Dec. 20, 1932. J. O. STAYTON 1,891,319

STOKER CONTROL

Filed April 15, 1932 2 Sheets-Sheet 1

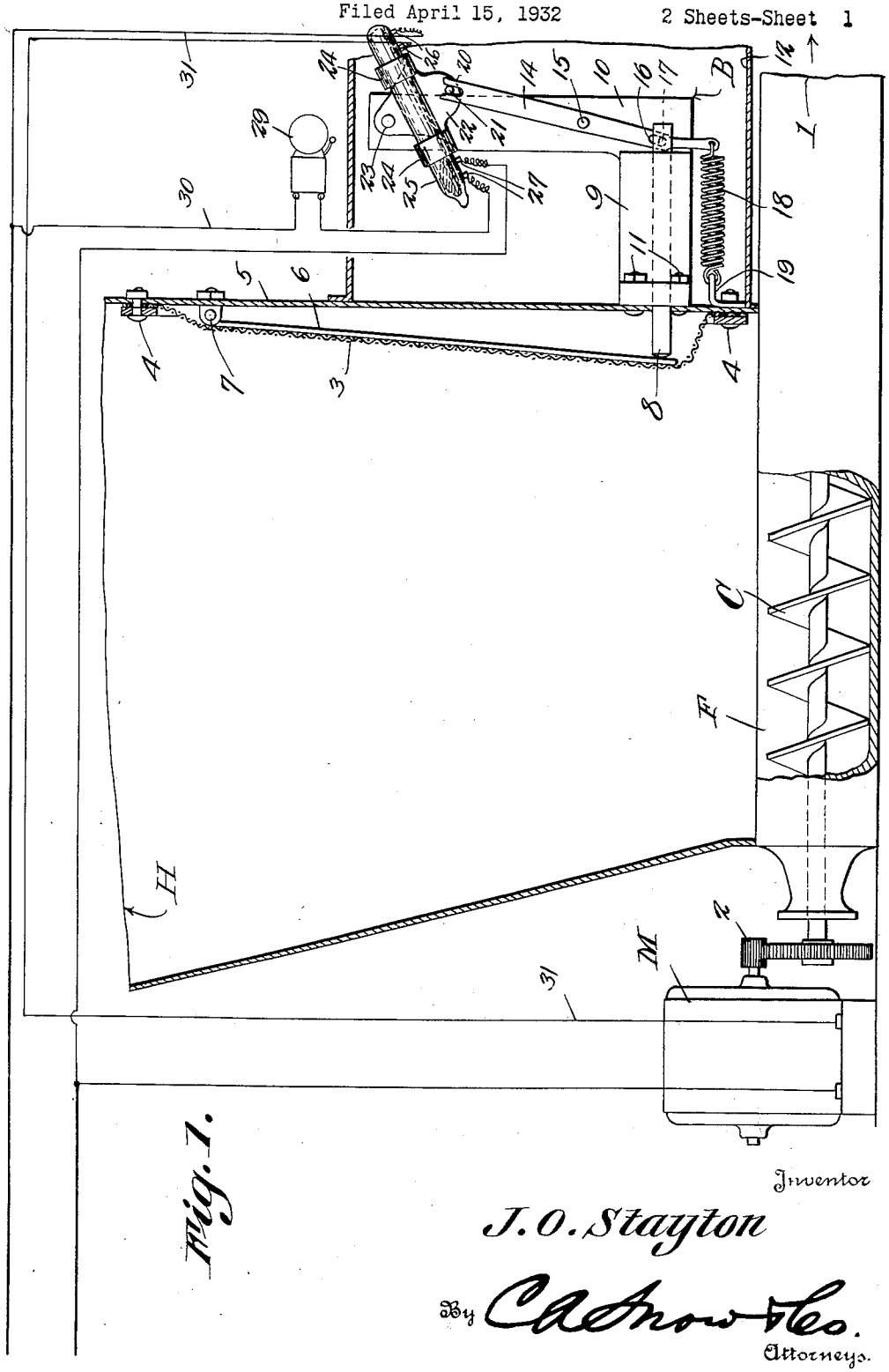


Fig. 1.

