BITUMINOUS



OPERATION AND CARE *of your* IRON FIREMAN

Warranty

The Iron Fireman Manufacturing Company warrants each new stoker manufactured by it to be free from defects in workmanship and material for a period of one year from date of installation, misuse and abuse excepted. Any part that proves defective within this time will be exchanged f. o. b., our factory or one of our warehouses. The Iron Fireman Manufacturing Company will assume no responsibility for any labor performed outside of its factory, nor will it be responsible for contingent damages of any kind whatsoever.

The Iron Fireman Manufacturing Company makes no warranty in regard to motors or controls, inasmuch as these are warranted separately by their respective manufacturers.

The Iron Fireman Manufacturing Company makes no warranty whatsoever in regard to tuyeres and dead plates. The Iron Fireman Manufacturing Company reserves the right to make changes in design or to make additions and improvements upon its product without imposing any obligation upon itself to install same on its product previously manufactured.

Note: In order for this warranty to be effective, it is necessary for your Iron Fireman dealer to return to the factory the "Guarantee Card," which he received for your machine.

IRON FIREMAN MANUFACTURING COMPANY

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To the Iron Fireman Owner

In purchasing an Iron Fireman you have selected a product of the world's largest manufacturer of automatic coal burners—the pioneer of the industry. Years of experience combined with constant research and development have made possible the production of this most outstanding coal burner—outstanding in durability, as well as convenient and economical operation.

The service, life and satisfaction which you derive from your Iron Fireman depends in a large measure, however, upon the care which you give it. We urge that you read carefully *and follow* the instructions given in this booklet on the type of coal to use, adjustment and care of the machine.

Any equipment, which is subject to such hard usage and which must be depended upon for continuous, efficient, uninterrupted operation, should be given at least one thorough inspection and servicing each year. (Compare this duty for instance with that on your automobile or other similar equipment.)

Ask your dealer about the Iron Fireman Summer Service Plan and insist that only a trained Iron Fireman man make any necessary adjustments or repairs to the equipment. He knows your burner and it is decidedly to his interest—more than to any other service man's—to do everything in his power to make sure that the equipment is always performing at its maximum efficiency.

He can also supply you with genuine Iron Fireman replacement parts that measure up to the same high standards of quality as the original equipment.

IRON FIREMAN MANUFACTURING COMPANY

OPERATION AND ADJUSTMENT

(Bituminous Models Having Coal Feeding Capacity up to 60 Pounds per Hour)

Coal to Use

A good grade of prepared stoker coal gives best results with these units. The largest lumps should not be over 1 inch dimension and the finest (¼ inch dimension, or less) should not represent a high percentage of the total. Do not use coal that is extremely wet as it will not feed out of the hopper or bin properly.

Some dust treatments contain salts which cause the metal parts of the stoker to rust out in an abnormally short time. Coals that have been treated with these materials should be avoided.

No paper, rags, sticks of wood, or rubbish should be put in the hopper or bin No glass, cans or metals should be thrown into the fire as they will melt and close up the air slots in the Firepot.

Coal Feed Regulation (See Cuts of Gear Cases Under "Lubrication")

Remove the hopper door on the back of the unit for access to the gear case or to change the coal feed on the *hopper model* machine.

The *Hopper Model* gear case operates continuously and is constantly in feed while the unit is operating.

To place the *Bin Feed* model machines in *neutral* pull outward on the index handle and turn it ½ revolution, so that the point of the handle is in the downward position, opposite *neutral* on the gear case cover. To re-engage the coal feeding mechanism pull the index handle outward and rotate it ½ turn until the point of the handle is *upward*—then press the handle toward the gear case to lock it in position.

Do not leave the gear case in neutral position while the stoker is operating.

Some coal should be feeding through the retort whenever the stoker is running, in order to prevent the fire from burning low and overheating the tuyere.

The coal feeding mechanism has three speeds, obtained by shifting the belts on the gear case pulleys. Changes in feed should only be necessary with seasonal changes in outside temperatures. It will not be necessary to change the feed daily. The coal feed should correspond with air adjustments to obtain the even fuel bed thickness so necessary for efficient combustion.

