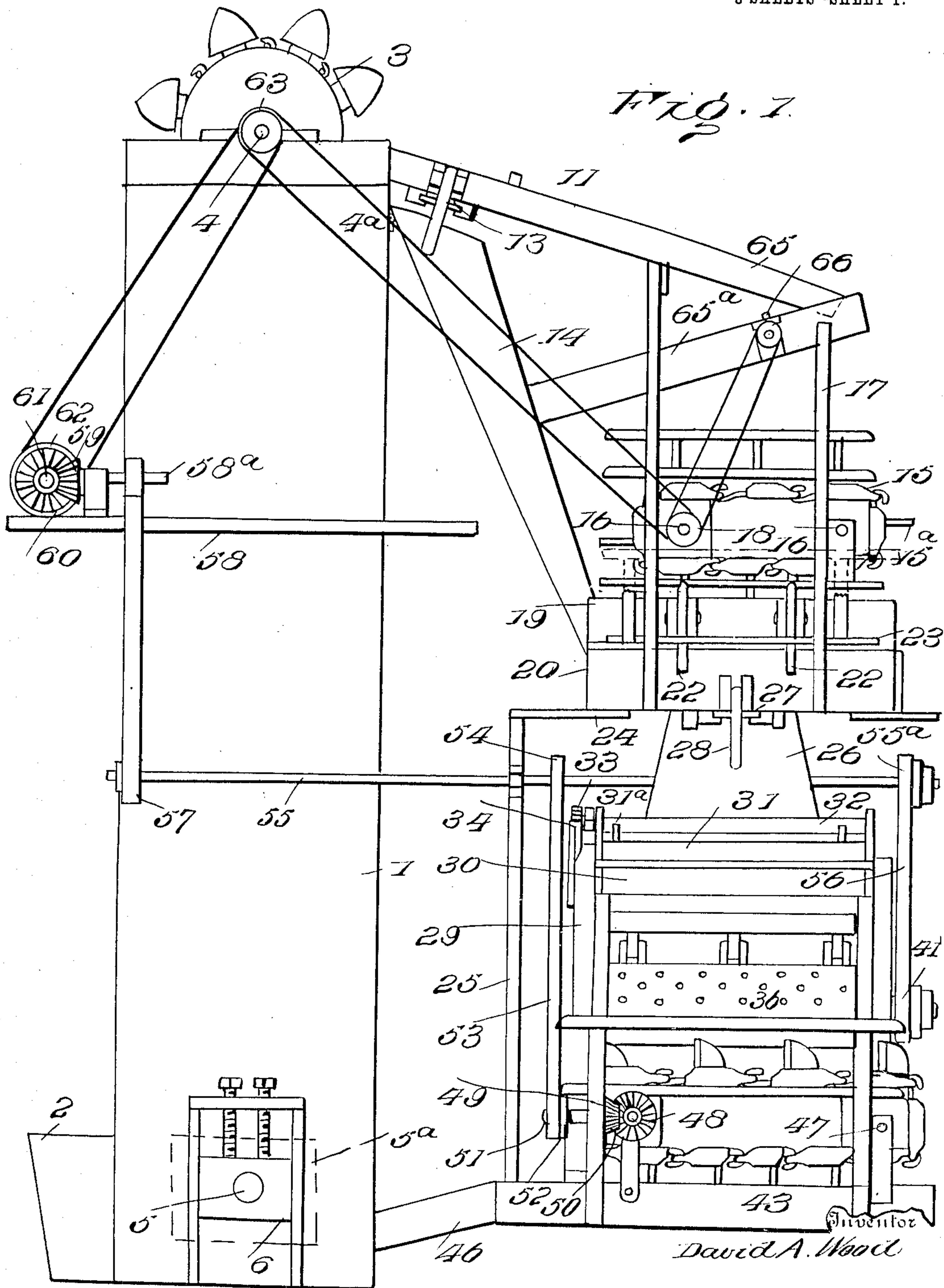


No. 869,539.

PATENTED OCT. 29, 1907.

