

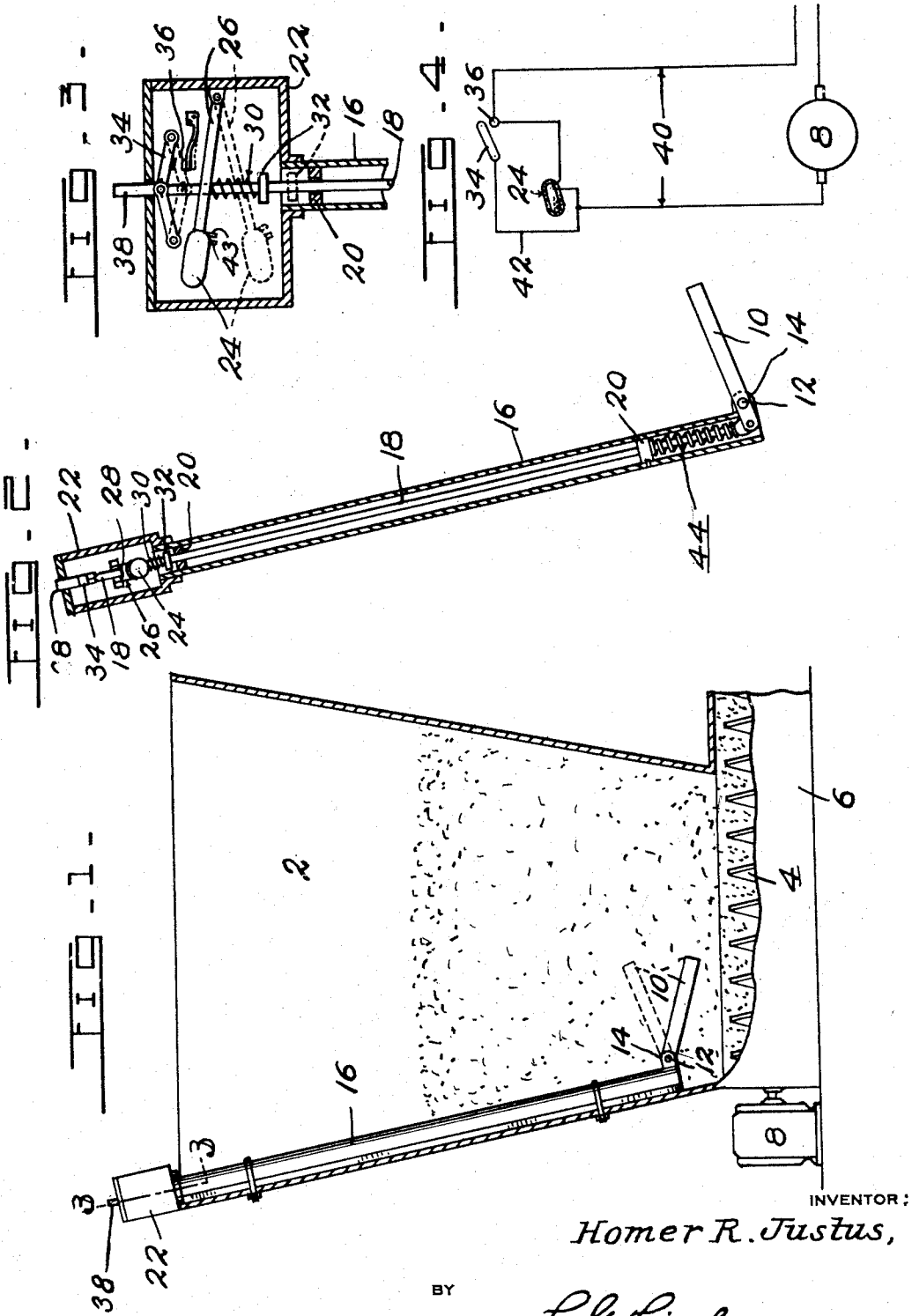
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H. R. JUSTUS

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PRESSURE OPERATED CIRCUIT CONTROLLER

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INVENTOR:

Homer R. Justus,

BY

F. G. Fischer,

ATTORNEY,

UNITED STATES PATENT OFFICE

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PRESSURE OPERATED CIRCUIT
CONTROLLER

Homer R. Justus, Kansas City, Mo.

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4 Claims. (Cl. 192—125)

My invention relates generally to controllers for motor driven devices and more particularly to means for controlling the motor circuit of said devices.

5 In the present instance I have shown my invention applied to apparatus for feeding pulverized or slack coal into furnaces, boilers and the like, wherein the coal is conveyed by a feeder from a hopper into the furnace or boiler. The feeder is driven by an electric motor which heretofore continued to operate even after the hopper had been emptied, thereby imposing unnecessary wear and tear upon the working parts.

15 The object of my invention is to provide simple and inexpensive means whereby the motor circuit is automatically opened before all of the coal has been fed to the furnace or boiler, and in order that said invention may be fully understood, reference will now be had to the accompanying drawing, in which:

20 Fig. 1 is a broken vertical sectional view of the feeding apparatus equipped with my invention.

Fig. 2 is a detail longitudinal section of the controlling means.

25 Fig. 3 is an enlarged sectional view of the upper portion of the controlling means, taken on line 3—3 of Fig. 1.

Fig. 4 is a diagram of the motor circuit.

30 Referring in detail to the different parts, 2 designates a hopper which communicates with a feeder comprising a screw 4 and a trough 6 for conducting the coal from the hopper to the furnace or boiler, not shown. 8 designates an electric motor for driving the screw 4. The foregoing may be of any well-known or preferred form.

