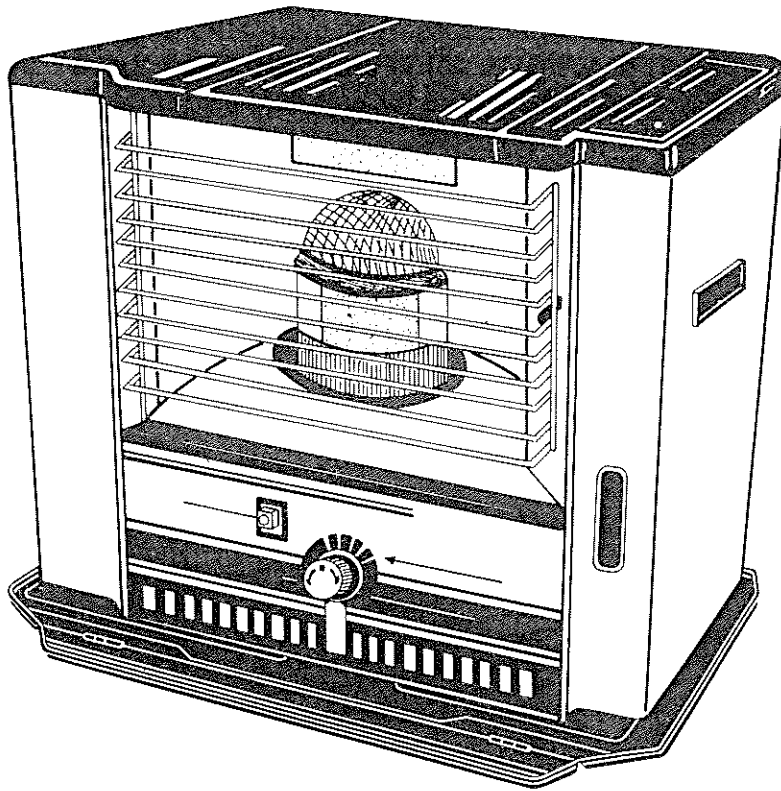


KEROSENE HEATER

Operation & Maintenance Handbook

For Models 3510 & 4510



3510/4510

IMPORTANT READ ALL CAUTION WARNINGS AND INSTRUCTIONS BEFORE OPERATING THIS UNIT

Your Kerosene Heater is equipped with push-button igniting and automatic extinguishing features. Provided are two 1.5 volt D-size batteries which supply power for the push-button igniter. The automatic extinguishing device lowers the wick instantly in the event that the heater is accidentally jarred or tipped over and may also be activated by pushing the button in the front of the cabinet.

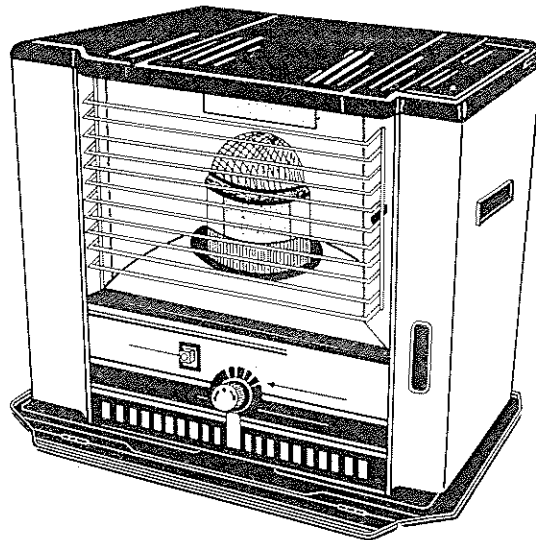
INSPECTION AND ASSEMBLY

We suggest that you save all packaging and carton material. This may be used to repack and store your heater when not in use.

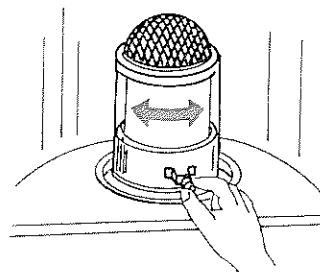
1. Remove and put aside the two (2) 1.5 volt D-size batteries.
2. Remove top protective packing.
3. Carefully lift out the heater from carton using carrying handles. Remove additional protective packing, taking extra care to remove fact tag hanging from the grill.
4. Open the grill by pulling straight out at the latch again checking to see that the fact tag has been removed.
5. Carefully remove the chimney assembly and all its protective packaging, including the corrugated ring underneath. Separate the chimney assembly from the packing and position it on the wick assembly.

After the chimney assembly is in place, be sure it rotates easily left and right. This assures the assembly will lie securely over the wick.

Caution: Misaligning the chimney assembly could cause smoke or possible damage to the heater.



6. Close the Grill.
7. Install the two batteries in the position shown on the battery case in the rear of the cabinet.
8. Return all protective packaging to the carton and store for future use.



3510/4510

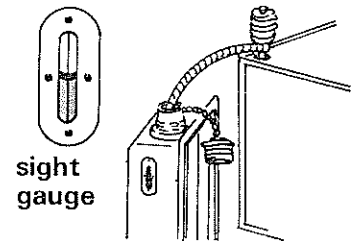
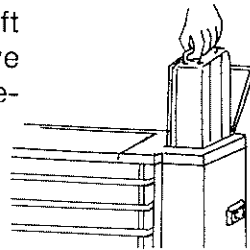
FUELING

WARNING

Use only pure kerosene. Never use gasoline or other flammable distillates. Use of such fuels can result in an explosive fire and cause severe injury.

