W. T. HANNA.

AUTOMATIC STOKER.

APPLICATION FILED JULY 6, 1909.

990,550.

Patented Apr. 25, 1911.

4 SHEETS—SHEET 1.

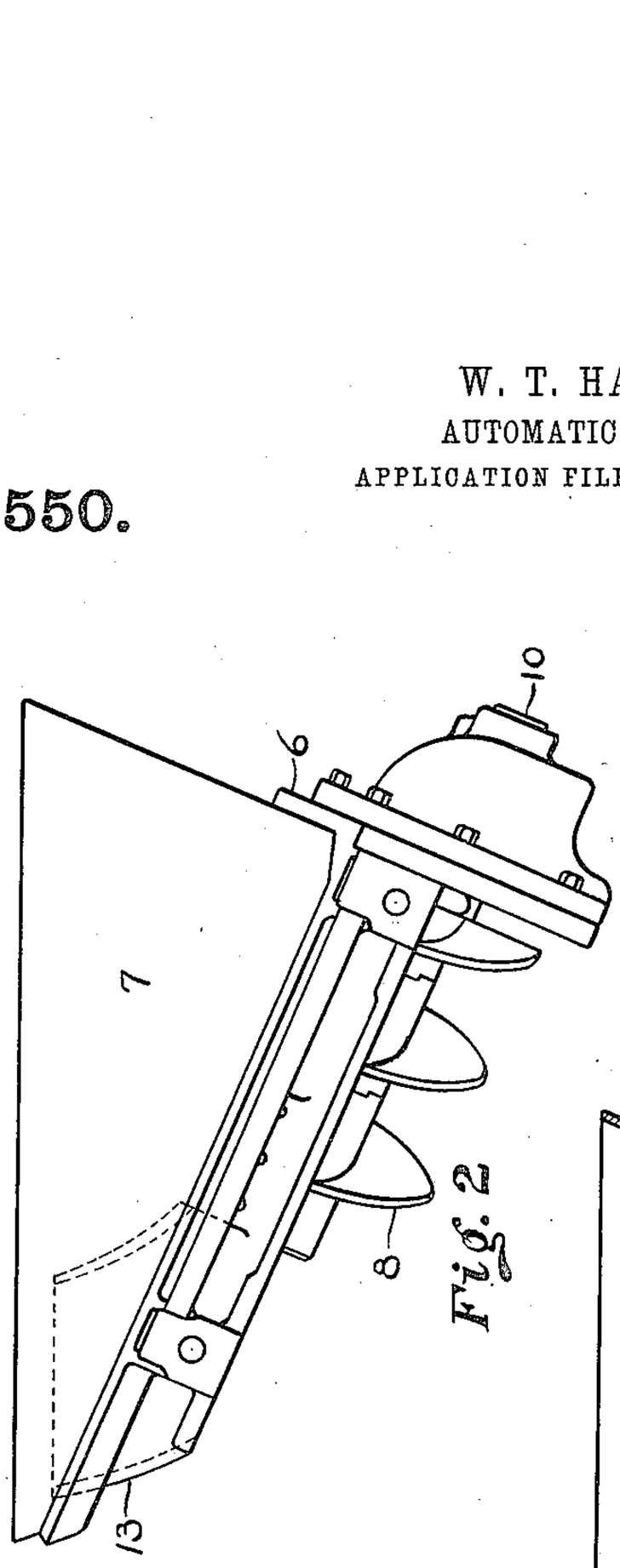

Fig. 2

Fig. 1

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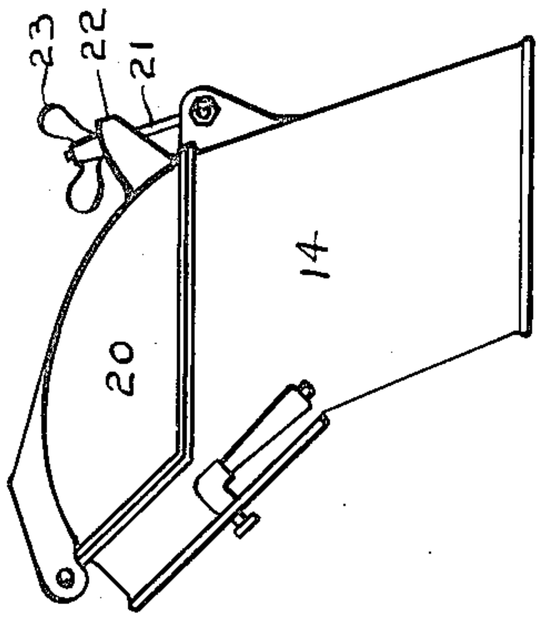