D. A. WOOD.
MECHANICAL STOKER.
APPLICATION FILED MAY 3, 1907.

3 SHEETS—SHEET 1.



Witnesses

W. H. Woodson

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By *Ph. A. Racy,*

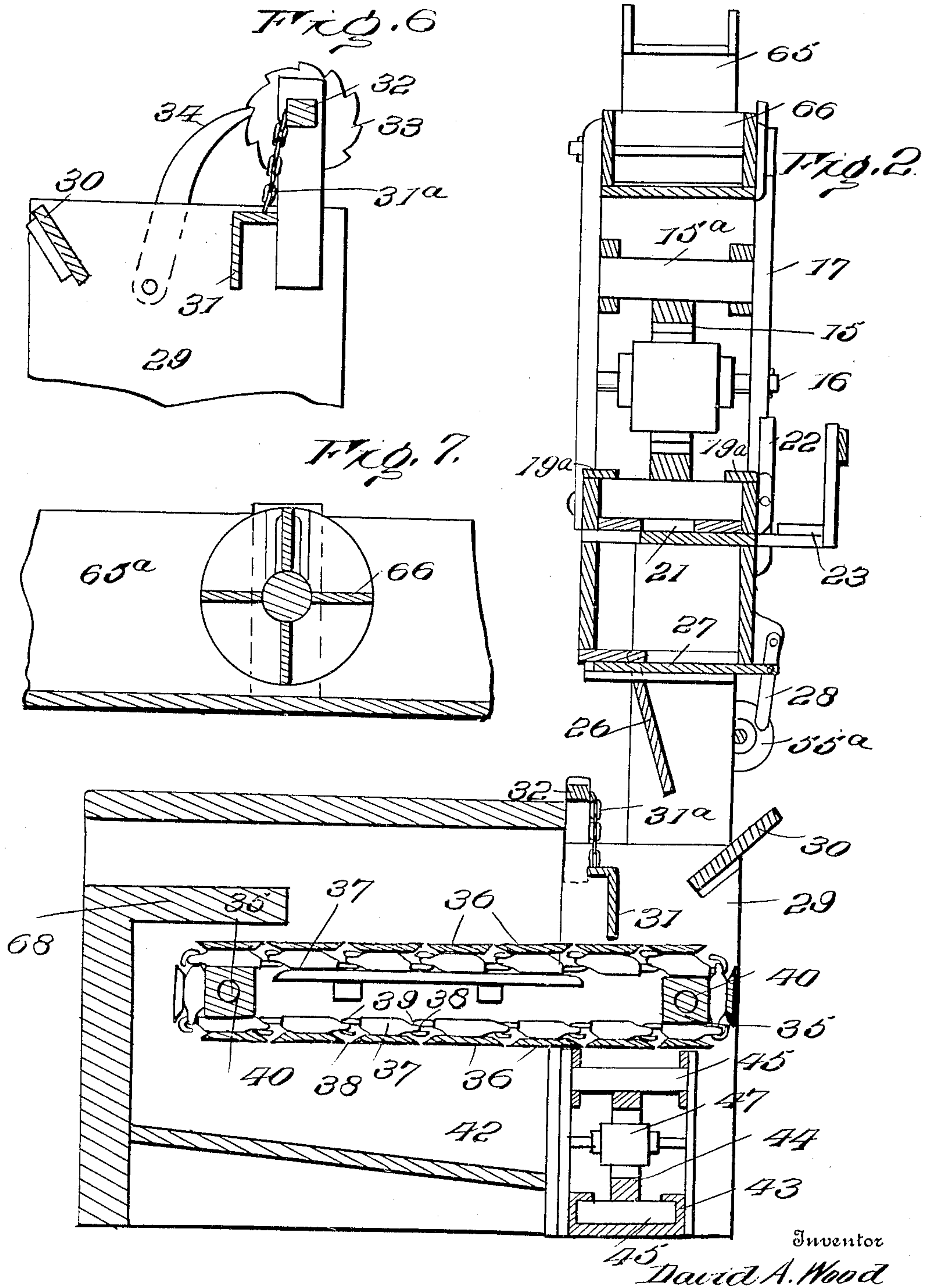
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Witnesses