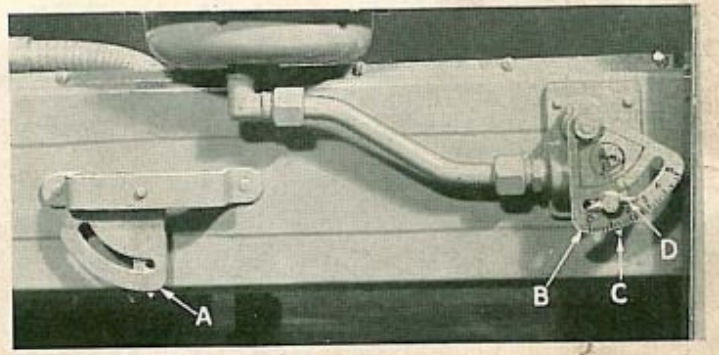
Starting the Fire

Fill the hopper or bin with coal, open the stack damper, run the machine until the coal has reached a level in the firebox approximately at the top of the tuyere. Kindle a small paper and wood fire on the top of the coal and start the machine, with the air regulator set at zero on the indicating dial. When the fuel bed is ignited, sprinkle a little coal on top of the fire until it burns brightly all over.

As the fuel bed increases in depth, increase the air supply slightly. (See paragraph on "Adjusting the Air".)

Adjusting the Air

Remove the door on the left side of the hopper for access to the volumeter mechanism on the hopper model machines.



Volumeter

The amount of air supplied to the fire is regulated by the setting of the pointer (C) on the scale (B). Variations in air adjustment are accomplished by loosening the wing nut (D) on pointer (C) and holding the dial (B) while (C) is moved along the scale. The wing nut (D) should be tightened to hold the pointer (C) in desired position. The air supply varies from a minimum with the pointer set at zero on the scale, to a maximum with the pointer at the opposite end of the scale.

After each change of air setting, the appearance of the fire will not indicate the true results of the change until about one hour of steady operation has elapsed.

Under average conditions a red smoky fire indicates too little air. A bright white flame indicates too much air. A clear yellow flame without smoke, is an indication of the proper air adjustment.

When the gear case belt is shifted to change the coal feed it will be necessary to readjust the air. If coal feed is reduced—the air adjustment should be reduced slightly. Conversely, if the coal feed is increased, the air should be slightly increased.

An excessive air supply will cause the fire to burn low in the tuyere and may overheat this part of the unit. Too much air will cause excessive fly-ash in the boiler and increase consumption due to reduced efficiency. With proper air adjustment fuel bed depth should be *maintained* at about six inches over the tuyer with average coals. Some coals will require a depth of 10 to 12 inches.

If for any reason the Volumeter should get out of order, the air can be adjusted manually by removing the wing nut (D) and using it to lock the damper sector (A) in the proper position.

Adjusting Chimney Draft

Make certain that the damper in the flue is in good operating condition and that it will *remain* set in the desired position. This equipment should be operated with a minimum of chimney draft. Too much draft will increase fly ash deposits in the gas passages and breeching. Too much draft will also reduce efficiency of operation and increase fuel consumption. The over fire draft should normally be adjusted to approximately .02 to .05 inch of water.

In the absence of a draft gauge, proceed as follows, to adjust the over fire draft; start the stoker with the stack damper open wide; after the fire has been burning brightly for a few minutes slowly close the damper until fumes begin to come out around the fire door. The damper should then be opened slightly until the fumes stop coming from the fire door.

Dirty flues, breeching or chimney may cause fumes from the door.

Automatic draft regulators are highly recommended in preference to the hand set damper.

Cleaning the Fire

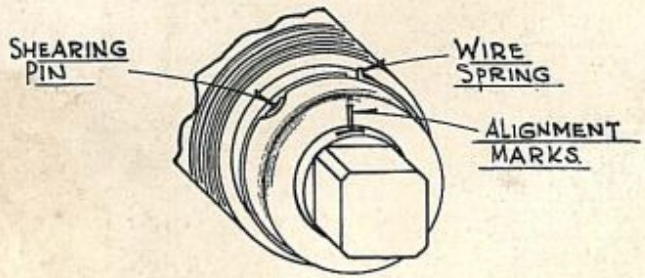
Pull the main switch and stop the machine before attempting to clean the fire or fill the hopper.

Use the clinker hook to loosen clinker from the hearth. If the unit has been operated properly no clinker will be found inside the tuyere. Run the point of the hook around the hearth—loosen the clinkers and bring them to the surface of the fuel bed. The clinker should then be removed through the firedoor by means of the clinker tongs and placed in a suitable covered metal container. If an excessive amount of *loose ash* has accumulated, scrape this toward the tuyere. The ash will then fuse to a clinker which can be removed at the next cleaning period.