1. **TO ASSURE THAT YOU ARE USING A GOOD GRADE OF KEROSENE, PLACE SOME IN A GLASS JAR AND COMPARE IT'S CLARITY TO ANOTHER GLASS JAR CONTAINING CLEAR WATER.**
2. Do not fuel or refuel your heater while it is hot. First turn the heater off and allow the cabinet to cool. Always fill with kerosene outdoors.

3. Open the fuel tank access door, lift out fuel tank and discard all protective packing. Invert the fuel tank and remove the filler cap.



4. Using a siphon pump, fill fuel tank with fresh, pure kerosene until the sight gauge shows $\frac{1}{2}$ red, which will reduce the possibility of spillage. Securely replace filler cap and wipe off any spilled kerosene. Replace fuel tank into heater with filler cap down.

SAFETY PRECAUTIONS

1. Use only clean, fresh and pure kerosene. Never use gasoline, naphtha, solvents such as alcohol, acetone and petroleum distillates. They are hazardous and may cause fire, explosion and serious injury.
2. Place heater on solid level surface.
3. Heater needs oxygen to operate. Therefore, do not use heater in small, closed areas such as bathrooms or tightly closed campers without providing an adequate source of fresh air.
4. Do not operate heater where it will be exposed to drafts.
5. HOT while operating. Do not touch. Keep children, pets and any flammable material or articles of clothing, furniture and curtains, etc. a safe distance away.
6. Do not move or service heater while burning. Extinguish first.
7. After extinguishing heater, make sure it is completely out.
8. Refuel outdoors when heater is cold to the touch.
9. Store kerosene in safe area. Keep kerosene and heater away from children.
10. Store fuel away from any heat source in an approved safety can clearly marked "Kerosene". Do not allow kerosene to be exposed to direct sunlight.
11. Keep outside of heater free of dust or spilled kerosene.

PREPARATION BEFORE LIGHTING

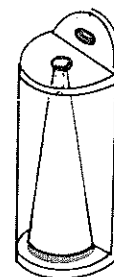
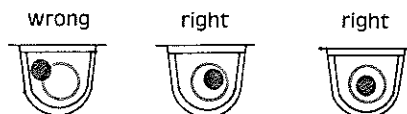
If the fuel tank has been empty for some time or the wick is new, it is necessary to allow 60 minutes for the wick to become saturated.

Each time you ignite the heater it is necessary to make sure the chimney assembly rotates easily from left to right.

When igniting your heater for the first time a slight odor and occasionally some smoke may occur which is caused by a preservative oil on the metal parts. Odor and smoke should disappear in a few minutes. For this reason, you may want to light your heater for the first time in a well-ventilated area, such as a porch.

LEVELING

IMPORTANT: In order for the heater to operate properly it must be positioned on a level surface using the level indicator installed on the side of the cabinet as illustrated.



3510/4510

VENTILATION

Your heater needs oxygen to operate. Before lighting your heater, it is important to provide a source of fresh air to the room. An opening of one-half inch in a window or door to an adjoining room is sufficient.

It is extremely important to provide a source of fresh air whenever the heater is operated in tightly confined areas, such as a bathroom, camper, boat, etc.

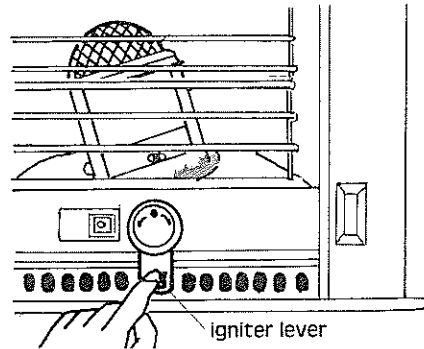
SETTING THE AUTOMATIC SHUT OFF DEVICE

Set the automatic shut off device by turning the wick control knob clockwise (to the right) until it stops.



LIGHTING

1. Set the wick to the highest position by rotating the wick control knob clockwise (to the right) until it stops. This is the wicks' highest position.
2. Push the igniter lever - gently. Note how the chimney assembly tilts, exposing the wick. The ignition element should glow and touch the wick. After a flame appears above the wick, release the lever and recheck the chimney assembly to make sure it is seated properly by rotating it to the left and right.



LIGHTING WITH A MATCH

In the event the ignition element does not function, the heater may be lit with a match until the cause of the problem is found and corrected. Open the grill, push the igniter lever - gently. When the wick becomes exposed, touch a match to the wick. When lighting in this manner, do not allow burned parts of the match to fall or remain on the wick.

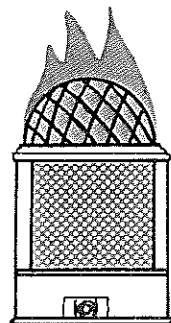
It is important to locate the cause of the igniter problem and check for worn-out batteries as soon as possible as described under "Troubleshooting".

