Aug. 31, 1926. 1,597,921

E. M. OKINS

FURNACE FUEL FEEDING APPARATUS

Filed June 4, 1923 2 Sheets-Sheet 1

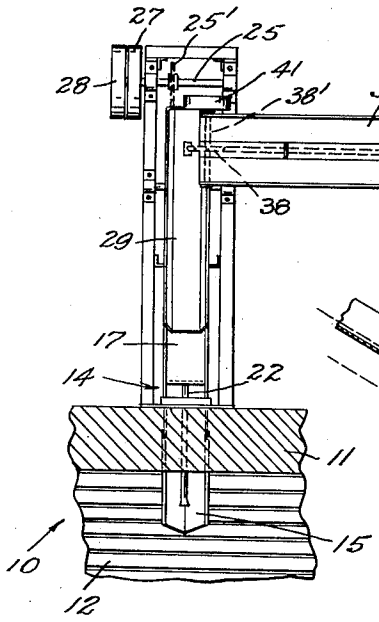


Fig. 1.

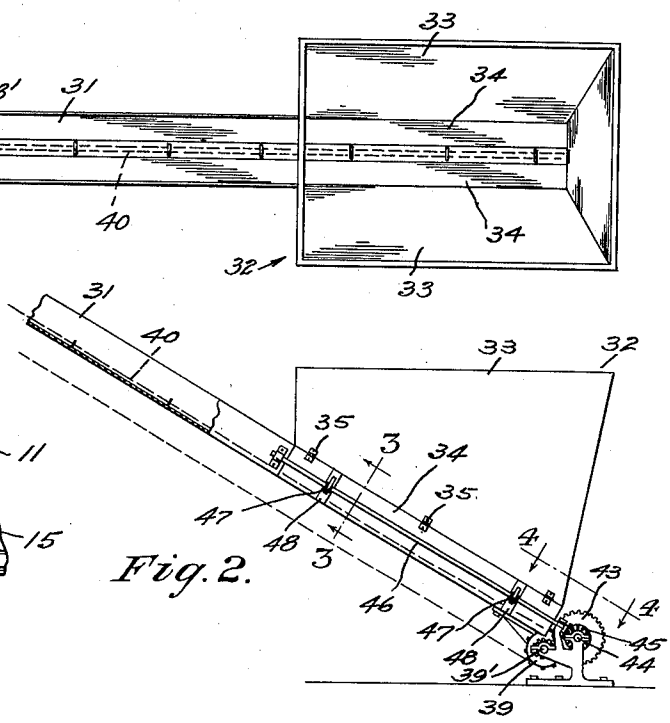


Fig. 2.

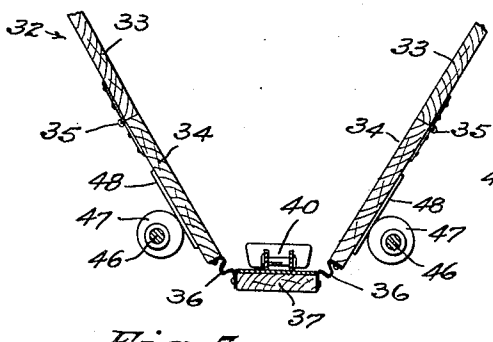


Fig. 3.

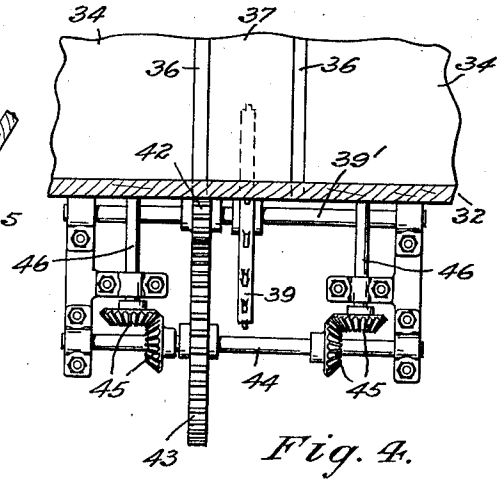


Fig. 4.

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FURNACE FUEL FEEDING APPARATUS

Filed June 4, 1923 2 Sheets-Sheet 2

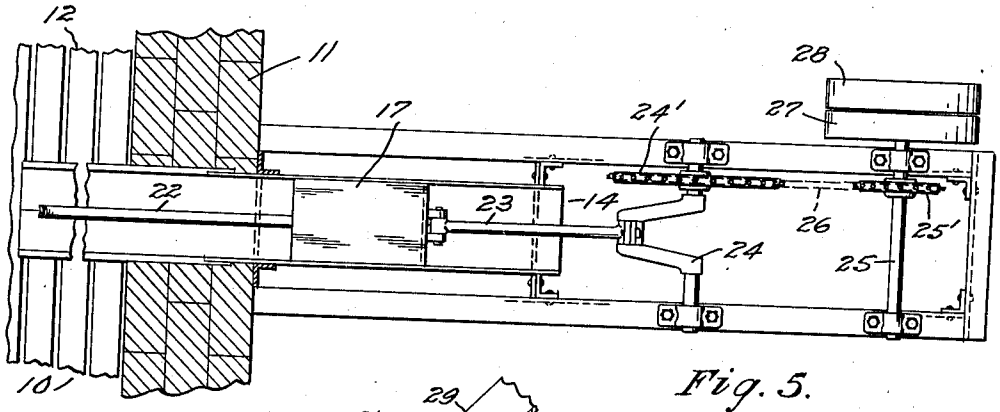


Fig. 5.

