

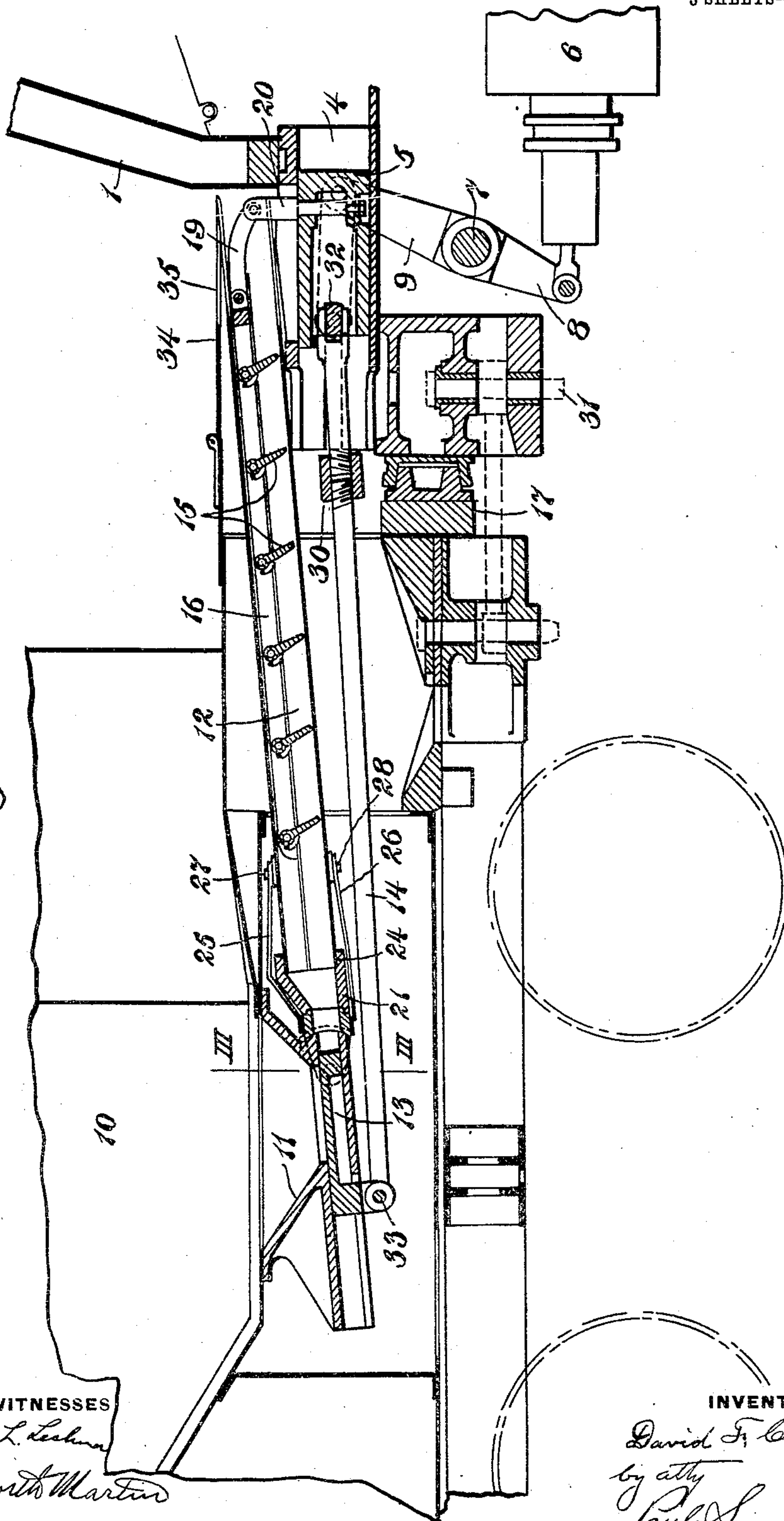
D. F. CRAWFORD.
TRANSFER MECHANISM.
APPLICATION FILED JUNE 3, 1909.