Referring now more particularly to my motor circuit controlling means, 10 designates a pressure actuated element consisting in its present form of a lever mounted upon a fulcrum 12 carried by ears 14 projecting from the lower end of a protective tube 16 located within the hopper 2.

45 The inner end of the lever 10 is connected to a plunger 18 which extends upwardly through guides 20 in the tube 16 and into a case 22 fixed to the upper end of said tube 16.

24 designates a switch, preferably of the mercury type, which is mounted upon one end of an arm 26 pivotally connected at its opposite end to the interior of the case 22. The arm 26 has an aperture 28 through which the upper end of the plunger 18 projects as shown by Fig. 3. When the device is in operation the arm 26 is held in raised position by means of a coil spring

30 interposed between said arm and a collar 32 fixed to the plunger 18.

34 designates a manually controlled switch adapted to remain in either open or closed position. Said switch 34 is adapted to close against a contact 36 and is provided with a push-button 38 which projects upwardly through an aperture in the top of the case 22.

As shown by the diagram Fig. 4, the switch 24 and the contact 36 are arranged in the motor circuit 40, while the switch 34 is connected to a loop 42 extending around the switch 24 and connected to one side of the motor circuit.

The operation briefly stated is as follows: When the hopper 2 is supplied with fuel the weight of the latter depresses the lever 10 to the full line position shown by Fig. 1, thereby causing the inner end of said lever to raise the plunger 18 to the full line position shown by Fig. 3. As the plunger 18 moves upwardly it, through the intermediary of the spring 30, raises the arm 26 and the switch 24, thereby causing the mercury in the latter to flow downwardly into contact with the switch terminals 43 and thus close the motor circuit 40. After a sufficient amount of coal has been fed from the hopper 2 to relieve the lever 10 of pressure the latter is immediately forced to the full line position shown by Fig. 2 and the dotted line position shown by Fig. 1, by an expansible spring 44 interposed between the adjacent guide 20 and the enlarged lower portion of the plunger 18. The foregoing operation carries the plunger 18 downwardly thereby permitting the arm 26 and the switch 24 to descend by the force of gravity to the dotted line position, Fig. 3, so that the mercury switch 24 will uncover the contacts 43 and thus automatically open the motor circuit 40. The motor circuit 40 remains open until the hopper 2 is replenished with sufficient coal to again depress the lever 10. In some instances, however, enough coal may lodge under the lever 10 to prevent the same from moving downwardly and effecting the reclosing of the switch 24. Under these circumstances the circuit 40 may be manually closed by forcing the switch 34 into engagement with the contact 36, thereby providing a path for the current around the switch 24 through means of the loop 42. When the circuit is closed as stated the motor 8 again starts to operate and just as soon as the coal lodged beneath the lever 10 has moved down into the trough 6 and permitted the lever 10 to be forced downwardly to the full line position, Fig. 1, by the weight of the coal thereon said lever pushes the plunger 18 upward-

ly, thereby causing the same to effect closing of the switch 24 and opening of the switch 34.

From the foregoing description it is apparent that I have provided controlling means which is well adapted for the purpose intended, and while I have shown and described a preferred arrangement of the invention I reserve all rights to such changes and modifications thereof as properly fall within the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In controlling means of the character described, the combination with a hopper, a feeder for conveying material from said hopper, an electric motor for driving said feeder, and a circuit for said motor, of a switch for controlling said circuit, a pivotally mounted member arranged within the hopper and adapted to be held in a depressed position by the material, a plunger adapted to be held in such position by the depressed lever as to close the switch, and spring means for shifting said plunger to another position so that the switch may open the circuit.

2. In controlling means of the character described, the combination with a hopper, a feeder for conveying material from said hopper, an electric motor for driving said feeder, and a circuit for said motor, of a self-opening switch for controlling said circuit, a pivotally mounted member arranged within the hopper and adapted to be held in a depressed position by the material, a plunger adapted to be held in such position by the depressed member as to close the switch, and spring means for shifting said plunger to another position so that the switch may open the circuit.

3. In controlling means of the character described, the combination with a hopper, a feeder for conveying material from said hopper, an electric motor for driving said feeder, and a

circuit for said motor, a protective tube extending downwardly into the hopper, a member pivotally mounted at the lower portion of said tube and adapted to be held in a depressed position by the material in the hopper, a plunger pivotally connected at its lower end to the pivotally mounted member and extending upwardly through the protective tube, a self-opening switch adapted to be held in closed position by said plunger when the pivotally mounted member is held in a depressed position by the material, and spring means for forcing the plunger downwardly so that said switch may open when the pivotally mounted member is relieved of the weight of the material.

4. In controlling means of the character described, the combination with a hopper, a feeder for conveying material from said hopper, an electric motor for driving said feeder, and a circuit for said motor, a protective tube extending downwardly into the hopper, a member pivotally mounted at the lower portion of said tube and adapted to be held in a depressed position by the material in the hopper, a plunger pivotally connected at its lower end to the pivotally mounted member and extending upwardly through the protective tube, a self-opening switch adapted to be held in closed position by said plunger when the pivotally mounted member is held in a depressed position by the material, spring means for forcing the plunger downwardly so that said switch may open when the pivotally mounted member is relieved of the weight of the material, a loop extending around the self-opening switch and connected to the motor circuit, and a switch adapted to be manually operated to close said loop, said last-mentioned switch being arranged in the path of the plunger so that the latter may open the former when the pivotally mounted member is depressed.

HOMER R. JUSTUS.