Jan. 3, 1933. C. D. SMELSER 1,892,790

STOKER SHUT-OFF DEVICE

Filed March 9, 1932

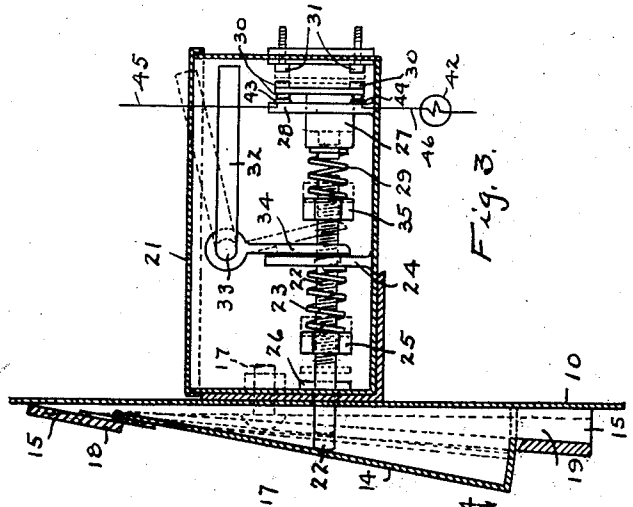


Fig. 3.

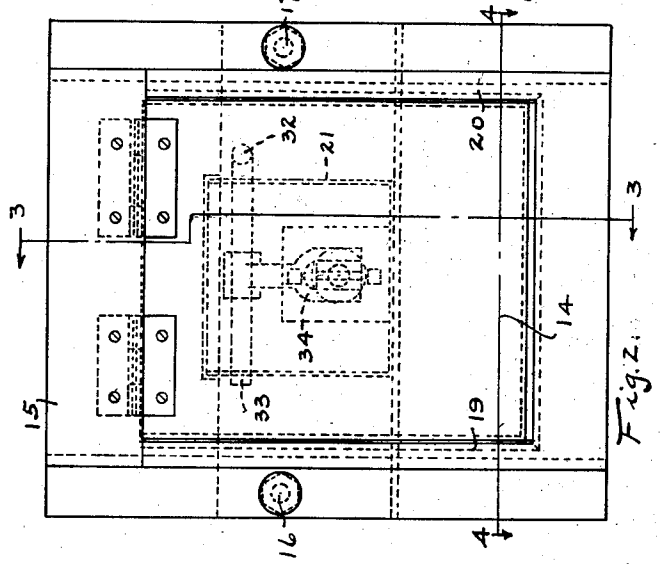


Fig. 2.

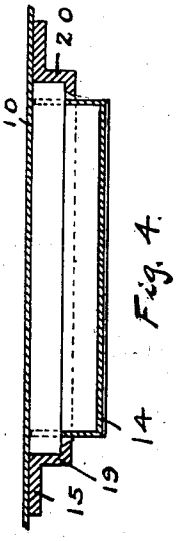


Fig. 4.

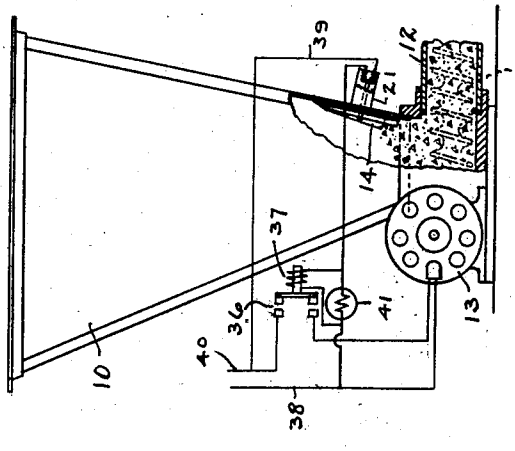


Fig. 1.

INVENTOR.
Chase D. Smelser,
BY Minturn & Minturn
ATTORNEYS.

Patented Jan. 3, 1933

1,892,790

UNITED STATES PATENT OFFICE

CHASE D. SMELSER, OF SOUTH BEND, INDIANA

STOKER SHUT-OFF DEVICE

Application filed March 9, 1932. Serial No. 597,761.

This invention relates to the art of mechanical furnace stokers and particularly to means of stopping the operating mechanism upon the feeding of a definite amount of coal from a supply hopper. Most mechanical stokers embody a coal supply hopper, some sort of a conveyor such as a motor-driven screw to carry the coal from the under side of the hopper into the fire-box, and a fan or blower to create a forced draft. When the hopper becomes empty, the screw continues to revolve and the fan also continues to discharge a current of air to within the fire-box. If the conveyor continues in operation any length of time after the hopper is emptied, the conveyor is then no longer covered over by coal and becomes exposed to the high temperatures of the fire and is thereby likely to become damaged. Also, since the coal no longer covers over the bottom of the hopper, the air under pressure in the fire-box may blow back over the conveyor and up through the hopper to carry smoke, ashes, and possibly burning particles into the room in which the stoker is located.