When the fire has been cleaned or the hopper filled—close the line switch so the unit can operate.

Shearing Pin Replacement

When foreign matter in the coal becomes jammed in the coal worm, a shear pin breaks to protect the gear case mechanism against excessive overloads. This shear pin is located under the round metal cap on the back of the gear case.



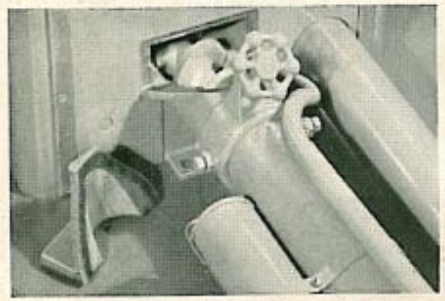
The main line switch should be opened before attempting to replace the shear pin. The obstruction should always be removed before attempting to replace the shear pin.

To remove the obstruction loosen the cleanout cover hand wheel or bolts and remove the cleanout cover. The obstruction will usually be found under the cleanout cover. (See Cleanout Cuts, page 9.)

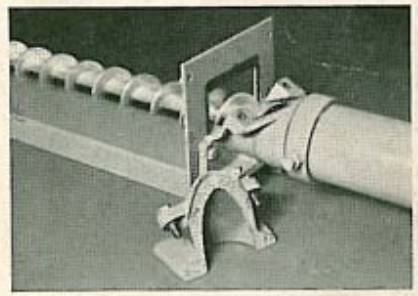
When the cover plate is replaced—be sure the cover plate gasket and joint are clean and fitted properly.

The shear pin is a straight round pin. To remove the broken pin match the aligning marks on hub and shaft and remove the wire spring. The broken pin can then be forced from the shear pin hole as the new pin is put in place. The wire spring should then be replaced and the shear pin guard cap tightened securely to prevent oil leakage. *Use standard Iron Fireman shear pins only.*

If difficulty is experienced in matching the aligning marks on the shear pin shaft and collar, turn the gear case pulley or the shear pin shaft until the marks are aligned.



Hopper Base Cleanout
Hopper Models

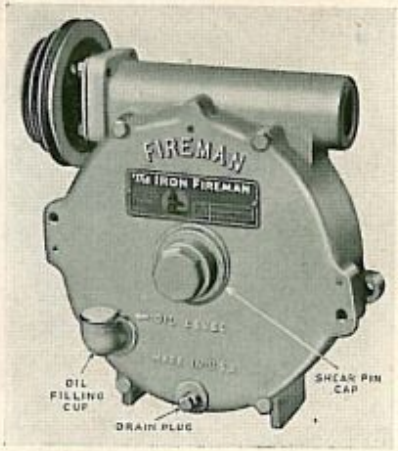


Worm Housing Cleanout
Bin Feed Models

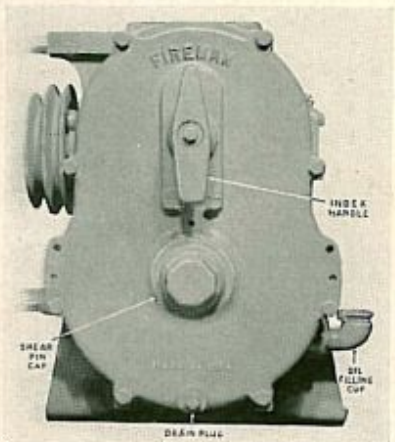
Lubrication

Do not start the machine without checking oil level in Gear Case and oiling motor.

The oil filling cup for the Gear Case is located on the back cover or side of the case. The gear case should be filled until oil is visible in the bottom of the oil filling cup,—when the machine is *not in operation.* Thereafter the oil level should always be visible in the oil filling cup when the machine is *stopped.*



Hopper Model Gear Case



Bin Feed Model Gear Case

It is very important to use the proper lubricant in the gear case. Any authorized Iron Fireman Dealer will be able to supply specifications for the recommended oils.

If for any reason water should get into the gear case the entire gear assembly should be carefully cleaned and dried out before adding new oil. Moisture remaining in the case for only a short time will quickly destroy gears and ball bearings.

