

D. F. CRAWFORD.
STOKER.

APPLICATION FILED MAY 8, 1909.

1,050,054.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 1.

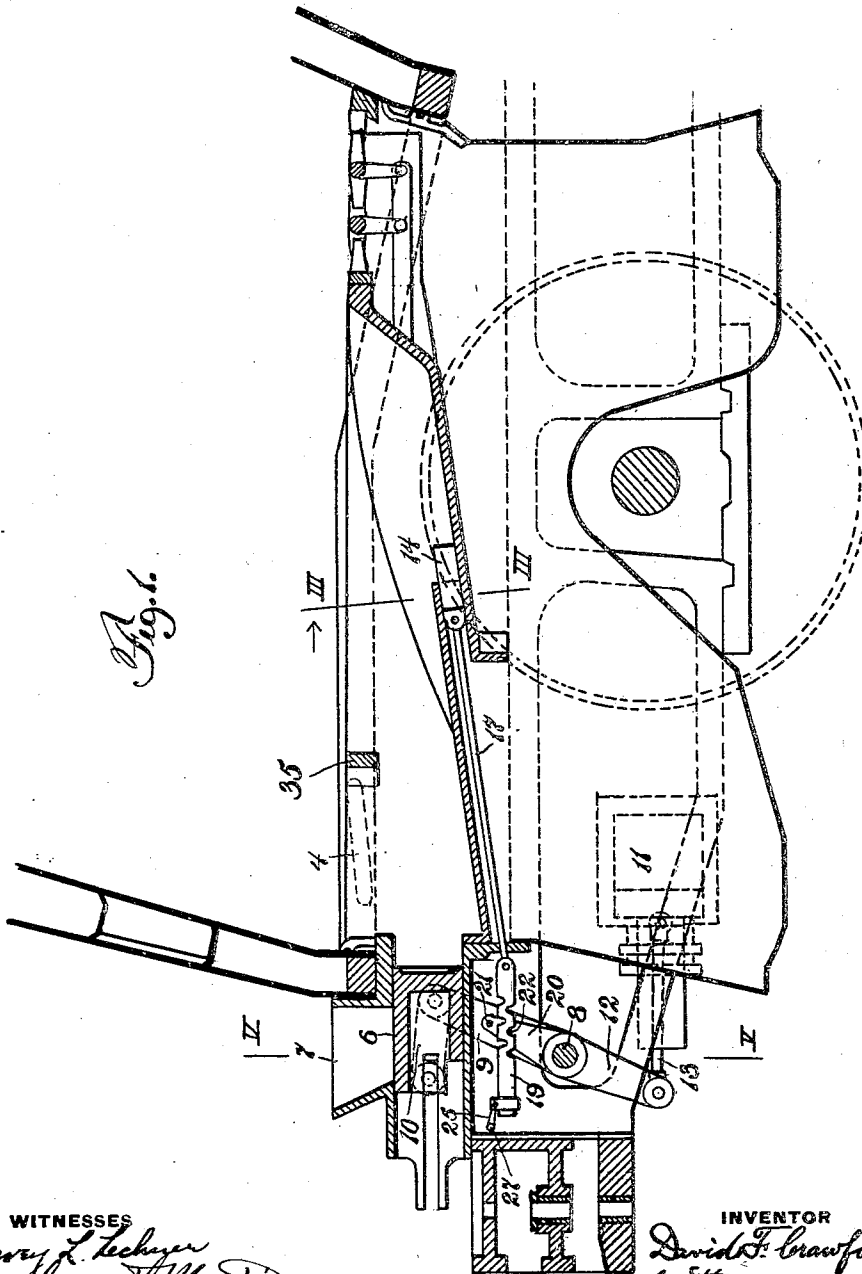


Fig. 1.