M. M. Wood
W. H. Wood

By

R. A. Mearns

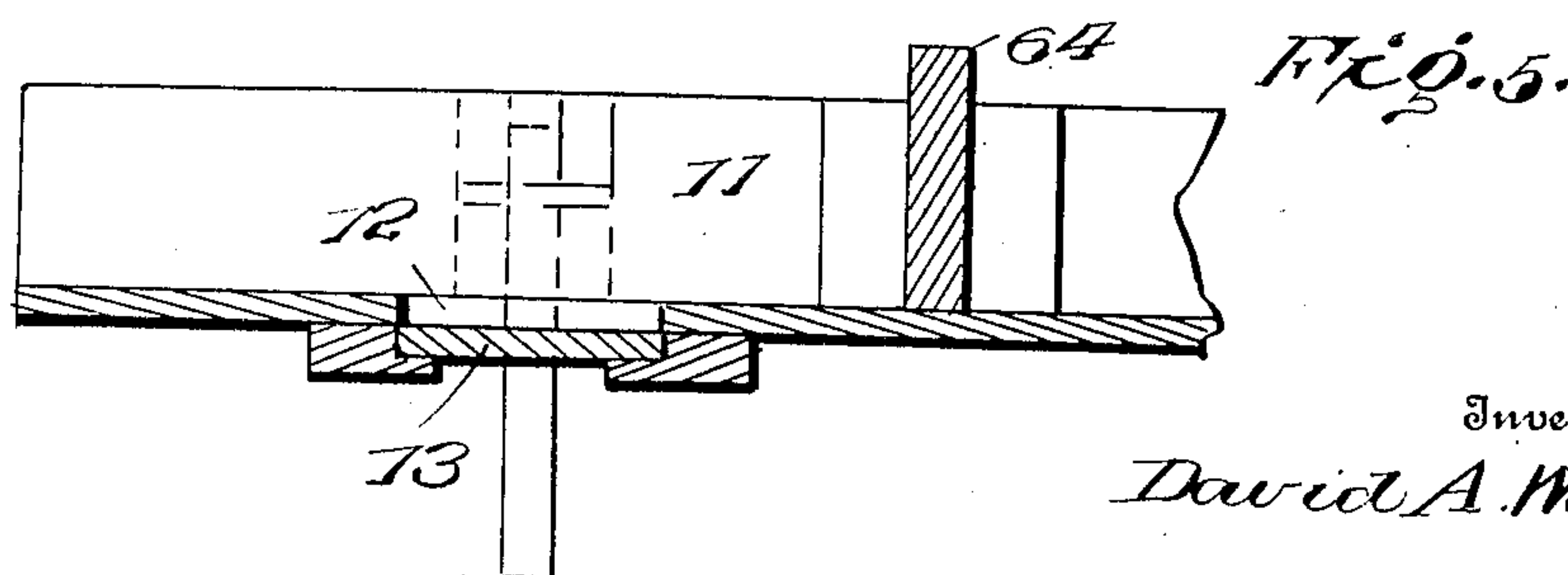