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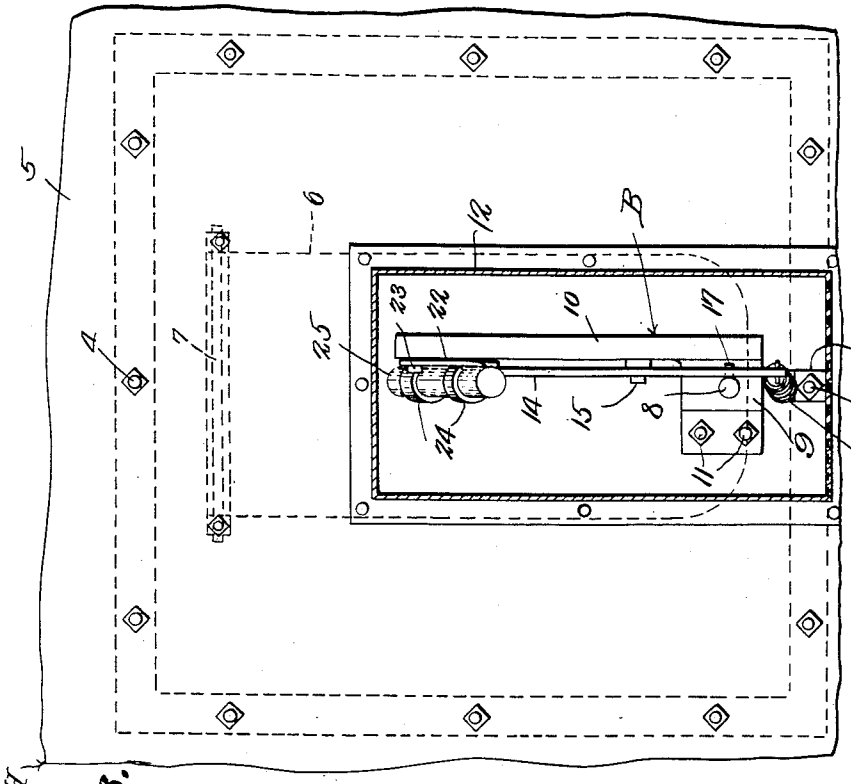


Fig. 3.



Fig. 4.

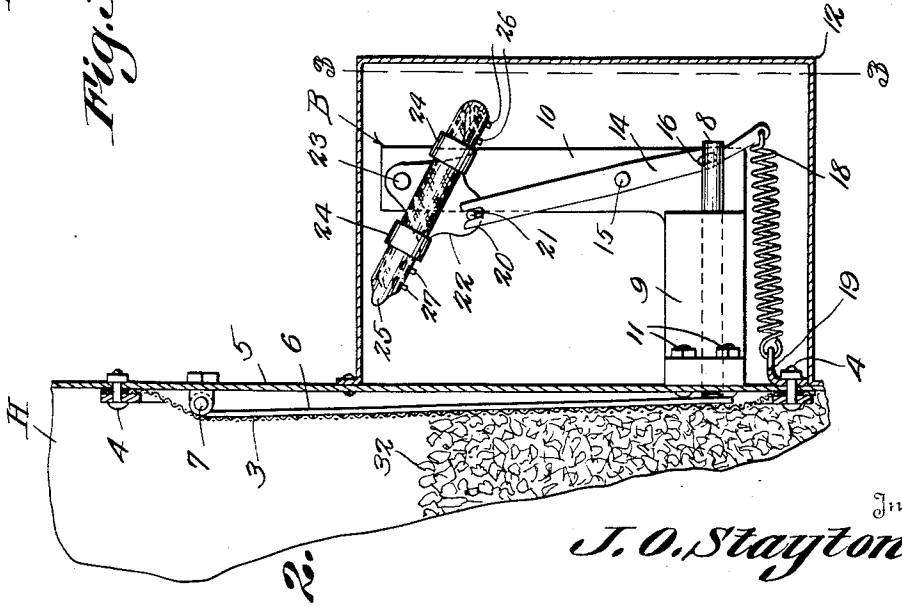


Fig. 2.

