

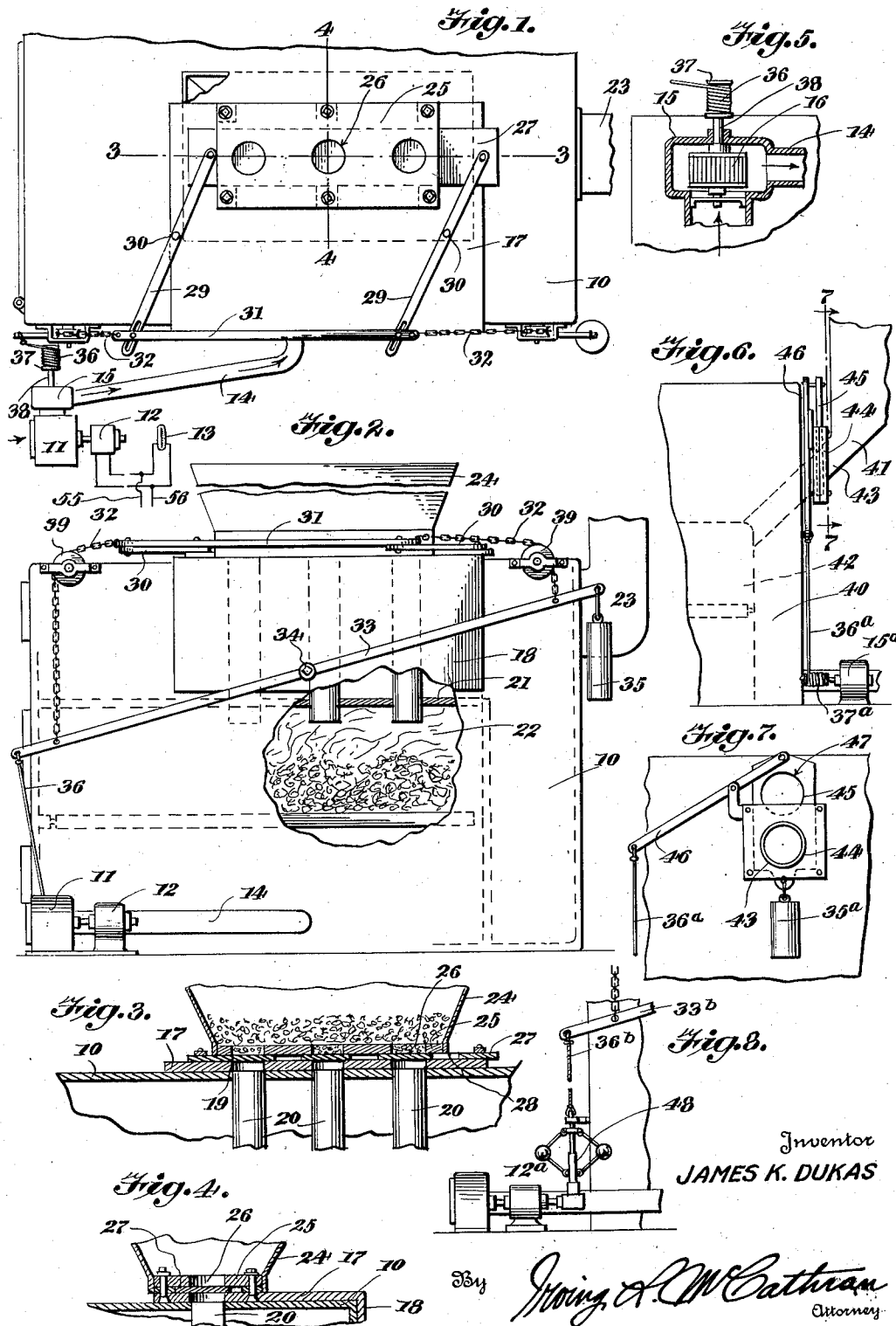
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AUTOMATIC GRAVITY STOKER

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AUTOMATIC GRAVITY STOKER

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1 Claim. (Cl. 110—118)

This invention relates to automatic gravity stokers for furnaces and the like, and has for one of its objects the production of a simple and efficient means for automatically and through gravity, feeding fuel to the fire-box of a furnace and the like.

