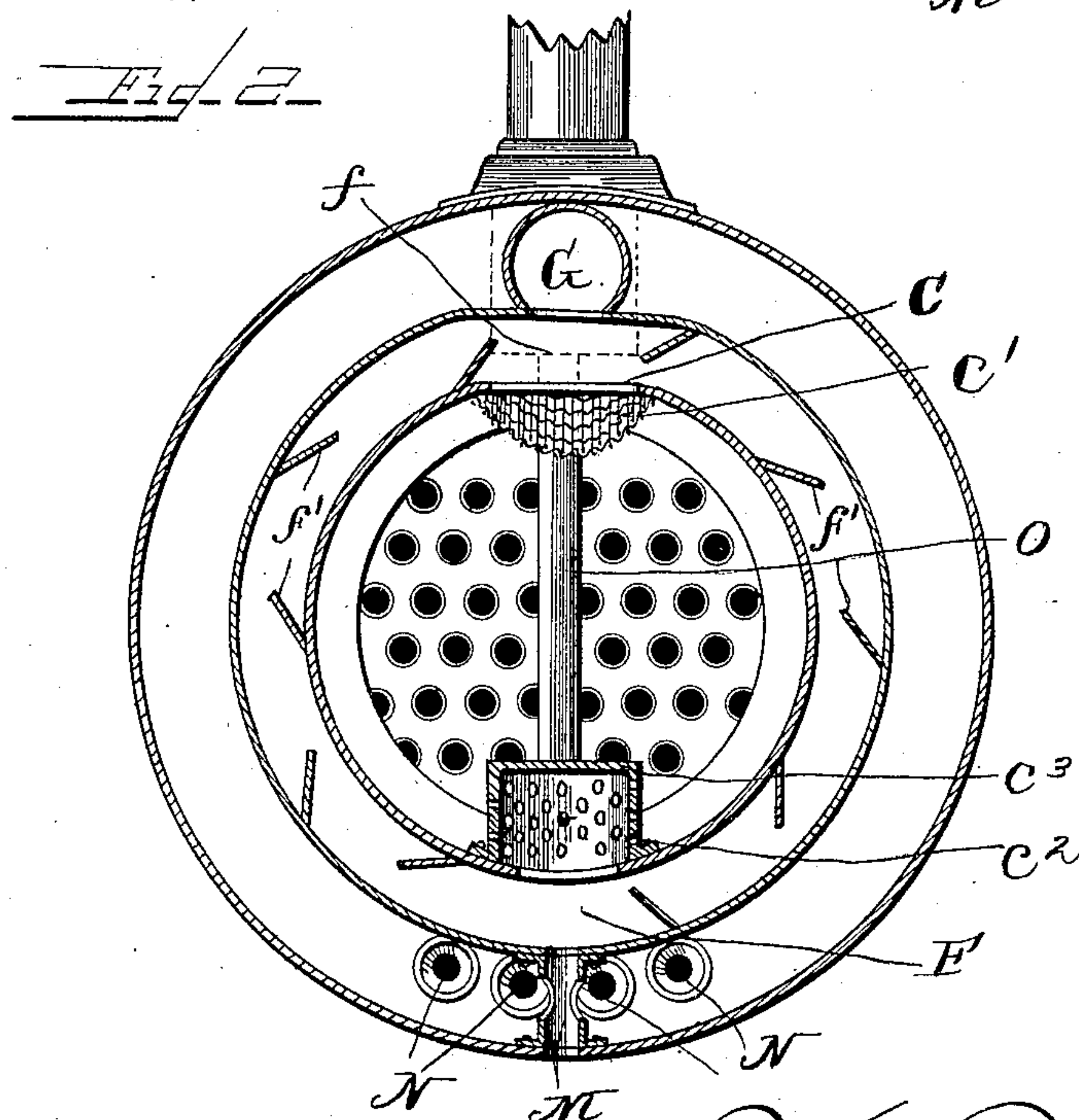
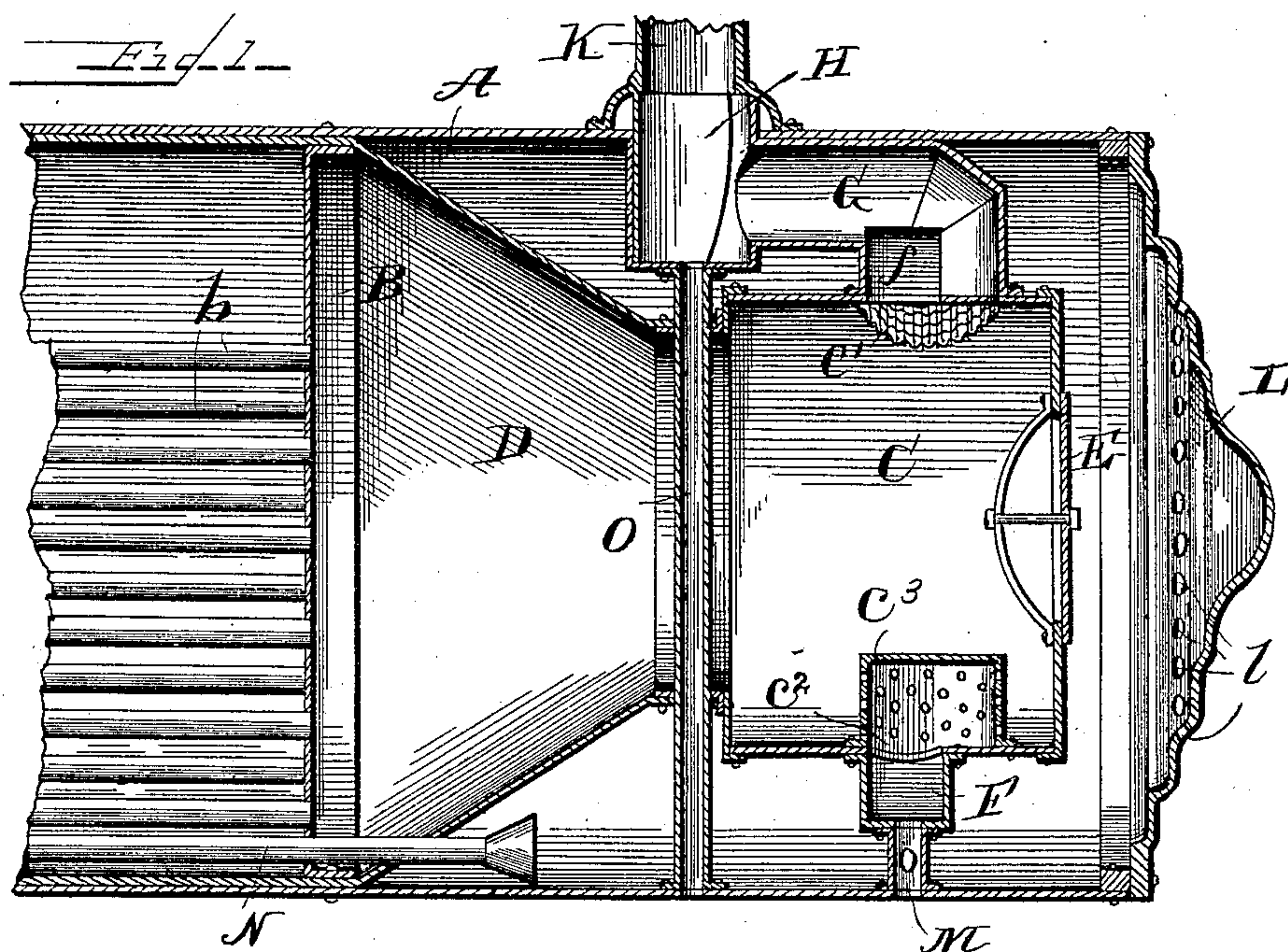


