

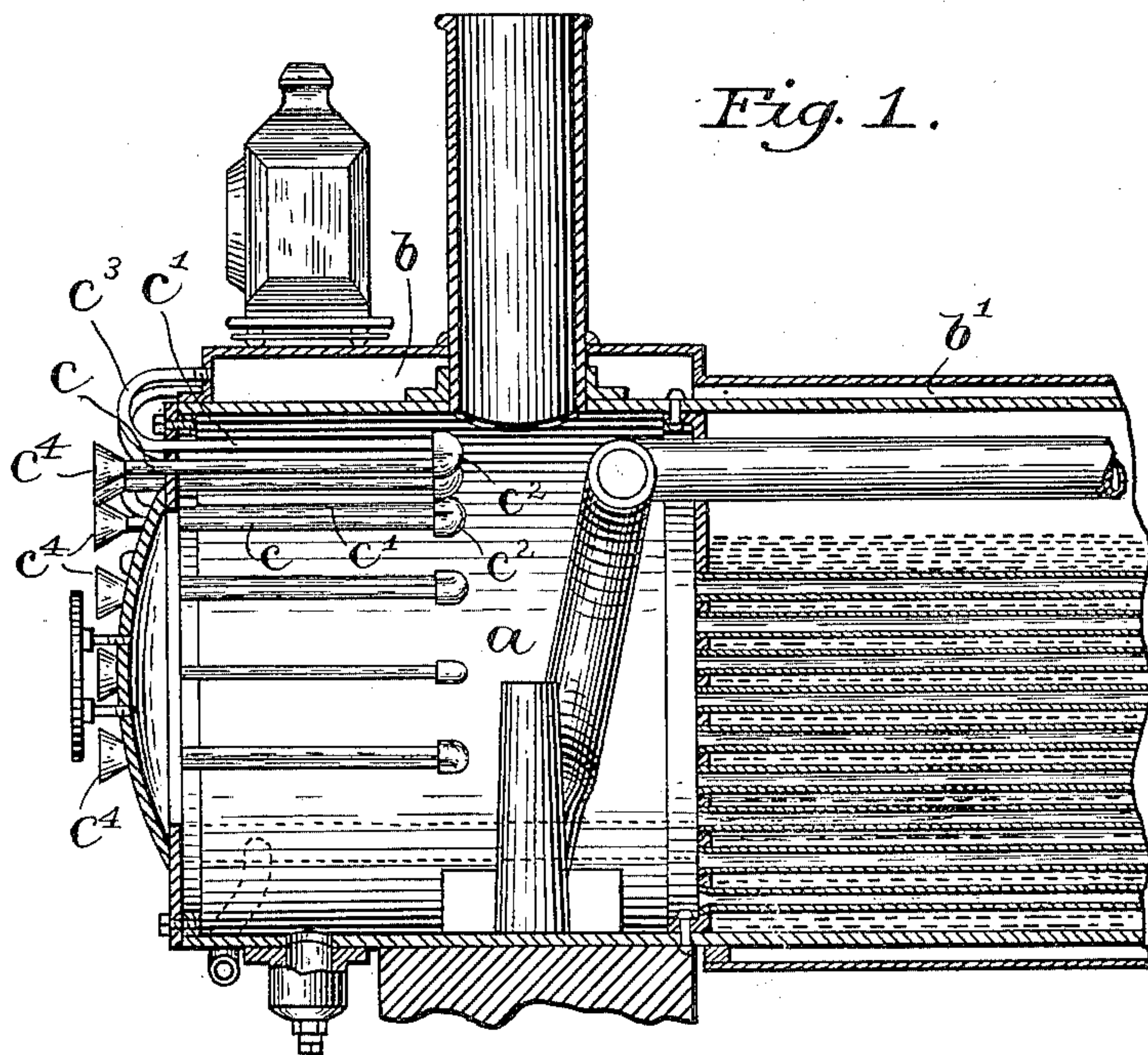
No. 652,479.

Patented June 26, 1900.

