possible, store all CO_2 cylinders near the beer and soda dispensing equipment. A few extra feet of line on the regulator valve will enable you to move from cylinder to cylinder, making it unnecessary to move any cylinders except when replenishing the supply from the purveyor.

IV. CLEANING

A. THE CO_2 SYSTEM itself is self-contained and requires little special attention in cleaning.

1. Regulator valves should be checked when changing cylinders and brushed or blown free of dirt or dust.

2. CO_2 cylinder storage areas and the lines running from the regulators to the dispensing equipment should be kept free of litter, debris, dirt and dust buildup as part of the normal daily, weekly and monthly parlor housekeeping duties.

B. YEARLY, THE CO_2 LINES should be flushed out by a qualified serviceman.

V. MAINTENANCE

Once a CO_2 system has been installed and the regulator pressures properly adjusted, the system should not require any further maintenance other than the proper connection of the CO_2 cylinders and the protection of the regulators, cylinders and lines from dirt and abuse.

VI. TROUBLESHOOTING

A. WHILE THE BASIC PRINCIPLE under which a CO_2 system operates is simple, actual balancing of pressures within the system is complex and is determined by several variables.

1. The diameter of the CO_2 lines affects the pressure.

2. The material of the lines affects the pressure (vinyl, plastic, rubber, etc.).

3. The number of feet of line from the cylinder to the dispensing equipment affects the pressure.

4. Each brand of soft drink syrup tank, beer keg and carbonator may require its own pressure.

5. For these reasons pressure balancing should be left to a qualified serviceman. The local soda, beer and CO_2 purveyors may offer help in this area.

B. BE FAMILIAR WITH SOME COMMON PROBLEMS

1. Is the CO_2 cylinder empty or simply shut off?

2. Are there leaks in the lines or a leaky fiber washer?

3. Are the pressures properly set? The following are only guidelines to determine whether a service call is required:

   a. 800 - 1000 psi - full cylinder pressure

   b. 90 - 100 psi - soda tank pressure

   c. 18 - 22 psi - beer tank pressure

   d. 21 - 35 psi - carbonator to dispenser pressure (7 - 10 psi for diet drinks)

4. Note again that system problems are best handled by qualified servicemen.

VII. CONCLUSION

The simple understanding and proper handling of the CO_2 System will help insure trouble-free operation.

HEATING & AIR CONDITIONING

INSTRUCTOR'S WORKBOOK

WORKBOOK

HEATING AND AIR-CONDITIONING SYSTEMS

I. FUNCTION

The heating and air-conditioning systems provide warm air in the cold winter months and cool air in the hot summer months. These systems may also include air purifiers or dehumidifiers; but the furnace and air-conditioning units are the heart of the heating, ventilating and air-conditioning systems.

II. HOW IT FUNCTIONS

A. THE ENVIRONMENTAL AIR SYSTEM consists of three basic parts; the ventilating system, the heating system and the air-conditioning system.

B. THE PURPOSE OF THE VENTILATING SYSTEM is to maintain a comfortable, clean smelling environment within the building.

1. EXHAUST FANS are used to remove stale, contaminated air.

2. Fresh air intake fans draw air from the outside to replace the stale air removed from the inside. AIR FILTERS clean the air as it enters the system.

3. The exhaust fans and intake fans are balanced so that slightly more fresh air enters the building than is removed. This builds a positive air pressure within the building. This constant "pushing out" action helps keep drafts and contaminated air out. A negative air pressure would create a "sucking in" action which would tend to draw drafts, dust and other contaminants into the building.

4. The air from the system is carried to the different areas of the building by ductwork.

C. THE HEATING SYSTEM takes the air drawn in from the ventilation system.

1. A furnace or other burner type arrangement heats this air.

2. Natural gas, fuel oil and electricity are common fuels to these burner systems.

3. The warmed air travels through the ventilation system ductwork and enters the building. Diffusers or grilles help spread the warm air throughout the building.

4. A *THERMOSTAT* (or perhaps more than one) senses the air temperature within the building and controls the heating.

D. THE AIR-CONDITIONING SYSTEM, as with the heating system, takes the air which is drawn in by the ventilation system.

1. The air-conditioning system cools this air which is passed through the ventilating system and is fed into the building in the same manner as warm air from the heating system.