It is the primary object of my invention to stop automatically the motor which is employed to drive the blower and the conveyor as soon as the coal drops to a predetermined level in the hopper. Other important objects and advantages reside in the particular combination of elements as hereinafter described and claimed.

Reference is made to the accompanying drawing, in which

Fig. 1 is a fragmentary diagrammatic side elevation of a stoker embodying my invention;

Fig. 2, a front elevation on an enlarged scale of the control member;

Fig. 3, a vertical section on the line 3—3 in Fig. 2; and

Fig. 4, a horizontal section on the line 4—4 in Fig. 2.

Like characters of reference indicate like parts throughout the several views.

Referring first to Fig. 1, a stoker is here more or less diagrammatically illustrated as having a coal hopper 10 discharging from its bottom over a screw conveyor 11 which extends through a tube 12. A motor 13 is employed to drive the screw in the usual and well known manner. On the inside of the back wall of the hopper and down toward the bottom thereof, I attach the stoker shut off control member 14. This member 14 is essentially a flat plate hingedly connected by its upper end to the frame 15 so that the plate may be free to be swung out from the hopper wall to within the hopper. The frame 15 is bolted to the hopper wall by the bolts 16, 17 and is flared out above the plate to have an apron 18 hang over the upper end of the plate and to have the flanges 19, 20 along the respective vertical edges of the plate so that coal within the hopper sliding down over the plate may not work in behind the plate. The plate 14 is here shown as having back-turned edges and bottom to cooperate with the side flanges to maintain a sliding closure therearound as the plate may swing.

On the outer side of the rear wall of the hopper is mounted a box 21, Fig. 3, in which is a horizontally disposed plunger 22 having its forward end freely carried through a hole cut in the hopper wall to abut the plate 14. A compression spring 23 surrounds the plunger 22 and bears compressively between a plunger support 24 and a nut 25 screw-threadedly carried on the plunger whereby the spring 23, by pressing on the nut 25 forces the plunger forwardly against the plate 14. The forward travel of the plunger is limited by a pin 26 extending from the plunger coming up against the forward end of the box 21. A second plunger 27 is slidingly carried by the support 28 and a compression spring 29 fixed by one end to the second plunger 27 extends forwardly to surround the end of the first plunger and be fixed thereto, an appreciable gap being normally left between the two plungers. The second plunger 27 carries a pair of electrical contacting members 30 normally spaced forwardly from a corresponding pair of members 31.

A handle 32 extends from one side of the box 21 from a transverse shaft 33 which has a yoke 34 fixed thereto to straddle the plunger 22 back of the support 24 and in front of the

nut 35 screw-threadedly carried on the plunger.

The motor 13 is started and stopped through a magnetically controlled switch 36. The coil 37 of the electro-magnet of this switch is in series with one of the contact members 31 and one of the line wires 38, while a wire 39 leads from the other contact member 16 to the other line wire 40.

Upon coal being poured into the hopper 10, the plate 14 will be pushed back toward the hopper wall causing the plunger 22 to be pushed outwardly to compress the spring 23 and in turn through the spring 29 to push back the second plunger 27 to bring the contacting members 30 against the members 31 to close an electrical circuit therebetween (the members 30 being electrically connected one with the other). Further backward travel of the plunger 22 as caused by movement of the plate 14 is permitted without damage or stress by reason of the spring 29 intervening between the two plungers, the spring being compressed by further travel of the first plunger. When the two contact members 31 are thus interconnected, current may flow between the line wires 38 and 40 through the coil 37 to cause the switch 36 to be closed to start the motor 13. As long as coal presses against the plate 14 to hold it back, the coil 37 remains energized and hence the motor 13 continues to run. However, when the coal drops to below the bottom edge of the plate 14, the spring 23 causes the plunger to push the plate forwardly and to carry the contacting members 30 away from the members 31 to open the solenoid coil 37 circuit to allow the switch 36 to open, thus stopping the motor 13 until more coal is dumped into the hopper to again push back the plate 14. Should the coal arch around the plate 14, the handle 32 may be lifted to the dotted line position, Fig. 3, to push back the plunger 22 to bring the contacting members 30 against the members 31 so as to set the motor 13 into operation to cause the coal to move and settle down against the plate 14.

