

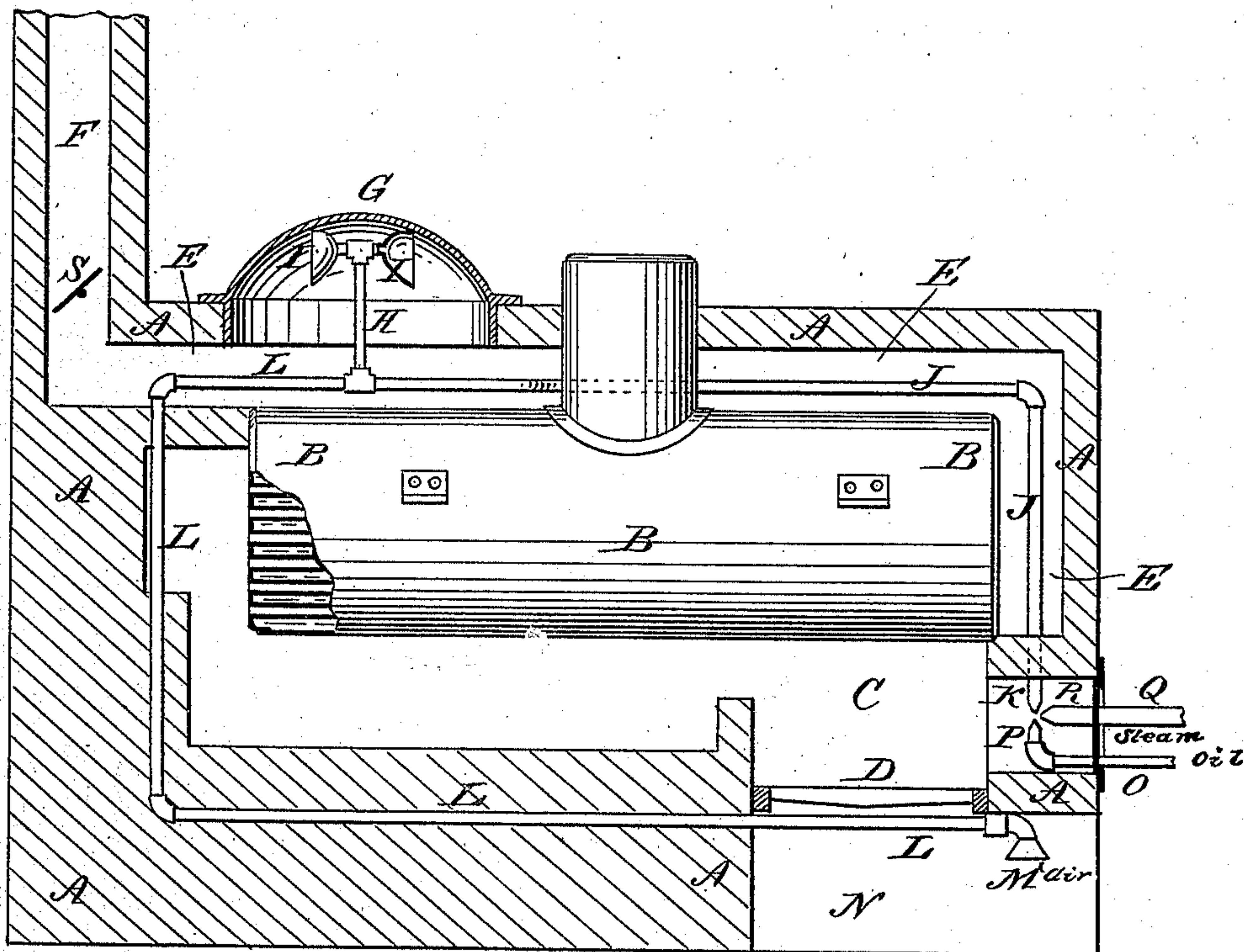
(No Model.)

W. T. McDONALD.

SMOKE BURNING FURNACE FOR STEAM BOILERS.

No. 344,537.

Patented June 29, 1886.



WITNESSES:

Down Twitchell.

C. Sedgwick

INVENTOR:

W. T. McDonald

BY *Munn & Co*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM T. McDONALD, OF NEW YORK, N. Y.

SMOKE-BURNING FURNACE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 344,537, dated June 29, 1886.

