D. F. CRAWFORD.

TRANSFER MECHANISM.

APPLICATION FILED DEC. 13, 1909.

1,035,162.

Patented Aug. 13, 1912.

3 SHEETS—SHEET 1.

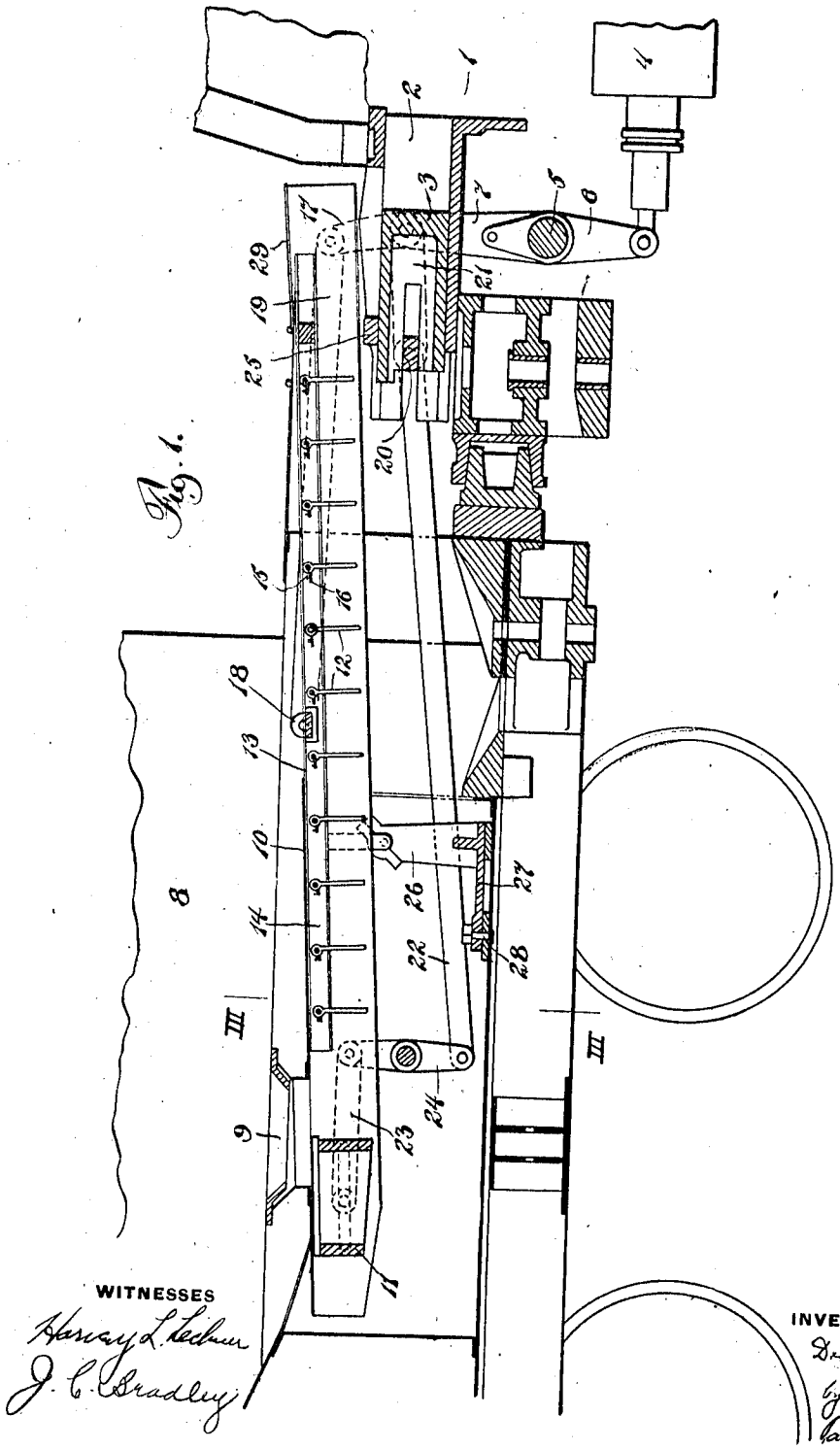

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 3.