(No Model.)

P. BROWN.  
LOCOMOTIVE.

No. 486,555.

Patented Nov. 22, 1892.



Witnesses

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# UNITED STATES PATENT OFFICE.

PATRICK BROWN, OF BUFFALO, NEW YORK.

## LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 486,555, dated November 22, 1892.

Application filed September 5, 1892. Serial No. 445,133. (No model.)

*To all whom it may concern:*

Be it known that I, PATRICK BROWN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Locomotives; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in locomotive-engines; and it consists in certain novel features of construction and combination of parts hereinafter fully described.

In the accompanying drawings I have shown one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a sectional view of the front portion of a locomotive, parts being broken away. Fig. 2 is a transverse sectional view of the same.

The object of my invention is to provide the smoke-arch of a locomotive with a construction by means of which the sparks will be arrested and extinguished and by means of which the smoke-arch and parts located therein will be kept comparatively cool and heated air will be supplied to the fire-box of the locomotive.

In the drawings, A represents the smoke-arch of usual form. BB represents the boiler-flue sheet, and *b b* the boiler-flues. In the fore part of the smoke-arch is located a shell C, of less diameter than the arch, suitably secured therein and connected with the flue-sheet by a cone D. The front part of the shell C is provided with a manhole closed by a manhole-cover E, and said shell is surrounded by an annular smoke-passage F, located intermediate the ends of the shell. The upper part of the shell C is provided with an aperture *c*, which communicates by means of a curved pipe G with a chamber H, into which the smoke-stack K extends. The annular passage F also discharges into the curved pipe G at the points *f f*, as shown. The aperture *c* in the top of the shell C is covered by wire-netting *c'*, or I may employ a finely-perforated plate, if desired. The lower part of the shell C is also provided with

an aperture *c*<sup>2</sup>, which opens downwardly into the annular smoke-flue F, and said opening is shown as covered by a box or cap *c*<sup>3</sup>, having its sides perforated.

