Feb. 23, 1932. D. DREIER 1,846,477

AUTOMATIC STOKER

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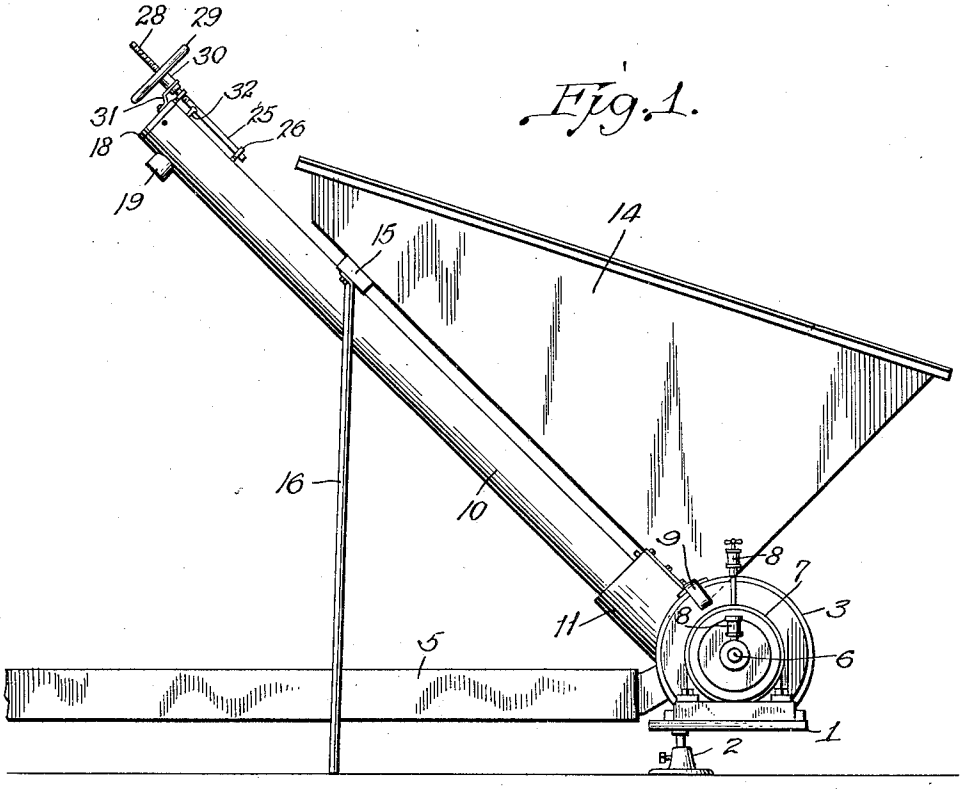


Fig. 1.

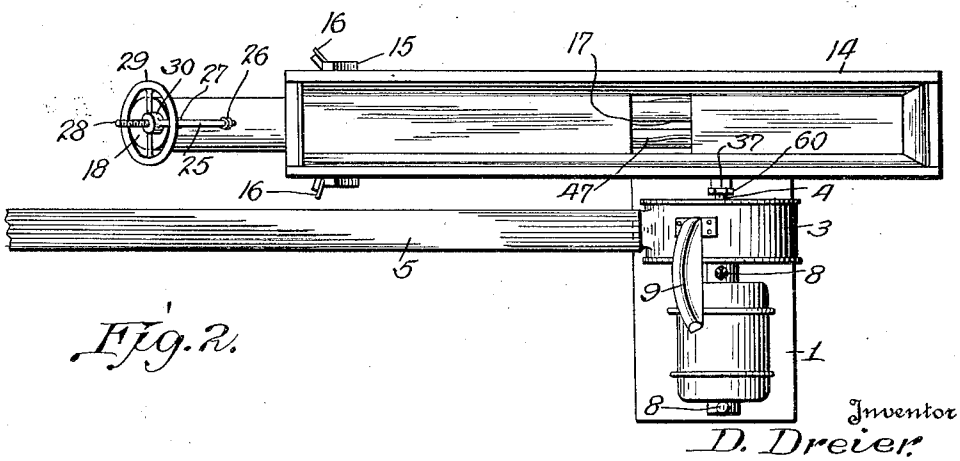


Fig. 2.