Fig. 4

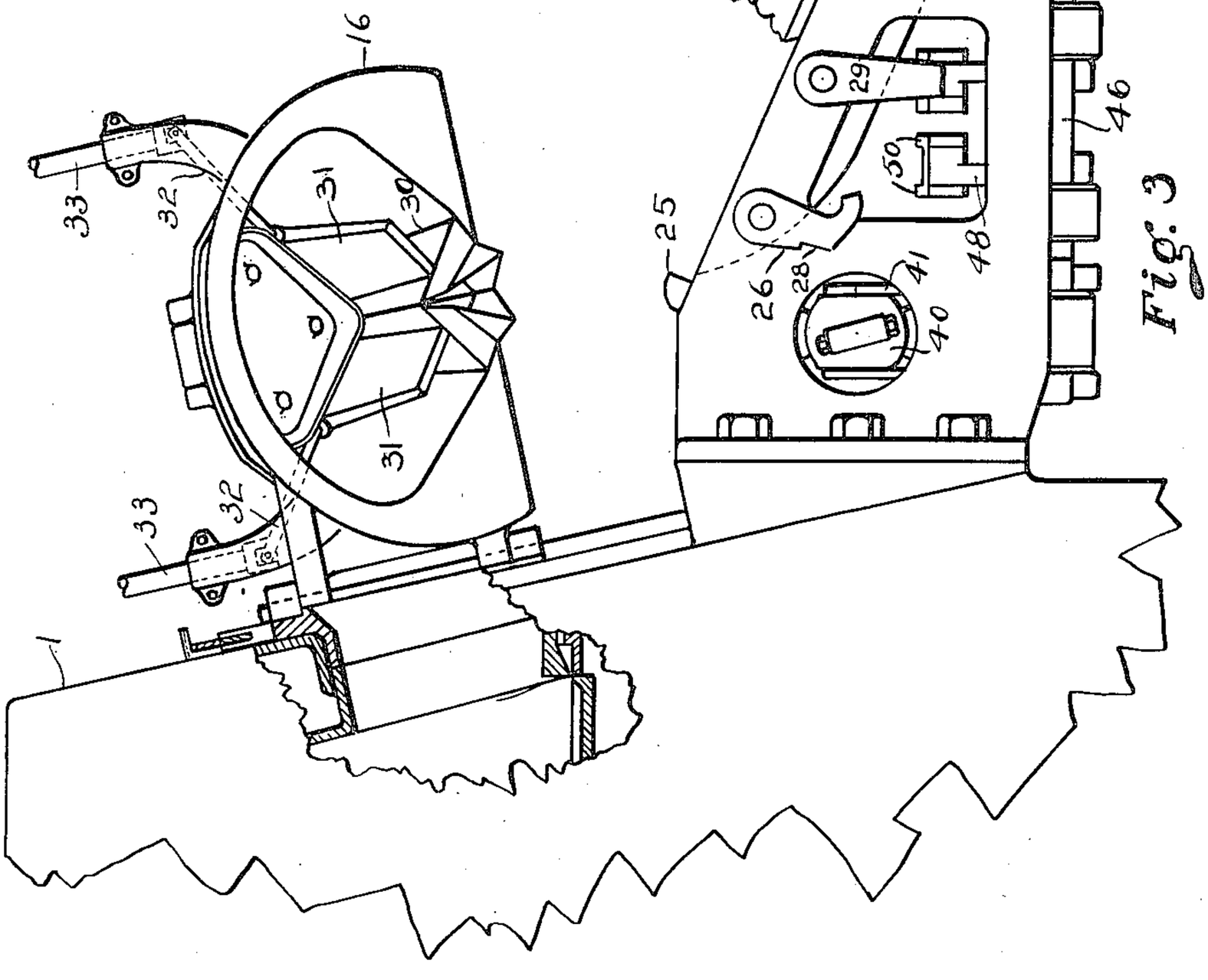

Fig. 3

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4 SHEETS—SHEET 3.

