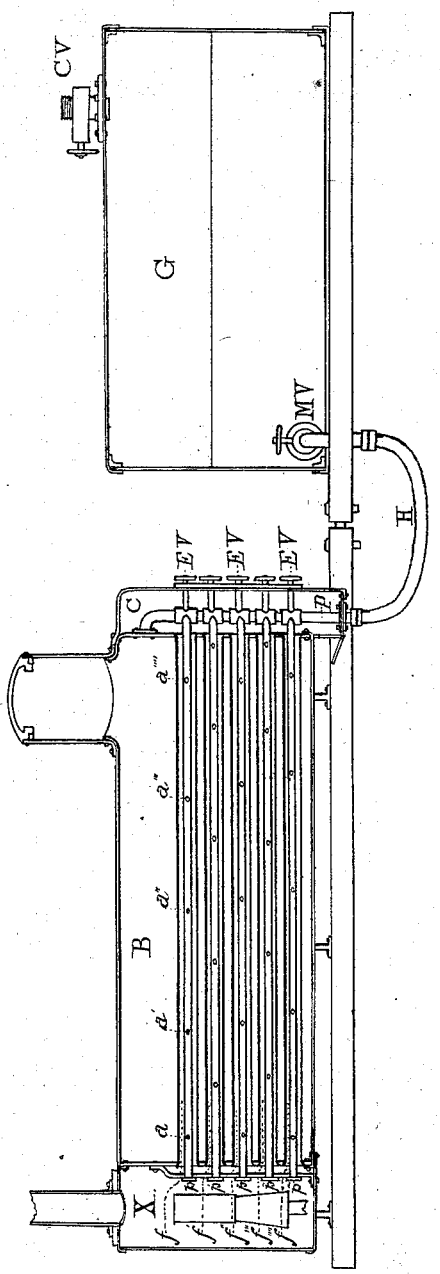
J. M. GOODWIN.

Locomotives for Burning Hydrocarbon.

No. 164,915. Patented June 29, 1875.



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UNITED STATES PATENT OFFICE.

JOHN M. GOODWIN, OF CLEVELAND, OHIO.

IMPROVEMENT IN LOCOMOTIVES FOR BURNING HYDROCARBON.

Specification forming part of Letters Patent No. **164,915**, dated June 29, 1875; application filed June 29, 1874.

To all whom it may concern:

Be it known that I, JOHN M. GOODWIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful method for applying fuel for the heating of the boilers of locomotive and other engines, and other boilers and apparatus for the generation of steam, and for other purposes, for which, and the devices appurtenant thereto, I desire to obtain Letters Patent of the United States, and of which the following is a specification:

The several conditions unfavorable to free combustion under which the fuel, as applied in the ordinary locomotive, is used, and the necessities growing out of the modes of construction adopted in (and in consequence of the use of) the locomotive fire-box as now constructed, make indispensable the use of the steam-blast, the maintenance of which is a considerable tax on the power of the engine.

The objects of my invention are, first, to effect a reduction in the weight of the supply of fuel now necessarily carried by or with locomotive, marine, road, and portable engines; second, to provide means for collecting and handling, and applying to the heating of the boilers of such engines and other apparatus, fuel that will not, while burning, throw off tarry particles, cinders, or smoke, as do the coals and other crude materials now generally used for fuel for such engines; third, to make practicable a reduction of the weight of the boilers and fire-boxes of such engines, and an entirely cylindrical conformation of the boilers thereof, to the end that they may have greater strength than they have as now made; fourth, to make practicable a reduction of the expenditure of force now necessary to the maintenance of the steam-blast as aforesaid; fifth, to render practicable the utilization of natural gases for fuel for locomotives, and to induce economy in the application of coals for fuel for the production of steam generally.

These objects I believe may be attained by the use of my aforesaid invention, whereby natural gases, and gases produced by treating coals and other substances with heat or otherwise, may be collected and secured in, or forced into and compressed and secured in, suitable portable receptacles, constructed so that, as required for use, they may be placed in or upon carriages to be used as tenders to locomotives or to road-engines, or to any engine mounted on wheels, or fixed or placed on or attached to such engines, or placed in or upon water-craft of any kind, or in any place within practicable connecting distance of any boiler or apparatus, and so that, when suitably placed, said receptacles, by means of adjustable pipes, tubes, or hose, fitted with necessary couplings and valves, may be connected with other pipes, arranged inside of, or inside the flues of, the boilers of such engines or apparatus, and whereby said pipes, tubes, or flues, arranged as aforesaid, being fitted with proper orifices for the emission of the said gases, the gases contained by the said receptacles may be, as occasion may require, allowed to flow from the receptacles through the connecting tubes, pipes, or hose, to and through said orifices, into the spaces in or about said boiler-flues or boilers, prepared as and for combustion-chambers, wherein said gases may be, by suitable means, mingled with a proper supply of atmospheric air and ignited, and applied and used as fuel, for the purposes hereinbefore specified.

Experiment has shown that the mechanically-produced pressure, operating in the receptacles, will deliver the gas freely into the spaces where it is to be consumed, and that the steam-blast will be necessary only for the production of a current of atmospheric air to support combustion in those spaces.

In the drawing accompanying and forming part of this specification, G represents a gas tank or receptacle; M V, a valve for controlling the flow of gas from the tank; H, a flexible tube or hose for connecting the tank with the pipes P P P P; P P P P, pipes fixed in an air-chamber, C, attached to the boiler and in the flues of the boiler; B, the boiler; *f f f*, the flues of the boiler; *a a a*, orifices in the pipes for the emission of gases for use as fuel.

The said drawing also indicates valves working in the pipes fixed in the air-chamber C, by the operation of which the gas may at will be shut off from any or all of the boiler-flues above the lower flue, and the gas will, in prac-

tice, be so shut off when a full head of steam is not needed, and a saving of fuel will be thereby effected.

As of my invention, I claim—

1. The combination with boiler B, provided with suitable air-chamber C and flues *f f*, of a gas-tank, G, hose or connection H, and pipes P P P P, with orifices *a a a*, substantially as and for the purposes set forth.

2. The combination with boiler B, flues *f f*, and gas-tank G, of pipes P P P P, orifices *a a a*, and suitable valves working in the pipes P P in the air-chamber C, whereby the supply of gas to any series of burners may be governed or cut off entirely, substantially as and for the purposes set forth.

JOHN M. GOODWIN.

Witnesses:

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