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AUTOMATIC STOKER

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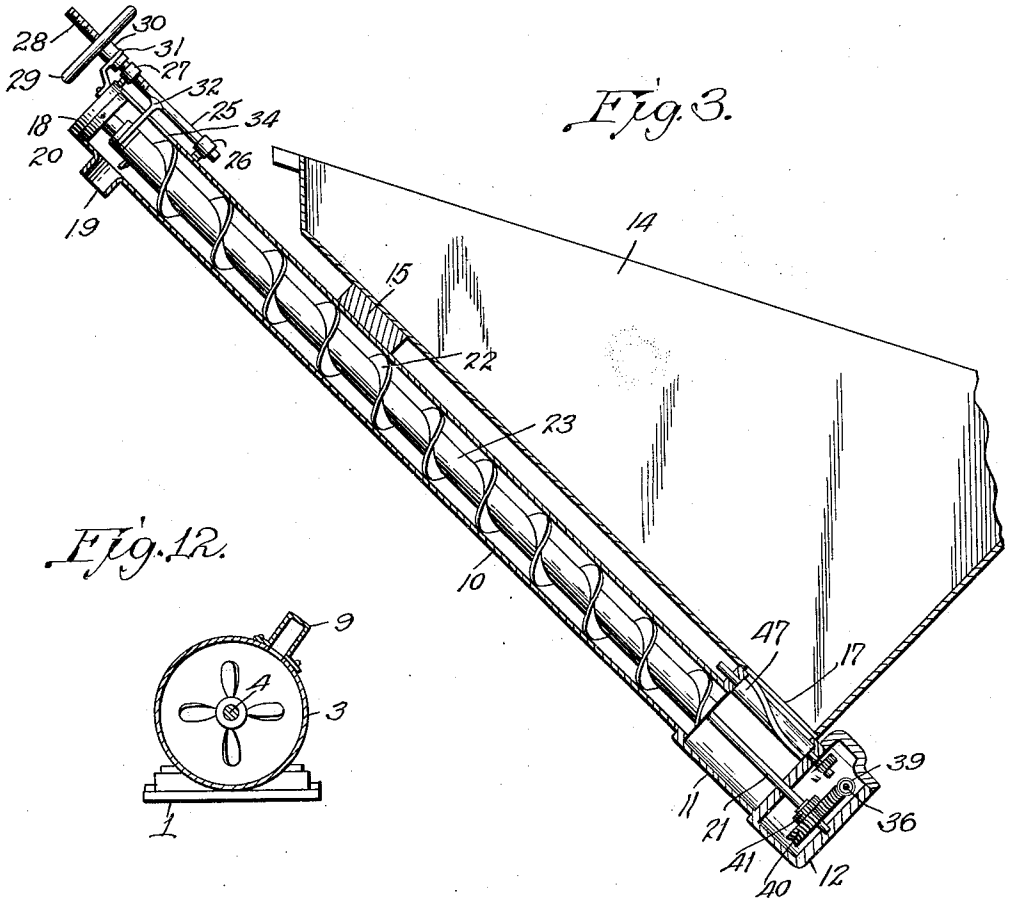


Fig. 3.

Fig. 12.

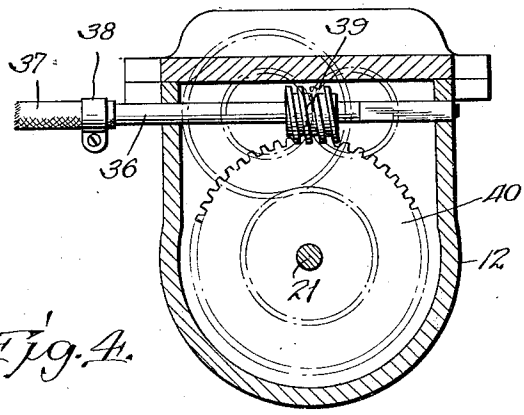


Fig. 4.