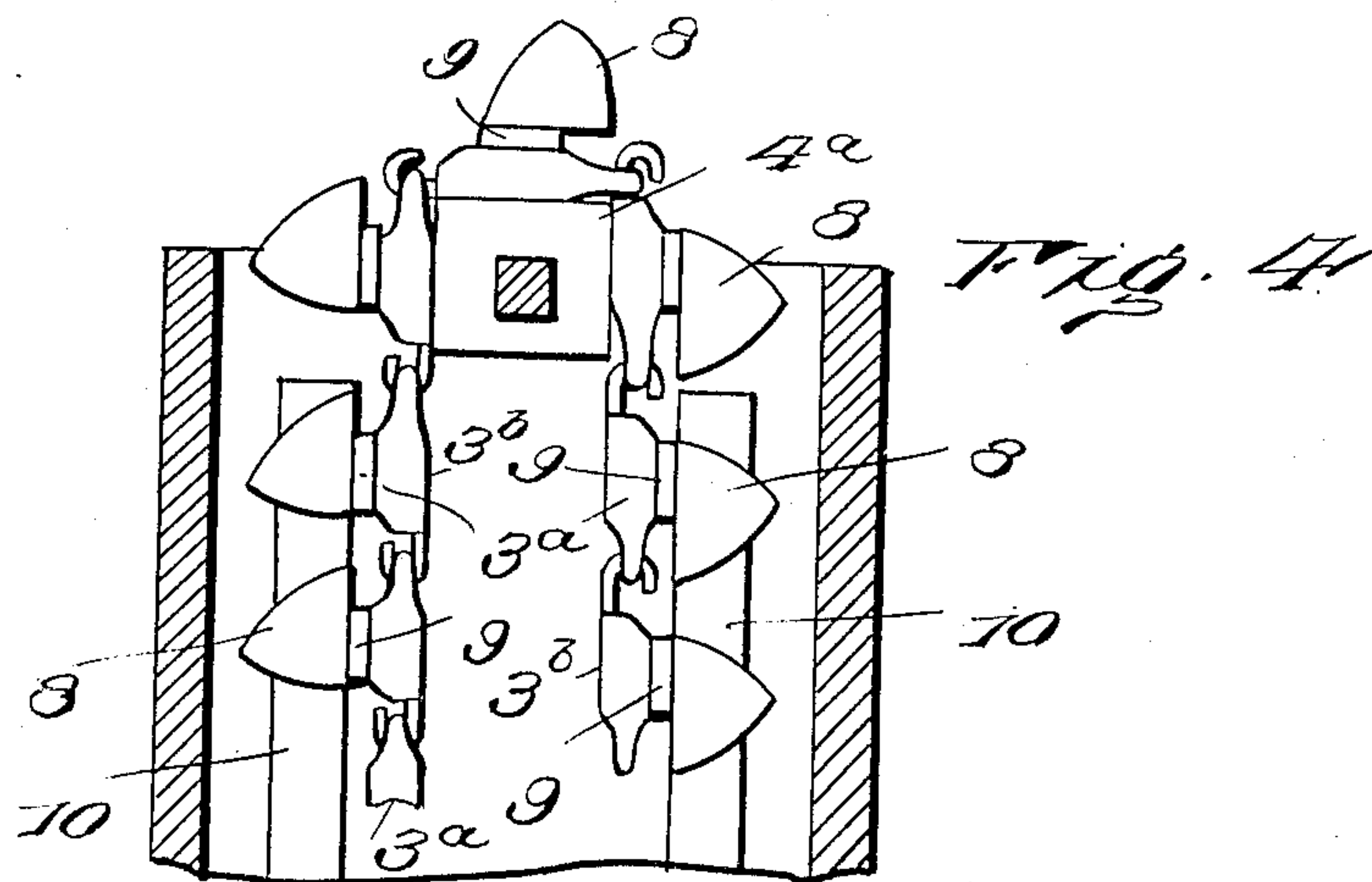
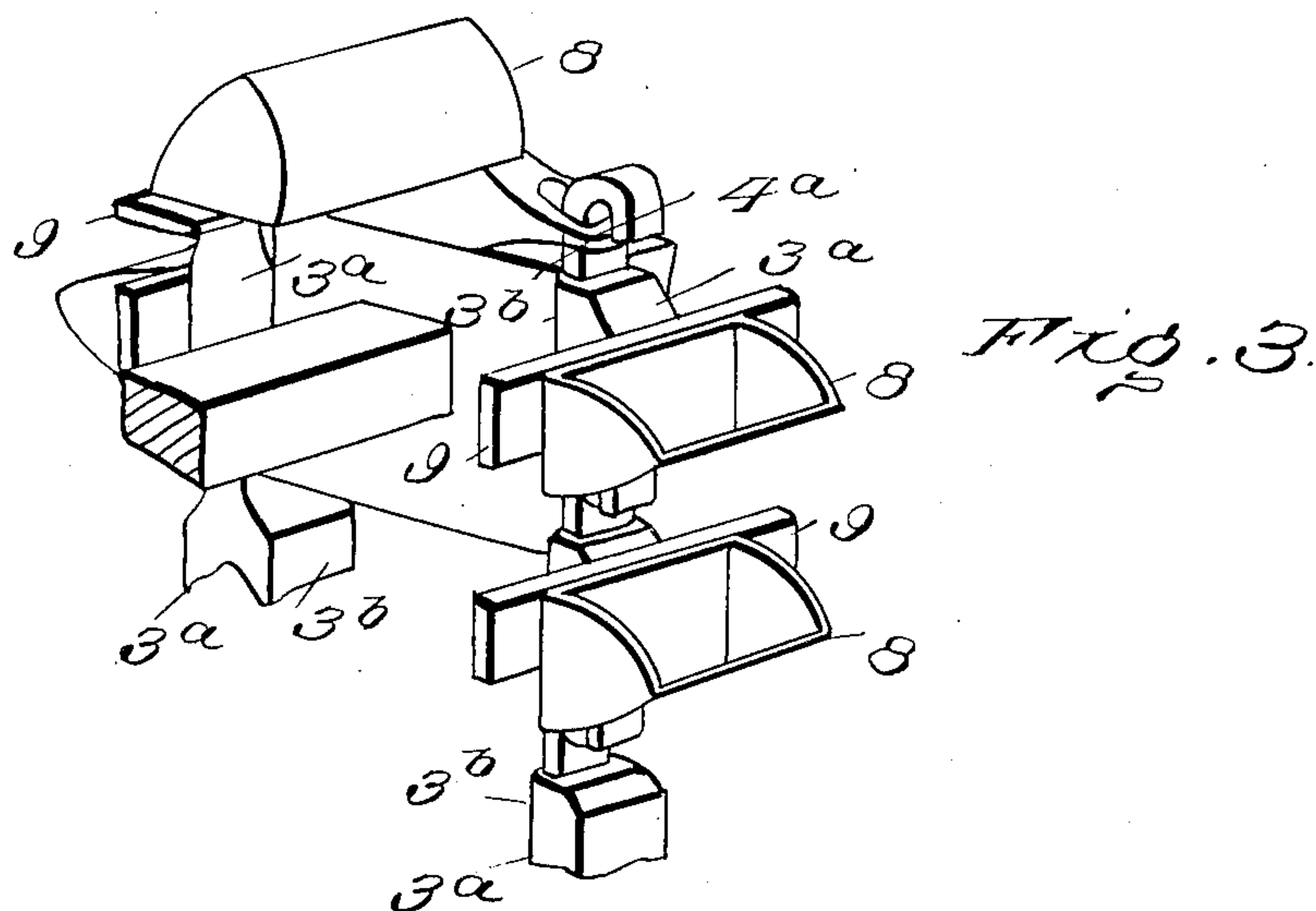
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Inventor

