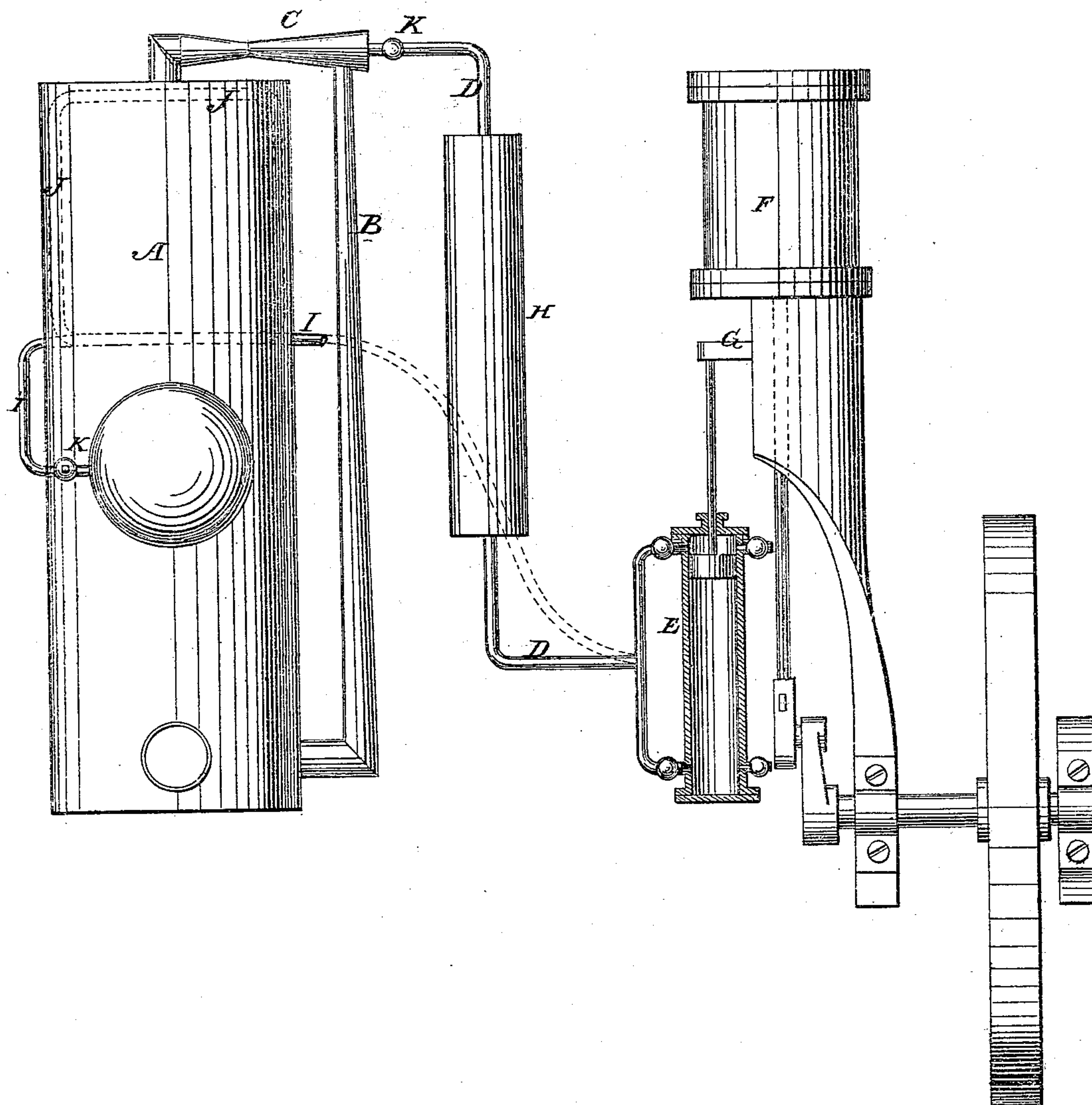


**M. E. BOLLINGER.**

## Apparatus for Feeding Steam-Boilers with Air.

No. 148,658.

Patented March 17, 1874.



**WITNESSES.**

WITNESSES.  
Chas. Nida  
Sedgwick

INVENTOR.

INVENTOR.  
M. E. Bollinger  
BY  
Munroe  
ATTORNEYS.

**ATTORNEYS.**

# UNITED STATES PATENT OFFICE.

MARTIN E. BOLLINGER, OF LITTLESTOWN, PENNSYLVANIA.

## IMPROVEMENT IN APPARATUS FOR FEEDING STEAM-BOILERS WITH AIR.

Specification forming part of Letters Patent No. **148,658**, dated March 17, 1874; application filed January 5, 1874.

*To all whom it may concern:*

Be it known that I, MARTIN E. BOLLINGER, of Littlestown, in the county of Adams and State of Pennsylvania, have invented a new and Improved Apparatus for Feeding Steam-Boilers with Air, of which the following is a specification:

The invention will first be fully described, and then pointed out in the claim.

The drawing is a plan view of the apparatus, except the pump, which is sectional.

A is the boiler; B, the circulating water-pipe; C, the injector; D, the air-feed pipe; E, the double-acting air-pump; F, the steam-engine; G, an arm of the cross-head, to which the pump piston-rod is attached. H is the exhaust-steam heater; and I, an air-pipe, leading directly from the feed-pump E to the boiler through a heating-coil, J, surrounding the fire, to be used when a steam-heater cannot be

used, as on locomotive-engines. Pipes D and I are both provided with a check-valve and stop-cock, K, to let off the pressure for a short time when starting. The steam-pipe I enters the steam-dome above the water-line. The pipe B, for the circulation of the water, is tapped into the boiler-shell, near the smoke-stack, below the water-level, and into it again at the front above the water-level.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of the boiler-injector C, the water-circulating pipe B, and the air-supply pipe D, in the manner and for the purpose specified.

MARTIN ELI BOLLINGER.

Witnesses:

S. L. BISHOP,  
SAML. P. YOUNG.