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Fig. 5.

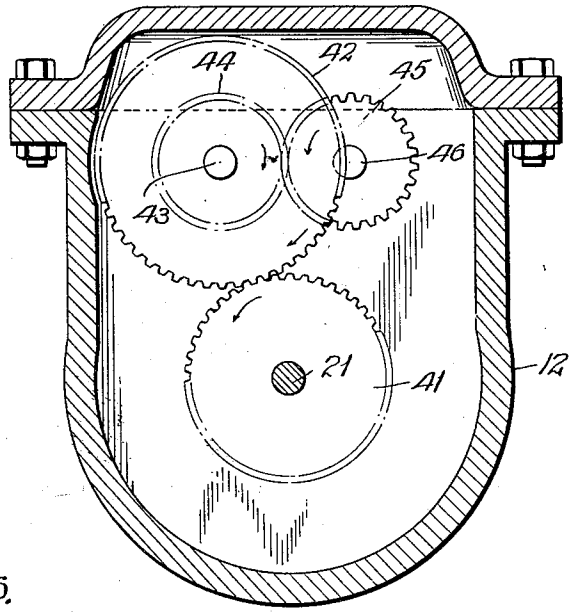


Fig. 6.

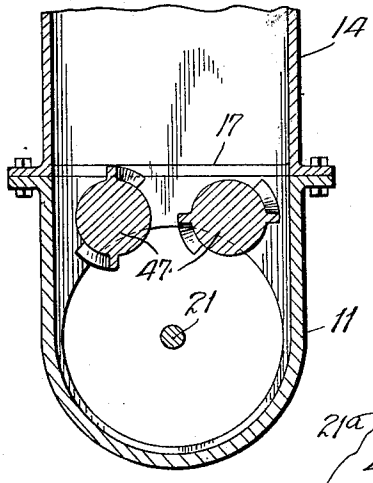
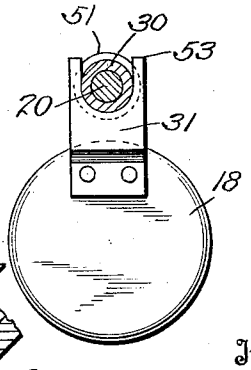


Fig. 11.



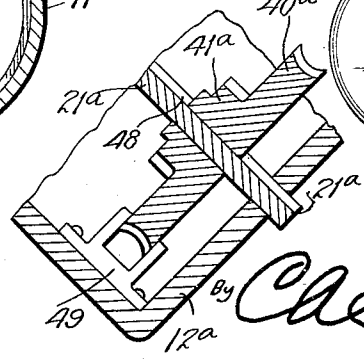


Fig. 13.

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Fig. 7.

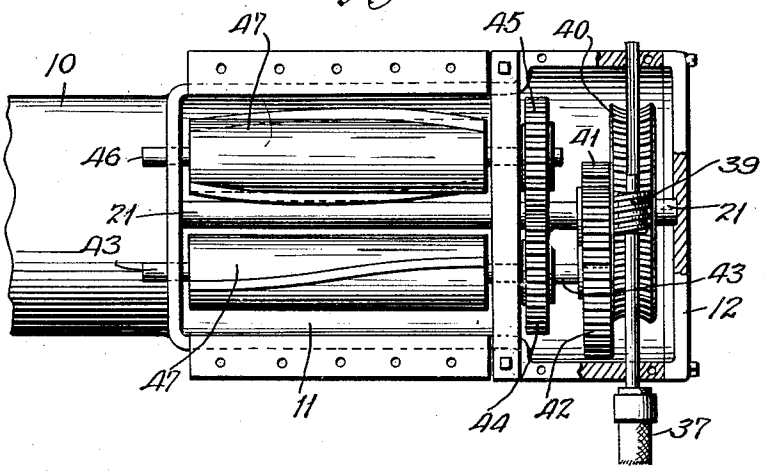


Fig. 8.