FLAME ADJUSTMENT

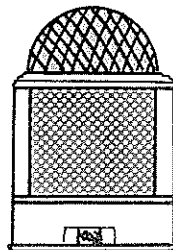
Approximately one minute after lighting, the flame should spread uniformly in the chimney around the entire circumference of the wick. In another minute the circular coil on top of the chimney should glow. After five minutes, the entire chimney should be glowing red.

If flames rise more than one inch above the top plate of the chimney, turn the wick adjuster knob counterclockwise slightly to lower the wick. The optimum setting causes the entire chimney to glow red with an almost invisible blue flame barely showing above the chimney top. (Make sure to adjust the knob within "HEAT ADJUSTMENT RANGE")

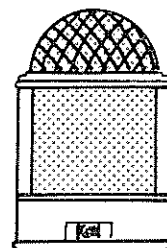
Example



high wick
INCORRECT



perfect burning
CORRECT

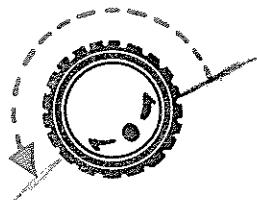


low wick
INCORRECT

NOTE: Occasionally, a slight flare-up may occur while the fuel is being transferred from the fuel tank, at which time a gurgling sound may also be heard.

EXTINGUISHING

Turn the wick adjuster knob fully to the left (counterclockwise). The flame will go out in a short time. After extinguishing, always check that the flame is completely out. Whenever the heater is extinguished, allow to cool for at least five minutes before attempting to relight, as there is a possibility of a flare up if metal and glass components are still hot.



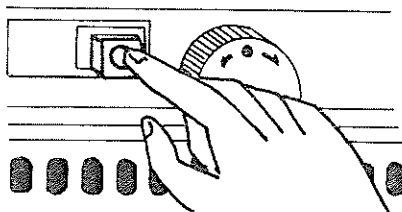
THE EMERGENCY SHUT OFF BUTTON

Use the emergency shut off button only in an emergency.

By pushing the emergency shut off button the wick will be lowered and the heater will be extinguished rapidly (in about 10 seconds).

A slight odor can occur by using the emergency shut off button. That is why we recommend using the wick control knob for extinguishing the heater.

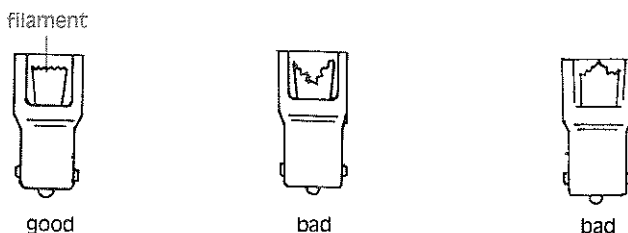
This shut off device will trip automatically in the event the heater is jarred or tipped over.



Make sure that the wick adjuster knob is turned fully to the left (counter clockwise) and the flame has gone out completely.

MAINTENANCE

1. Always keep the heater in a clean condition. Using an unclean heater can create a dangerous situation and may reduce the life of the heater.
2. Always be certain that the base plate is free of any spilled fuel.
3. Check for distortion of the filament of the igniter occasionally (See Illustration). When the filament is worn the igniting time becomes longer (more than 10 seconds).



In such cases, replace the igniter with a new one. This procedure is outlined in the parts replacement section of your manual.

4. The batteries may need replacing if the ignition time is more than 20 seconds.
5. The wick may require cleaning after extended use.

IMPORTANT: After extended use, tars will accumulate on the top edge of the wick, which will cause inefficient burning and difficulty in wick adjustment. Therefore it is important to clean the wick regularly.

With chimney assembly in place, and fuel tank empty or removed from the heater, raise the lighted wick as high as possible (knob turned fully to the right-clockwise) and let the flame burn until it goes out. This will burn off the tar and restore the wick to its original condition (the top edge of the wick will become grayish white). Then lower wick and, using a soft bristle brush, loosen any ash or soot accumulations from the burner and wick. This must be done carefully to avoid fraying the wick. Finally, remove ash and soot carefully with a vacuum. The wick may require replacement after several cleanings.

6. Check for distortion of the burner net and circular coil inside the net. If they are distorted the following conditions may be experienced.
 - a. The color of the burner net may not be uniform.
 - b. The flame may project through the damaged area.



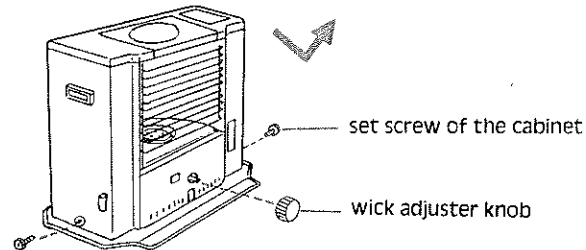
Replace the parts which are deformed as shown in the "Parts Replacement" section.

7. Activate the emergency shut off button 2 or 3 times a season to confirm that the safety feature is functioning correctly.