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UNITED STATES PATENT OFFICE

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STOKER CONTROL

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By way of explanation, it may be stated that mechanical stokers sometimes run out of fuel because the hopper is not replenished. Then the back draft from the furnace which is being stoked, carries the flame into the conveyor and burns out the feed screw.

In view of the foregoing, this invention aims to provide means for stopping the conveyor while there is still fuel enough in the hopper and in the feed chute so that the back draft from the furnace will not burn out the conveyor, a signal being given when the fuel in the hopper begins to run low.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:—

Fig. 1 is a vertical section showing a device constructed in accordance with the invention, some parts being in elevation, and the parts being in the positions which they will assume, when there is not much fuel in the hopper;

Fig. 2 is a fragmental vertical section, like Fig. 1, but showing the parts as they will appear when there is considerable fuel in the hopper;

Fig. 3 is a transverse sectional view taken about on the line 3—3 of Fig. 2; and

Fig. 4 is a sectional view showing a detail of the switch.

The hopper H receives the fuel and discharges it into a transverse feed chute F at the lower end of the hopper. In the feed chute F, rotates a worm conveyor C that carries the fuel out of the end 1 of the chute F, into the furnace to be stoked. Gearing 2 connects the conveyor C with an electric motor M, located wherever desired.

In the hopper H is placed a flexible shield 3, such as a piece of leather, canvas or the like, held by securing elements 4 on one wall 5 of the hopper H. A radius arm 6 is located between the shield 3 and the wall 5 of the hopper H, and the upper end of the radius arm is pivoted at 7 to the wall 5, so that the radius arm can swing vertically. The shield 3 keeps the coal dust away from the radius arm 6 and other parts which coact with it.

The lower end of the radius arm 6 is in contact with the inner end of a horizontal slide 8, which can reciprocate in the lateral extension 9 of a bracket B, the bracket including a vertical arm 10. The lateral extension 9 of the bracket B is connected by securing members 11 with the wall 5 of the hopper H. The bracket B and the parts associated therewith are housed within a casing 12 of box-like construction, secured to the wall 5 of the hopper H.

A lever 14 is provided, and is fulcrumed intermediate its ends, at 15, on the vertical arm 10 of the bracket B. Below its fulcrum 15 the lever 14 has an elongated slot 16, in which is received a projection 17 on the slide 8, the slide and the lever thus being connected together pivotally. One end of a pull spring 18 is connected to the lower end of the lever 14, and the opposite end of the pull spring is connected to an anchor 19 which may be conveniently fixed to the wall 5 of the hopper H by one of the securing elements 4 that hold the shield 3 in place. There is a fork 20 on the upper end of the lever 14.

The fork 20 of the lever 14 receives a projection 21 on the lower part of a carrier 22, the lever and the carrier, thus, being pivotally connected together. The upper part of the carrier 22 is pivotally mounted at 23, to swing vertically on the arm 10 of the bracket B.

A switch mechanism is provided, and includes a tubular container 25, made of glass or other non-conducting material, and held by rings 24, or the like, on the carrier 22. The outer end of the tubular container 25 carries terminals 26, located at the bottom of the container, and similar terminals 27 are mounted in the bottom of the container at the inner end thereof. In the container 25 is carried a mass 28 of conducting liquid, spe-

cifically, a small amount of mercury. The mercury shown at 28 bridges the terminals 26 when the container 25 is in the tilted position of Fig. 2, and it bridges the terminals 27, when the container is in the tilted position of Fig. 1.

The signal 29, shown in Fig. 1, may be an electric bell or any thing else which will warn an operator, either by sight or by sound. The circuit for the signal 29 is shown at 30, and is joined to the terminals 27. This circuit is open at the terminals 27, saving when those terminals are bridged by the mercury 28. The circuit for the motor M is marked by the numeral 31, and is connected to the terminals 26. The circuit 31 is open, saving when the terminals 26 are bridged by the mercury 28.