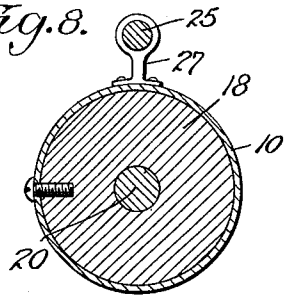


Fig. 9.

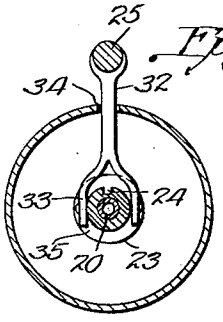
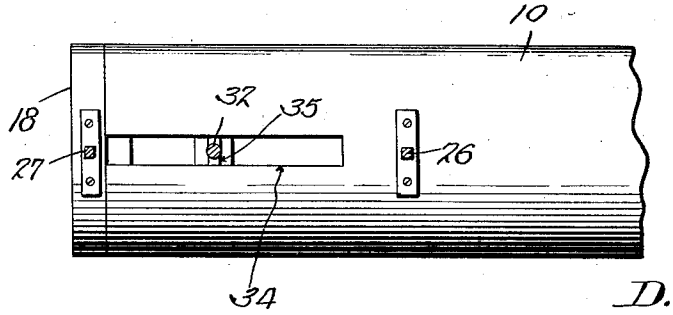


Fig. 10.



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Patented Feb. 23, 1932 1,846,477

UNITED STATES PATENT OFFICE

DOMINICK DREIER, OF LIVINGSTON, MONTANA, ASSIGNOR OF TWENTY-FIVE PER CENT TO EDWARD E. GRABOW, OF LIVINGSTON, MONTANA

AUTOMATIC STOKER

Application filed June 9, 1930. Serial No. 460,046.

The device forming the subject matter of this application is an automatic stoker. One object of the invention is to provide novel means for operating the conveyor. A further object of the invention is to supply novel means for crushing the fuel. A further object of the invention is to supply novel means whereby the conveyor may be moved longitudinally with respect to the fuel pit, to regulate the amount of fuel that is fed by the conveyor. Another object of the invention is to provide novel means whereby the conveying mechanism and other parts will not be broken, if a rock, a chunk of iron, or other object becomes caught at any place, for instance, in the crushing rolls.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present 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 may be made in the precise embodiment of the invention herein disclosed, within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Figure 1 shows in side elevation, a device constructed in accordance with the invention;

Figure 2 is a top plan;

Figure 3 is a longitudinal section wherein parts appear in elevation;

Figure 4 is a transverse section through the gear housing;

Figure 5 is a transverse section through the gear housing in a different plane from that through the gear housing in a different plane from that shown in Figure 4;

Figure 6 is a section through the fuel pit and through a portion of the hopper, the view displaying the crushing rolls;

Figure 7 is a top plan view of the fuel pit and the gear housing, parts being removed, and parts being in section;

Figure 8 is a transverse section through the fuel chute, showing the bearing in one end of the chute;

Figure 9 is a transverse section through the fuel chute, showing a portion of the means whereby longitudinal adjustment is imparted to the conveyor and the shaft which rotates the conveyor;

Figure 10 is a top plan showing a portion of the fuel chute, parts being in section;

Figure 11 is an end elevation of the fuel chute, parts being in section;

Figure 12 is a transverse section through the blower;

Figure 13 is a fragmental sectional view illustrating a modification.

In carrying out the invention, there is provided a base 1 carried by vertically adjustable pedestals 2. On the base 1 is mounted a blower 3, the blower shaft being marked by the numeral 4.

The blower 3 has an outlet 5 which may lead to the furnace (not shown) for the purpose of creating a forced draft. The shaft 4 of the blower 3 is connected directly to the shaft 6 of a motor 7 mounted on the base 1. The motor 7 may be an electrical motor. Lubricating means 8 may be supplied wherever necessary. The blower 3 has a lateral air nozzle 9 discharging downwardly on the motor 7, for the purpose of keeping the motor cool.