2. An air-conditioning system cools a building by removing the heat from the air within the building. The definition of cold is simply the absence of heat. The more heat the system removes, the cooler the building becomes.

3. Air from the building is passed over the cooling coils of the air conditioner which removes, or "absorbs" the heat.

4. This cooler air is channeled back into the building by the ventilating system.

5. The cooling coils use the principle of evaporation to remove heat from the air. It requires heat to turn a liquid into a gas and that heat is lost when the change from liquid to gas is made.

6. Freon, which is a gas at normal temperatures, is placed into the air-conditioning system in a liquid state and is circulated through the tubing of the cooling coils.

7. Since it takes very little heat to "evaporate" or turn freon back into a gas, the heat from the air passing over the cooling coils is readily absorbed and the air is cooled.

8. The compressor of the air-conditioning system squeezes the evaporated freon back into a liquid, recycles it through the tubing and the cooling process continues until the building is cool enough and the thermostat shuts off the system.

E. THE VENTILATION SYSTEM, heating system and air-conditioning system are each an integral part of the overall environmental air system.

III. OPERATION

A. THE HEATING AND AIR-CONDITIONING SYSTEMS are operated by one or more thermostats.

1. In many cases, one thermostat controls both heating and cooling. The desired temperature is set and the proper unit is automatically controlled.

2. In some systems, one thermostat controls heating and cooling but not automatically. The heating or cooling unit is selected manually.

B. IN ADDITION TO THE HEATING AND COOLING UNITS, the ventilation system may have separate controls.

1. These controls may be located separately from the heating and cooling thermostats.

2. These controls may be a part of the thermostats and labeled as "fan" with "off", "on" or "automatic" positions.

IV. CLEANING

Since cleaning and maintenance of this piece of equipment is the same, details of cleaning required are given below in the maintenance section.

V. MAINTENANCE

Monthly, quarterly and annual maintenance should be performed on the ventilating, heating and air-conditioning portions of the environmental air system.

A. THE VENTILATING SYSTEM

1. Each month, check the blades of the exhaust fans and remove any *DIRT* and *GREASE* which might have accumulated on them.

a. An excessive buildup of dirt and grease on fan blades will not only cause the blades to run out of balance, damaging the motor bearings, but will also cut down the amount of air volume the fan can handle.

b. If the pulleys are in proper alignment, the belts will be straight. You can quickly check the alignment by holding a yardstick or other straight device parallel with the belt and pulleys (with the system off).

c. To clean the fan blades, first turn off the power to the system at the fuse box or breaker panel. With the fans off, a detergent or degreaser or a stiff brush may be used to clean fan blades.

2. Each month when checking the exhaust fans, check the air intake screen.

   a. The screen allows fresh air to enter the system but keeps out birds, paper and other debris. It should be *1/2"* x *1/2"* mesh. Smaller mesh screen becomes clogged too quickly.

   b. Check to make sure the air intake fits snuggly to the system with no air leaks. Replace or repair caulking as necessary.

3. Check the *V-BELTS* and *PULLEYS* each month for wear and alignment.

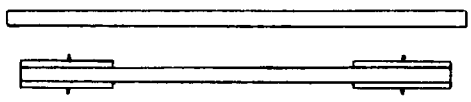
   a. Check with the system stopped. If the belts are frayed, cracked or split, replace them. If two belts are used on a system, replace them both. Don't try to save pennies when buying belts. Good quality is more than worth the money.

   b. At this time check for proper belt tension. The belt should give about *5/8"* when you press on it. (Make sure the system is stopped.) If the tension isn't correct, use the motor mount adjusting screw to obtain the correct tension.

4. Check the pulleys for wear and proper alignment.

   a. If the pulley grooves are excessively worn or unevenly worn, they should be replaced.

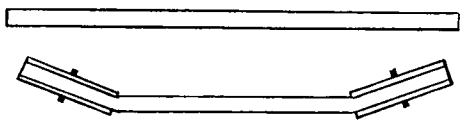
   b. If the pulleys are in proper alignment, the belts will be straight. You can quickly check the alignment by holding a yardstick or other straight device parallel with the belt and pulleys (with the system off).



Straight Edge

Correct Alignment

   c. If the pulleys are in angular misalignment, loosen the motor mounting bolts and tap the motor base until the pulleys are in alignment; then tighten the motor mounting bolts.