954,500.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

Harvey L. Lechner
Archibald Martin

INVENTOR

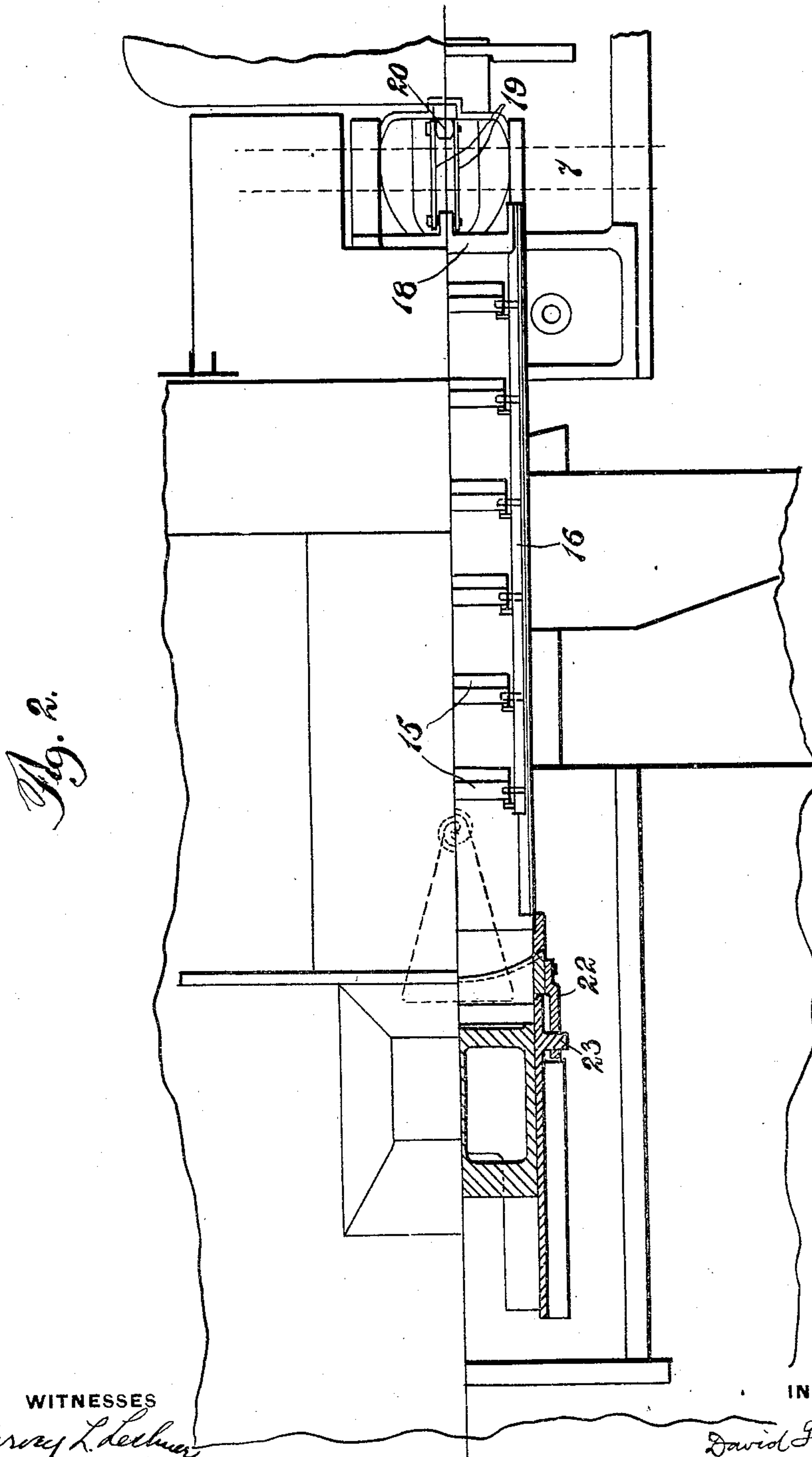
David F. Crawford
by atty
Paul Spinnestredt

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Harvey L. Lechman
Archibuth Martin

INVENTOR

David F. Crawford
by atty
Paul Symmes to

D. F. CRAWFORD.
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3 SHEETS—SHEET 3.

Fig. 3.

