March 30, 1926. 1,578,306

H. WOOD

WATER GAS APPARATUS

Filed Nov. 14, 1922 2 Sheets-Sheet 1

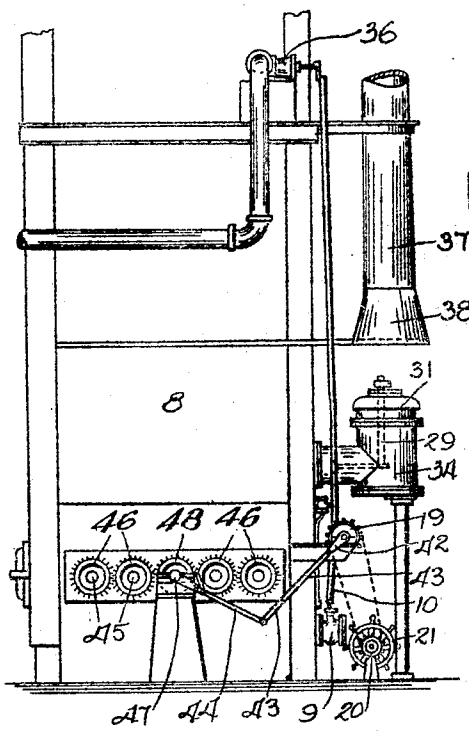


Fig. 2.

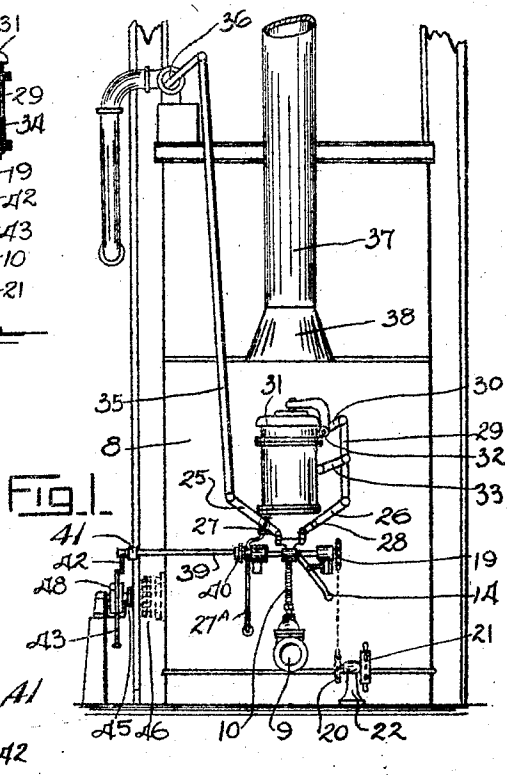


Fig. 1.

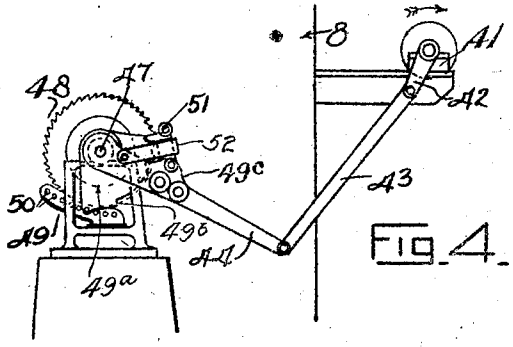


Fig. 4.