David A. Wood

Witnesses

M. J. Moore
W. A. Woodson

By

R. A. Macey

Attorneys

UNITED STATES PATENT OFFICE.

DAVID A. WOOD, OF McKEESPORT, PENNSYLVANIA.

MECHANICAL STOKER.

No. 869,539.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed May 3, 1907. Serial No. 371,712.

To all whom it may concern:

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

This invention contemplates certain new and useful improvements in combined automatic stokers, smoke consumers and ash burners for steam boiler furnaces and the like, and the invention has for its object an improved construction of apparatus of this character which will be composed of comparatively few and simple parts that are not liable to get out of order and that may be operated efficiently for the desired purpose.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts which I shall hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a front elevation of my improved mechanical stoker; Fig. 2 is a vertical sectional view thereof; Fig. 3 is a detail perspective view of a portion of the elevator; Fig. 4 is a sectional side elevation of the elevator; Fig. 5 is a detail sectional view of the primary chute; Fig. 6 is a detail sectional view with parts in side elevation, illustrating the volume controlling gate for the traveling grate; and, Fig. 7 is a detail sectional view of a portion of the ash tank.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

My improved apparatus embodies an elevator of which 1 designates the casing, provided at its lower end with a coal hopper 2. An elevator chain 3 is mounted within the casing and is adapted to run over an upper shaft 4 and a lower shaft 5 that are provided, respectively, with sprockets 4^a and 5^a, preferably, consisting of square or otherwise polygonal blocks, as shown. The lower shaft 5 is preferably journaled in adjustable boxes 6 so that the tension of the chain may be regulated. The chain 3 consists of a series of links 3^a that are provided at one end with hooks and at the other end with eyes, the hooks of one link being engaged with the eye of the next adjacent link, so that the entire chain may be constructed without the use of bolts or rivets that are constantly getting out of order and causing trouble. Each link is formed intermediate of its ends with a cheek piece 3^b having a flat surface adapted to be engaged by one of the flat surfaces of the sprocket, so as to effect the travel of the chain. Buckets 8 are secured to

the respective links and are provided with oppositely extending guide arms 9 arranged for guiding movement between the rails 10 of the elevator casing, so as to maintain the buckets in proper alinement and prevent them from tipping sidewise to spill their load or from otherwise becoming disarranged.

The primary chute 11 is secured to and slopes downwardly from the top of the elevator casing 1 in position to receive the loads discharged from the buckets 8 and said chute is provided near its receiving end with a bottom discharge opening 12 controlled by a sliding gate 13 that may be opened and closed by the operator in any desired manner. A coal chute 14 is suspended at its upper end subjacent the bottom discharge opening 12 of the primary chute 11, the lower end of said coal chute being held in proximity to a feeder which consists of a chain 15, the links of which are provided with lags or scraper blades 15^a, said chain being mounted to pass around shafts 16 journaled in brackets on the standards of the supporting framework 17. One of said shafts 16 is provided with a pulley 18 by which the endless feeders may be driven. The framework 17 may be supported on the top 19 of a coal tank 20, and the scraper blades 15^a are adapted to slide horizontally on edge under the said top and underneath rails 19^a which guide them in proper movement. The top 19 of the coal tank 20 extends along in front of the boilers (not shown), and said top is provided with openings extending there-through and controlled by gates 21, mounted to slide as shown and provided with operating handles 22. A platform 23 with a railing supported thereby, is mounted upon the top 19, so that an operator may stand thereon and manipulate the handles 22, as well as any clutch that may be provided for the pulley 18 and other pulleys of the apparatus, hereinafter specified. The coal tank 20 is supported on the cross beam 24 which is held in an elevated position on standards 25. A stoker feeding chute 26 projects from underneath the coal tank 20 and is contiguous to a bottom discharge opening in said tank, said opening being controlled by a gate 27 manipulated by means of a lever 28. 29 designates the stoker framework which is provided with a hopper or stop plate 30 to direct the material which is discharged from the chute 26, and a fuel regulating gate 31 is suspended by means of chains or cables 31^a in proximity to the lower end of the chute 26, preferably beyond the same, said gate 31 being vertically adjusted so as to control the volume of material passing to the furnace. These cords 31^a are adapted to wind upon a shaft 32 which is provided with a ratchet 33, and a hand actuated pawl 34 engages with said ratchet to turn the shaft, so as to hold the gate with its lower edge at different elevations. This gate is preferably constructed of brick-work.

Within the framework 29 front and rear shafts 35 are journaled, and grate bars 36 are secured to the links 37 of a chain that advances around and is driven by the

said shafts with its upper lap extending from front to rear so as to carry the material back to the furnace. These grate bars are in the form of perforated plates 36, and the links 37 are formed with interengaging hooks 5 38 and eyes 39 and pass around sprocket wheels 40, the joints between the links, as clearly illustrated in the drawings, providing that the grate bars will abut edge to edge to the upper and lower laps of the travel, but will separate as they pass around the sprocket wheels.

