Oct. 17, 1933. H. H. CULVER 1,931,181

DOMESTIC STOKER

Filed June 7, 1932

Fig. 1.

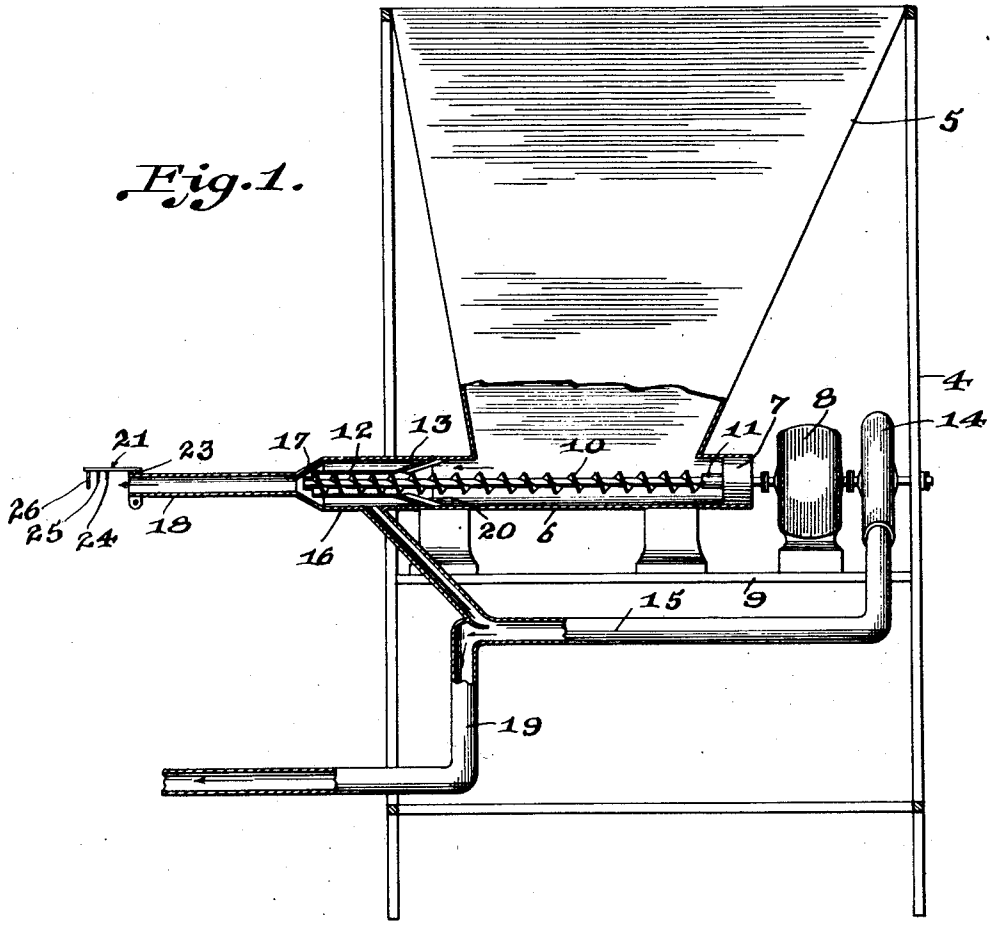


Fig. 2.

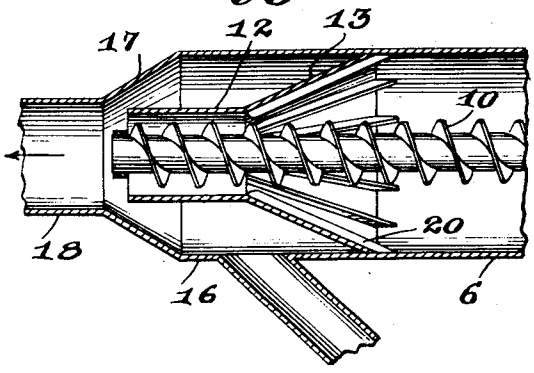
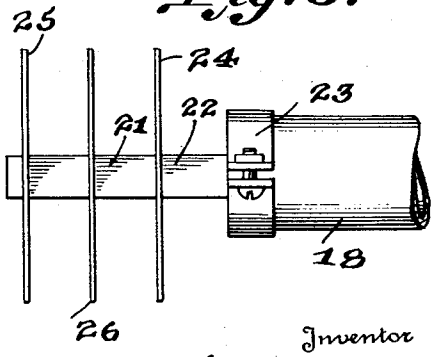


Fig. 3.



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DOMESTIC STOKER

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2 Claims. (Cl. 110—104)

This invention relates to improvements in domestic stokers, and more particularly to a novel stoker designed to work on pea size hard coal and smaller, as well as on mine run soft coal.

One of the objects of the invention is to provide a stoker having a conveyor cooperating with a throat or nozzle for the purpose of breaking coarse soft coal and hard coal of improper size before the latter is mixed with forced draft air, and the mixture is introduced into the fire box of a furnace.

Another object is to supply a domestic stoker having a coal spreader designed to spread the coal and air as the mixture leaves the delivery pipe of the stoker.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims.

Referring to the drawing,

Fig. 1 is a vertical sectional view of the improved stoker.