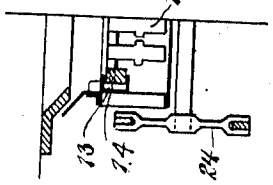
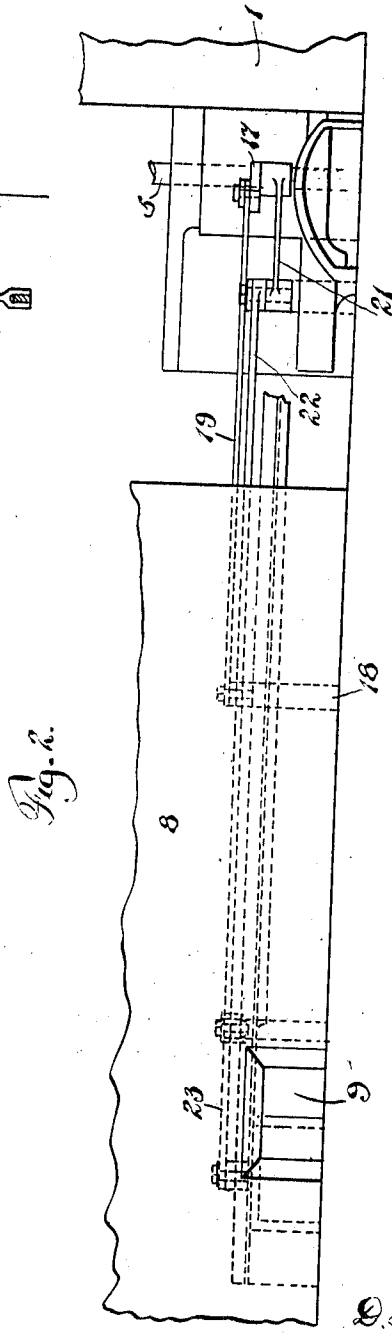


Fig. 2.



WITNESSES

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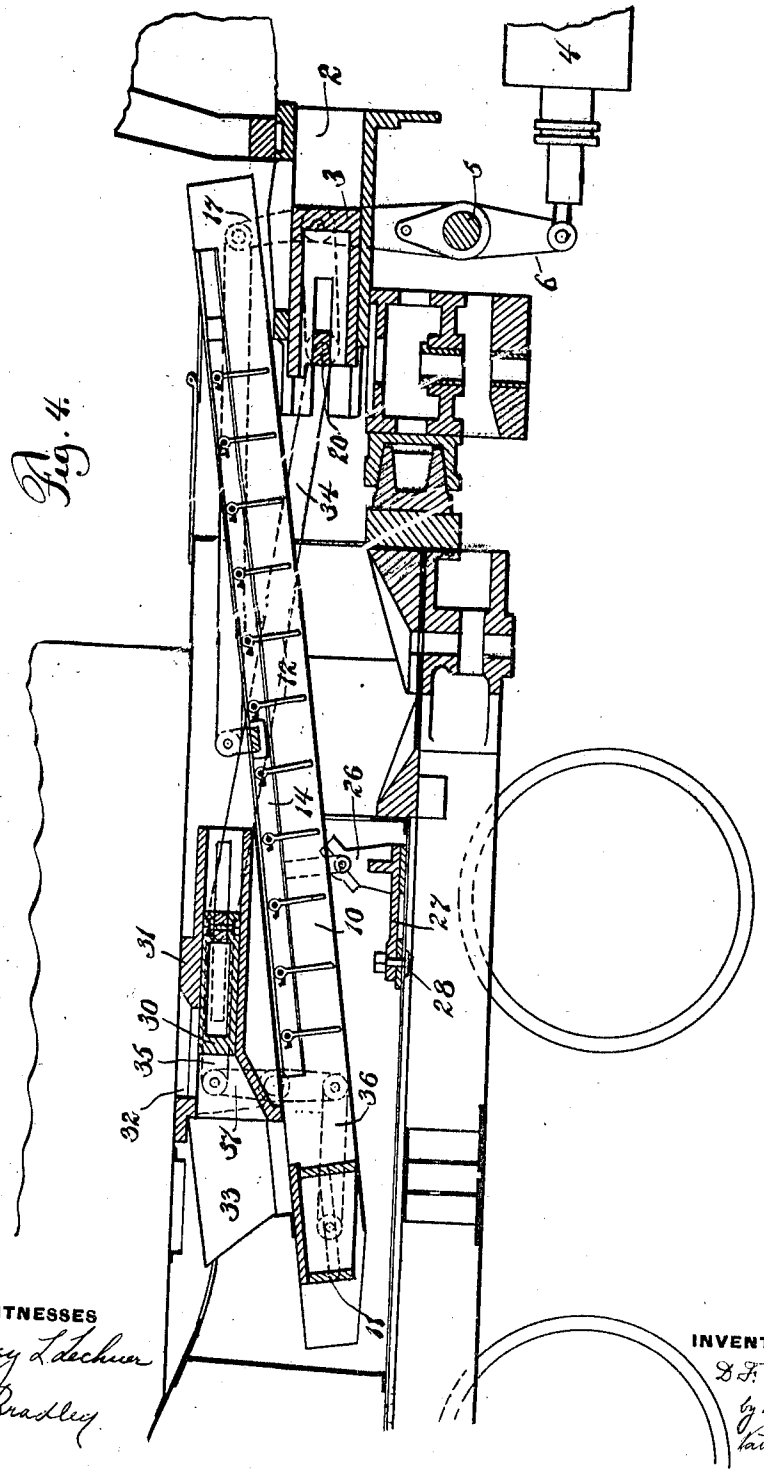
3 SHEETS—SHEET 3.