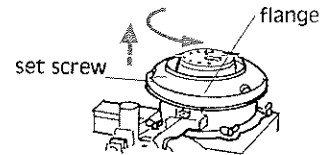
PARTS REPLACEMENT PROCEDURES

REPLACING THE WICK

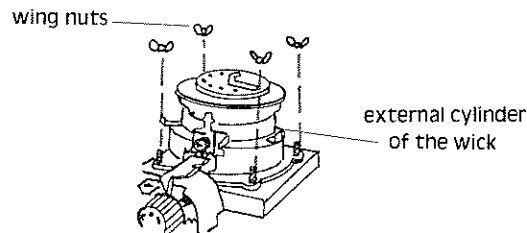
1. Push the emergency shut off button.
2. Pull the fuel tank out of the heater.
3. Open the grill and take out the chimney assembly.
4. Pull off the wick control knob and remove the set screws from both ends of the cabinet. Tilt the cabinet forward and remove it.



5. Remove the set screw and turn the flange of the external cylinder to the left (counterclockwise) and remove the flange.



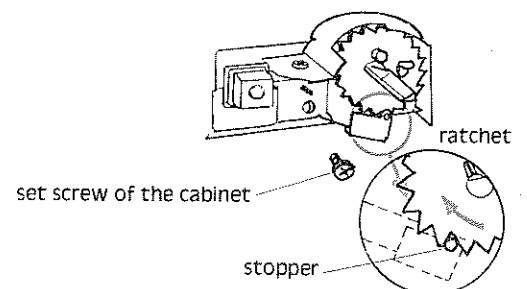
6. Unscrew the 4 wing nuts and remove the external cylinder of the wick.



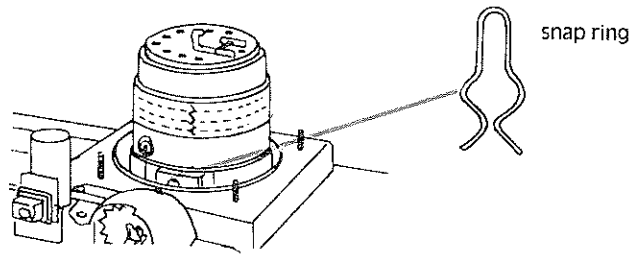
- 7.a. Replace the wick adjuster knob back on its shaft.

IMPORTANT

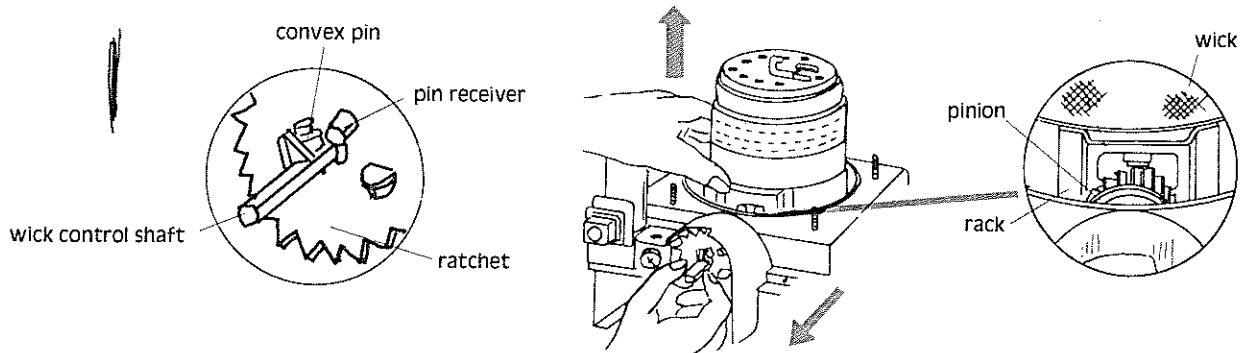
- b. Turn the knob one notch to the right (clockwise). You will hear one click as it goes into position. If you go beyond one notch, reset the wick adjuster knob by pushing the emergency shut off button and carefully set the wick adjuster knob again (see Illustration).
- c. Insert one of the two screws removed from the cabinet securely into the hole to the right of the emergency shut off button (See Illustration). This prevents the stopper from disengaging from the ratchet.



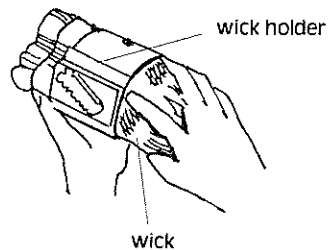
8. Pull the snap ring from the groove of the collar.



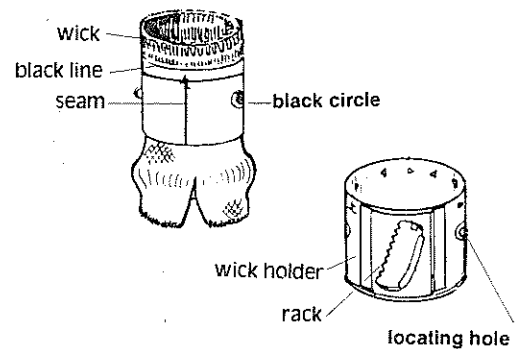
9. Carefully pull the wick control shaft towards you (by about 6mm - 1/4") and remove the pinion at the end of the wick control shaft from the rack of the wick holder and remove the wick assembly from the unit.



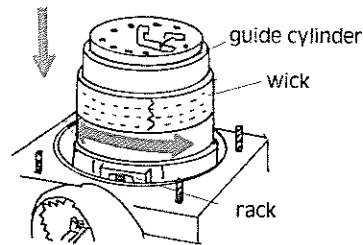
10. Fold the used wick to remove it from the wick holder.



