Oct. 20, 1925. 1,557,722

A. PASTRNÁK

FEEDING DEVICE FOR FURNACES

Filed Feb. 7, 1923

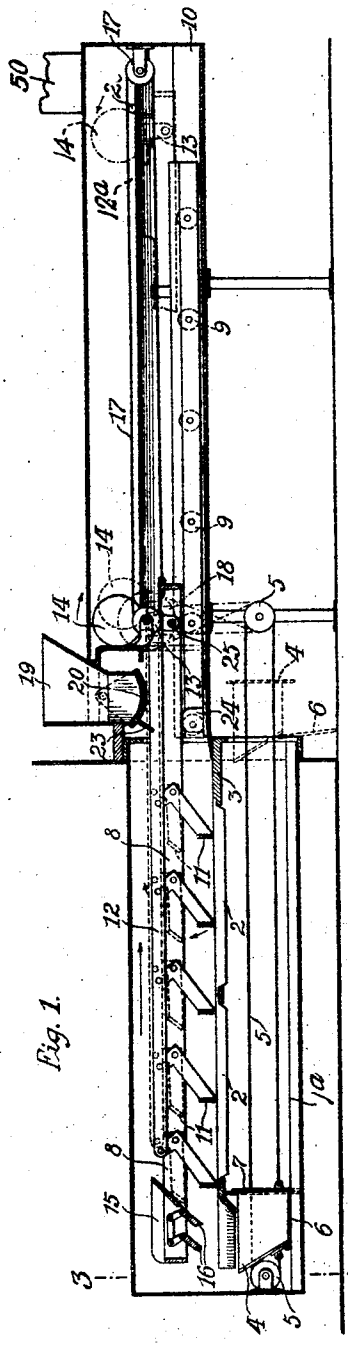


Fig. 1.

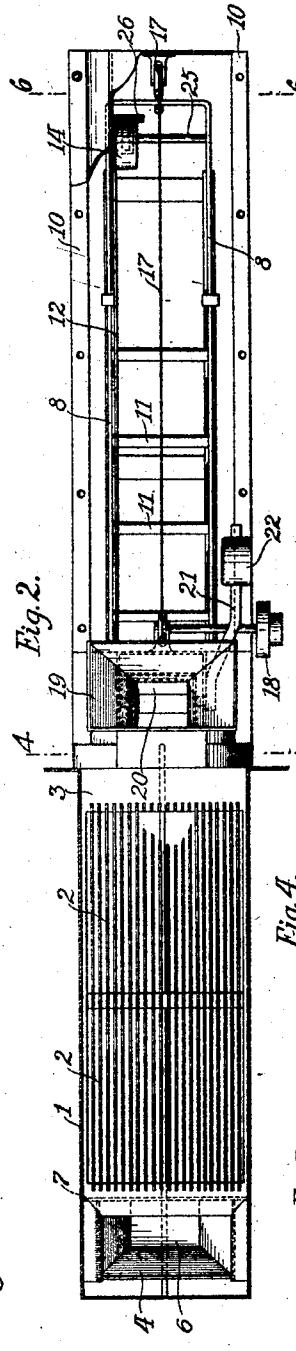


Fig. 2.

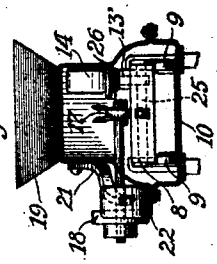


Fig. 6.

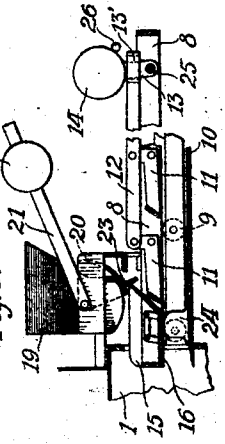


Fig. 5.

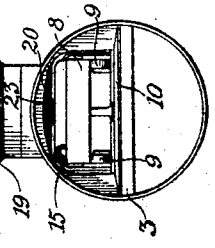


Fig. 4.