Application filed December 22, 1885. Serial No. 186,463. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. McDONALD, of the city, county, and State of New York, have invented a new and useful Improvement in Smoke-Burning Furnaces for Steam-Boilers, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawing, forming a part of this specification, and which is a sectional elevation of a furnace to which my improvement has been applied, the steam-boiler being shown in side elevation and with part broken away.

The object of this invention is to provide furnaces for steam-boilers constructed in such a manner that the gaseous and other combustible products of combustion in the smoke will be consumed and the additional heat thus produced utilized for heating the boiler.

A represents a furnace, and B a steam-boiler set therein.

Beneath the forward part of the boiler B is the fire-chamber C and the grate D, where fuel is burned in the ordinary manner. From the fire-chamber C the smoke and other gaseous products of combustion pass back beneath the boiler B, and return through the flues of the said boiler B to the flue E, through which they pass along the top of the said boiler B to the smoke-stack F.

In the top of the furnace A, above the rear part of the boiler B, is formed a dome, G, within which is placed a T-shaped pipe, H, having funnels I attached to the ends of its cross-arms. The lower end of the T-shaped pipe H is connected with the horizontal pipe J, which passes forward along the top of the boiler B, passes down at the forward end of the said boiler, and terminates in a nozzle, K, in the doorway or other suitable opening at the forward end of the furnace A, or in the forward part of the combustion-chamber C.

With the rear end of the pipe J is connected the end of a pipe, L, which passes down at the rear end of the furnace A, passes forward through the lower part of the said furnace A, and terminates in a funnel, M, in the forward part of the ash-pit N.

O is a pipe, the outer end of which is connected with a cask or other reservoir of kerosene-oil placed at a higher level than the nozzle K of the pipe J.

The lower end of the pipe O, directly below the nozzle K, is bent upward at right angles, and is provided with a nozzle, P, which is placed directly opposite and close to the said nozzle K.

Q is a pipe, the outer end of which is connected with the steam-space of the boiler B or some other steam-generator. The inner end of the pipe Q is provided with a nozzle, R, is placed at right angles with, close to, and equally distant from the two nozzles K P.

In the lower part of the chimney-flue F is placed a damper, S, so that the passage of the products of combustion through the said flue can be regulated or prevented, as may be required. With this construction, after the fire in the fire-chamber C is well started, the damper S is closed or partly closed, which causes the gaseous and other light combustible parts of the products of combustion to rise into the dome G, where they are made to enter the funnels I, pass through the pipes H J, and pass out through the nozzle K by the tendency of the steam-jet from the nozzle R of the steam-pipe Q to form a vacuum in the said pipe J. This same tendency to form a vacuum in the pipe J causes air to pass into the said pipe J through the funnel M and pipe L, and become mixed with the gaseous products of combustion as they pass through the said pipe J. The jet of steam from the pipe Q and nozzle R has also a tendency to produce a vacuum in the pipe O, and causes a jet of kerosene-oil to be discharged from the pipe O and nozzle P, so that the gaseous products of combustion, mixed with air from the pipe J, kerosene-oil from the pipe O, and steam from the pipe Q, will be discharged, in the form of a spray, into the fire-chamber C above the fire, and will be consumed, thus utilizing a large quantity of combustible matter that would otherwise pass off through the smoke-stack and be wasted.

It is quite evident that the unconsumed gases, together with the steam and petroleum, may be consumed beneath a separate boiler or for other purposes altogether, if desired.

The air-pipe L and gas-pipe J may be independent, and the gases and air introduced separately into the furnace for combustion, if preferred.

Having thus fully described my invention,

I claim as new and desire to secure by Letters Patent—

1. In a smoke-burning furnace for steam-boilers, the combination, with the furnace A and the steam-boiler B, of the dome G, the T-shaped pipe H, having funnels I, and the pipes J, O, Q, and L, the latter having funnel M, and the nozzles K P R, substantially as herein shown and described, whereby the gaseous products of combustion, mixed with air, kerosene-oil, and steam, will be introduced into the fire-chamber in the form of a spray and burned, as set forth.

2. The herein-described smoke-burning at-

tachment to a boiler-furnace, consisting in a smoke-pipe extending from the smoke-flue to the combustion-chamber, and provided with a nozzle at its forward end, an air-pipe extending from the rear portion of said smoke-pipe, an oil-supply pipe provided with a nozzle, and a steam pipe and nozzle, the nozzle end of said steam-pipe being arranged intermediately of and closely to the nozzle ends of the smoke and oil pipes, substantially as set forth.

WM. T. McDONALD.

Witnesses:

EDGAR TATE,

EDWD. M. CLARK.