

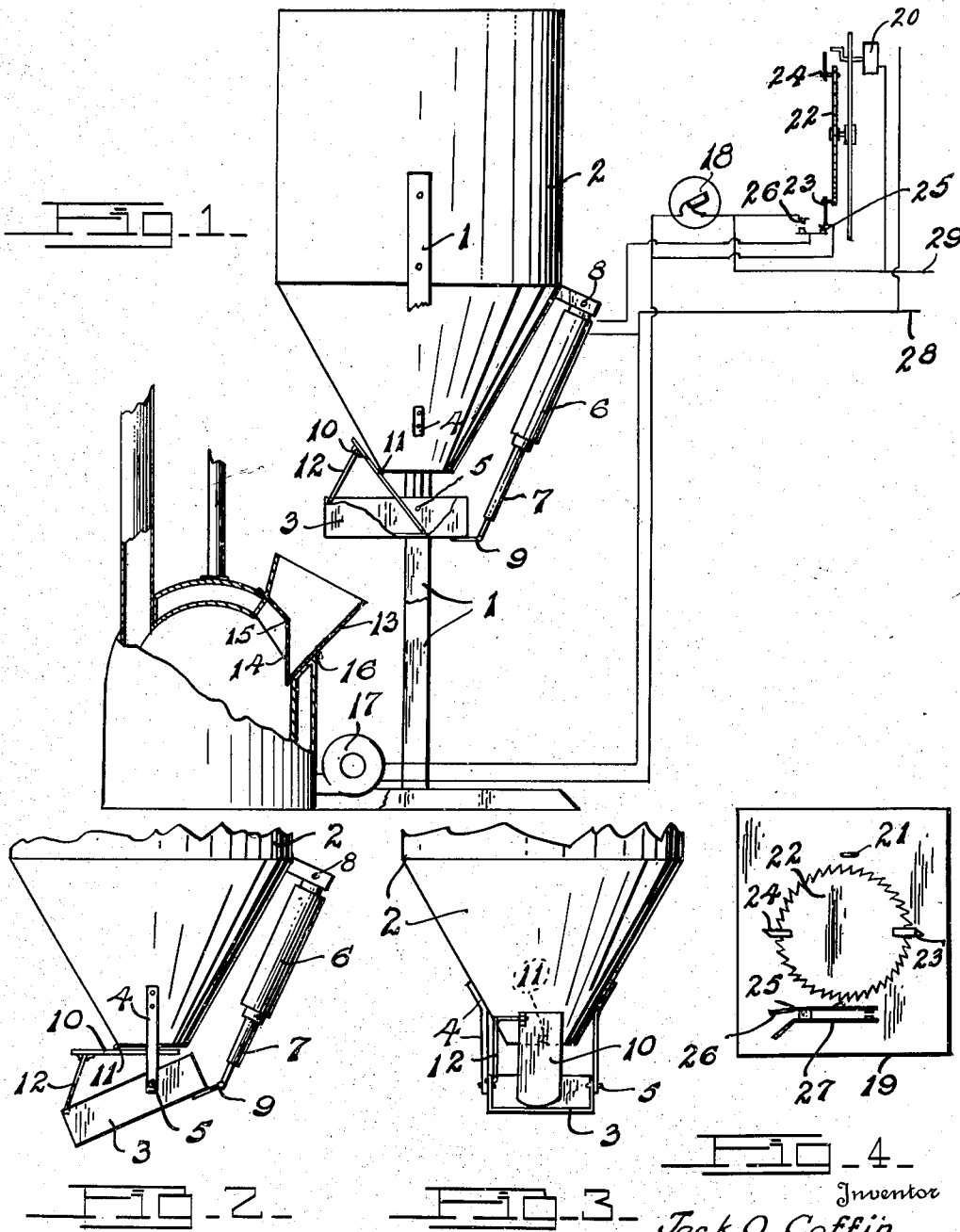
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AUTOMATIC COAL STOKING MACHINE

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AUTOMATIC COAL STOKING MACHINE

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1 Claim. (Cl. 110—101)

The invention relates to the design of an automatic coal stoking machine of unique principle and high efficiency which can be produced at low cost; and the objects of the principle are to provide a dumping system for slack coal, which is operated by an electric solenoid and controlled in turn by an electric timing device and an aquastat of conventional design, to provide the necessary amounts of coal at the proper intervals to a heating system of conventional design, such as a coal burning water heater, "monkey stove," etc.

One form of the invention is illustrated in the accompanying drawing in which it is shown being used in conjunction with a "dome type" coal burning water heater of standard manufacture. Figure 1 illustrates the hopper and dumping mechanism from a side view and a "cut away" section of the dumping mechanism showing the detail thereof. Figure 1 also includes the electric wiring detail and a vertical side view of the electric timing device. Figure 2 illustrates the dumping mechanism in the dumping position from a vertical side view. Figure 3 is a vertical front view of the dumping mechanism in its relaxed or non-dumping position. Figure 4 is a vertical front view of the electric timing device.