Fig. 4.



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TRANSFER MECHANISM.

1,035,162. Specification of Letters Patent. Patented Aug. 13, 1912.

Application filed December 13, 1909. Serial No. 532,916.

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 Transfer Mechanisms, of which the following is a specification.

The invention relates to transfer mechanism, and particularly to mechanism for conveying fuel from the tender of a locomotive to the stoker mechanism employed on the locomotive. The invention has for its primary objects; the provision of an arrangement having improved means for imparting the preliminary feed to the fuel in the transfer chute; and the provision of an improved and simplified arrangement of connecting links for securing the actuation of the piston and forwarding means in the chute. One embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal section through the mechanism as applied to a locomotive and tender,

Figure 2 is a partial view taken above the floor of the tender,

Figure 3 is a half section taken on the line III—III of Figure 1, and

Figure 4 is a longitudinal section through a modified form of transfer mechanism applied to a locomotive and tender.

Referring to the drawings, the principal parts may be enumerated as follows; 1 is the fire-box of the locomotive which may be of any approved type; 2 is a receiving or feed chamber which opens into the feed box, and from which the coal is forced by means of the piston 3; 4 is a steam cylinder located at the side of the fire-box and furnishing the power for operating the feed piston 3; 5 is a transverse shaft carrying the crank arm 6 connected to the piston of the steam cylinder, and the crank arms 7 from which the feed piston 3 is reciprocated; 8 is the tender of the locomotive provided in its bottom with the vertical outlet passage 9; 10 is a chute having its top open to receive the coal from the passage 9, and extending forwardly to a position above the feed chamber 2 of the locomotive, the bottom of such chute being open above the feed chamber 2 to permit a discharge thereto; 11 is a feed piston working in the rear end of the chute 10, and adapted to give the coal discharged into the chute from the passage 9, its preliminary forward movement; and 12 are a series of feed flaps or plates for advancing the fuel through the chute 10.