The numeral 10 marks an upwardly inclined tubular fuel chute located at one side of the outlet 5 of the blower 3 and carried by the base 1. At its lower end, the tubular fuel chute 10 is connected to a fuel pit 11, and a box-like gear housing 12 is connected to the lower end of the fuel pit 11. A hopper 14 is connected to the fuel pit 11 and discharges thereinto through an opening 17. The hopper 14 may be supported in any desired way, for instance, by means of a cross beam 15 supported on props 16 and connected to the fuel chute 10.

A head 18 is mounted in the upper end of the tubular fuel chute 10, the chute having a downwardly extended outlet 19 disposed adjacent to the head 18. Any suitable means (forming no part of the present invention) is provided for conveying the fuel from the

outlet 10 into the furnace. A shaft 20 is journaled for rotation in the head 18 and has a reduced end 21 mounted to turn in the lower end wall of the gear housing 12. The shaft 20 does not move longitudinally.

The numeral 22 marks a screw conveyor operating the fuel chute 10. The screw conveyor 22 has a tubular hub 23 receiving the shaft 20. The hub 23 of the screw conveyor 22 is splined at 24 (Figure 9) on the shaft 20, the construction being such that, although the screw conveyor 22 is rotated by the shaft 20, the conveyor, nevertheless, can be adjusted longitudinally of the shaft, at the will of an operator, so as to project it more or less into the fuel pit 11, thereby regulating the upward feed of the fuel from the fuel pit.

The means for imparting said longitudinal adjustment to the screw conveyor 22 may be constructed in various ways. As shown, it embodies a slide rod 25 mounted for right line reciprocation in a bearing 26 on the chute 10 and in a bearing 27 on the head 18 of the fuel chute 10. The upper end of the slide rod 25 is threaded, as indicated at 28, into a hand wheel 29, the hub 30 of which has a circumferential groove 51 (Figure 11) received for rotation in a fork 53 of a bracket 31 secured to the head 18 of the chute 10. The slide rod 25 is provided with a depending arm 32 movable in an elongated slot 34 in the top of the fuel chute 10. At its lower end, the arm 32 is supplied with a fork 33 fitting in a circumferential groove 35 formed in the hub 23 of the screw conveyor 22.

A transverse shaft 36 (Figure 7) is journaled for rotation in the gear housing 12. The numeral 37 designates a tubular shaft section, which may be flexible. The outer end of the shaft section 37 is connected at 60 (Figure 2) to the shaft 4 of the blower 3. At its inner end, the shaft section 37 is connected by a clamp 38 to the shaft 36, a simple slip clutch thus being provided.

The shaft 36 carries a worm 39 (Figures 7 and 4) located within the gear housing 12 and meshing with a worm wheel 40 on the reduced end 21 of the shaft 20. On the end 21 of the shaft 20 there is secured a pinion 41 meshing with a gear wheel 42 on a shaft 43 journaled in the fuel pit 11, and extended into the gear housing 12. On the shaft 43 is mounted a pinion 44 meshing with a pinion 45 on a shaft 46 journaled in the fuel pit 11, the pinions 44 and 45 being located in the gear housing 12, as shown in Figure 7. A crushing means is carried by the shafts 43 and 46 and is located in the fuel pit 11. The crushing means may be of any desired kind, spirally ribbed crushing rolls 47 being embodied in the invention, in its preferred form.

The drives are as follows:—

The motor 7 drives the shaft 6 which is joined directly to the shafts 4 of the blower 3, and, thus, the blower is operated, a forced draft being created through the outlet 5 of the blower to the furnace (not shown). The blower 3 forces air through the nozzle 9, and the nozzle 9 discharges on the motor 7, the motor thereby being cooled.