The legs or standards 1, 1 are shown "cut away" to expose the remaining view. They constitute the support of the hopper and dumping mechanism. The hopper 2 holds the slack coal in storage and allows it to pour into the dump pan 3. The dump pan 3, when filled, by its own obstruction prevents further coal from pouring from the hopper. This dump pan is supported by brackets 4, 4 and pivoted at 5, 5. The electric solenoid 6 consists of $\frac{3}{4}$ pound of enameled copper wire #24 wound around a $\frac{1}{2}$ " inside diameter fiber tube 8" long, and 7, a bar of cold rolled steel 6" long and slightly less than $\frac{1}{2}$ " in diameter to allow it to slide freely within the fiber tube. The solenoid proper is supported from the hopper by a hinged member 8 which allows it to hang freely. The bar 7 rides within the solenoid tube, the lower end being attached to the dump pan by link 9. The metal plate 10, being hinged at the side of the hopper mouth at point 11 and connected to the dump pan with link 12, closes the mouth of the hopper when the pan arrives at a dumping position, thus preventing coal from flowing from the hopper while in the dumping position (Figure 2).

13 (Fig. 1) is a receiving funnel which must be attached to the heater to allow the coal to fall into the fire. It consists of the funnel proper, with an outlet 14, which is simply a door hinged

and hung at 15 that opens as the coal falls against it and closes by means of gravity when there is no coal against it. The whole funnel is mounted on and through the plate 16 which in turn is fastened over the opening in the heater itself. The blower 17 is a conventional centrifugal fan of capacity depending on the size and nature of the application. The aquastat 18 is of conventional design and variable with a range of approximately 60 degrees to 200 degrees F.

Figure 1 includes a vertical side view of the electric timing device wherein 19 is the base or frame, 20 a synchronous electric clock motor geared to 1 R. P. M. which rotates the eccentric shaft or crank 21 at that speed. Each revolution of the eccentric shaft 21 turns the gear, or ratchet, 22 one notch. The number of notches to be used on 22 is determined by the requirements for coal. As an example, for an ordinary domestic water heating installation such as illustrated, a gear of 100 notches is suitable. On opposite edges of this gear (Figure 4) are mounted fibre eccentrics 23 and 24. Both of these eccentrics are offset from the gear 22, and also eccentric 24 is offset from eccentric 23, so that it will be seen that in Figure 1, eccentric 23 will operate contact point 25 and eccentric 24 will operate contact point 26, pressing them in turn to contact point 27, 27 (these two points are common).

Going back to the gear 22; if this gear has 100 notches, being driven by the eccentric shaft 21 at 1 R. P. M., it will be observed it takes 100 minutes for the gear 22 to make a complete revolution. Therefore, the eccentrics 23 and 24 will alternately close the contacts 25—27 and 26—27 respectively at intervals of 100 minutes (each), or 50 minutes jointly.

Now, the object of this timing mechanism is to shift the heating system from a low-heat "keep alive" basis to a high-heat recovery basis. On the low-heat basis, just enough coal is fed the fire to keep it alive. On the low-heat basis, coal is fed the fire every 100 minutes, with the blower turned off. On the high-heat basis, coal is fed every 50 minutes with the blower turned on. (This 50-minute or high-heat basis can be increased by adding eccentrics 23 according to requirements, and spacing them properly on the gear 22. It is not necessary to change the 100 minute basis since this is just intended to keep the fire alive, although any of these arrangements could be altered to meet the requirements of various installations.)

This shift from the low-heat basis to the high-heat basis is accomplished by the aquastat 18.

This and the function of the electrical circuit is described as follows:

Tracing the side of the 120 volt supply marked 28, we find this going directly to one side of the electric clock motor, to one side of the solenoid and to one side of the blower motor. It, therefore, requires no further attention. The side of the 120 volt supply, marked 29, goes to the other side of the electric clock motor so that it will be seen this motor runs continuously. 29 then goes to one side of the aquastat and also to contact point 26. The other side of the aquastat goes to contact point 25 and also to the remaining side of the blower motor. Contact point 27 is connected directly to the remaining side of the solenoid.

Thus it will be seen that when the aquastat switch is closed, calling for heat, the circuit is closed turning the blower on. At the same time, line 29 is actually connected to contact point 25. Therefore, it will be observed, that with the closing of either the contact points 25—27 or 26—27, the solenoid will be excited, drawing in the bar 7 and dumping the coal from the dump pan 3, and into the fire. The closing of these points will occur at 50 minute intervals dumping the coal each time and, with the blower going, will build up the fire to a high-heat basis.

Now, when the heat has been built up and the aquastat satisfied, the aquastat switch at 18 is

opened, turning off the blower and disconnecting the contact point 25 from the electric supply. Therefore, only the contact points 26—27 are in an operating condition and will close only every 100 minutes, dumping the coal at this interval. With the blower turned off, this shifts the fire to a low-heat "keep-alive" basis.

I am aware that prior to my invention, automatic coal stoking machines have been made. I, therefore, do not claim such a machine broadly; but I claim:

An automatic coal stoker of the class described comprising, a vertical walled cylindrical hopper having the bottom formed as an inverted frusto-conical base with the end open; a control plate pivoted across the opening, said plate being narrower than the width of the opening, said plate normally being away from the opening; a tiltable dump pan mounted spaced below said plate and opening to receive the coal from the hopper, said pan to discharge coal into a burner area; a link connecting the dump pan and plate, a solenoid pivotally mounted on the side of the hopper and having the core of the solenoid connected pivotally with an extension on the dump pan, said solenoid to actuate the dump pan, simultaneously closing the flow of coal from the hopper.

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