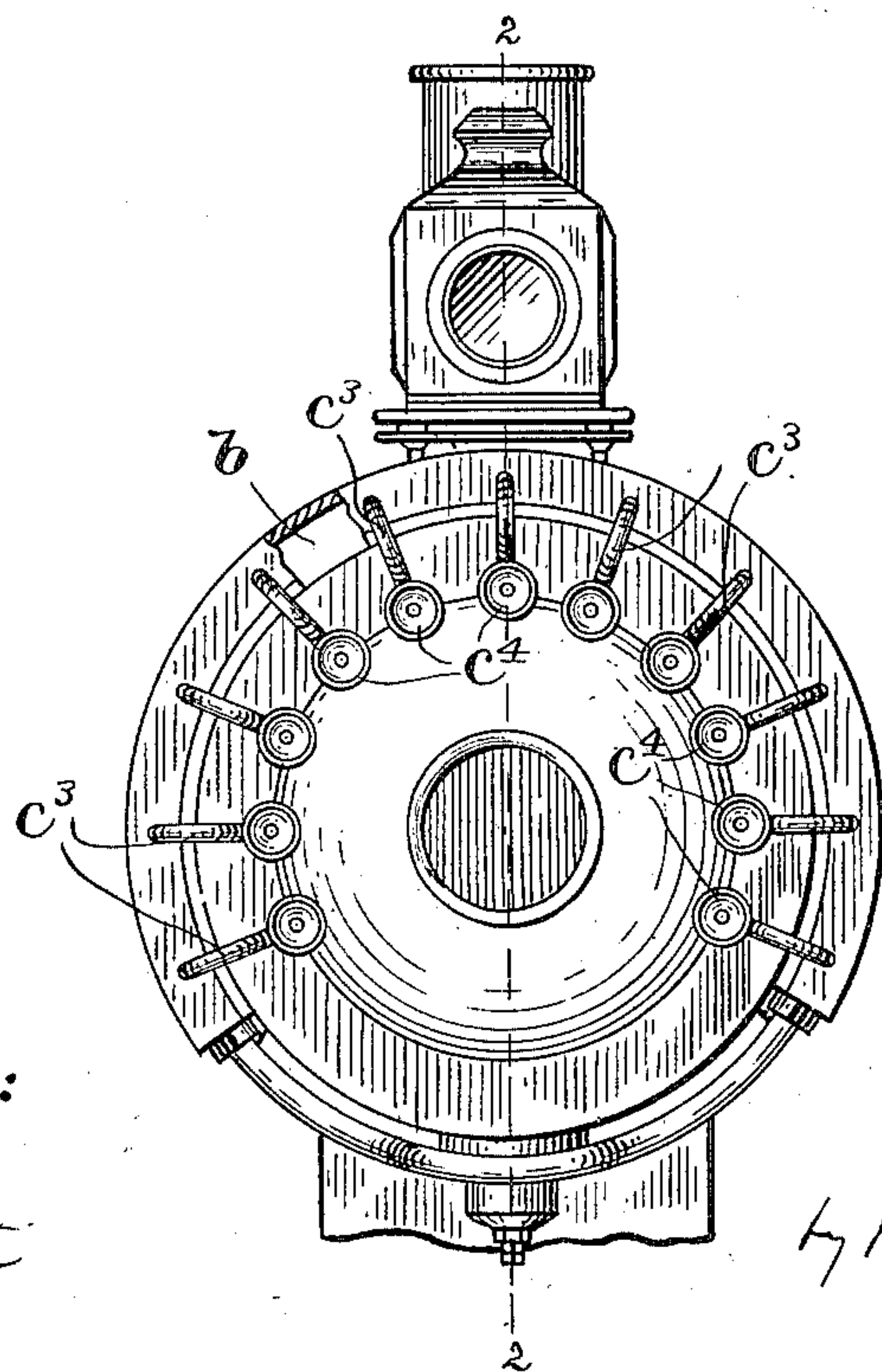
H. H. HUFF.  
AIR HEATER FOR LOCOMOTIVES.

(Application filed Nov. 6, 1899.)

(No Model.)



*Fig. 2.*



Witnesses:

A. D. Harrison

P. W. Pezzetti

Inventor:

Henry H. Huff  
by Night Brown & Quincy  
Attys



# UNITED STATES PATENT OFFICE.

HENRY H. HUFF, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS  
TO ARTHUR D. CURRAN, OF SAME PLACE, AND SMITH P. BURTON, JR.,  
OF READING, MASSACHUSETTS.