When the shaft 4 of the blower 3 is rotated, the said shaft imparts rotation to the tubular shaft section 37 and the transverse shaft 36 of Figure 7 is rotated. The clamp 38 forms a clutch of sufficient strength to transmit motion from the shaft section 37 to the transverse shaft 36 and to parts driven thereby. If, however, the screw conveyor 22 or the crushing mechanism 47 becomes clogged, due to the presence of an infrangible obstruction, then the clamp 38 will permit relative rotation between the tubular shaft section 37 and the shaft 36, and no damage will result.

When the shaft 36 is rotated, the worm 39 cooperates with the worm wheel 40 on the end 21 of the shaft 20, to rotate the shaft 20, rotation being imparted to the screw conveyor 22, because the hub 23 of the screw conveyor is splined at 24 (Figure 9) to the shaft 20.

When the shaft 20—21 is rotated, rotation is imparted to the pinion 41 of Figure 5, and the pinion 41 rotates the shaft 43 through the instrumentality of the gear 42. The pinion 44 on the shaft 43 rotates the shaft 46 by way of the pinion 45, and, thus, the crushing rolls 47 are rotated.

The fuel in the hopper 14 moves through the opening 17 into the fuel pit 11, and upon the crushing rolls 47. The fuel is crushed by the rolls 47 and is passed downwardly into the fuel pit 11. The downwardly crowding movement of the rolls 47 and the agitation of the fuel in the fuel pit 11, due to the action of the rolls 47, will force the fuel against the lower end of the screw conveyor 22, even though the lower end of the conveyor may be flush with the upper wall of the fuel pit 11, as depicted in Figure 3 of the drawings.

The screw conveyor, therefore, will carry the fuel upwardly to the chute 10 and discharge the fuel through the outlet 19.

The operator may desire to have the fuel fed more rapidly than is possible when the parts are arranged as shown in Figure 3, and means to that end is afforded in the hand wheel 29 and connected parts. When the hand wheel 29 is rotated, the hub 30 of the hand wheel rotates in the bracket 31 and longitudinal movement is imparted to the slide rod 25 because the slide rod is threaded at 28 into the hand wheel and its hub. When the slide rod 25 moves endwise, the arm 42 and the fork 33 impart longitudinal adjustment to the screw conveyor 22, the operative driving connection between the screw conveyor and the shaft 20 being maintained, owing to the presence of the spline 24 of Figure 9. The operator, in view of the foregoing, can cause the screw conveyor 22 to

project more or less into the fuel pit 11, thereby regulating the rapidity with which the fuel is fed upwardly through the chute 10.

In the device forming the subject matter of this application, as hereinbefore described, it has been presupposed that the screw conveyor 22 moves longitudinally of the shaft 20, the shaft 20 having no endwise movement. It is possible, however, to fix the screw conveyor to the shaft 20, to operate the shaft longitudinally by means of the hand wheel 29 and associated parts and to permit the shaft 20 to slide longitudinally in the head 18 and in the gear housing 12. Such a construction is shown in Figure 13, and in that figure, parts hereinbefore described have been designated by numerals previously used, with the suffix "*a*".

In Figure 13, the lower end 21*a* of the shaft 20*a* is shown as mounted for right line reciprocation in the gear housing 12*a*. The end 21*a* of the shaft 20*a* slides through the worm wheel 40*a* and the pinion 41*a* and is splined to these members, as shown at 48. In order to prevent the worm wheel 40*a* from sliding transversely, when longitudinal movement is imparted to the shaft member 21*a*, the lower portion of the worm wheel may be made to turn within a yoke 49 secured to the bottom of the gear housing 12*a*.

Having thus described the invention, what is claimed is:—

In a device of the class described, a chute, a fuel pit at the end of the chute, a crusher in the fuel pit, a conveyor in the chute, means for mounting the conveyor for rotation and for longitudinal adjustment toward and away from the fuel pit, and under and out from under the crusher, means for rotating the conveyor, and means under the control of an operator for adjusting the conveyor longitudinally toward and away from the fuel pit, and under and out from under the crusher, the crusher lying immediately over the conveyor when said conveyor is projected into the pit.

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

DOMINICK DREIER.