Oil the motor every 3 to 4 months with a few drops of regular light motor oil. Do not use gear case oil for this purpose. Do not *over lubricate* the motor bearings as this is harmful to the motor.

SERVICE SUGGESTIONS

Stoker Fails to Start

Test for current in the controller box by shorting across the two low voltage terminals of the transformer with a screw driver. If there is no indication of a spark across the terminals, proceed as follows:

With the main line switch in "off" position, examine and tighten the fuses in the fuse holders; close the switch and see that it makes proper contact.

Tighten all control wires at the binding posts on each instrument in the circuit, determine that the wire at each binding post is clean and making a metal to metal connection; turn dial of refueling instrument to running position to see if stoker will operate; note if power is operating telechron motor in refueling or timing device; observe if low water has turned the low water cut-off to "off" position with pressure heating jobs; fill the boiler to proper operating level if necessary; if an obstruction is causing an overload against the coal worm and tripping the motor overload switch—remove the obstruction.

Stoker Fails to Stop

Examine the control circuit for short circuited control wires; examine all connections to control binding posts and see that these are clean and tight; set the thermostat at normal room temperature 70°; ground the motor or change the polarity of the line connections to the controller by reversing the wires.

Stoker Runs Too Long

Regulate the air and coal feed to maintain a fuel bed 6" to 8" over the top of the tuyere; clean the fire—removing the clinker and loose ash; use a coal with maximum size 1" and the fines (¼ dimension and smaller) should not represent more than 50% of the total; change to a better grade

fuel if clinker trouble develops; adjust and keep the thermostat setting at 70° or normal room temperature; clean soot and fly-ash from the boiler or furnace passages and from the sides of the water legs in the combustion chamber; change to higher coal feed and adjust the air to suit; check to see if the boiler or furnace is overloaded; adjust the stack draft.

Using Too Much Fuel

Check for additional load on the plant due to rooms not previously heated—exposed piping, faulty vents, faulty traps, dirty boiler or furnace; check with nearest weather bureau for degree day comparison with previous heating season; set limit control to higher pressure or temperature; determine if building is being heated to higher average temperature with longer daily heating period (see other items under "Stoker Runs Too Long").

Cannot Heat the Building

Adjust the limit control to higher pressure or temperature; regulate the fan and coal feed together so that machine will operate at higher rating. (See other items under "Stoker Runs Too Long" and "Using Too Much Fuel".)

Fire Goes Out Frequently

Regulate fan and coal feed to maintain 6" to 8" fuel bed over the tuyere; adjust the stack damper. Lengthen the refueling period; reduce the period between refueling operations; remove clinker or hard coke from the tuyere openings and retort; examine the hopper for arching of damp coal, or for hard packed coal around entrance to coal tube.

Fire Difficult to Clean

Operate the machine with more draft by opening the stack damper slightly; clean the fire thoroughly at regular intervals and remove all clinker at each cleaning period; change to a better grade of coal.

Cannot Form Clinkers

Regulate the air and coal feed to provide a fuel bed depth of 6" to 8" over the tuyere; scrape loose ash accumulation toward tuyere so it will form into a clinker.

Excessive Fly Ash in Boiler or Furnace Passages

Maintain a minimum draft over the fire in the combustion chamber; break down coke formations at intervals when using coking coal; remove large loose ash accumulations from combustion chamber; scrape loose ash toward the tuyere at each cleaning period. (See other items under "Cannot Form Clinkers".)

Smoking from the Stack

Remove clinker or hard coke from the tuyere openings; use a coal with a minimum of fine sizes and 1" maximum size; open stack damper; provide proper ventilation for air-tight boiler room; clean fan blades and fan inlet; clean flues or gas passages in boiler or furnace; regulate fan and coal feed to *maintain* proper fuel bed depth; use a slightly thinner fuel bed with finer coal size; clean "riddlings" (fine coal and ash) from the wind box around the tuyere; low volatile coal will reduce the tendency for smoke and may be used effectively if available.

Smoking from the Fire Doors

Open the stack damper to increase over fire draft, examine damper and stack—clean out fly ash and obstructions from passages, flues and breeching; close up other openings to chimney or breeching; examine the breeching for leaks; see that the stack damper will *remain* set in desired position; clean clinker and loose ash from hearth and combustion chamber; tighten the fire door and boiler clean-out doors.