WITNESSES

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INVENTOR

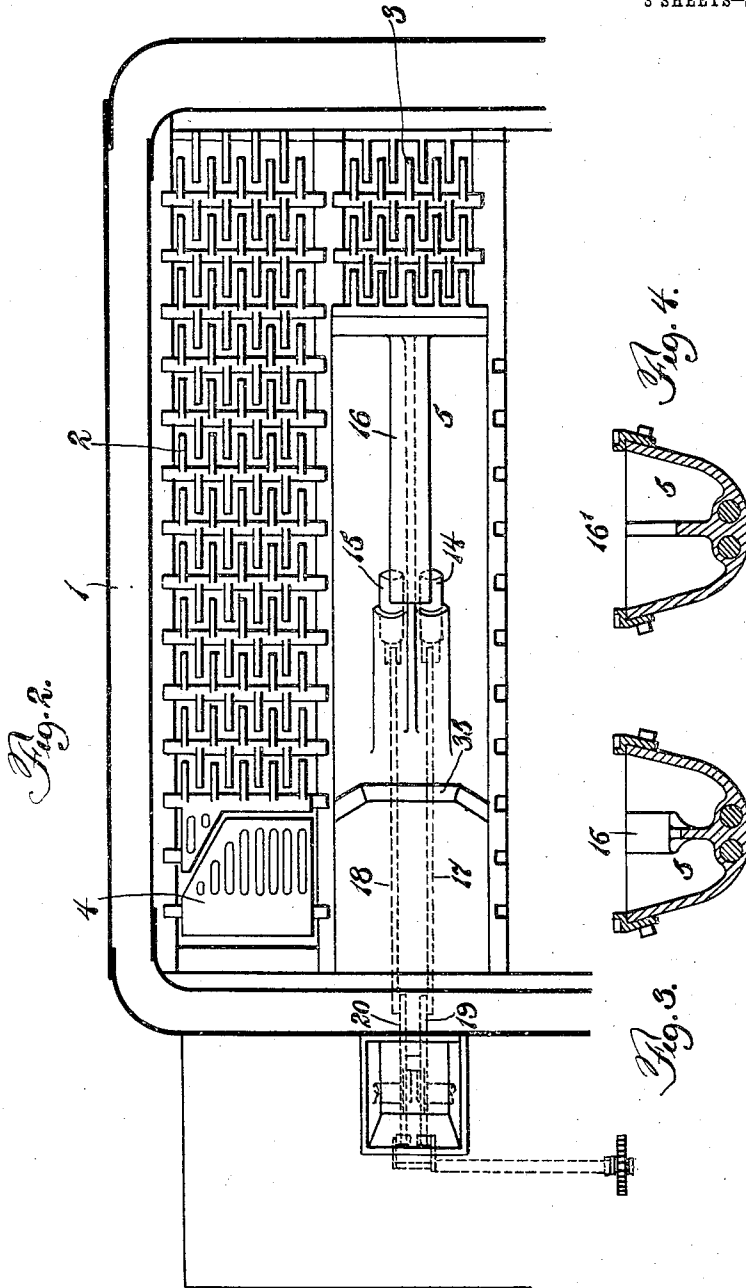
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3 SHEETS—SHEET 2.