10 In the present instance, I have shown three sets of sprocket wheels, and three chains to support these grate bars in their travel. One of the grate shafts is provided with a pulley 41 by which the traveling grate is driven. 42 designates an ash chute which is ar-

15 ranged underneath the traveling grate and slopes from rear to front, as shown, and at the discharge end of said chute there is a horizontally extending run-way 43 over which the ash conveyer 44 travels. This conveyer embodies a series of scraper blades 45 designed to travel

20 on edge as shown and scrape ashes into the discharge chute and hopper 46 which conveys the ashes to the bottom of the elevator casing, so that they may be caught by the buckets and carried upwardly to be discharged into the primary chute 11. The ash conveyer

25 44 travels around shafts 47 and 48, the latter being provided with a bevel pinion 49 which engages a similar pinion 50 on a stub shaft 51. The stub shaft 51 carries a pulley 52, and a belt 53 operatively connects said pulley with a similar pulley 54 on the main drive shaft

30 55 which is journaled in bearings on the standards 25. At one end the drive shaft 55 carries a pulley 55^a and a belt 56 operatively connects said pulley with the pulley 41 to drive the traveling grate of the stoker. The shaft 55 extends over in front of the elevator casing 1

35 as shown and is provided at its end with a pulley 57 connected by a belt to a similar pulley on the stub shaft 58^a journaled in suitable bearings on the platform 58. This stub 58^a carries a bevel pinion 59 meshing with a similar pinion 60 on a stub shaft 61, and said

40 last named stub shaft carries a pulley 62 connected by belts with pulley 63 on the upper shaft 4 of the elevator.

The primary chute 11 is provided beyond the bottom discharge opening 12 with a gate 64 which extends thereacross, and which may be raised or lowered,

45 if desired, so as to prevent the ashes from falling down the said primary chute and the lower end of said primary chute is in communication with the chute 65 which forms a continuation thereof and which is preferably supported by a portion of the framework 17. The

50 lower end of the chute 65^a is adapted to discharge into an inclined ash tank 65. Said ash tank is provided with a rotary mixer 66 consisting of a series of blades extending thereagainst and mounted upon a shaft, and said shaft is provided with a pulley so that it may be

55 turned whenever desired to slowly feed the ashes from the ash tank 65 and permit them to drop downwardly for action by the feeder just below the tank so as to mix with the coal in the coal tank 20. 68 designates the bridge wall and flame bed over which the flame

60 is directed so as to act upon the boiler.

In the practical operation of my improved apparatus, the coal is first dumped from the car into the hopper 2 at the bottom of the elevator casing 1, which is then raised to the top of the elevator and the buckets will

65 dump the coal into the primary chute 11. When the

bottom discharge opening 12 is opened, the coal will pass down the coal chute 14 and be carried by the feeder or conveyer chain 15 along the front of the boilers and be dumped into the coal tank 20. The coal then runs down the chute 26 underneath the regulating gate 70 31. As the coal passes through, under the gate, it starts to burn, and the stoker is automatically moved slowly so as to effect the consumption of the fuel before it is dumped by the grate. The stoker is intended to be mounted in a brick furnace with two sides, front 75 and roof, the back being left open to allow the fire to pass out to the boiler. As the ashes are discharged, as above described, into the lower end of the elevator, they are carried upwardly and discharged on to the primary chute 11. If it be desired to fill the ash tank, 80 the gate 64 is raised and the discharge opening 12 of the chute 11 is closed. The ashes will then pass to the ash tank 65. If it be desired to slowly mix the ashes from this tank with the coal as it is discharged by the elevator on to the primary chute 11, the mixer of the 85 ash tank is started and the ashes fed in the proper proportions to mix with the coal passing down through the bottom discharge opening 12 and the chute 14 to the coal tank 20. Or, if desired, the gate 64 may be closed and coal fed into the coal hopper 2 whereupon both 90 ashes and coal will be carried upwardly by the elevator and discharged through the opening 12 on to the chute 14 so as to convey the mixed ashes and coal directly to the coal tank 20.

From the foregoing description in connection with 95 the accompanying drawings, it will be seen that I have provided a very simple, durable and efficient construction of apparatus of this character by which the ashes may be mixed with the coal and returned to the furnace in such a manner capable of regulation, as to give 100 the ashes a chance to burn up when passing through the fire.