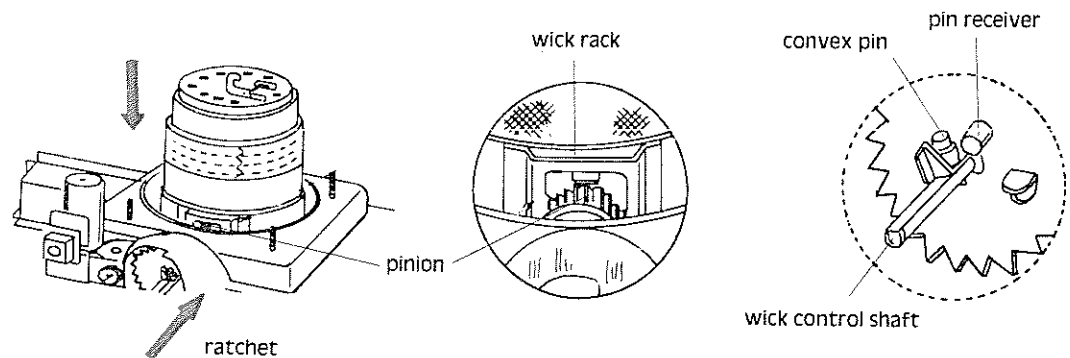
11. Fold the replacement wick and insert it into the wick holder with the seam of the wick toward the rack side of the holder. There are two black circles located on the wick, these should be centered in the holes in the side of the wick holder. Set the wick by placing the black line on the wick at the top of the wick holder.



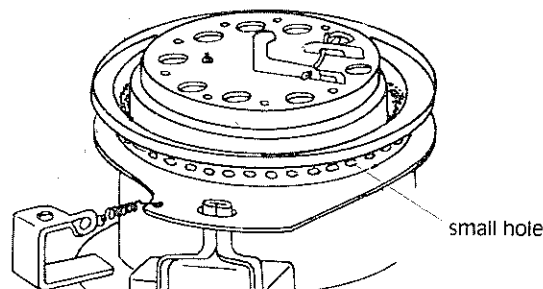
12. Secure the wick by pressing it from the inside into the points built into the wick holder. Position the new wick assembly on the guide cylinder with the rack part of the holder facing the front; by moving the wick up and down and to the left and right. Position the wick at its lowest position.



13. Assure that the convex pin is against the pin receiver as shown by turning the wick control shaft to the right if necessary. With the wick at its lowest position insert the pinion into the wick rack by pushing the wick control shaft until the pinion is in mesh with the highest teeth of the wick rack.



14. Reinsert the snap ring in the groove of the wick control shaft.
15. Remove the set screw from the hole to the right of the emergency shut off button. If you did not insert the set screw of the cabinet at step 7B the stopper and the ratchet will not engage each other. Turn the wick control shaft to the right until the pin receiver of the ratchet comes around to the top (approximately $\frac{1}{4}$ turn) and insert the pinion into the wick rack by pushing the wick control shaft until the pinion is in mesh with the highest teeth of the wick rack. Now follow step 14 through 18.
16. Position the wick at its highest position by turning the wick control knob clockwise (to the right) until it stops. Replace the external cylinder and secure with two wing nuts (placed diagonally) to assure that the wick moves up and down smoothly. Once the wick is operating smoothly attach the other two wing nuts being careful not to hit the automatic shut-off pendulum which can result in an unsafe condition. Check to ensure the small holes of the external cylinder are closed. If they are not closed your heater might not function correctly. If the holes are not closed the next step should correct this condition.

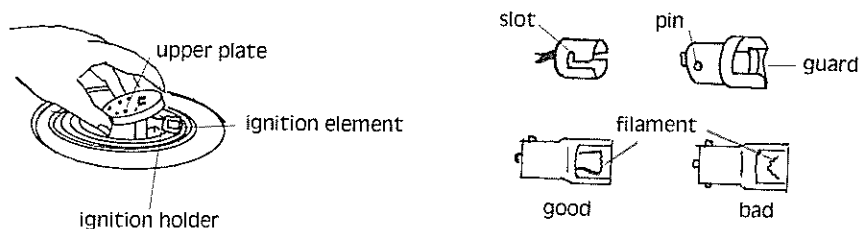


17. Turn the wick adjuster knob clockwise (to the right) until it stops. Trip the automatic shut off device by pushing the shut off button. Check to see that the wick has returned to its lowest position and the small holes in the external cylinder of the wick are open. If the small holes are not open — loosen the four wing nuts and rotate the external cylinder until the small holes are completely open. Now retighten the four wing nuts.
18. Return to step #5 through 2 and reverse the procedures to reassemble the heater after removing the wick adjuster knob.