Inventor.
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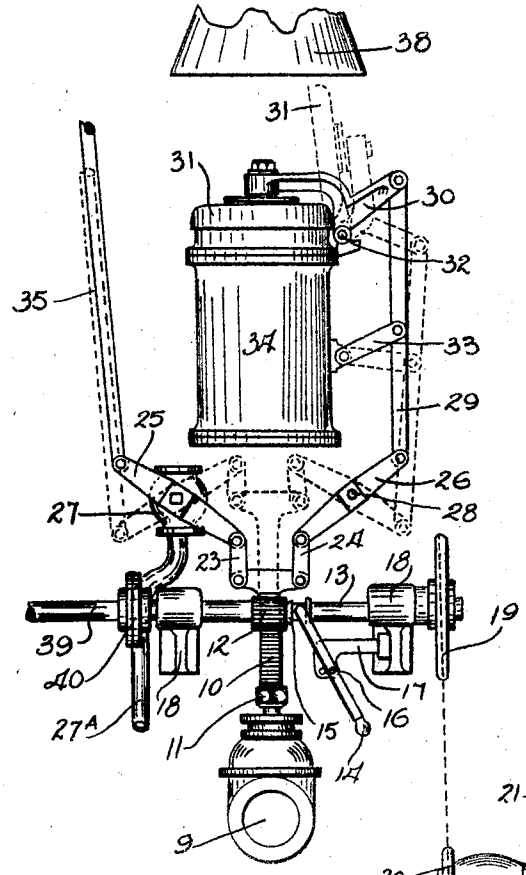


Fig. 3.

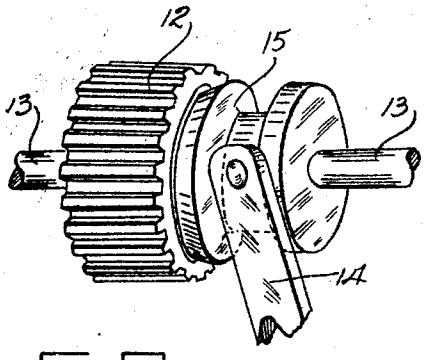


Fig. 5.

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Patented Mar. 30, 1926. 1,578,306

UNITED STATES PATENT OFFICE.

HERBERT WOOD, OF MORTLAKE, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

WATER-GAS APPARATUS.

Application filed November 14, 1922. Serial No. 600,936.

To all whom it may concern:

Be it known that I, HERBERT WOOD, a subject of the King of Great Britain, residing at Mortlake, near Sydney, in the State of New South Wales, Commonwealth of Australia, have invented certain new and useful Improvements in Water-Gas Apparatus, of which the following is a specification.

This invention has reference to water gas generators for the manufacture of gas from coal or other carbonaceous material. My objects have been to provide operating gear or mechanism for controlling the volume and quality of the gas manufactured, the supply of air under pressure, admission of steam for the production of water gas, and for the removal of ashes, whereby the whole of the operations in their proper sequence may be controlled by a hand wheel.

According to the invention, air under pressure is admitted under the ash extractor to raise the coke in the generator to incandescence, being controlled by a suitable valve which is opened and closed by a rack and pinion operated by a rotatable shaft. This shaft is rotated by a chain and sprocket or other transmission gear driven from a hand wheel positioned either on the charging floor or ground floor level. Extending upwardly from the rack are two levers, one of which operates the stack valve, while the other operates the steam supply valve, and a gas off-take valve which is closed when the stack valve and air blast valve are open.

When the air blast and stack valves are closed and the steam valve fully open, the gas off-take valve is fully opened by the lever operating the steam valve.

An extension is provided on the rotatable shaft coupled or connected directly or indirectly by a clutch or similar device which extension carries a crank connected by a connecting rod to a lever which operates the ash extractor which is turned by an adjustable positioned apron ratchet actuated by the lever to rotate the extractor a predetermined distance, and allow a gradual descent of fuel in the generator.

But in order that my invention may be more clearly comprehended I will now refer to the accompanying two sheets of drawings in which is illustrated a practical embodiment of my invention.

Figure 1 is a front elevation of a water gas generator fitted with the operating gear.

Figure 2 is a side elevation of Figure 1.

Figure 3 is an elevation on an enlarged scale of the operating wheel, rack, and levers, while

Figure 4 is an elevation of the ash extractor operating levers.

Figure 5 is a perspective view of the pinion operating the rack and clutch mechanism.

The same numerals indicate the same or corresponding parts throughout the drawings.

8 is the water gas generator with an air pressure valve 9, the operating rod of which is attached to the rack 10 by nut 11. 12 is a pinion wheel for moving said rack which wheel revolves with the shaft 13 when the clutch 15 is forced into engagement with it on operating the handle 14 which is held in position by a pin inserted in holes 16 in a bracket 17 attached to one of the bearings 18. The shaft 13 is revolved by a sprocket wheel 19 driven by chain belting from sprocket wheel 20 revolved by the hand wheel 21 mounted on the stand 22.