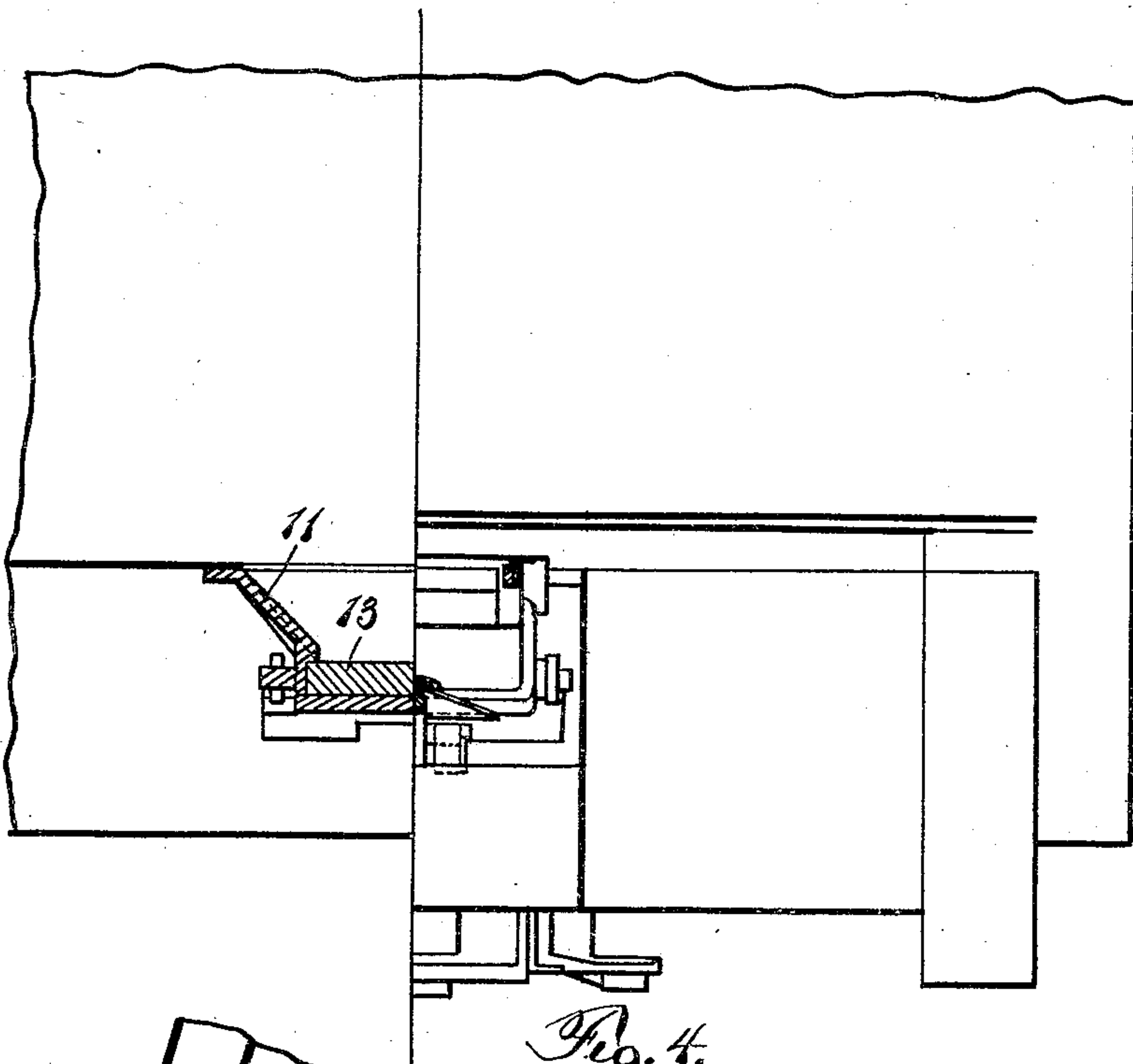