An indicating lamp 41, Fig. 1, may be employed to give a visual indication that the motor 13 is running, while a second lamp 42, Fig. 3, may be used to indicate at a remote point that the motor is stopped and more coal is required. In the use of the lamp 42, contacting members 43 and 44 are mounted on the supporting member 28 to be contacted by the members 30 when the plunger 22 is in its forward position, and wires 45 and 46 lead from the members 43 and 45, one to include the lamp 42, to the line wires.

While I have here shown and described my invention in the best form as now known to me, it is obvious that structural changes may be made in that form without departing from the spirit of the invention, and I, therefore, do not desire to be limited to that precise form beyond the limitations as may be required by the following claims.

What I claim as new is:

1. In a stoker having a hopper and a motor, a frame having outturned flanges, a movable plate disposed along a wall of the hopper toward the bottom thereof said plate having backturned and bottom flanges cooperating with the flanges of the frame to prevent the entrance of coal back of the plate, electrical contacting members back of the plate normally separated a motor control switch, an electromagnet coil adapted to close said switch upon energization of the coil, an electric circuit including said contacting members and said coil, and connecting means between said plate and said members, said members being respectively contacted with each other upon movement of the plate under pressure thereon of coal in the hopper.

2. In a stoker having a hopper and a driving motor, a frame having outturned flanges, a plate yieldingly disposed within the hopper toward the bottom thereof said plate having back turned side and bottom flanges cooperating with the flanges of the frame, spring means outside of the hopper normally tending to press the plate to within the hopper, a switch back of the plate normally open, a plunger between the plate and the switch, and a starting motor switch coil in circuit with said first switch, said plate being pushed outwardly by coal within the hopper to carry said plunger back to close said switch.

3. In a stoker having a hopper and a driving motor, a frame with outturned flanges, a plate yieldingly disposed within the frame having back turned side and bottom flanges, spring means normally tending to press the plate to within the hopper, a switch back of the plate normally open, a plunger between the plate and the switch, and a starting motor switch coil in circuit with said first switch, said plate being pushed outwardly by coal within the hopper to carry said plunger back to close said switch, said spring means being connected with said plunger to return the plunger and open said switch upon said plate being free from coal pressure.

4. A hopper stoker control attachment comprising a frame adapted to be bolted to the hopper of the stoker, said frame projecting furthest from the hopper wall at the bottom of the frame and having outturned flanges, a plate movably carried by the frame having inturned edges cooperating with the flanges of the frame, said plate being hinged at its top, a switch, a plunger abutting said plate, spring means forcing said plunger against said plate, and connecting means between the plunger and said switch.

5. A hopper stoker control attachment comprising a frame tapering toward the top adapted to be bolted to the hopper of the stoker, said frame having outturned flanges,

a plate movably carried by the frame having side and bottom back turned edge flanges cooperating with the flanges of the frame, a switch, a plunger abutting said plate, spring means forcing said plunger against said plate, and connecting means between the plunger and said switch, said connecting means comprising a second plunger attached to the switch, a compression spring between said two plungers normally spacing the plungers apart and means for manually swinging the plate.

6. A stoker motor shut-off device adapted to be operated upon a diminished coal supply in a hopper comprising, a swinging plate mounted within the stoker hopper to be rocked by coal pressing thereagainst, lever means for manually swinging the plate, means to keep the coal from entering back of the plate, a plunger back of the plate, a spring normally carrying the plunger against the plate, stop means limiting the travel of the plunger, a switch, and means interconnecting said switch and said plunger whereby the switch may be closed and opened upon travel of said plunger.

7. A stoker motor shut-off device adapted to be operated upon a diminished coal supply in a hopper comprising a frame having outturned flanges, a swinging plate mounted at its top within the frame and rocked by coal pressing thereagainst said plate having flanges cooperating with those of the frame to keep coal from entering behind the plate, a plunger back of the plate, a spring normally carrying the plunger against the plate, stop means limiting the travel of the plunger, a switch, and means interconnecting said switch and said plunger whereby the switch may be closed and opened upon travel of said plunger, a hand lever, and connecting means between the lever and said plunger whereby said plunger may be manually shifted independently of movement of said plate.

8. A stoker motor shut-off device adapted to be operated upon a diminished coal supply in a hopper comprising, a swinging plate mounted within the stoker hopper to be rocked by coal pressing thereagainst, a plunger back of the plate, a spring normally carrying the plunger against the plate, stop means limiting the travel of the plunger, a switch, and means interconnecting said switch and said plunger whereby the switch may be closed and opened upon travel of said plunger, said means comprising a second plunger engaging said switch, and a compression spring between and normally separating said first and second plungers, means to prevent coal entering back of the plate and lever means manually operable outside of the hopper to swing the plate to prevent the arching of coal thereagainst.

In testimony whereof I affix my signature.

CHASE D. SMELSER.