REPLACING THE IGNITION ELEMENT

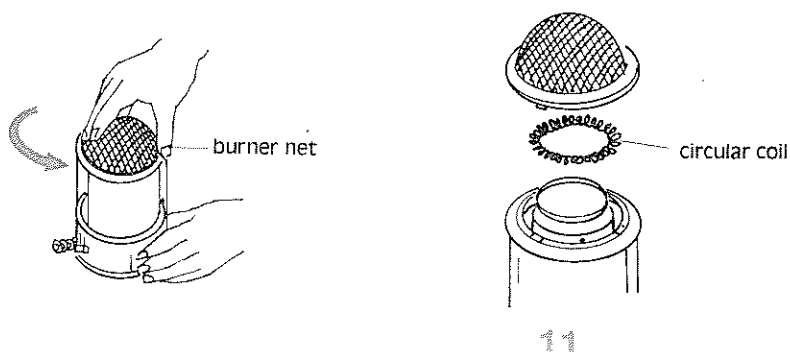
1. Turn the wick adjuster knob to the left (counter clockwise) until it stops and remove the dry batteries from the rear of the cabinet.
2. Open the grill and remove the chimney assembly.
3. Hold the upper plate of the guide cylinder open after pushing the ignition lever gently.
4. Push and turn the ignition element to the left which releases it and then remove it.
5. Insert the new ignition element as shown and press inward and turn to the right until it locks.
6. Replace the chimney assembly and close the grill.
7. Replace the dry batteries.

NOTE: Take care not to deform the new element built into the new ignition element.



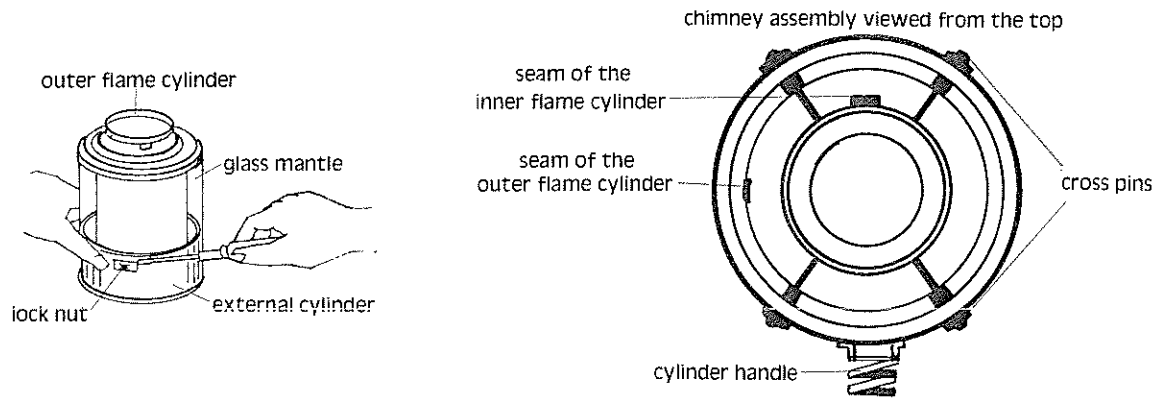
REPLACING THE BURNER NET AND COIL

1. Rotate the burner net to the left (counter-clockwise) and lift to remove.
2. Remove the old circular coil and replace it with a new one.
3. Replace the burner net and turn net to the right to lock into position.



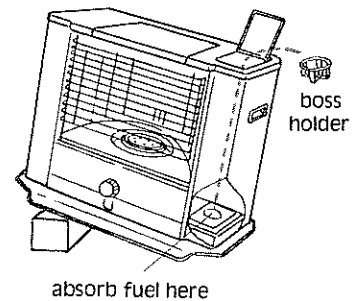
REPLACING THE CROSS PINS AND THE GLASS MANTLE

1. Remove the burner net and coil as shown in the previous step.
2. Carefully remove the lock nut with the tip of a screwdriver to prevent damaging the glass mantle, and remove the cross pin. When replacing only the cross pins it will be easier to replace one pin at a time.
3. Remove both pins to replace the glass mantle.
4. When reassembling the chimney assembly refer to the illustration for the proper positioning of the parts. Replace the lock nuts.
5. Assemble the burner net, and burner coil referring to the illustration.



STORAGE

1. Remove the fuel from both the fuel tank and the fixed tank. Water and foreign matter might be present in these tanks which could lead to corrosion and potential leakage problems.
 - a. Wash and rinse the inside of the fuel tank and the fixed tank with clean kerosene and remove the kerosene completely.
 - b. To remove the fuel from the fixed tank.
 1. Open the grill and remove the chimney assembly.
 2. Remove the fuel tank and the boss holder.
 3. Tip the heater as illustrated and insert a fuel pump or siphon through the drain hole in the back of the cabinet to remove all the fuel.
 4. Remove any additional fuel with a clean cloth.
2. Remove the batteries and replace them with new ones prior to the start of the next heating season.
3. Push the automatic shut off button.
4. Replace the chimney assembly with its' protective packaging and close the grill. Replace the boss holder and empty fuel tank.
5. Repack the heater in the original shipping carton.
6. Store the heater in a well ventilated area.