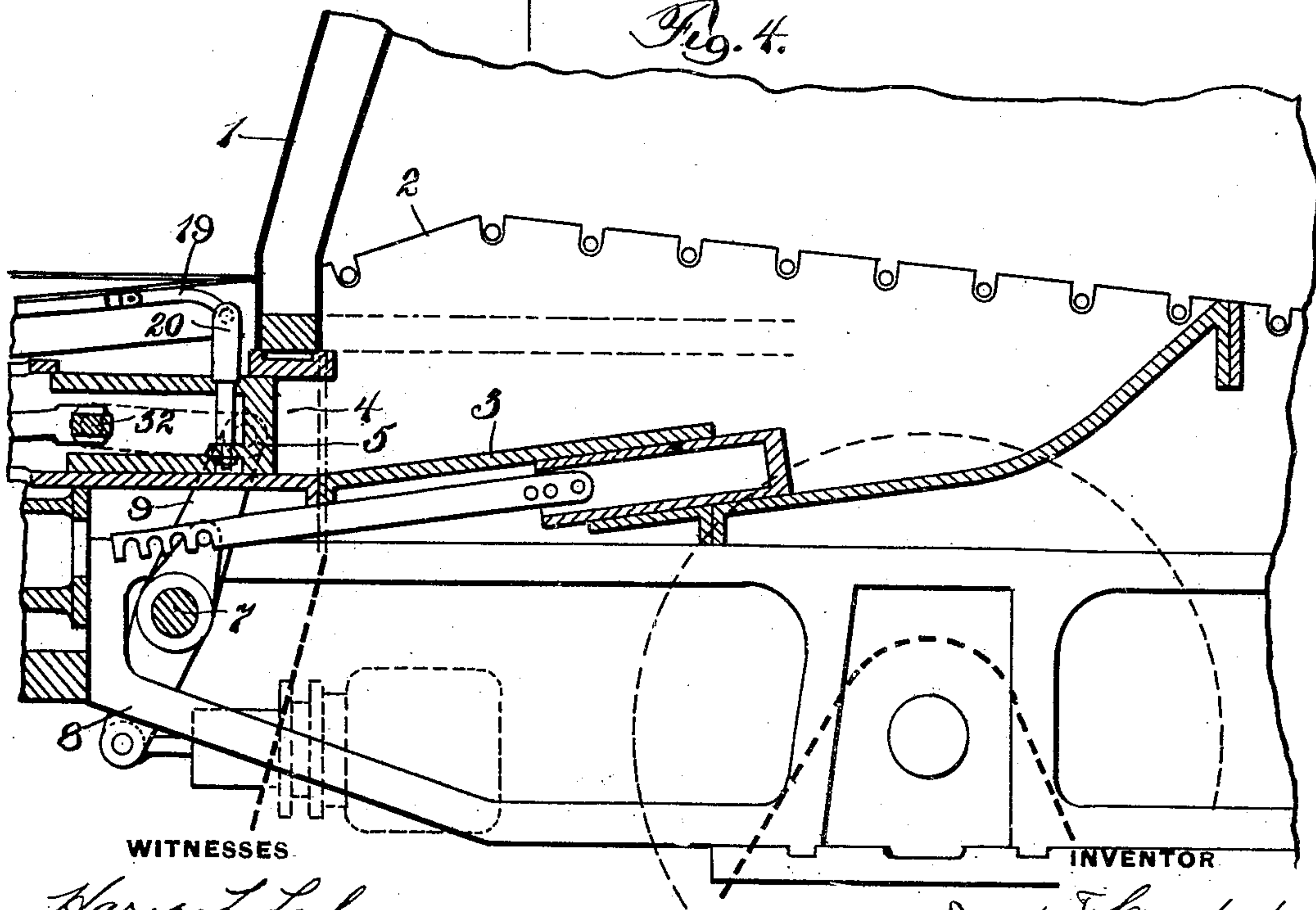