Angular Misalignment

d. If the pulleys are in parallel misalignment, loosen the set screws holding the pulleys in place on their shafts and gently tap the pulleys back into alignment. Tighten the pulley's set screws when the alignment is achieved.

Parallel Misalignment

5. Clean the air supply and return grilles regularly as needed. This could be monthly, weekly or even daily as determined by the dust and grease buildup.

   a. These grilles are designed to direct proper air flow without causing blasts of air. You must take care in removing and cleaning these grilles not to change the direction of the grille vanes.

   b. Hot, soapy water works well to clean greasy grilles. Where grease is not a problem, a good brushing or vacuuming will normally remove dust and dirt.

6. Check the ductwork each month.

   a. Use silver duct tape to repair any joints which might be leaking air.

   b. The ductwork should be relatively level to prevent an accumulation of water. Low or sagging sections should be secured.

   c. It is a good idea to have a professional check the ductwork periodically. Each season when a qualified serviceman checks the heating or air-conditioning system, he can check the ductwork.

B. MAINTENANCE OF THE HEATING SYSTEM deals mainly with the heating controls.

1. Visually check the heating system for damaged parts, dirt accumulation, loose or disconnected parts. This should be done *MONTHLY*.

2. If the system uses finned coils, gently remove any dirt which might have accumulated between the fins. Do not damage the fins.

3. Wall thermostats have an easy to remove cover which permits you to visually inspect the inside of the thermostat. If dust or dirt are present, use a very soft brush such as an artist's brush to remove the dust.

4. Thermostats are very delicate. When effecting maintenance, do not use pressure or force which might damage them.

5. If the wall thermostat is not properly located in the room, you might be wasting a lot of fuel and your heating system might not be delivering all the heat you are paying for. The thermostat should be located away from sunlight, heat lights or food warmers.

   The thermostat should be located where it is sensing *GENERAL ROOM TEMPERATURE*.

C. MAINTAINING THE AIR-CONDITIONING SYSTEM involves some simple cleaning and checks.

1. The cooling coil is made up of aluminum fins. These fins must be kept free of dirt and dust in order for the system to function properly. Although the cooling coil is located within the system, condensation can cause dirt and grease to adhere to the areas between the fins reducing cooling efficiency.

   a. Use a stiff brush to remove surface dirt. Do not exert too much pressure or brush "against" the fins as both can bend the fins reducing the efficiency of the coil. Brush in the same direction as the fins.

   b. Use a hose to wet the discharge side of the coil; then spray liquid detergent into the coil from both sides covering the entire coil thickness.

   c. After the detergent has stood for about five minutes, begin spraying the bottom of the discharge side with a hose. Continue spraying until clear water comes through the intake side. Continue moving higher on the coil moving the hose from side to side until the entire coil is free of dirt and detergent.

   d. Remove the condensate pan from under the cooling coil. Check the pan for leaks and use a stiff wire to clean out the drain.

   e. Vacuum all loose dirt from both the floor and the coil.

   f. This should be done every three months.

2. During the summer months, the condenser coil should be cleaned monthly. Built-up dirt and grease or damaged fins can reduce the efficiency of the condenser coil. (The condenser coil is essential in allowing the compressor to turn the freon gas back into liquid.)

a. Use a brush to clean both sides of the coil. Follow the same precautions as listed for the cooling coil.

b. Spray the coil fins with liquid detergent and hose with water until dirt and detergent are removed.

3. Check the refrigerant pipes for leaks monthly. If oil deposits are found on joints, lines and fittings, tighten the fitting and contact a serviceman to recharge the system.

D. AIR FILTERS

The air filters are extremely important to a well functioning environmental air system. Clean air filters are the *PRIMARY* *PREVENTIVE* *MAINTENANCE* *TOOL* in keeping your system functioning.

1. The function of an air filter is to let air into a building while keeping out air-carried dirt, insects, leaves and other contaminants.

2. The importance of keeping air filters clean cannot be stressed too strongly.

   a. A dirty filter cannot do its primary job - to filter out unwanted contaminants.

   b. A dirty filter will not allow a heating or air-conditioning system to work to its full potential.

   c. A dirty filter places undue strain on the entire system and can cause the system to break down.