In the installation of my improved apparatus, the stoker is to be supported on a level with the floor, and the ash conveyer is to be underneath the floor. The 105 lower end of the coal elevator is mounted in a still lower plane, so as to permit the ashes to run in at the bottom of the elevator casing from the ash conveyer.

Having thus described the invention, what is claimed as new is: 110

1. In a mechanical stoker, the combination of a traveling grate, means for feeding coal to said grate, and means for mixing ashes with the coal preparatory to being fed to the grate. 110
2. In a mechanical stoker, the combination of a traveling grate, means for actuating the same, a storage tank for coal above the grate and adapted to discharge coal thereon, means for elevating and feeding coal to said tank, and means for conveying the ashes from the grate to the coal elevating means and for transmitting the said 115 ashes to the said storage tank. 120
3. In a mechanical stoker, the combination of a traveling grate, means for actuating the same, a coal elevator, means for actuating the same, a storage tank for coal above the grate and adapted to discharge coal thereon, a chute adapted to convey the coal from the elevator to said tank, and an ash conveyer underneath the grate and connected to the coal elevator and adapted to convey 125 ashes from the grate to the conveyer so that the ashes may be carried upwardly with the coal and discharged into the tank. 130
4. In a mechanical stoker, the combination with a traveling grate and means for actuating the same, of a storage tank above the grate and adapted to discharge thereon, an

elevator, a chute connecting the upper discharge end of the elevator with the said tank, an ash tank supported above the first named tank, a chute connecting said ash tank with the upper discharge end of the elevator, and means for directing the ashes either over said last named chute into the ash tank, or directly down the first named chute into the first named tank.

5. In a mechanical stoker, the combination of a traveling grate, means for actuating the same, a coal tank above the traveling grate and adapted to discharge thereon, an elevator, an ash conveyer underneath the grate and adapted to convey the ashes therefrom to the elevator, a coal hopper connected to said elevator, a chute connecting the upper discharge end of the elevator, with the coal tank, a primary chute provided with a bottom discharge opening above the first named chute, means for controlling said opening, an ash tank supported above the coal tank, means for directing ashes over the primary tank into the ash tank, and means for controlling the flow of ashes from the ash tank to the coal tank.

6. A mechanical stoker, the combination of a traveling grate, means for actuating the same, a coal tank mounted above the grate and adapted to discharge thereon, and an elevator adapted to automatically discharge coal into the said tank, means for actuating said elevator, an ash conveyer underneath the grate and adapted to convey ashes therefrom and discharge them into the elevator, and means for actuating said ash conveyer whereby ashes may be emptied into the elevator and carried to the coal tank.

7. In a mechanical stoker, the combination of a traveling grate, means for actuating the same, a coal tank above said grate and adapted to discharge thereon, an elevator provided at its upper end with a chute adapted to discharge coal into the coal tank, an ash tank supported in

an inclined position above the coal tank, a chute adapted to direct ashes into the ash tank, and provided with a bottom opening and a closure therefor, said bottom opening being adapted to permit either coal or ashes to drop into the first named chute, means for feeding ashes from the ash tank to the coal tank, an ash conveyer underneath the grate and adapted to convey ashes therefrom to the elevator, and means for actuating said ash conveyer.

8. In a mechanical stoker, the combination of a traveling grate, means for actuating the same, a coal tank mounted above the grate and adapted to discharge thereon, a feeder supported above said tank and adapted to carry material along the top thereof, said top being provided with openings through which the material may be scraped into the tank, an elevator provided at its lower end with a coal receiving hopper, a chute connected to the upper discharge end of said elevator and adapted to discharge material on to the top of the coal tank, a primary tank also secured to the upper discharge end of the elevator, and above the first named chute, an ash tank supported above the coal tank and in operative communication with the lower end of said primary chute, said primary chute being provided with a bottom discharge opening over the first named chute and with a closure therefor and being also provided with a grate extending thereacross beyond said bottom opening, an ash conveyer underneath the grate and adapted to convey ashes to the lower end of the elevator and deposit them therein for elevation, and means for actuating said ash conveyer.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID A. WOOD. [L. S.]

Witnesses:

CATHERINE BARRY,
B. F. KUMMER.