As shown in Fig. 2, there is a considerable amount of fuel 32 in the hopper H, the shield 3 is pressed outwardly by the fuel, and the radius arm 6 is swung outwardly, also, on the pivotal mounting 7 for the radius arm. The slide 8 is carried to the right by the pressure of the radius arm 6, and the spring 18 is elongated. The slide 8, operating through the projection 9 and the slot 16, carries the lower end of the lever 14 to the right, and the upper end of the lever to the left, as in Fig. 2. The parts 20 and 21 tilt the carrier 22 on its pivotal mounting 23. The mercury 28 does not bridge the terminals 27, and, therefore, the signal circuit 30 is open, and the signal 29 gives no sound, or otherwise admonishes the operator. The mercury 28 bridges the terminals 26, the motor circuit 31 is closed, the motor M is operated, and the gearing 2 turns the conveyor, to feed out the coal from the chute F into the furnace (not shown) through the end 1 of the chute.

When the fuel is fed out of the hopper H to such an extent that the shield 3 is released, the parts assume the position of Fig. 1, before the fuel is depleted enough to permit a back draft from the furnace, and a burning out of the conveyor C. It will be obvious that, then, the mercury 28 in the container 25 bridges the terminals 27, thereby to close the signal circuit 30 and energize the signal 29, the operator being advised of existing conditions. When the container 25 is in the tilted position of Fig. 1, the mercury 28 is moved away from the terminals 26. Those terminals no longer are bridged by the mercury 28, the motor circuit 31 is opened, the motor M is stopped, and the conveyor C no longer advances the fuel in the feed chute F.

When the device forming the subject matter of this application is installed in a stoker, the feed chute F will not run out of fuel, and the flames from the furnace cannot lick back into the feed chute and burn out the conveyor C. Moreover, the operator is advised by the signal 29, when the fuel runs low in the hopper H, and under such conditions, the motor M no longer drives the conveyor C, to feed the fuel.

What is claimed is:—

1. The combination with a fuel hopper, a conveyor into which a hopper discharges, an electric motor operatively connected with the conveyor, and a motor circuit; of an electric switch interposed in the motor circuit, a member movably mounted in the hopper, a flexible shield within the hopper, between said member and the contents of the hopper, means for securing the shield about its margin to one wall of the hopper, to form a pocket in which said member works, the shield constituting means for transmitting pressure from the contents of the hopper to said member, and also preventing the contents of the hopper from clogging the action of said member by lodgment between said member and said wall, and mechanism for operatively connecting said member with the switch, the said member being movable, responsive to the pressure of feul against the shield to close the switch, said mechanism comprising automatically acting yieldable means for operating the switch, after the fuel in the hopper has been depleted to a predetermined degree, to open the switch.

2. The combination with a fuel hopper, a conveyor into which the hopper discharges, an electric motor operatively connected with the conveyor, and a motor circuit; of a member movably mounted in the hopper, a slide, means for mounting the slide for reciprocation, said member engaging the slide to move the slide in one direction, spring means for moving the slide in an opposite direction, a lever, means for fulcruming the lever intermediate its ends, means for connecting the lever on one side of its fulcrum with the slide, an electric switch interposed in the motor circuit, and means for pivotally connecting the lever, on the opposite side of its fulcrum, with the switch.

3. The combination with a fuel hopper, a conveyor into which the hopper discharges, an electric motor operatively connected with the conveyor, and a motor circuit; of a radius arm pivotally mounted in the hopper, a slide engaged with the radius arm, the radius arm constituting means for moving the slide in one direction, spring means for moving the slide in an opposite direction, means for supporting the slide for reciprocation, a lever, means for fulcruming the lever intermediate its ends, means for connecting the lever pivotally on one side of its fulcrum with the slide, an electric switch interposed in the motor circuit, and means for pivotally connecting the lever, on the opposite side of its fulcrum, with the switch.

In testimony that I claim the foregoing as my own, I have hereunto affixed my signature.

JOHN ORA STAYTON.