Fig. 4.



WITNESSES

Harvey L. Lohr
Archibald Martin

INVENTOR

David F. Crawford
by atty
Paul Synnecotred

UNITED STATES PATENT OFFICE.

DAVID F. CRAWFORD, OF PITTSBURG, PENNSYLVANIA.

TRANSFER MECHANISM.

954,500.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed June 3, 1909. Serial No. 499,891.

To all whom it may concern:

Be it known that I, DAVID F. CRAWFORD, a citizen of the United States, residing at Pittsburg, 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 underfeed stoker mechanism employed on the locomotive. The invention has for its primary objects; the provision of transfer mechanism of this character which may be readily installed in the space available beneath the floor of the tender and locomotive, and which will adapt itself to the relative movement of the tender and the locomotive; the provision of transfer mechanism which shall be entirely automatic in its operation and which will break up the larger lumps of coal to a size suitable for use by the stoker; the provision of simple and light construction which shall be positive and reliable in its operation and which may be operated from the stoker or its driving means; and the provision of improved means for forwarding the coal through the chute employed. One embodiment of the invention as applied to a locomotive and its tender, is illustrated in the accompanying drawings, wherein:—

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

Figure 2 is a partial plan view and partial horizontal section taken through the chute and piston beneath the tender,

Figure 3 is a partial front elevation of the tender and partial section therethrough on the line III—III of Figure 1, and

Figure 4 is a longitudinal section through the portion of the locomotive and stoker to the front of the parts shown in Figure 1.

Referring to the drawings and particularly to Figs. 1 and 4, the principal parts shown may be briefly enumerated as follows. 1 is the fire-box of the locomotive, which fire-box is provided with side grates 2, and the feed trough 3 extending into the furnace; 4 is the feed chamber or cylinder from which the fuel is forced into the trough 3 by means of the piston 5; 6 is the steam cylinder located at the side of the fire-box and furnishing the power for operating the

feed piston 5; 7 is a transverse shaft carrying the crank arm 8 connected to the piston of the steam cylinder and the crank arm 9 from which the feed piston 5 is reciprocated; 10 is the tender provided in its bottom with the hopper 11; 12 is a chute or trough extending from the feed chamber 4 of the stoker to a point adjacent the lower end of the hopper 11; 13 is a piston reciprocating in the end of the chute beneath the hopper and adapted to supply the chute with fuel from the tender; 14 is a connecting rod by means of which the piston 13 is operated from the feed piston 5; 15 are a series of feed flaps or plates for advancing the fuel through the chute 12; 16 are the operating rods upon which the flaps 15 are pivoted, which rods 16 are also operated from the feed piston 5; and 17 is the coupling mechanism between the locomotive and tender.

The chute 12 is preferably made of sheet metal and the bars 16 are mounted for reciprocation at the upper sides thereof, the feed flaps 15 being pivotally mounted upon the bars 16 as indicated in Figs. 1 and 2. The flaps are so proportioned that they rest normally in the inclined position indicated in Fig. 1 with their lower ends resting against the bottom of the chute. The bottom of the chute thus acts as a stop, and on the forward movement of the bars 16 and the flaps, the flaps are prevented from swinging rearwardly. The fuel in front of the flaps is thus carried forward and on a rearward movement of the bars 16 with the flaps, the flaps are free to swing upward to permit the parts to move rearward. The bars 16 are not directly connected to the piston 5, but are provided with a yoke 18 (Fig. 2), which is loosely pivoted to the pair of connecting rods 19, which in turn are pivoted to opposite sides of the pin 20, carried by the piston 5. By this means a loose connection is provided between the bars 16 and the piston 5 to avoid cramping due to the relative movement of the locomotive and tender. The chute is also made freely movable with respect to the hopper 11 by providing the casting 21 with a pair of arms 22 (Fig. 2), which arms 22 are pivoted to projecting lugs 23 upon the hopper casting. The casting 21 has a radial joint with the casting 24 (Figs. 1 and 2) carried by the front end of the chute 12, and these parts may move laterally upon each other, the casting 21

being pivoted to the chute by means of the plates 25 and 26 located above and below the chute respectively and pivoted to the chute at the points 27 and 28. A universal joint is thus provided between the front end of the chute and the hopper 11, so that the locomotive and tender may move in any direction with respect to each other without interfering with the transfer mechanism.