L represents the head of the smoke-arch, which is provided, preferably, with a series of apertures *l*, as shown, for the admission of air to the annular space between the walls of the arch and the shell C and cone D, and I have also shown an air-inlet port M in the lower part of the smoke-arch for the same purpose.

A series of pipes N are arranged preferably along the bottom of the smoke-arch, which are for the purpose of conducting the air from the annular space between the smoke-arch and shell C rearward to the fire-box, (not shown,) thereby supplying fresh air heated by contact with the shell and arch to support combustion in the fire-box. I prefer to provide these pipes N with means for enabling them to readily take in the heated air. In the drawings I have shown the pipes N provided with funnel-shaped or flanged open ends to receive the air, and the sides of cone D will also assist in conducting the air to said pipes.

The annular smoke-passage F is provided with a series of smoke-retarding devices, consisting, in this instance, of the deflectors *f' f'*, arranged in said passage and adapted to retard the smoke and make it take a tortuous course.

O is the exhaust-flue, which discharges into the smoke-stack K, as usual, to increase the draft.

The operation of my improved device is as follows: The smoke and products of combustion pass forwardly through the boiler-tubes into cone D, which conducts them to the shell C, a part of the smoke passing upwardly through the wire-gauze *c'* into the smoke-flue G and thence to the stack K, and the rest passing downwardly. The wire-gauze will be fine enough to hold back almost all of the cinders and permit only the smoke to pass out. The rest of the smoke and products of combustion will pass down through the apertures in the box or cap *c*<sup>3</sup>, which forms a screen, into the annular smoke-passage F, and will ascend past the deflectors *f'* until it reaches the smoke-flue G, and thence to the smoke-stack. The smoke and cinders will be re-



tarded by the deflectors  $f' f'$  and the cinders cooled and extinguished before they reach the stack. The cold air from the exterior rushes into the space between the arch A and shell C and keeps the parts comparatively cool, thus greatly assisting in cooling and extinguishing the sparks. The air will take the heat from the surrounding parts and become itself highly heated as it passes rearwardly, when it will be conducted in a highly-heated condition to the fire-box. (Not shown.) By the construction herein shown and described it will be seen that the smoke-arch and the parts contained therein will be kept comparatively cool, thereby increasing their effectiveness in cooling and extinguishing the sparks, preventing the parts from burning out so rapidly and furnishing a supply of heated air to the fire-box. The construction of the spark-arresting devices, also, is such that a large surface is provided for the cool air to act upon, and the smoke and cinders are conducted in a passage F, of small diameter, which allows the air to act upon three sides of the same, thus increasing the efficiency of the device. When there is an accumulation of cinders in the shell C, the manhole cover may be removed and the cinders taken out.

I do not desire to be limited to the exact details of construction and combination of parts herein shown and described, as variations may be made therein without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In a locomotive, the combination, with the smoke-arch, of a shell for receiving the products of combustion located within said arch, an annular smoke-passage adjacent to said shell and communicating with the smoke-stack, a connection between said shell and said annular passage, and a perforated screen interposed between said shell and said annular passage, substantially as described.

2. In a locomotive, the combination, with the smoke-arch, of a shell for receiving the products of combustion located within the

same, an annular smoke-passage adjacent to said shell and communicating with the smoke-stack, a direct connection between the shell and smoke-stack provided with a screen, and a connection between said shell and said annular passage having a screen interposed therein, substantially as described.

3. In a locomotive, the combination, with the smoke-arch, of a shell for receiving the products of combustion located within the same, an annular smoke-passage adjacent to said shell and communicating with the smoke-stack, smoke-retarding deflectors located in said passage, and a connection between said shell and said annular passage, substantially as described.

4. In a locomotive, the combination, with the smoke-arch, of a shell for receiving the products of combustion located within said arch, the annular smoke-passage provided interiorly with smoke-deflectors and communicating with the smoke-stack, a direct connection between said shell and the smoke-stack, a screen for said connection, a connection between the said shell and said annular passage, and a screen for said connection, substantially as described.

5. In a locomotive, the combination, with the smoke-arch, of a shell for receiving the products of combustion, located within the same and forming an air-space between the two, an annular smoke-passage adjacent to said shell having its exterior walls in contact with the air in said air-space, a connection between said shell and said annular passage and a connection between said passage and the smoke-stack, air-inlets for admitting air to said air-space, and pipes for conducting the air from said air-space to the fire-box, substantially as described.

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

PATRICK BROWN.

Witnesses:

EGBERT E. GORING,  
SILAS J. DOUGLASS.