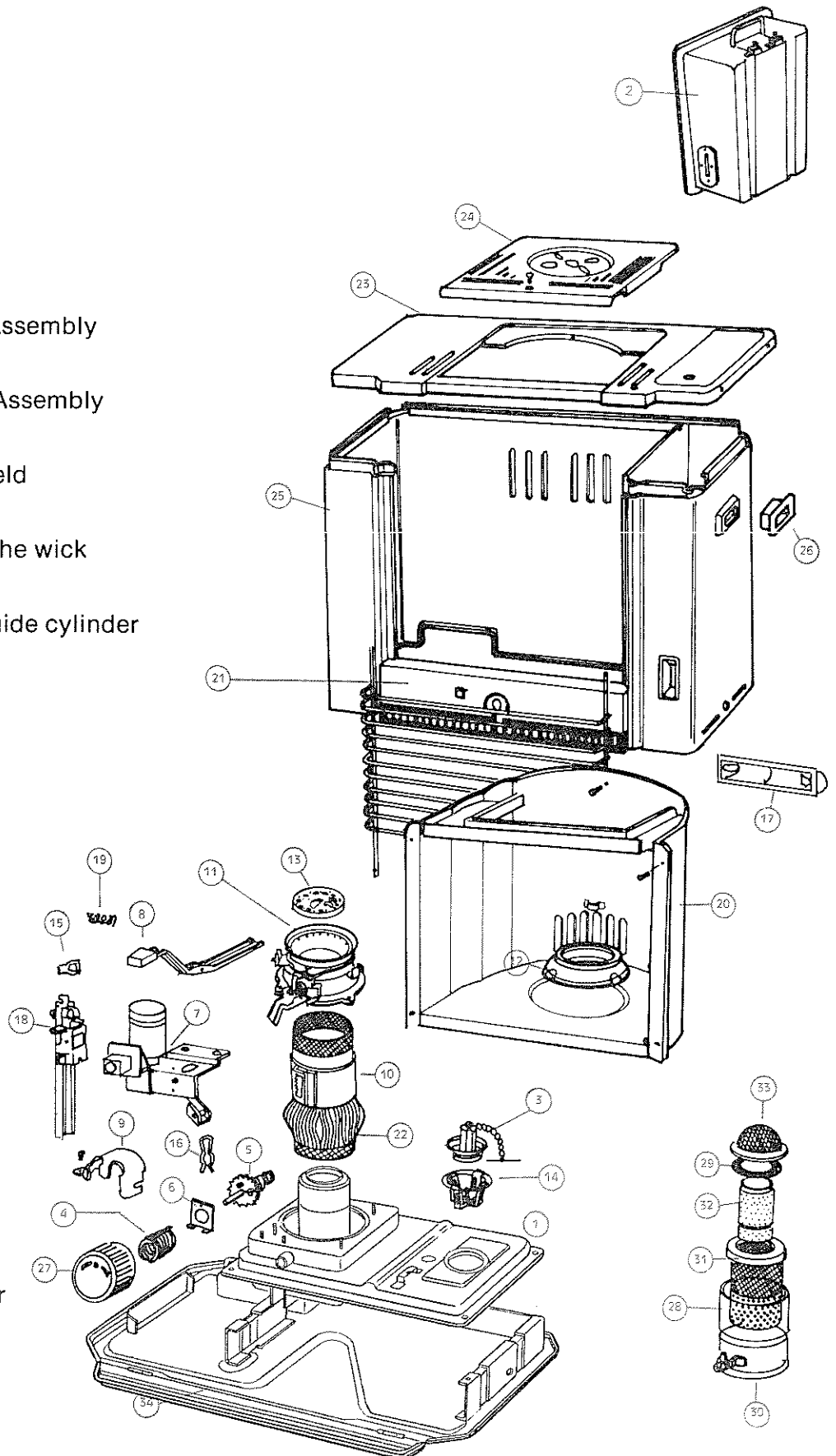
TROUBLESHOOTING

SYMPTOM	CAUSE	CURE	PAGE
Wick will not ignite	Water is mixed with kerosene	Remove the fuel from both the fuel tank and the fixed tank. Replace the wick.	8,12
	Out of fuel	Check fuel gauge-add fuel.	3
	Igniter won't glow	Replace batteries- Replace igniter element	11
	Build up of tar on wick	Clean wick	7
	Wick adjuster knob is not rotated to the limit	Rotate wick adjuster knob clockwise (to the right)	5
	Fuel port is clogged	Clean the filler cap	2
Smoke or odor	Chimney not seated properly	Move wire handle to reseal heat chamber	2
	Contaminated fuel	Remove the fuel from both the fuel tank and the fixed tank. Replace the wick.	12,8
	Build up of tar on wick	Clean wick	7
	Drafts	Relocate heater	
	Flame too high	Reduce wick height	5
	Burner net, circular coil or cross pins are deformed	Replace with new parts	11
Wick cannot be operated smoothly	Build up of tar on wick	Clean wick	7
	External cylinder of wick is not installed properly	Adjust the external cylinder	10
	Water is mixed with kerosene	Remove the fuel from both the fuel tank and the fixed tank. Replace the wick.	8,12
Color of the chimney does not become red or Low Flame	Water is mixed with kerosene	Remove the fuel from both the fuel tank and the fixed tank. Replace the wick.	12,8
	Build up of tar on wick	Clean wick	7
	Heater subject to wind or vibration	Move heater	
	Lack of ventilation	Supply air to the heater	4
	Burner net, circular coil or cross pins are deformed	Replace with new parts	11
Red flame or burning soot	Volatile fuel such as gasoline mixed in the fuel	Remove the fuel from both the fuel tank and the fixed tank. Replace the wick.	12,8
	Chimney not seated properly	Move wire handle to seat chimney	2
	Heater subject to wind or vibration	Relocate heater	
	Lack of ventilation	Supply air to heater	4
	Burner net, circular coil or cross pins are deformed	Replace with new parts	11