Fig. 2 is an enlarged view of a portion of the same.

Fig. 3 is a bottom plan view of the coal spreader forming part of the device.

In the drawing, 4 designates any suitable type of casing or cabinet of a suitable size to be arranged in front of a conventional furnace or boiler. It is preferred that the cabinet be made neat and attractive in order to enhance the appearance of the power plant with which it is used. A hopper 5 in the upper portion of the cabinet is designed to feed coal stored in the same into a trough 6 at the bottom of the hopper. One end of the trough is closed by a housing 7 in which reducing gears are arranged. These gears are driven by a prime mover 8 mounted on a floor 9.

The gearing drives a conveyor screw 10 which has one of its ends mounted in a suitable bearing 11, and its other end floating in a funnel-shaped nozzle 12. The trough 6 beneath the hopper extends beyond the same in the direction of fuel feed in the form of a cylindrical conduit 16 having a frusto-conical restriction 17 which connects with a conduit portion 18 of reduced diameter that forms a continuation of the same. The funnel-shaped nozzle 12 which is mounted coaxially within the said conduit 16 has its enlarged portion 13 contacting with the wall of the conduit 16, and its smaller end extending in the direction of fuel feed in spaced relation to said wall, to form therebetween an annular air space. The small or discharge end of the nozzle terminates within said frusto-conical restriction 17, and an air conduit 15 communicates with the said annular space.

For the purpose of crushing any coal which must be reduced in size, the conveyor screw feeds the same into the enlarged end of the nozzle which is of frusto-conical shape, as shown at 13.

A fan or blower 14 is mounted on the floor 9 and driven by the prime mover 8, and from the outlet of the fan, the duct 15 leads air to said annular space.

The tube 16 delivers the mixture of coal and air into a delivery pipe 18 which discharges into the fire box of the furnace, not shown.

An auxiliary air passageway 19 is connected to the duct 15 for force draft to fire box through the ash pit of the furnace. To assist in crushing the coal due to forcibly feeding the same by the screw conveyor, the flared portion 13 of the nozzle may be provided with radially disposed internal ribs 20, (Fig. 2), which are fixed to the nozzle.

A coal spreader 21 is arranged at the discharge end of the delivery pipe 18 for the purpose of spreading the coal and air evenly over the fire. From Figs. 1 and 3 it will be noted that the coal spreader consists of an arm 22 having one of its ends secured to the delivery pipe by means of a clamp sleeve 23. The arm carries depending fins 24, 25 and 26 which are preferably arranged parallel to one another and increase in depth toward the outer end of the arm 22.

The stoker illustrated will work very satisfactory on either soft or hard coal. When soft coal is used, the coal will be carried forward from the hopper by means of the screw conveyor 10, and will be fed into the funnel-shaped crusher 13. It is then carried forward by the worm and delivered into the combining chamber or tube 17, where it is picked up by the air current from the fan and carried through the delivery pipe to the coal spreader at the end of the pipe, which acts to evenly distribute the coal over the fire. At the same time, the air is spread over the fire and this causes good combustion and almost smokeless fire.

When hard coal is used, it travels the same course as the soft, except it is not crushed when the proper size is used. This should preferably be not larger than pea size. The hard coal is blown in the fire box in the manner above described,

causing a deep blue flame and giving the appearance of a gas burner.

From the foregoing it is believed that the construction, operation and advantages of the invention may be readily understood by those skilled in the art, and it is apparent that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the claims.

What is claimed and desired to be secured by Letters Patent is:

1. A stoker including a coal hopper, a trough arranged at the bottom of the hopper to receive coal therefrom, a cylindrical conduit projecting from one end of said trough and terminating in a frusto-conical restriction, a conduit of smaller diameter than the first mentioned conduit projecting from the smaller end of said restriction, a funnel-shaped nozzle mounted coaxially within the first mentioned conduit and having its enlarged end contacting the wall of the first mentioned conduit, the smaller end of said nozzle extending into said frusto-conical restriction and being spaced from the wall of the first mentioned conduit to provide an annular air space, means for forcing air into said air space, a bearing mounted on the trough at the end opposite that which is connected to the first mentioned conduit, a conveyor screw journaled in said bearing and extending through said trough and through said nozzle, and a prime mover for rotatitng said conveyor screw.

2. A stoker including a coal hopper, a trough arranged at the bottom of the hopper to receive coal therefrom, a cylindrical conduit projecting from one end of said trough and terminating in a frusto-conical restriction, a conduit of smaller diameter than the first mentioned conduit projecting from the smaller end of said restriction, a funnel-shaped nozzle mounted coaxially within the first mentioned conduit and having its enlarged end contacting the wall of the first mentioned conduit, the smaller end of said nozzle extending into said frusto-conical restriction and being spaced from the wall of the first mentioned conduit to provide an annular air space, means for forcing air into said air space, a bearing mounted on the trough at the end opposite that which is connected to the first mentioned conduit, a conveyor screw journaled in said bearing and extending through said trough and through said nozzle, a prime mover for rotating said conveyor screw, and radially disposed ribs secured to the internal surface of the enlarged end portion of the nozzle.

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