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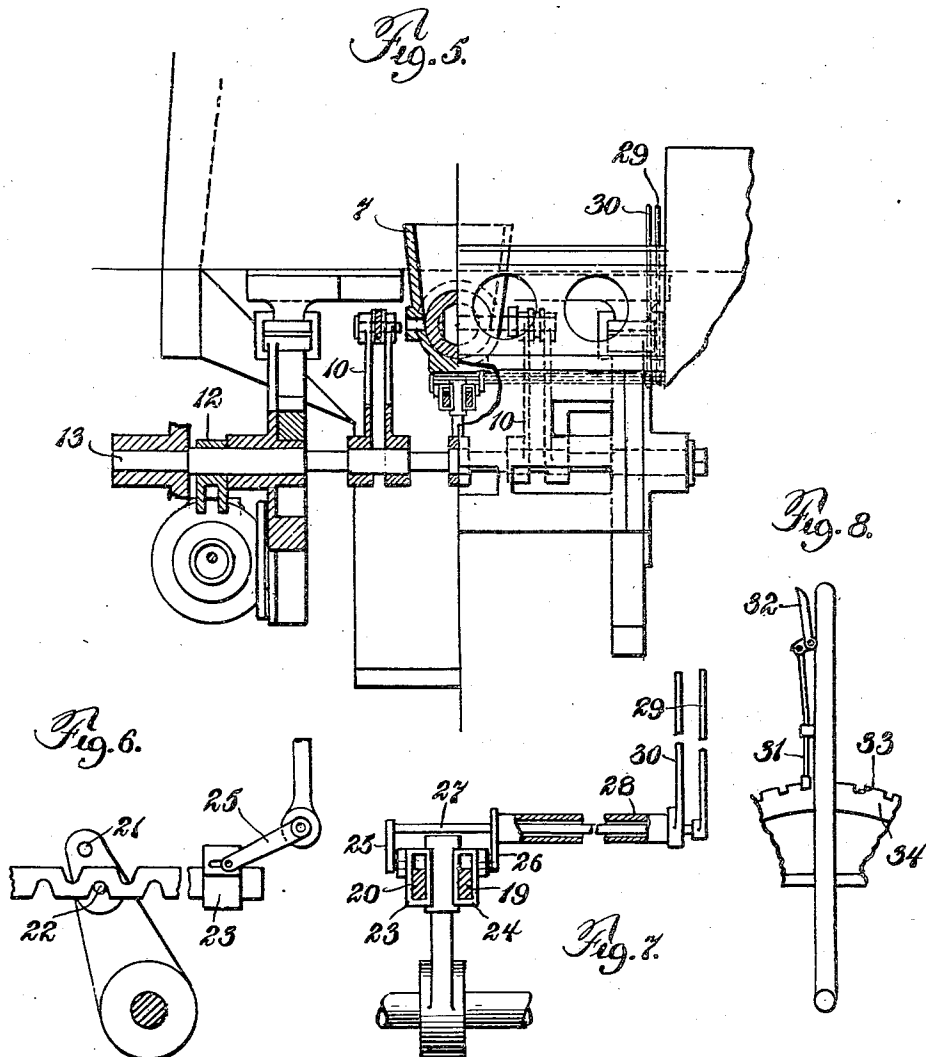
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3 SHEETS-SHEET 3.



WITNESSES

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STOKER.

1,050,054.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, DAVID F. CRAWFORD, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Stokers, of which the following is a specification.

The invention relates to automatic underfeed stokers, and has for its objects; the provision in apparatus of the character specified of improved means for regulating the feed through the feed trough; the provision of auxiliary feeding means whereby the supply of fuel to the sides of the furnace may be controlled independently of the main feed; and the provision of means whereby the fuel in the trough is caused to spread laterally. Certain embodiments of the invention are illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section through a furnace supplied with the improved stoker.

Figure 2 is a partial plan view of the apparatus,

Figure 3 is a detail section through the trough on the line III—III of Fig. 1,

Figure 4 is a similar section through a somewhat modified form of trough,

Figure 5 is a partial rear elevation and partial section on the line V—V of Figure 1,

Figure 6 is an enlarged detail side elevation of the connection between the operating crank and the adjustable link,

Figure 7 is an enlarged detail rear elevation partly broken away of the operating means for the adjusting link, and

Figure 8 is an enlarged detail end view of the controlling handle and its latch.

The stoker is illustrated as applied to a locomotive fire-box, but it will be understood that the construction is of general application and not limited to use in the relation shown. Only so much of the fire-box is shown as is necessary to illustrate the relation of the parts.

Referring first to the general arrangement of parts as shown in Figs. 1 and 2; 1 is the fire-box; 2 is one of the side grates which may be of any approved type, it being understood that the other side grate, not shown, is of the same construction; 3 is the front grate; 4 is the drop grate located at the end of the side grate, which drop grate is preferably somewhat inclined to the rear as indicated in dotted lines in Fig. 1; and

5 is the underfeed trough preferably of the general contour indicated in Fig. 1.

The primary feeding member is the piston 6, which is mounted for reciprocation beneath the hopper 7, and is operated from the shaft 8 by means of the cranks 9—9 and the connecting rods 10—10. The shaft is oscillated from a steam cylinder 11 at the side of the fire-box by means of the crank arm 12 keyed to the shaft 8, and connected at its other end to the piston rod 13 of the steam cylinder.