The piston 13 beneath the hopper 11 not only serves to feed the fuel forwardly into the chute, but also serves to break up the larger chunks of coal so that they may pass readily through the chute, and render the fuel of proper consistency for feeding into the furnace without the necessity of any hand labor prior to the introduction of the fuel into the fire-box. The passage in which the front of the piston 13 works is made of sufficiently restricted height to insure the reduction of the large pieces of coal to such size as is necessary for proper feeding through the apparatus, and proper combustion in the furnace. In order that the feed by this piston 13 be sufficient, the width thereof as compared with the height is made very considerable as indicated in Figs. 1 and 2. Another advantage resulting from this arrangement is the avoidance of any packing of the coal in the chute, as would be the case if the feed of the piston were equal to or greater than that of the forwarding means in the chute. The friction incident to the passage of the material through the chute is thus reduced to a minimum, and danger of an overload on the operating parts and breakage are avoided. In order to provide for the disconnection of the pistons 5 and 13, the connecting rod 14 is made in two sections connected by a coupling 30. This also permits of access to the coupling pin 31 as the front portion of the connecting rod may be swung laterally after disconnection, thus permitting the pin to be raised vertically through the coupler head. The planes of the pivotal connections of the connecting rod 14 with the pistons 5 and 13 at 32 and 33 respectively are made at right angles so as to provide for relative universal movement between the two pistons, thus avoiding binding or bending of the rod 14.

The operation of the mechanism will be clear from the foregoing description. The coal in the tender 10 feeds by gravity down to the hopper 11, and is carried forwardly into the chute by means of the piston or plunger 13 reciprocated from the piston 5 by means of the connecting rod 14. When a sufficient quantity of fuel has accumulated in the chute 12, the front portion thereof is engaged by the rear feed flap 15 and fed forward to a position at which it may be engaged by the feed flap next in advance thereof. The pivotal mounting of the feed flaps permits their movement to

the rear to engage a fresh charge of fuel without materially moving the fuel to the rear. In this manner the fuel is fed step-by-step from one end of the chute to the other and finally discharged into the upper side of the feed chamber 4. Access to the upper side of the feed chamber 4 is provided through the floor 34 of the locomotive through the opening 35. The fuel is fed forwardly from the chamber 4 through the trough of the stoker in the usual manner by the piston 5.

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 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 for feeding the coal to the chute, and means for forwarding the coal through the chute to a point adjacent the fire-box, the feeding capacity of the piston being less than that of the means for forwarding the coal through the chute.

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 and having a laterally extending portion, a chute leading forwardly from the laterally extending portion, a piston working in the laterally extending portion for feeding the coal into the chute, means for forwarding the coal through the chute, a receiving chamber beneath the forward end of the chute and opening into the fire-box, and a piston for forcing the coal from the receiving chamber into the fire-box, the said laterally extending portion and piston therein having a cross section less than that of the chute whereby the coal entering the chute is broken up.

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 and having a laterally extending portion, a chute leading forwardly from the laterally extending portion, a piston working in the laterally extending portion for feeding coal into the chute, means for forwarding the coal through the chute, a receiving chamber beneath the forward end of the chute and opening into the fire-box, and a piston for forcing the coal from the receiving chamber into the fire-box, the said laterally extending portion and piston therein having a depth less than that of the chute whereby the coal forced through such portion is broken up.

4. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided in its bottom with a hopper, a

chute extending forwardly from the hopper, a restricted entrance portion therefor, a piston working through the restricted portion and adapted to break up the coal and feed
5 it into the chute, and means for forwarding the coal through the chute and into the fire-box.

10 5. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided in its bottom with a hopper, a chute extending forwardly from the hopper, a restricted entrance portion therefor, a piston working through the restricted portion and adapted to break up the coal and feed
15 it into the chute, a receiving chamber beneath the forward end of the chute opening into the fire-box, and a piston therefor for feeding the coal into the fire-box.

20 6. In combination in apparatus for supplying coal to a locomotive fire-box, a tender provided in its bottom with a hopper, a feed

chamber on the locomotive open at its top and adapted to discharge into the fire-box, a feed piston working therein, a chute extending from a point adjacent the hopper in the
25 tender to a point above the feed chamber in position to discharge into the open top of the feed chamber, a piston for feeding coal from the hopper to the chute, reciprocating means for forwarding the coal through the
30 chute, means for reciprocating the piston in the feed chamber, and rod connections from such last piston for operating the other piston and the forwarding means in the chute.

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

DAVID F. CRAWFORD.

Witnesses:

HARVEY L. LECHNER,
ARCHWORTH MARTIN.