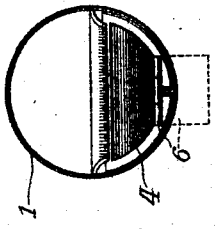


Fig. 3.

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UNITED STATES PATENT OFFICE.

ANTONIN PASTRNÁK, OF VELKE-KUNCICE, N/OSTR., CZECHOSLOVAKIA.

FEEDING DEVICE FOR FURNACES.

Application filed February 7, 1923. Serial No. 617,623.

To all whom it may concern:

Be it known that I, ANTONIN PASTRNÁK, a citizen of the Republic of Czechoslovakia, and resident of Velke-Kuncice, n/Ostr., Czechoslovakia, have invented certain new and useful Improvements in Feeding Devices for Furnaces, of which the following is a specification.

The present invention refers to a feeding device for furnaces wherein the fuel automatically fed to the grate is successively pushed forward a certain distance by a number of blades pivotally mounted within a frame, the blades being afterwards lifted from the grate and automatically withdrawn from the furnace.

The drawing shows a diagram of a design of the object of the invention. Fig. 1 being a longitudinal section of the furnace and feeding device, Fig. 2 a plan view of the same Fig. 3 a section on the line 3—3 of Fig. 1. Fig. 4 a section on the line 4—4 of Fig. 2. Fig. 5 a fragmentary section of the fuel tank with the charging box and Fig. 6 a section on the line 6—6 of Fig. 2.

The drawing shows the furnace as employed with an internally fired boiler Within the firing space 1 there are grate bars 2 as well as a fire plate 3 of corresponding width. At the extremity of the grate a clinker receptacle 4 is provided within the ash pit, which receptacle may be pulled outward by means of a chain drive 5. The bottom of the clinker receptacle is formed by a trap door 6 which is hinged at the front side as shown. Said trap door when the said receptacle is within the ash pit is supported in a closed position by rails 1^a. The rear wall of the clinker receptacle is indicated at 7. When the receptacle is moved longitudinally through the ash pit to a point beyond the rear end thereof as indicated in dotted lines in Figure 1, the said bottom or trap door 6 as it passes over the inner ends of the rails 1^a drops by gravity and hence discharges the load of clinkers from the clinker receptacle. The furnace feeder proper consists of a frame 8 arranged and longitudinally movable on rollers 9 which are mounted in bearings on an underframe 10. To the frame 8 U-shaped conveyors or blades 11 are pivotally mounted at like intervals. One arm of each of these blades is in the shape of a double bell crank lever and pivoted to a through bar 12 so that by shifting this said bar 12 all blades may be simultaneously turned either upwards or downwards (Fig. 1). The protruding end of the bar 12 is connected to a second lever 13 carrying a counterweight 14. A loop 12^a is on the bar 12 and is for the purpose of transmitting motion from the lever 13 to said bar, while permitting a certain freedom of movement of the lever 13 above its pivotal axis.

The free end of the frame 8 reaching well into the fire space 1 is provided with a fuel tank 15 the bottom of which is fitted with hinged bottom flaps 16 swinging simultaneously. To the underframe 10 of the sliding frame 8 a chain pulling device 17 is fitted which engages the frame 8 and is actuated by the drive 18. The drive is so designed as to render the speed of the forward movement of the frame less than the speed of the back movement, as is also usually the case with the well-known planing machine drive. To the underframe 10 there is also fitted, in close proximity to the fire space, a coal hopper 19 the bottom of which is curved as shown. This bottom 20 is kept closed by means of the lever 21 and counterweight 22. The underportion of this curved bottom is fitted with a pin 23 which engages the wall of the holder 15 when the latter is withdrawn from the fire box, thus opening the bottom and causing the lever 21 to raise the weight 22.

This occurs every time the fuel holder is just beneath the hopper 19, the sliding frame 8 being, at the same time, almost completely withdrawn from the fire box, and the blades being in the position as indicated in Fig. 1 by dotted lines and being kept in this position by the guides in the underframe.