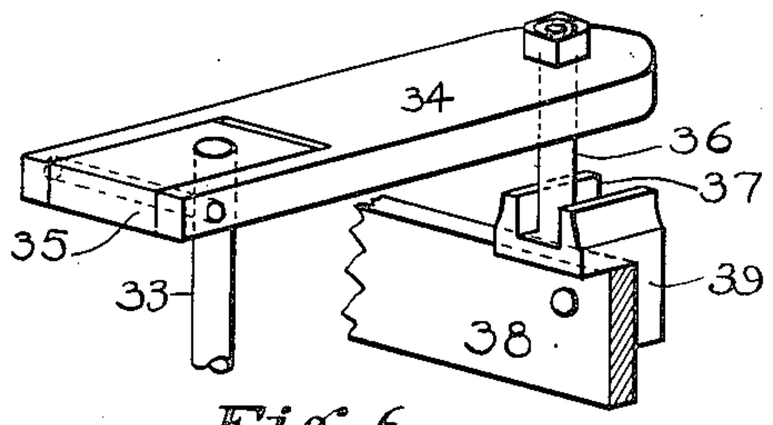

Fig. 6

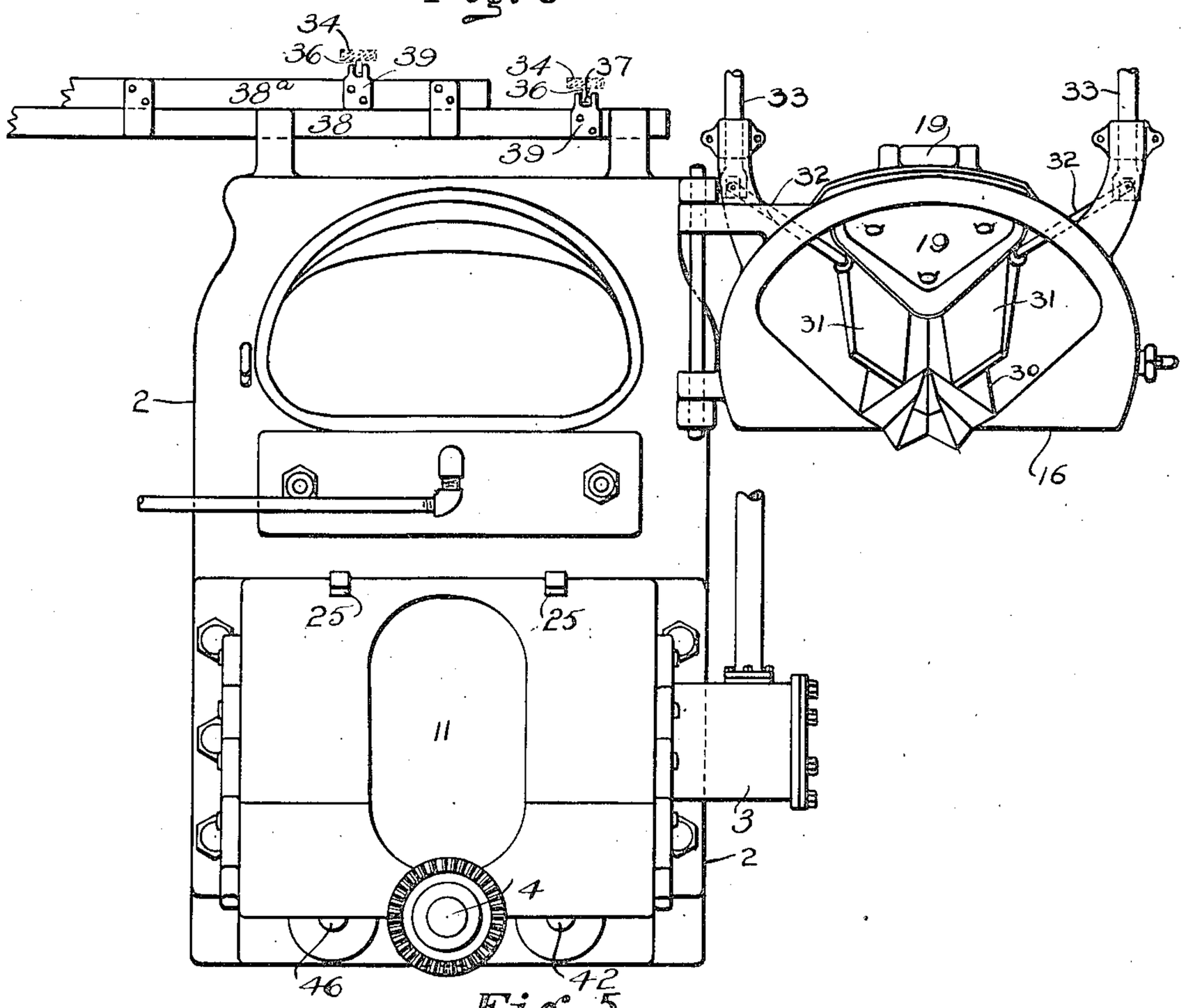

Fig. 5

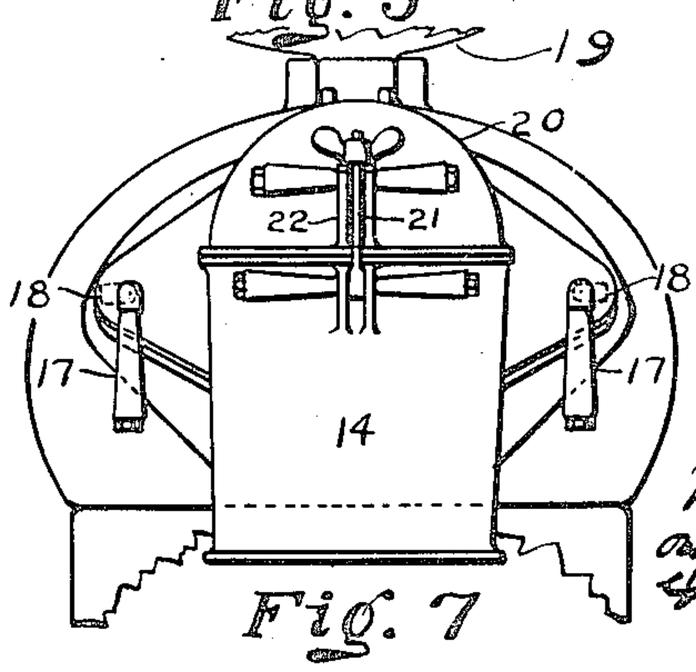

Fig. 7

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Patented Apr. 25, 1911.

4 SHEETS—SHEET 4.

Fig. 9.