The chute 10 is preferably made of sheet metal and is provided at its upper inner edges with channels 13 (Fig. 3). Mounted in these channels are the operating rods 14 upon which the feed flaps 12 are pivotally supported. As indicated in Figure 3 each flap consists of a plurality of independently movable strips or fingers, which divided arrangement increases the efficiency of the flaps, as a lump of coal lodged beneath a flap can render only a portion of the strips ineffective, instead of the entire flap being held up, as is the case where the flaps are made in one piece. Rods 15 are provided upon the bars 14 against which the stops 16 on the feed flaps 12 are adapted to engage, so that the flaps while free to swing forwardly are prevented from swinging rearwardly. In order to reciprocate the bars 14, the crank arms 17 are provided upon the rock shaft 5, and the upper ends of these crank arms 17 are connected to a transverse block 18 carried by the bars 14 by means of the connecting rods 19. The piston 3 is provided with a transverse block 20, and the reciprocation of the piston is secured by means of a pair of connecting arms 21, one on either side of the piston, which connecting arms are pivoted at their forward ends to the upper ends of the crank arms 7 and at their rear ends to the ends of the block 20. The feed piston 11 is reciprocated by means of the connecting rods 22 and 23, and the lever 24 arranged as indicated in Figure 1, the front ends of the connecting rods 22 being secured to the ends of the block 20.

The feature of making the flaps in the forwarding chute in sections and of making the stroke of the flaps greater than that of the feed pistons is shown and described in my co-pending application Serial No. 532,915, filed December 13, 1909, and claimed therein.

The chute 10 rests at its front end upon its supporting block 25 on the locomotive, and is freely movable in all directions upon such support. At its rear portion the chute is trunnioned upon a pair of bearings 26 mounted upon the tender, and the plate 27 carrying the bearings is pivoted at 28, the arrangement thus providing for the relative universal movement between the tender and

locomotive without clamping or twisting the chute, and without interfering with the operating mechanism in any manner. The chute 10 is provided with an opening above the piston 3, so that the operator is enabled to supplement the feed of the conveyer by hand if desired, such opening being protected by a door 29.

The operation of the mechanism will be readily understood from the foregoing description. The coal in the tender feeds by gravity into the chute 10 through the passage 9, and the piston 11 serves to give the coal its preliminary movement in the chute, and the flaps 12 carried by the bars 14 serve to convey the coal step-by-step through the chute until it falls into the chamber 2 and is forced therefrom into the fire-box by the piston 3. The crank arms 17 are made of greater length than the crank arms 7 which operate the pistons 3 and 11 in order that the feed of the flaps 12 in the chute may be relatively greater than that of the pistons, thus avoiding the danger of clogging in the chute and rendering the feed more free. The use of the lever 24 in the line of connection between the pistons 3 and 11 causes the piston 11 to travel in a direction reverse of that of the piston 3 and flaps 12, which arrangement gives a very positive and efficient feed, the rearmost flap 12 approaching very close to the front end of the piston 11 when these parts are in their innermost positions.

The general arrangement of the parts of the modification of Figure 4 is quite similar to that shown in Figs. 1, 2 and 3, with the exception that an additional feed piston is provided beneath the tender, and the means for operating the piston in the chute is slightly different. The same reference numerals are applied to the parts of the construction shown in Figure 4 as are used in Figs. 1, 2 and 3 for corresponding parts, and it will be understood that the same description applies to both constructions. The additional piston 30 is mounted in a casting 31 at the bottom of the tender and works transversely of the discharge passage 32 leading from the tender. This piston 30 serves to break up the coal and discharges it into the hopper 33, which hopper in turn discharges into the chute 10 in front of the piston 11. The piston 30 is operated from the block 20 on the piston 3, by means of the connecting rod 34 pivoted to such block and to the sides of the piston 30. The piston 11 is operated from the piston 30 by means of the connecting rods 35 and 36 and the levers 37 pivoted intermediate their ends, the members being pivotally connected as indicated in the drawing. This arrangement gives the piston 11 a movement the reverse to that of the movement of the flaps 12 and to that of the piston 30.

