

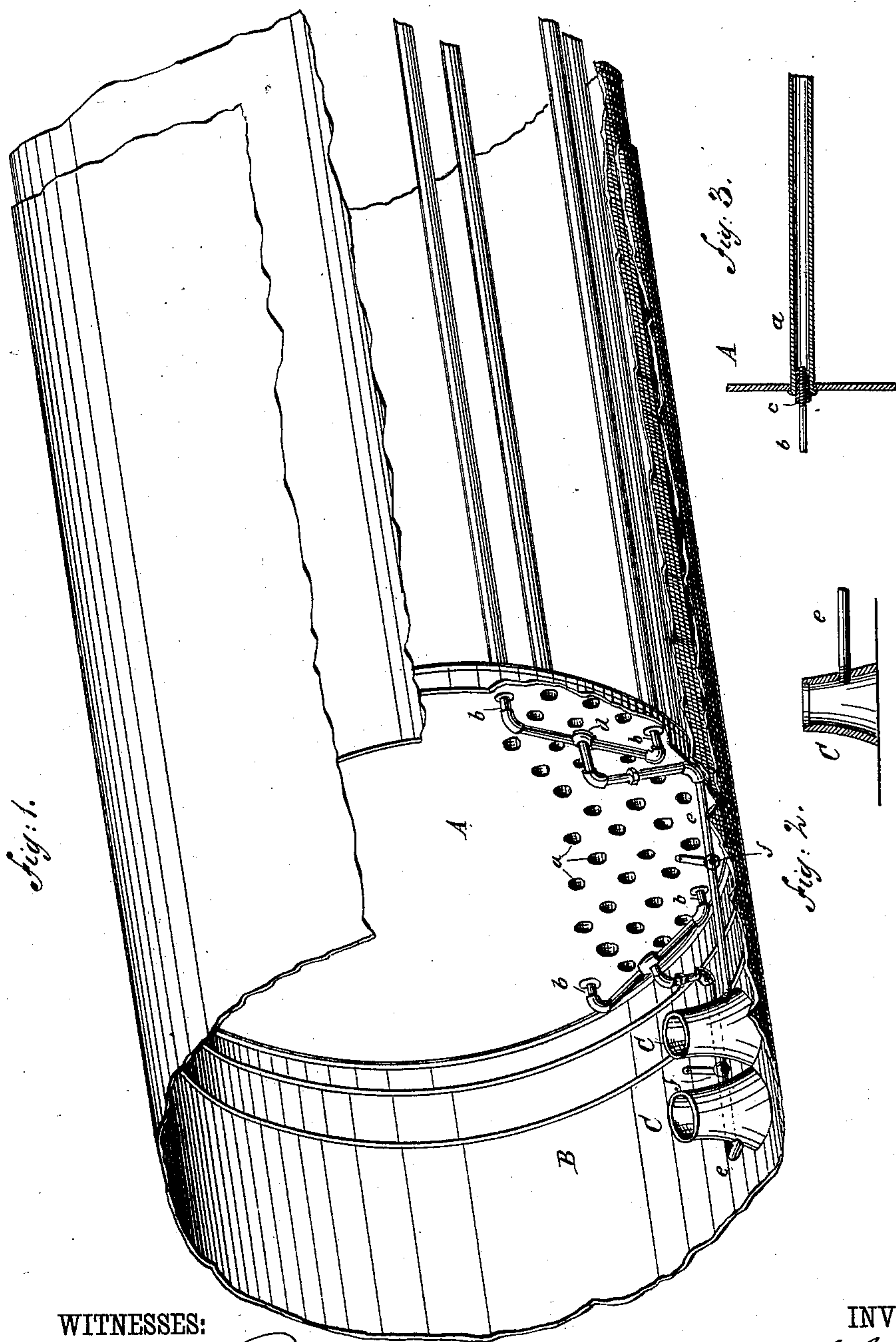
(No Model.)

2 Sheets—Sheet 1.

C. S. SMITH.
LOCOMOTIVE BOILER.

No. 393,790.

Patented Dec. 4, 1888.



WITNESSES:

Chas. N. Aa.
C. Sedgwick.