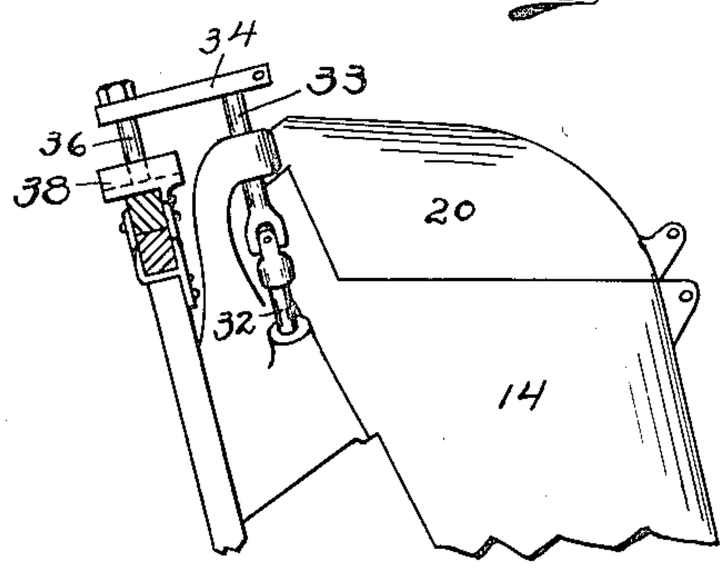


Fig. 10