NOTE: SHOULD YOU ENCOUNTER ANY PROBLEM WHICH YOU CANNOT SOLVE BY USING THIS MANUAL. DO NOT RETURN THE HEATER TO THE STORE. CALL OUR CUSTOMER SERVICE DEPARTMENT AT THIS TOLL FREE NUMBER FOR ASSISTANCE. 800 — 526-3986
IN NEW JERSEY, CALL: 800 — 942-7779

REPLACEMENT PARTS

1. Fixed Tank
2. Fuel Tank
3. Filler Cap
4. Wick Control spring
5. Wick Control Shaft Assembly
6. Wick Control Plate
7. Emergency shut off Assembly
8. Igniter Lever
9. Ratchet & Spring Shield
10. Wick Holder
11. External cylinder of the wick
12. Flange
13. Upper plate of the guide cylinder
14. Boss holder
15. Ignition element
16. Snap ring
17. Battery case
18. Igniter Assembly
19. Igniter lever spring
20. Reflective shield
21. Front panel
22. Wick
23. Top panel
24. Top panel insert
25. Cabinet
26. Carrying handle
27. Wick Adjuster Knob
28. Glass mantle
29. Circular Coil
30. Burner Cylinder
31. Outer Flame Cylinder
32. Inner Flame Cylinder
33. Burner Net
34. Base plate



CRESTLINE LIMITED WARRANTY

CRESTLINE warrants each heater sold by it against defects in factory materials and workmanship, under recommended use and maintenance, for a period of one year from the date of original retail purchase, subject to the following terms and conditions:

1. **Warrantor:** This warranty is issued by Crestline, a division of North American Products, Inc., Foot of Tillman Street, Raritan, New Jersey 08869.

2. **Persons to Whom Warranty Extends:** This warranty extends only to the original retail purchaser.

3. **Items Covered:** This warranty covers all parts and components of the heater (a complete list may be found in your Operation and Maintenance Handbook) manufactured by or for Crestline, except as provided in the next sentence. This warranty does not cover normal wear and tear and maintenance items, including, but not limited to wicks, batteries, ignition elements, burner nets, cylinder assembly pins, lock nuts, burner coils, and glass mantles.

4. **Limited Remedy:** If any part or component covered by this warranty proves to be defective in factory materials or workmanship within one year from the date of original retail purchase, we will, at our option, repair or replace the defective heater, part or component if a claim is made within that one year period. This is your sole and exclusive remedy and the limit of our liability under this warranty. We assume no responsibility for loss of use of any heater, loss of time, inconvenience, commercial loss, or other INCIDENTAL OR CONSEQUENTIAL DAMAGES, whether as a result of breach of express or implied warranty, negligence, strict liability or otherwise. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

5. **Procedure for Making Claims:** In order to obtain performance under this warranty, you must promptly notify us of any defect in one of the following ways:

(1) call the Customer Service Department of Crestline at the following toll-free number: 800 — 526-3986
In New Jersey, call 800 — 942-7779

(2) Send your name, address and telephone number, together with a statement describing the nature of the problem and your sales slip or other proof of purchase, to: Customer Service Department, Crestline, Foot of Tillman Street, Raritan, New Jersey 08869.

DO NOT return the heater, part or component to Crestline or your dealer. You will be contacted by a representative from our Customer Service Department.

If it is necessary to return the heater, part or component to Crestline, all transportation costs will be at your expense. We assume no responsibility for any damage that occurs during transit.

If the heater, part or component is returned for any cause not covered by this warranty, there may be a charge to you for testing, handling, packing and/or any repairs made by us.

6. **Other Exclusions and Limitations:** This warranty does not cover any malfunction or defect due to the negligence of others, failure to use or maintain the heater in accordance with the instructions in the Operation and Maintenance Handbook, accidents, alterations by changing or adding to the heater, normal wear and tear, misuse of the heater, or the use of any fuel other than fresh, pure kerosene.

ANY IMPLIED WARRANTIES (INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) ARE LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY. THERE ARE NO EXPRESS OR IMPLIED WARRANTIES (INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE) WHICH EXTEND BEYOND THIS WARRANTY. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

All recommendations, information and descriptive literature supplied by us with respect to our heaters are believed by us to be accurate and reliable but do not constitute warranties.

No person is authorized to make any statement, representation or warranty, either orally or in writing, which adds to or varies the terms and conditions of this warranty.

7. **Legal rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

SPECIFICATIONS

Model No.	3510/4510
Type of Heater	Reflection
Heat Output (BTU)	9,500
Fuel Tank	Cartridge Type
Fuel Capacity	
US Gallons (Liters)	1.0 (3.785)
Room Size	15' X 22'
Burning Duration per tankful (hours)	14 - 22
Crestlite Ignition	Push Button Type
Dimensions (inches)	18-5/16 X 25½ X 15½

NORTH AMERICAN PRODUCTS, INC.

TILLMAN ST. • RARITAN, N.J. 08869