Secondary or auxiliary feeding means are provided for the trough in the form of the two pistons 14 and 15 working through the bottom of the trough in the manner indicated in Fig. 1, and located on opposite sides of a dividing wall or partition 16, which wall or partition has, as indicated in Fig. 3, flared sides in order to assist in giving the coal a lateral feed at this portion of the trough. The pistons 14 and 15 are pivoted respectively to connecting rods 17 and 18, which connecting rods are pivoted in turn at their rear ends to adjusting links or bars 19 and 20. These adjusting links are adapted to be engaged by laterally projecting pins upon the crank arm 20 keyed to the shaft 8. Each side of the crank is provided with two projecting pins as indicated in Fig. 1, and the bars or links are provided with notches adapted to engage the pins. The purpose in using two pins on each side is to give an adjustment as to the length of the stroke of the piston. For instance when the bar 19 is shifted from the position indicated in Fig. 1 to a position so that the notches on the upper side of the bar engage the upper pin 21 on the crank arm 20, the length of stroke of the piston is somewhat increased. When the bar is returned to the position indicated in Fig. 1 with one of the notches engaging the lower pin 22, the stroke is shortened. The provision of a plurality of notches on each side provides for the altering of the positions of the piston 14, which altering of position influences the quantity of feed, as the quantity of feed depends upon the amount or length of piston which is forced into the fuel of the trough. In order to govern the links or bars 19 and 20, the mechanism shown in detail in Figs. 6, 7, and 8 is employed. The ends of the bars are loosely engaged by loops 23 and 24,

which loops are pivotally engaged by crank arms 25 and 26, such crank arms being carried respectively by the rod 27 and the tube 28 mounted in suitable bearings. The tube 28 and the rod 27 carry respectively at their outer ends the operating handles 29 and 30 extending up above the floor of the engine as indicated in Fig. 5. Each of these handles is provided with a holding catch 31 and operating handle 32 therefor (Fig. 8), which catches are adapted to engage in notches 33 in a rack 34 interposed between the two handles. By means of these handles the length and the position of the strokes of the auxiliary pistons 14 and 15 may be regulated, and if desired the bars 19 and 20 may be moved to such position that they engage neither of the pins on the crank arm 20 in which case the pistons 14 and 15 are not operated.

In order to secure a proper lateral feed from the trough at the rear end of the trough 5 a transverse retarding member or bridge 35 is employed, which member extends entirely across the upper portion of the trough and retards the forward movement of the fuel at this point. This retarding of the fuel causes the banking of such fuel at the rear of the member and a consequent lateral spreading. This lateral spreading is necessary and desirable, as it has been found difficult to properly supply the rear portions of the side grates with fuel, the tendency of the fuel being to bank up in the front portions of the furnace leaving the rear portions without sufficient fuel. This deficiency of fuel in the rear portion of the furnace has necessitated considerable hand firing in order to properly cover the grates at the points specified.

The use of the two pistons 14 and 15 placed side by side upon opposite sides of the partition 16 is advantageous in that it provides for the increase or decrease of the supply of fuel to the sides of the furnace when found necessary. The tendency of the fuel is to bank up either upon one side of the furnace or upon the other in appa-

ratues of this character, necessitating a certain amount of hand firing, and the two pistons 14 and 15 provide a means whereby this condition may be controlled without the necessity of hand firing. The flaring shape of the dividing wall 16 tends to increase the lateral feed, but in some cases a straight central wall 16' may be employed as indicated in modified form shown in Fig. 4. The number of deflecting members 35 may be varied to suit conditions.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. In combination in an underfeed stoker, a feed trough, means at the rear end of the trough for forcing the fuel forwardly therein, a pair of feed pistons placed side by side in the trough in advance of the first feeding means, a partition in the trough extending longitudinally thereof and intermediate the pistons, and means for reciprocating the pistons.

2. In combination in an underfeed stoker, a feed trough, means at the rear end of the trough for forcing the fuel forwardly therein, a pair of feed pistons placed side by side in the trough in advance of the first feeding means, a partition in the trough extending longitudinally thereof and intermediate the pistons having its sides flared outwardly, and means for reciprocating the pistons.

3. In combination in an underfeed stoker, a feed trough, means at the rear end of the trough for forcing the fuel forwardly therein, a dividing wall extending longitudinally of the front end of the trough, a feed piston on each side of the wall, and means for reciprocating the pistons.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

D. F. CRAWFORD.

Witnesses:

L. S. KINNAIRD,
W. S. CAREY.