3. Check filters frequently and change them when needed - at least *ONCE* a *MONTH*.

   a. Have spare filters on hand.

   b. Shut off the fan and hang a "Do Not Use" sign on the fan switch when changing filters. This will prevent accidental starting of the fan and possible injury. Many systems have shut-off switches on the roof.

   c. When installing filters make sure they fit snuggly. Check for open spaces between filters. Make sure they fit tightly against the sides of the furnace of air-conditioning unit.

E. THE FOLLOWING IS A PERIODIC MAINTENANCE CHECKLIST:

Monthly

1. Change air filters.
2. Check fan belts for wear and alignment.
3. Brush condenser coil (summer).
4. Keep fresh air intake clean.
5. Clean and check thermostats.

Every Three Months

1. Clean the cooling coil.
2. Clean out the condensate pan and drain line (summer).
3. Lubricate all motors and bearings.
4. Check and tighten electrical connections.

Annually

1. Replace damaged, cracked and dried-out caulking and weather-stripping.
2. Remove rust areas and recover with rust-proof paint.
3. Replace all drive belts.
4. Check and tighten bolts, screws and nuts on components.
5. Vacuum the blower compartment and assembly.
6. Check the condition of the flashing and pitch pan on the roof.

F. SHOULD YOUR HEATING OR AIR-CONDITIONING SYSTEM be shut down during off months, get it ready ahead of time for the next season.

1. With an air-conditioning system, call your serviceman ahead of time to make sure he is not tied up and can get your system ready for hot weather. Have him perform the following:
   a. Inspect and operate all safety devices.
   b. Inspect and tighten all electrical connections.
   c. Check the freon charge in the system.

d. Check the high and low pressure gauge for accuracy.

e. Inspect the function and condition of the condenser coil, fan, drive motor and belts.

f. Inspect duct and pipe connections.

g. Clean and service the heating system so it can be shut down for the summer (if the heating system is not needed in the cooling system).

2. A serviceman should perform the following functions when preparing your heating system for winter:

a. Inspect and operate heating controls and safety devices.

b. Adjust the pilot light flame.

c. Clean the pilot nozzle.

d. Check combustion and light off of main burner flame.

e. Make necessary adjustments to electrical connection belts and motors.

G. EVAPORATIVE COOLERS (also called swamp coolers) are often used to cool kitchens or sculleries. These units are effective only in areas where the air is dry.

1. An evaporative cooler consists of a blower fan, water pump, large filters, a sump and a float valve that maintains the water level in the sump.

a. The pump circulates water from the sump over the filters while outside air is drawn through the wet filters.

b. The air is cooled by the evaporation of the water and is discharged into the area to be cooled.

2. Maintenance of the blower fan, fan belt and diffuser is the same as for the similar equipment on air-conditioning equipment.

3. The sump should be drained, cleaned and painted to protect against rust before the cooling season.

4. The pump should be checked before the cooling season to make sure it turns freely. Be sure the pump housing and water tubes are not clogged with sediment and lime.

5. Replace the large filters each year before the cooling season.

6. The unit should be shut down at the end of the cooling season.

   a. Shut off the water supply. If freezing weather is anticipated, be sure the water supply is shut off inside the building and that the line is drained.

   b. Drain and clean the sump. Leave the drain open to prevent accumulation of water during the winter months.

VI. TROUBLESHOOTING

A. AS WITH ANY EQUIPMENT, PROPER MAINTENANCE will prevent most breakdowns. A survey of heating and air-conditioning service companies indicated that between 80% and 85% of all service calls could have been avoided if simple, routine preventive maintenance checks of the system had been made. A qualified serviceman should be called to handle problems other than simple cleaning and maintenance steps given above.

B. SHOULD THE HEATING, COOLING OR VENTILATING fail to operate up to par or fail completely, check the following:

1. Check the circuit panel and thermostat to make sure the system is getting power and is turned on.

2. Make sure the temperature setting is correct on the thermostat.

3. Check for blocked or dirty air filters.

4. Check for burned out fan motors, motor bearings and broken, loose or misaligned V-belts.

5. Check for broken parts, loose or unconnected electric wiring.

6. Check for blocked or inadequate air supply through the condensing coils (dirty coil fins).

7. Check for refrigerant leaks (air conditioning system).

8. Check to make sure pilot lights are lit.

VII. CONCLUSION

A comfortable parlor environment is important to maintain and increase sales volume. A well maintained and functioning environmental air system insures that this comfortable environment will be maintained. Expensive repair bills and customer and employee discomfort due to system shutdown will also be avoided.