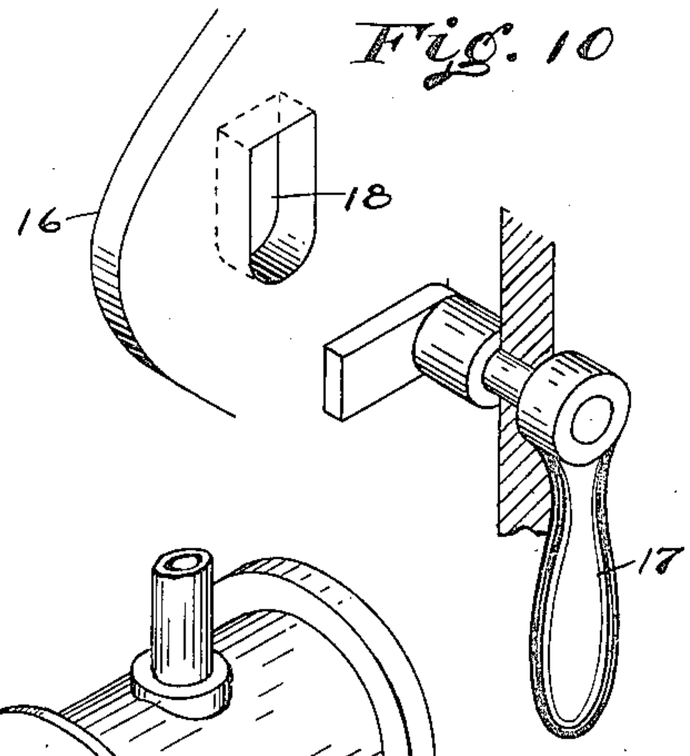
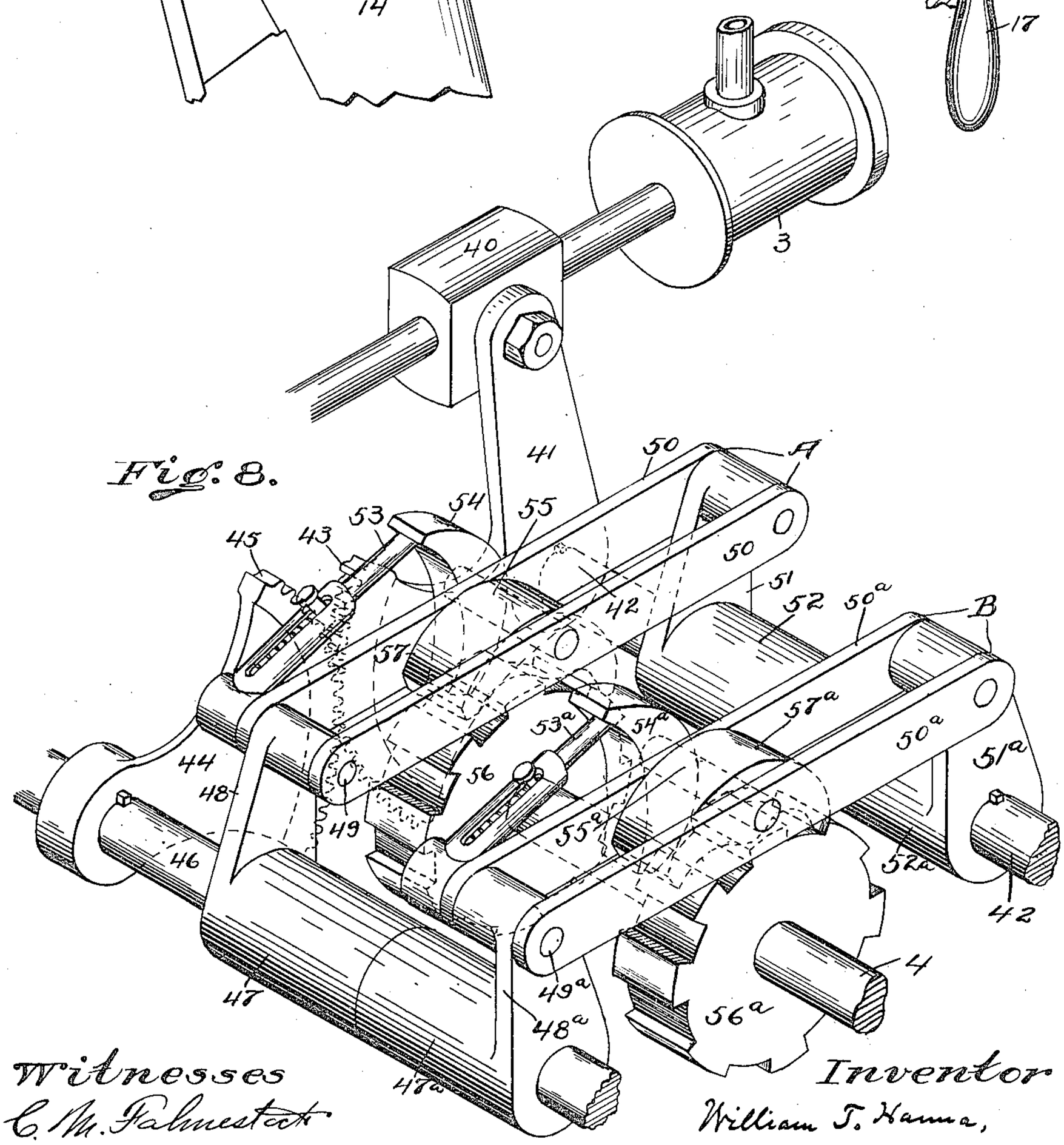