Another object of this invention is the production of a simple and efficient means for automatically cutting off the flow of fuel to the fire-box of a furnace and the like, when the blower is in operation, and then automatically opening the fuel feed when the blower discontinues operation.

A further object of this invention is the production of a simple and efficient gravity feed automatic fuel stoker for furnaces, boilers, and the like, wherein the fuel feed may be automatically opened and closed through the starting and stopping of the blower.

Other objects and advantages of the present invention will appear throughout the following specification and claim.

In the drawing:

Figure 1 is a fragmentary top plan view of a furnace showing the improved automatic gravity stoker in position;

Figure 2 is a side elevation of a furnace showing the gravity automatic stoker and actuating means, a portion of the furnace being broken away and shown in section;

Figure 3 is a longitudinal section taken through the bottom of the feeding hopper and valve mechanism on line 3—3 of Figure 1;

Figure 4 is a transverse sectional view taken on line 4—4 of Figure 1;

Figure 5 is a horizontal sectional view through the blower tube showing the valve actuating fan carried thereby;

Figure 6 is a side elevation illustrating a modified form of gravity automatic stoker;

Figure 7 is a section taken on line 7—7 of Figure 6;

Figure 8 is a side elevation showing a modified form of automatic control for actuating the operating lever of the automatic stoker.

By referring to the drawing, it will be seen that 10 designates the furnace boiler or similar heating medium which may be of the conventional type common to the trade. In connection with the furnace 10 I employ a blower 11 of the conventional type actuated by a motor 12, which motor 12 is controlled through the medium of a thermostat 13 located in a room above or in any other convenient place to thermostatically control the operation of the motor 12. A blower tube 14 is connected to the furnace through the ash

pit or in any other convenient manner and this blower tube 14 is provided with a wind motor housing 15 which housing 15 communicates directly with the blower 11, as shown in Figure 1, a wind motor 16 being mounted within the wind motor housing 15 for the purpose hereinafter described.

I preferably mount the gravity fuel feeding mechanism upon a platform 17 which rests upon the top of the furnace 10, as shown, the platform 17 having a depending and right-angularly extending face plate 18 overhanging the side of the furnace 10, as shown in Figure 2, for the purpose of supporting the working parts of the gravity stoker mechanism. The platform 17 is provided with a plurality of ports 19 through which extend the feed tubes 20 which may be of any number desired, and preferably from three to six inches in diameter, the size being varied to suit the particular condition and type of coal being used. The feed tubes 20 extend down through the roof 21 of the fire-box 22 for a substantial distance beyond the lower face of the tube, as shown in Figure 2, in order to provide a space above the normal layer of fuel in the fire-box whereby the gas may easily pass out through the flue 23.

A fuel hopper or bin 24 is mounted upon the platform 17 and carries a bottom 25 having feeding ports 26 which communicate with the feed tubes or pipes 20. A valve plate 27 is slidably mounted between the bottom 25 and the platform 17, and this valve plate 27 is provided with ports 28 which are adapted to be brought into registration with the ports 26 and the feed tubes or pipes 20 and allow the fuel within the hopper or bin 24 to drop through gravity down through the feed tubes or pipes 20 into the fire-box 22.

The valve plate 27 is mounted to freely reciprocate between the bottom 25 and the platform 17 and operating levers 29 are pivotally connected to the respective ends of the valve plate 27, as shown in Figure 1, and these levers 29 are connected by a connecting link 31 which connecting link 31 is engaged at its respective ends by the chains 32. These chains 32 are connected near the respective ends of the rock lever 33, which lever 33 is pivoted, as at 34, to the depending angularly extending face plate 18.

A weight 35 is connected to one end of the rock lever 33 and the opposite end of the rock lever 33 is connected to a flexible element or cable 36 which cable 36 is wound about a drum 37 carried by the supporting shaft 38 of the fan 16, shown in detail in Figure 5. The chains 32 as

shown in Figure 1, preferably extend around guiding pulleys 39 mounted in any desired or convenient manner upon the body of the furnace or boiler 10.