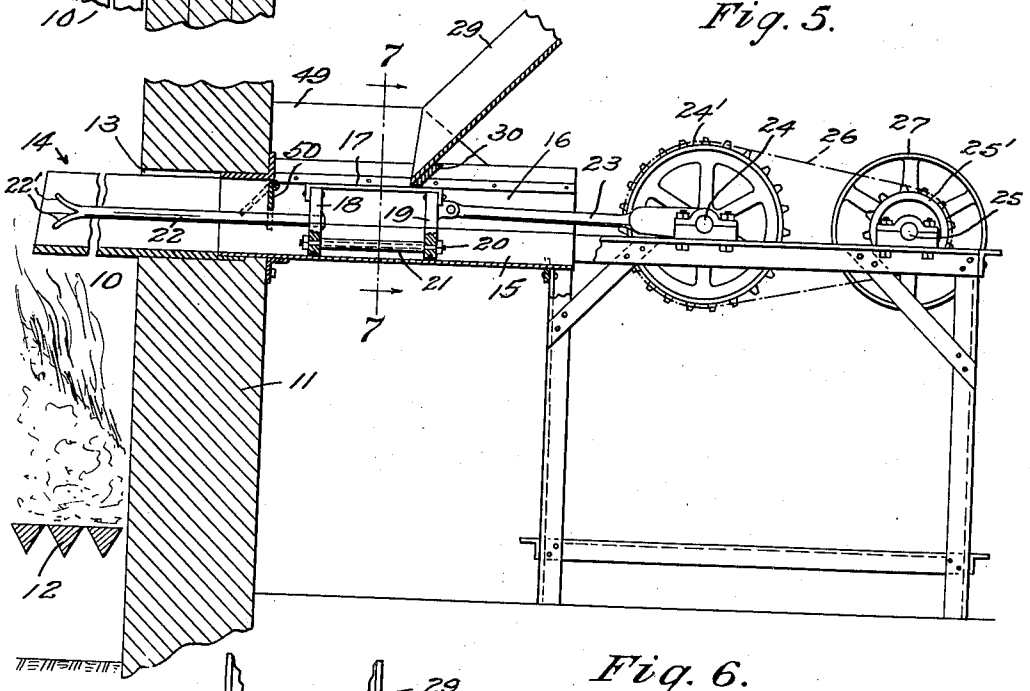


Fig. 6.

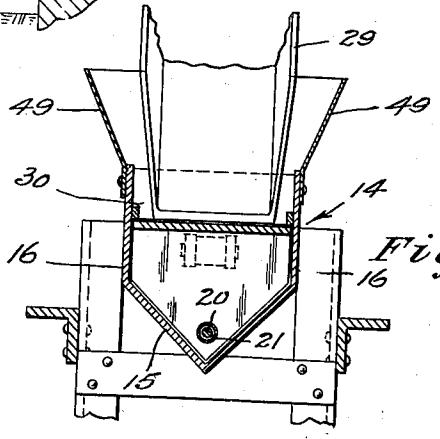


Fig. 7.

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UNITED STATES PATENT OFFICE.

ELLIOTT M. OKINS, OF AUBURN, WASHINGTON.

FURNACE-FUEL-FEEDING APPARATUS.

Application filed June 4, 1923. Serial No. 643,423.

This invention relates to furnace fuel-feeding apparatus and more especially to improvements in the apparatus illustrated and described in United States Patent No. 1,424,258 issued to me August 1, 1922.

The object of the present invention, generally, is the perfecting of apparatus of this character to render the same more efficient.

Other objects and advantages of the invention will appear in the following description.

The invention consists in the novel construction, arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings,—

Figure 1 is a plan view of apparatus embodying the invention. Fig. 2 is a side elevation, partly in section, of the fuel feed-hopper and a portion of the elevator shown in Fig. 1. Figs. 3 and 4 are detail sectional views on lines 3—3 and 4—4 of Fig. 2. Fig. 5 is a plan view of the feed chute, shown to a larger scale than in Fig. 1. Fig. 6 is a view partly in side elevation and partly in longitudinal vertical section of Fig. 5. Fig. 7 is a transverse section on line 7—7 of Fig. 6.

In said drawings, the reference numeral 10 represents the fire box of a furnace having a side wall 11 and provided with a grate such as 12. Through an opening 13 in the furnace wall 11 extends a substantially horizontal chute 14 having a V-shaped bottom 15 (see Fig. 7) and preferably parallel side walls 16.