INVENTOR:

C. S. Smith.
BY *Munn & Co.*

ATTORNEYS.

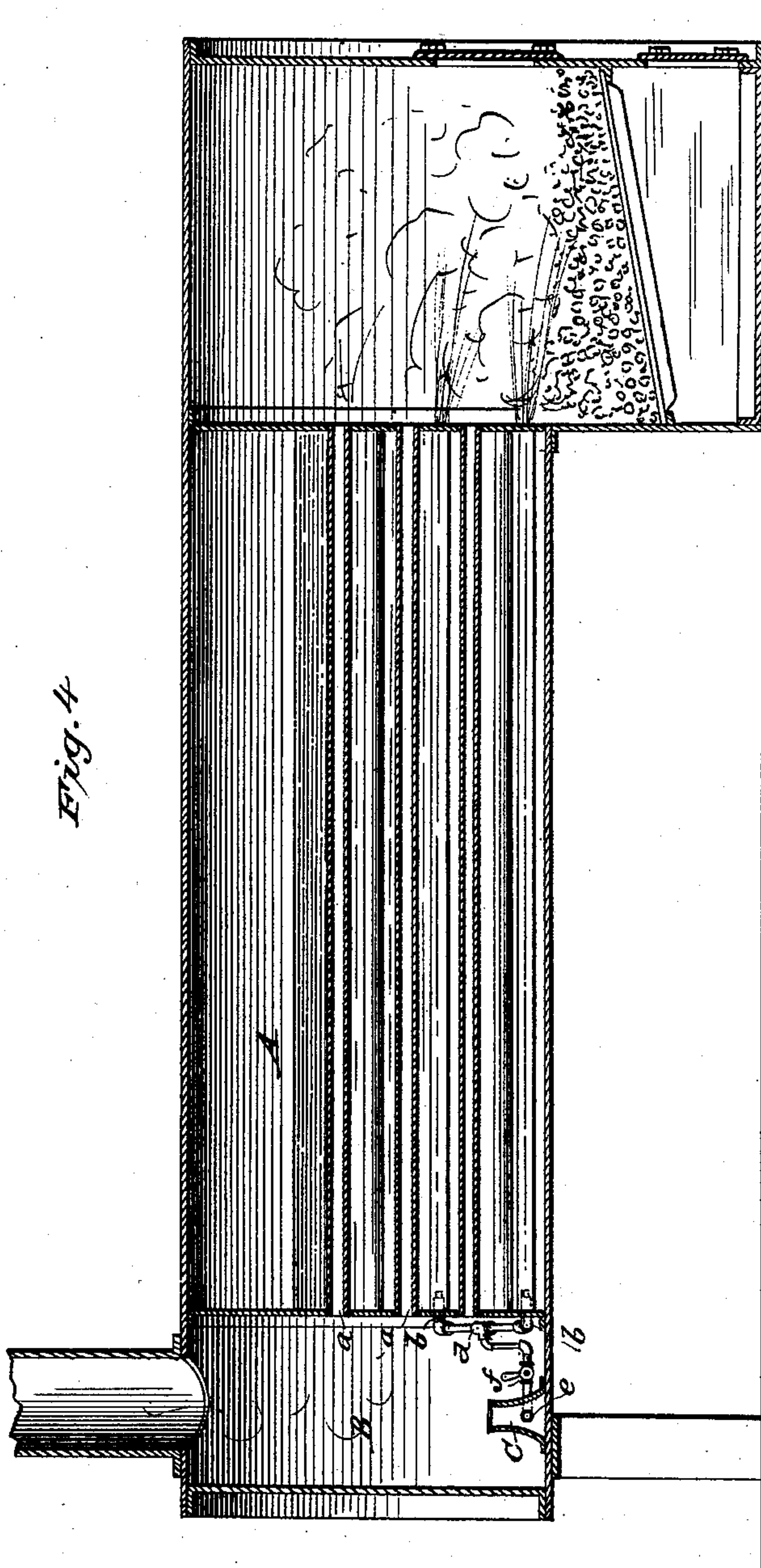
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E. Edgewood

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UNITED STATES PATENT OFFICE.