5 The operation of the device is as follows:—

Several days' supply of coal of the pulverized variety such as buckwheat and finer qualities, which may be purchased on the market at the cheapest rate, is placed within the bin or hopper 24. When the thermostat 13 starts the motor 12, the blower 11 will be actuated, driving the wind motor 16, thereby winding the cable 36 upon the drum 37 which will cause the cable 36 to pull downwardly on one end of the rock lever 33, lifting the weight 35 and moving the valve plate 27 to a point where the ports 28 will be out of registration with the ports 26 and feeding tubes or pipes 20 cutting off the fuel supply of the hopper 24 while the blower 11 is in operation. In this way, the draft through will be prevented from being forced up through the tubes 20 and into the hopper in order to prevent an explosion of gases through the tube and hopper. As soon as the thermostat 13 cuts off the motor 12 and the operation of the blower 11 is stopped or the blower 11 is rendered inactive, the weight 35 will cause the rock lever 33 to return to its normal or substantially horizontal position, thereby bringing the ports 28 of the valve plate 27 into registration with the ports 26 and feeding tubes 20, allowing the pulverized fuel from the hopper 24 to pass down through the feed tubes or pipes 20 and into the fire-box 22.

It will therefore be seen from the foregoing description and by considering the drawing, that the supply of fuel through the tubes 20 will be cut off while the blower 11 is in operation, but as soon as the blower 11 has discontinued its operation or is rendered inactive, the valve plate 27 will move to an open position allowing the fuel to pass down through the tubes or pipes to into the fire-box 22.

In Figures 6 and 7 there is shown a modified form of the invention wherein the furnace 40 carries a hopper 41 for feeding fuel to the fire-box 42 of the furnace 40 through an inclined feeding tube or chute 43. This chute 43 carries a valve box 44 in which works an apertured control gate 45 which gate is actuated through the medium of an operating lever 46 connected to a cable 36a, similar to the cable 36, which cable 36a is actuated in a manner similar to that as illustrated in Figures 1 and 2 through the medium of a wind motor mounted in the housing 15a similar to the housing 15, and a drum 37a.

A weight 35a is connected to the control gate 45 to bring the feeding aperture 47 into registration with the feeding tube 43 and tension is released from the pull cable 36a.

It should be understood that the wind motor 16 mounted within the wind motor housing 15, as well as the wind motor mounted within the wind motor housing 15a will keep the cables 36 and 36a wound upon their respective drums, as long as the blast of air passing from the blower against the wind motor continues, since this blast will prevent the wind motor from reversing. This will allow the passage of air from the blower through the blower tube even though the cables are wound to their limit upon the respective drums.

In Figure 8 there is shown a further modified form of the invention wherein in place of the wind motor housing 15 and wind motor 16, I employ a governor 48 which is actuated by the motor 12a, the governor 48 being connected to the cable 36b which cable in turn is connected to the rock lever 33b.

Certain detail changes in the mechanical construction, combination and arrangement of parts may be employed without departing from the spirit of the invention, so long as such changes fall within the scope of the appended claim.

Having described the invention what is claimed as new is:—

In combination with a furnace having a fire-box, a blower, a fuel supply hopper located above the furnace and having discharge openings for supplying fuel from the hopper to the fire-box of the furnace, a support for said hopper having a depending apron at one side, a valve plate slidable into and out of position for opening and closing said discharge openings, a rock lever pivotally connected to said apron and extending longitudinally of the apron and the valve, flexible connection between ends of the lever and ends of the valve for sliding the valve as said rock lever is swung, a weight connected to one end of the rock lever for automatically moving the valve in one direction, means driven in conjunction with the blower for moving the rock lever in the opposite direction, said last mentioned means comprising a wind motor actuated by a blast of air from the blower, a shaft supporting the wind motor, a drum carried by the shaft, and a flexible cable wound upon the drum and to be connected to the opposite end of said rock lever from said weight for tilting the lever and moving the valve to an adjusted position.

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