Pivotally attached to the rack 10 are short links 23 and 24 pivoted to levers 25 and 26, the lever 25 being provided with a squared hole fitting over the operating rod of the steam supply valve 27 controlling the steam pipe 27A. Lever 26 is pivoted to the generator at 28 and at the outer end to the upwardly extending operating rod 29. This rod 29 is pivoted to an extension 30 integral with the stack valve 31 which moves on a pivot 32. A lever 33 is pivoted to the body 34 of the stack valve and to the operating rod 29 to insure greater rigidity. To the outer end of the lever 25 operating the steam supply valve 27 is pivoted a long upwardly extending rod or lever 35 connected at its upper end to the gas off-take valve 36. 37 is a stack provided with a cowl or bell shaped portion 38 positioned over the stack valve 31 to take the blast gases therefrom and lead them to the atmosphere.

To the shaft 13 is attached an extension shaft 39 by a coupling 40, said shaft being provided at its outer end after passing through a bearing 41, with a crank arm 42. Pivoted to this arm 42 is a downwardly extending rod 43 which is pivotally connected to a rod 44 for operating the ash extractor. This ash extractor comprises a number of shafts 45 provided with gears 46 which are revolved by the shaft 47 carrying a gear wheel 48. Said gears 46 and 48 are inter-

engaged as shown in Figure 2. This wheel 48 is turned one or more teeth as desired by a pawl 51 controlled by the sector plate 49 provided with holes 50. A plate 49[a] has a stop 49[b] the position of which is adjusted by a pin inserted in a predetermined hole 50 of the sector plate 49. On downward movement of the rods 43, 44, the pawl 51 rides over the teeth on the wheel 48 until the member 49[c] carrying the pawl contacts with the stop 49[b]. Said pawl then engages a tooth on the wheel 48 and on upward movement of the rods 43, 44, the wheel 48 is partially turned the required number of teeth. A yoke 52 is provided to limit the extent of movement of the pawl 51 on the pivot of the latter. This ash extractor can be operated independently by disengaging the clutch 15 from the pinion 12.

In operation, when the generator has been charged with sufficient fuel, assuming that the clutch 15 has been brought in contact with the pinion 12, the hand wheel 21 is then turned, raising the rack 10 and opening the air blast valve 9, forcing the levers 25 and 26 to the position shown in dotted lines in Figure 3, the operating rod 29 opening the stack valve 31. At the same time the lever 25 closes the steam valve 27 and the rod 35 closes the gas off-take valve 36. This operation brings the fuel to the required temperature, the blast gases passing through the stack valve 31, up through the stack 37, to the atmosphere. After a predetermined period the hand wheel 21 is revolved in the opposite direction moving the rack 10 downwardly thus closing the stack valve 31 and air blast valve 9 and opening the steam valve 27 to generate water gas, and the rod 35 opens the gas off-take valve 36.

With this arrangement the necessary operations can be controlled from the hand wheel 21 by unskilled labor, with the possibility of any of the valves not being opened or closed in their proper sequence being avoided.

I claim:—

1. Water gas apparatus including a water gas generator having an air blast valve, a steam admission valve, a stack valve and a gas outlet valve; in combination, operating mechanism comprising a manually controlled shaft, a pinion on the shaft, a rack operated by the pinion, said rack directly controlling the air blast valve and controlling the steam, stack and gas outlet valves through pivotally connected rods connected to the rack, said shaft having an extension, ash extractor rolls having interengaging gears, a gear wheel engaging certain of said interengaging gears, to operate the ash extractor rolls, a crank arm on said shaft extension; a pair of pivotally interconnected rods, one pivotally connected to said crank arm and the other to the shaft of said gear wheel, and a pawl, to rotate said gear wheel, said pawl being connected to one of said last named pair of rods.

2. In water gas apparatus as claimed in claim 1, a clutch on the said shaft capable of disengaging the pinion therewith and enabling the extractor rolls to be revolved without actuating the operating valves.

In testimony whereof I have hereunto set my hand.

HERBERT WOOD.