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

1. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided with a fuel discharge passage leading from its lower portion, a chute leading forwardly from a point adjacent the discharge passage, a piston mounted in the chute for giving the coal its preliminary forward movement in the chute, reciprocatory forwarding means for moving the coal through the chute step by step, and operating mechanism adapted to move the piston and forwarding means in opposite directions at the same time.

2. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided with a fuel discharge passage leading from its lower portion, a chute leading forwardly from a point adjacent the discharge passage, a piston mounted in the chute for giving the coal its preliminary forward movement in the chute, reciprocatory forwarding means for moving the coal through the chute step by step, means for reciprocating the forwarding means, and means for reciprocating the piston, the parts being so arranged that the stroke of the forwarding means is longer than that of the piston.

3. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided with a fuel discharge passage leading from its lower portion, a chute leading forwardly from a point adjacent the discharge passage, a piston mounted in the chute for giving the coal its preliminary forward movement in the chute, reciprocatory forwarding means for moving the coal through the chute step by step, means for reciprocating the forwarding means, and means for reciprocating the piston, the parts being so arranged that the piston and forwarding means work in opposition simultaneously and with the stroke of the forwarding means longer than that of the piston.

4. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided with a fuel discharge passage leading from its lower portion, a chute leading forwardly from a point adjacent the discharge passage, forwarding means comprising a series of flaps arranged along the chute and mounted for reciprocation therein, a piston mounted for longitudinal movement in the chute beneath the discharge passage and mechanism for moving the piston and flaps toward and from each other.

5. In combination in apparatus for supplying coal to a locomotive fire-box, a piston for discharging the coal into the fire-box, a rock shaft, a crank arm thereon, for operating the piston, a tender provided

with a discharge passage, a chute with its rear end in position to receive the discharge from said passage and its front end in position to discharge to the said piston, a feed piston working longitudinally of the rear end of the chute for giving the coal its preliminary forward movement, reciprocatory forwarding means arranged along the chute for giving the coal a step by step movement therethrough, a second crank on the rock shaft, of greater length than the first crank arm for operating the forwarding means, and a connection from the first mentioned piston to the feed piston whereby they are operated in unison with a stroke less than that of the forwarding means.

6. In combination in apparatus for supplying coal to a locomotive fire-box, a piston for discharging the coal into the fire-box, a rock shaft, a crank arm thereon for operating the piston, a tender provided with a discharge passage, a chute with its rear end in position to receive the discharge from said passage and its front end in position to discharge to the said piston, a feed piston working longitudinally of the rear end of the chute for giving the coal its preliminary forward movement, reciprocatory forwarding means arranged along the chute for giving the coal a step by step movement therethrough, a second crank on the rock shaft of greater length than the first crank arm for operating the forwarding means, and connecting rods and a lever mounted therebetween whereby the feed piston is operated from the first mentioned piston with substantially the same length stroke but in the oppposite direction.

7. In combination in apparatus for supplying coal to a locomotive fire-box, a piston for discharging the coal into the fire-box, a rock shaft, a crank arm thereon for operating the piston, a tender provided with a discharge passage, a chute with its rear end in position to receive the discharge from said passage and its front end in position to discharge to the said piston, a feed piston working longitudinally of the rear end of the chute for giving the coal its preliminary forward movement, reciprocatory forwarding means arranged along the chute for giving the coal a step by step movement therethrough, means for operating such last means from the rock shaft, a connecting rod extending rearwardly from the first mentioned piston, a lever pivoted intermediate its ends and having one end pivoted to the connecting rod, and a second connecting rod pivoted to the feed piston and to the other end of the said lever.

8. In combination in transfer mechanism, a transfer chute, a piston in the chute for giving material supplied in front thereof a preliminary forward feed, reciprocatory forwarding means in front of the piston for moving the material step-by-step through the chute, and comprising a series of flaps pivoted to swing freely forward but held against rearward oscillation, and operating mechanism adapted to move the piston and forwarding means in opposite directions at the same time.

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

DAVID F. CRAWFORD.

Witnesses:
HARVEY L. LECHNER,
DOERING BELLINGER.