As soon as the frame is moving in the direction of the fire space the round flap door 20, owing to the action of the weight 22, will close the hopper 19, and the fuel holder 15 supplied with the necessary fuel will enter the fire space. As soon as the back flap 16 of the tank 15, mounted on the pivot 25 and is released by the cam 24 fitted to the underframe, both flaps will open simultaneously so as to let the fuel drop on to the grate from the tank. As the frame advances the last of the blades 11 passes the cam 24, and as the movement still proceeds further the blades 11 will swing in common towards the grate. As this is done the coal dropped on the grate is pushed forward a

short distance into the fire space by the blade 11 which happens to be next to it. As soon as the frame is almost completely moved home into the fire space the weight 14 butts against the wall of the hopper 19, and on final advancing movement of the frame 8 said lever 13 will swing over in the direction indicated by an arrow in Fig. 1, thereby exerting a rear pull on the bar 12 and hence lifting the blades from the grate.

In Fig. 1 the end position of this swinging-over is shown in dashed lines. At this moment, the frame has altered its movement into the fire space and is starting a quick movement in the opposite direction, viz, out from the fire space, by means of a reversing mechanism such as used with planning machines and the like. After the frame has reached its end position in the underframe the weight 14, by means of a pin 26 fitted to the frame, is swung back into its initial position. The blades however, since that they are guided in the frame, and are unable to swing downward owing to the cam 24, remain in their lifted position. Corresponding to this end position the round flap 20 of the hopper 19 is swung over against the action of the weight 22, and fresh fuel enters the tank 15 from the hopper. Following this the direction of movement is reversed, and the procedure as described above repeats itself. Here again the fresh fuel is dropped on the front part of the grate, and then the frame is again pushed into the fire space 1 till the last of the blades has passed the cam 24 when all blades will swing over in common towards the grate. The last portion of coal deposited on the grate is again pushed forward by the corresponding blade, the fuel pushed forward by the preceding process being also pushed forward still farther a certain distance by the next blade.

The drawing shows a furnace wherein five blades are provided for the purpose of feeding the fuel to the fire box, accordingly it takes five fillings to cover the entire surface of the grate with the fuel. The blade closest to the fuel tank 15 serves to remove from the grate the already burned coal as well as the slag formed during combustion, and to convey it to the slag box 4 whence it may be removed together with the rest of the ashes from the ash pit. This method of firing is superior to the existing fire boxes in that the fuel is fed absolutely automatically, and that the coal is completely uniformly distributed over the entire grate area, while the burnt coal and slag are at the same time automatically removed from the fire box. Besides this method offers the advantage that it permits the use of coal of low quality as well as of wet coal. As the coal is supplied to the fire space in a number of consecutive impulses the coal fed first to the grate is first dried on the front part of the latter and pre-heated, and it is only after this coal has been dried and heated that it is pushed further into the fire space and burned, fresh coal being supplied simultaneously. A flue is indicated at 50 in Figure 1.

Having now ascertained and specified the nature of my invention, what I claim is:

1. In combination with a furnace grate, a furnace feeder comprising a frame mounted for longitudinal movement above the grate, means to impart reciprocating movement to said frame, blades pivotally mounted on said frame, a bar connected to said blades and adapted to rock the same into operative and into inoperative positions, a weighted lever movable with said frame and operatively connected to said bar, and means to operate said lever, to actuate said bar and cause the same to operate said blades at the limits of the strokes of said frame.

2. A furnace feeder comprising a fixed hopper, a movable bottom therefor, a frame arranged for longitudinal movement below said hopper, a second hopper carried by said frame and arranged to open the bottom of the first hopper when the frame is at one end of its stroke, the said second hopper having a movable bottom, and means to close the bottom of the second hopper as the latter reaches a position under the first hopper.

3. A furnace feeder comprising a fixed hopper having a pivotally mounted bottom, a lever connected to said bottom and having a counterweight to normally hold said bottom in closed position, a frame mounted for longitudinal movement below said hopper, a second hopper carried by said frame and arranged to open the bottom of the first hopper when said second hopper passes under the first hopper, said second hopper having a movable bottom, and means to close the movable bottom of the second hopper as the latter moves under the first hopper.

In witness whereof I affix my signature.

ANTONIN PASTRNÁK.