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM T. HANNA, OF CINCINNATI, OHIO, ASSIGNOR OF TWO-THIRDS TO MARTHA A. HANNA AND ONE-THIRD TO CLYDE P. JOHNSON, BOTH OF CINCINNATI, OHIO.

AUTOMATIC STOKER.

990,550. Specification of Letters Patent. Patented Apr. 25, 1911.

Application filed July 6, 1909. Serial No. 505,958.

To all whom it may concern:

Be it known that I, WILLIAM T. HANNA, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Stokers, of which the following is a specification.

My invention relates more particularly to the construction of the fuel conduit. One of the serious problems in applying stoking mechanism to locomotive use is due to the necessity of making provision for a quick change from automatic to hand stoking in case the stoking mechanism should be disabled.

The object of my invention is to provide automatic stoking mechanism so constructed as to permit of practically instantaneous removal of all parts of the stoking mechanism which would interfere with hand stoking, and the invention consists in the parts and combination and arrangement of parts hereinafter described and claimed.

I have illustrated the invention in connection with fuel feeding mechanism substantially like that disclosed in my application for Letters Patent, filed May 16, 1907, Serial No. 373,908.

In the drawings, Figure 1 is a vertical central longitudinal section showing stoking mechanism embodying my invention as applied to the fire box of a locomotive; Fig. 2 a side elevation showing the hopper and feed screw disconnected; Fig. 3 a side elevation of the stoking mechanism showing the fire door open and the hopper and feed screw broken away; Fig. 4 a side elevation of one of the conduit sections; Fig. 5 a front elevation showing the parts which remain when the stoking apparatus is cleared away for hand stoking; Fig. 6 a detail showing part of the connections by which the direction of feed is controlled; Fig. 7 a front view of the upper conduit section showing it connected to the fuel door; Fig. 8 a diagrammatic view showing the connections between the engine and the shaft which drives the fuel conveyer; and Figs. 9 and 10 details.

The reference numeral 1 designates the front of the fire box of a locomotive engine, 2 a base frame for the stoking mechanism in which is mounted an engine 3 arranged to drive a shaft 4 carrying a gear 5, 6 a frame detachably mounted on frame 2 carrying a hopper 7, and, beneath the hopper, a screw conveyer 8 adapted to be driven by a gear 9, fixed to the conveyer shaft 10 and meshing with gear 5, and adapted to rotate in a casing formed in part by an oval chamber 11 in the base frame 2 and in part by a semi-cylindrical wall 12 constituting part of the wall of the hopper, 13 an approximately cylindrical conduit section, preferably integral with the hopper, adapted to receive fuel from the delivery end of the conveyer screw and deliver it to an elbow shaped conduit section 14 removably seated thereon and adapted to deliver the fuel to a feed chute 15 carried by a fuel door 16, 17 keys adapted to take into sockets 18 in the door and lock the conduit section 14 in alined engagement with the feed chute, 19 a plate or lid hinged to the upper part of the door and adapted to close the feed chute when the stoking apparatus is disconnected, 20 a hinged plate forming part of the upper wall of conduit section 14 and, when open permitting inspection of the interior of the fire box, 21 a threaded pin pivotally connected with the body of the conduit section 14, and adapted to take into a U-shaped lug 22 on the view plate 20, and 23 a thumb nut adapted to lock the pin in engagement with lug 22 thereby holding the view plate in its closed position.

The base frame 2 is provided with abutments 25, adapted to center the hopper, and with pivoted clamps, or hooks, 26 adapted to take over pins or lugs 27 upon the base of the hopper and lock the hopper in position. The rear side of the hooks are preferably cut away at 28 to receive detents 29 pivoted to the base frame and adapted to lock the hooks against accidental displacement.

In the preferred form the stoking apparatus includes power operated mechanism, carried by the fuel door, for directing the flow of the fuel as it leaves the feed chute. For this purpose I provide a feed plate 30, fixed to the fuel door, preferably inclining downwardly from its receiving to its discharge end, and having its side faces sloping downwardly from its longitudinal central line. Guide plates or wings 31, extending longitudinally of the feed plate are fixed at their rear ends to rods 32, having a jointed connection with rock shafts 33, whereby a continuous upward and downward swing, upon the faces of the feed plate, may be imparted to either or both guide wings. The rock

shafts are actuated by arms 34, pivoted at 35 and provided with pins 36 taking into slots or channels 37 in blocks 39 fixed to arms 38 and 38[a] which are adapted to be reciprocated by suitable connections (not shown) the slots being arranged transversely of the arms.