Provided for reciprocating movements in the chute 14 is a fuel pusher comprising a horizontal plate 17 which is secured at its ends upon supporting elements 18 and 19 of transverse shapes corresponding to the transverse shape of said chute.

The pusher elements 18 and 19 are each formed in its side and bottom edges with a groove to accommodate a metallic packing, of Babbitt or equivalent metal, to afford anti-friction wearing surfaces with respect to the chute walls.

The pusher end elements 18 and 19 are further connected with each other by a longitudinally disposed bolt 20 extending through the same and a tubular spacing element 21 interposed between said end elements. Secured to the pusher end element 18 and extending forwardly therefrom is a stoker bar 22 having a forked end the prongs or bifurcations 22^1 of which diverge as shown in Fig. 6. The pronged stoker bar functions in each rearward stroke thereof to break up accumulations of fuel deposited in front of the pusher and in each forward stroke of the latter the prongs of the bar serve to progressively feed the fuel as a stream from the delivery end of the chute 14.

Said pusher is reciprocated, see Figs. 5 and 6, through the medium of a connecting rod 23 from a crank shaft 24 which is rotated from a shaft 25 by means of an endless chain belt 26 passing about sprocket wheels 24^1 and 25^1 provided on the respective shafts. The shaft 25 may be driven as by means of a power driven belt, not shown, engaging a pulley 27 secured to the shaft. 28 represents an idler pulley loosely mounted upon the shaft 25 to receive the power belt above referred to when the pusher is unemployed.

The fuel is deposited upon the pusher element 17 from a feed trough 29. A stationary scraper blade 30 is disposed transversely of the chute 14 above the pusher plate 17 whereby fuel deposited on the pusher will be swept therefrom during the successive rearward strokes of the same.

The feed trough 29 constitutes the discharge spout for an elevator trough 31 extending from a fuel-receiving hopper which is indicated generally by 32.

The side walls 33 of said hopper are inclined outwardly, as shown in Figs. 1 and 3, and each side wall is provided with a lower section or board 34 which is connected at its upper edge by hinges 35 to the adjacent upper section of the hopper structure.

Flexible material 36 such as fabric connect the free ends of the swingable sections 34 to the stationary floor board 37 of the hopper for the purpose of preventing the escape of fuel from the bottom of the hopper.

A conveyor belt passes about sprocket wheels 38 and 39 which are located to have a lead, indicated by 40, of the conveyor belt travel upon the floors of the hopper and said elevator.

Provided on the shaft 38^1 of sprocket wheel 38 is a pulley 41 for a power driven belt (not shown) whereby said conveyor belt is operated for transporting fuel from the hopper to the feed trough 29 of said chute.

The shaft 39^1 of the sprocket wheel 39, which is rotated through the medium of the conveyor belt, acts through the medium of spur gears 42 and 43 to rotate a shaft 44 ar-

ranged transversely of the elevator and hopper.

45 represent bevel gears operatively connecting the shaft 44 with cam shafts 46, one at each side of the hopper, upon which are mounted cams 47 which acts against wearing plates 48 provided on the hinged hopper-sections 34.

The cams 47 serve to impart vibratory impulses to the movable sections 34 of the hopper for obviating any arching of the fuel within the latter.

Guard plates such as 49, Figs. 6 and 7, are desirably provided as extensions for the trough side plates 16.

A swingable door 50 depending from the wall 11, as shown in Fig. 6, serves to obviate the admission above the fuel level in the trough 14 of air from entering the fire box through the wall opening 13.

When the apparatus is operated, fuel dumped or otherwise supplied into the hopper 32 is agitated by the action of the vibratory movements of the hopper hinged-sections 34, above described, to ensure an uninterrupted supply of fuel to the conveyor whereby the fuel is transported in the elevator trough 31 to the delivery trough 29.

The fuel is delivered by the action of gravity from the trough 29 into the chute 14 to be intermittently shoved by the pusher toward the associated furnace.

The pusher and the stoker bar 22 acting supplementary thereto serve to feed the fuel in a succession of streams into the fire box of the furnace and most advantageously upon the apex of a conical pile or accumulation of fuel upon the grate in the fire box where it is consumed. Owing to the fuel being thus piled under the extremity of the chute 14 within the fire box, the fresh charges of fuel spread downwardly over the pile surface becoming progressively hotter as they approach the base of the cone where the combustion is most vigorous and affords thereat a relatively thin body of fuel through which combustion air can readily penetrate. The cooler central portion of the fuel deposit in the fire box burns more slowly and crumbles down, so to speak, to produce a substantially uniform fire.

What I claim, is,—

In apparatus of the class described, the combination with the fuel feed chute, a reciprocatory pusher member therein, of means to supply fuel progressively to said chute, said means comprising a fuel receiving hopper provided with a stationary floor, hinged wall-elements and flexible means connecting said floor with the respective wall elements, power operated conveyor devices for transporting fuel from said hopper to said chute and means actuated through the medium of said conveyor devices to impart vibratory motion to said hinged wall elements.

Signed at Auburn, Washington, this 22nd day of May 1923.

ELLIOTT M. OKINS.