CHARLES S. SMITH, OF POCATELLO, IDAHO TERRITORY.

LOCOMOTIVE-BOILER.

SPECIFICATION forming part of Letters Patent No. 393,790, dated December 4, 1888.

Application filed January 7, 1888. Serial No. 260,049. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. SMITH, of Pocatello, in the county of Bingham and Territory of Idaho, have invented new and useful Improvements in Locomotive-Boilers, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a perspective view, with parts broken away, of a locomotive-boiler to which my improvement has been applied. Fig. 2 is a vertical transverse section of one of the exhaust-nozzles, showing the connection of one of the pipes; and Fig. 3 is a longitudinal section of one end of one of the boiler-tubes. Fig. 4 is a central longitudinal section of a boiler and its furnace or fire-box provided with my improvement.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to provide an attachment for locomotive and other boilers in which the draft is urged by the exhaust of the engine, whereby a portion of the exhaust-steam may be utilized in the boiler-furnace for completing the combustion of the fuel and for preventing the escape of sparks and cinders.

My invention consists in the construction and arrangement of parts, as will be hereinafter fully described and claimed.

The boiler A, which is of the usual locomotive type, is provided with the tubes *a* and with a smoke-box, B, in which are placed the ordinary exhaust-nozzles, C C. With two of the tubes *a* on each side of the boiler are connected short pipes *b*, which are preferably smaller in diameter than the boiler-tubes, the said pipes *b* being fitted to the ends of the boiler-tubes by bushings *c*. The pipes *b* upon each side of the boiler are connected with T's *d*, which in turn are connected by the pipes *e* with the nozzles C at points near the bases of the nozzles. Each of the pipes *e* is provided with a valve, *f*, of any suitable construction, by which the amount of steam passing from the nozzles C through the said pipes is controlled.

Although I have shown four pipes *b* entering four of the tubes *a* of the boiler and com-

municating with the exhaust-nozzles, I do not confine myself to any particular number of pipes, nor to any special location, providing only that the pipes *b* communicate with the tubes *a*, which are above the coals in the fire-box of the locomotive.

The location of the pipes *e* with reference to the nozzles C is such as to cause some of the exhaust-steam to escape through the pipes *e* to the tubes *a*, and the said steam in passing through the tubes becomes heated to the temperature of the water in the boiler and is discharged into the fire-box of the locomotive in a highly-heated state. The heated steam entering the fire-box from the tubes *a* is decomposed by the flame and burns, thus supplementing the heating-power of the coal upon the grate.

In addition to the advantage of perfecting the combustion of the gases from the coal, the puffs of the exhaust-steam entering the fire-box cause the sparks and cinders to fall back and prevent them from passing into or through the tubes. By returning to the fire the fuel, which naturally escapes in the form of cinders and sparks, and by completing the combustion of the gases, I am enabled to effect a saving of about twenty per cent. in the amount of coal required to drive the locomotive.

It will be observed that when the steam is shut off from the engine my apparatus becomes inoperative without any manipulation other than is necessary to the usual working of the locomotive, and that my device becomes more effective in proportion as the engine is doing an increased amount of work.

While my improvement finds its principal application on locomotive-engines, it is equally beneficial and effective upon any boiler in which the draft is urged by the exhaust-steam of the engine.

I am aware that pipes have been extended from a cinder-receptacle within the smoke-stack through the boiler to the fire-box, steam-pipes being connected with said pipes within the smoke-box, and with the exhaust-nozzles to blow the cinders back from the smoke-box into the fire-box, and I do not claim the same as of my invention.

I am also aware that it is not broadly new

to connect the exhaust in a locomotive smoke-box with the discharge end of some of the boiler-flues.

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

The combination, with the locomotive-boiler A, provided with the tubes *a*, smoke-box B, and exhaust-nozzles C, of the pipes *b*, inserted

in the tubes *a* and connected with the T's *d*, and the pipes *e*, communicating between the T's *d* and nozzles C and provided with the valves *f*, substantially as specified. 10

CHARLES S. SMITH.

Witnesses:

C. SEDGWICK,

GEO. M. HOPKINS.