A preferred method of connecting the engine with the driving shaft 4 is shown in Fig. 8 in which 41 designates a sector arm pivotally secured to the cross head 40 of the engine. This arm is fixed to a shaft 42 and carries at its free end a segmental rack 43 fixed to a shaft 46. A sleeve 47, fixed on shaft 46, carries a crank 48 which is connected by a pivot shaft 49 with links 50 which are pivotally connected at their other ends with a crank 51 carried by a sleeve 52 loosely mounted on shaft 42. These links and their connections will be designated as frame A. An adjustable spring arm 53, pivotally mounted on pivot shaft 49, carries, at its free end, a sector shaped arm 54, which is fixed to a stud shaft 55 having its bearings in links 50. Stud shaft 55 carries a sector shaped pallet 57 adapted to engage, at either end, with the teeth of a toothed wheel 56 fixed to shaft 4. Shaft 46 carries a second sleeve 47[a], loosely mounted thereon and shaft 42 a second sleeve 52[a], fixed thereto. These sleeves are connected by crank 48[a], links 50[a] and crank 51[a]. These links and their connections will be designated as frame B. An adjustable spring arm 53 is mounted on pivot shaft 49[a] and carries a sector arm 54[a] connected with a pallet 57[a], adapted to engage with a toothed wheel 56[a] fixed to shaft 4, these parts being duplicates in form and arrangement of the corresponding parts described in connection with frame A. Movement of the cross head to the right causes arm 41 to rock shaft 42 from left to right, and through racks 43 and 45 to rock shaft 46 from right to left. This movement of shaft 42, through fixed sleeve 52[a] and crank 51[a], causes frame B to move from left to right, and pallet 57[a] engaging with a tooth in wheel 55[a] imparts rotation to the wheel and consequently to shaft 4, the rotation being from left to right. At the same time the rocking motion of shaft 46, through fixed sleeve 47 and crank 48 causes frame A to move from right to left, pallet 57 riding idly. Reversal of movement of the cross head causes the frames to move in reverse directions and pallet 57 then engages with toothed wheel 55 and imparts rotation to it and shaft 4, the direction of rotation being still from left to right. By changing the positions of the sector arms 54, 54[a] the pallets may be so positioned that their other ends will engage with the toothed wheels and the direction of rotation of shaft 4 thereby reversed, or the pallets may be positioned that both will be idle.

To clear the locomotive for hand stoking the arms 34, which actuate the rock shafts, are lifted out of engagement with the reciprocating arms 38, the keys 17 turned to disengaging position, the conduit section 14 removed, the detents 29 disengaged from the hooks 26, the hooks disengaged from pins 27 and the frame carrying the feed screw and hopper removed, all of which may be done in a fraction of a minute.

By turning down the lid 19 the feed chute in the door may be closed so that the door may completely close the fuel opening.

If when the stoking apparatus is in use it should at any time become desirable to rake the fuel, the arms 34 may be lifted out of engagement, the keys 17 disengaged, conduit section 14 removed and the door opened.

I claim, in an automatic stoker:

1. The combination with a fire box of a base frame: an engine mounted thereon: a frame detachably secured to the base frame: a feed screw mounted in the detachable frame and adapted to be driven by connections with the engine, a suitable casing for the feed screw being provided, partly in the base frame and partly in the detachable frame; a hopper carried by the detachable frame: and a separable conduit leading from the feed screw casing and adapted to deliver fuel to the fire box.

2. The combination with a fire box of a base frame: an engine mounted thereon: a frame detachably secured to the base frame: a feed screw mounted in the detachable frame and adapted to be driven by connections with the engine, a suitable casing for the feed screw being provided, partly in the base frame and partly in the detachable frame: a hopper carried by the detachable frame: a fuel door: a feed chute therein: a conduit section fixed to the detachable frame and adapted to receive fuel from the conveyer: and a removable conduit section seated thereon, adapted to receive fuel therefrom and deliver it to the feed chute, and detachably connected with the door.

3. The combination with a fire box of a base frame: an engine mounted thereon: a frame detachably secured to the base frame: a feed screw mounted in the detachable frame and adapted to be driven by connections with the engine, a suitable casing for the feed screw being provided, partly in the base frame and partly in the detachable frame: a hopper carried by the detachable frame: a fuel door: a feed chute therein: a separable conduit leading from the feed screw casing to the feed chute: a feed plate mounted in the feed chute: fuel directing wings adapted to reciprocate upon the feed plate: and detachably connected means for reciprocating the wings.

4. The combination with a fire box of a base frame: an engine mounted thereon: a

frame detachably secured to the base frame: a feed screw mounted in the detachable frame and adapted to be driven by connections with the engine, a suitable casing for the feed screw being provided, partly in the base frame and partly in the detachable frame: a hopper carried by the detachable frame: a fuel door: a feed chute therein: a separable conduit leading from the feed screw casing to the feed chute: and means for closing the feed chute.

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