## AIR-HEATER FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 652,479, dated June 26, 1900.

Application filed November 6, 1899. Serial No. 735,901. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY H. HUFF, of Boston, (Dorchester,) in the county of Suffolk and State of Massachusetts, have invented certain  
5 new and useful Improvements in Air-Heaters for Locomotives, of which the following is a specification.

This invention relates to apparatus for heating the air supplied to fire-boxes of locomotive-engines, in which outside air forward of the engine is conducted along conduits which are heated by the waste heat of the engine and delivered in a heated condition to the fire-box. A type of apparatus of this character is shown in Letters Patent of the United States No. 631,990, dated August 29, 1899, said patent showing an air-receiving chamber surrounding the smoke-box of the engine and connections between said chamber and  
15 the fire-box, the arrangement being such that the air entering said chamber is warmed by the waste heat radiated from the smoke-box and passes from thence to the fire-box over other heated surfaces.

25 The present invention has for its object to more fully utilize the waste heat within the smoke-box by passing the air through portions of the smoke-box before it enters the said chamber.

30 The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents  
35 a front end elevation of a locomotive equipped with my improved air-heating apparatus. Fig. 2 represents a section on line 2 2 of Fig. 1.

The same letters of reference indicate the same parts in both figures.

40 In the drawings, *a* represents the smoke-box of a locomotive, and *b* represents an air-chamber surrounding the main portion of the smoke-box, said chamber being formed by a jacket or casing outside the smoke-box. A  
45 supplemental casing *b'* forms a conduit which conducts air from the chamber to the fire-box, substantially as shown in the above-mentioned patent. Instead of admitting outside air directly into the chamber *b*, as shown in

said patent, I provide a series of conduits located within the smoke-box and arranged to conduct the outside air through portions of the smoke-box and to deliver the air to the forward portion of the chamber *b*, thus utilizing more fully than heretofore the waste heat  
50 in the smoke-box. Said conduits are preferably substantially U-shaped, each comprising an inner member *c*, which extends through the front of the smoke-box and rearwardly therefrom through a portion of the smoke-  
55 box, an outer member *c'*, disposed between the inner member *c* and the wall of the smoke-box, a return-bend *c<sup>2</sup>*, connecting the rear ends of the members *c* *c'*, and a connection (preferably a return-bend) *c<sup>3</sup>*, connecting the  
60 forward end of the outer member *c'* with the forward portion of the chamber *b*. The front end of the inner member *c* has a bell-mouth *c<sup>4</sup>*, which receives the outside air in front of the smoke-box, the air passing backwardly  
65 through the inner member *c* and forward through the member *c'* and then into the forward portion of the chamber *b*. The air is thus heated within the smoke-box, enters the chamber *b* in a heated condition, and is ad-  
70 ditionally heated while passing through the chamber *b* and jacket *b'* to the fire-box. It will be seen that by the said conduits I utilize the waste heat in the smoke-box, their location in the outer portion of the smoke-  
75 box, where there is an extended space, permitting a large number of conduits to be exposed to the heated products of combustion within the smoke-box.

My invention is not limited to the U shape  
80 shown and described, but is intended to include a series of conduits of any suitable form located in the smoke-box, receiving air in front of the smoke-box and delivering it to the forward portion of a chamber surround-  
85 ing the smoke-box.

I claim—

1. A locomotive-engine having an air-chamber at the exterior of the smoke-box; connections between said air-chamber and the fire-  
90 box, whereby air is conducted from the chamber to the fire-box; and a series of conduits located within the smoke-box and adapted to

supply air to said chamber, each conduit being open at one end to the outside air forward of the smoke-box and communicating at its other end with the forward portion of the air-chamber.

5 2. A locomotive-engine having an air-chamber at the exterior of the smoke-box; connections between said air-chamber and the fire-box whereby air is conducted from the chamber to the fire-box; and a series of U-shaped  
10 air-conduits composed of inner members extending through the front of the smoke-box and backwardly within the latter and having

receiving-mouths at their front ends; outer members disposed between the inner members and the wall of the smoke-box; return-bends connecting the rear ends of the inner and outer members; and connections between the forward ends of the outer members and the air-chamber.

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

HENRY H. HUFF.

Witnesses:

C. F. BROWN,

GEO. M. CARPENTER.