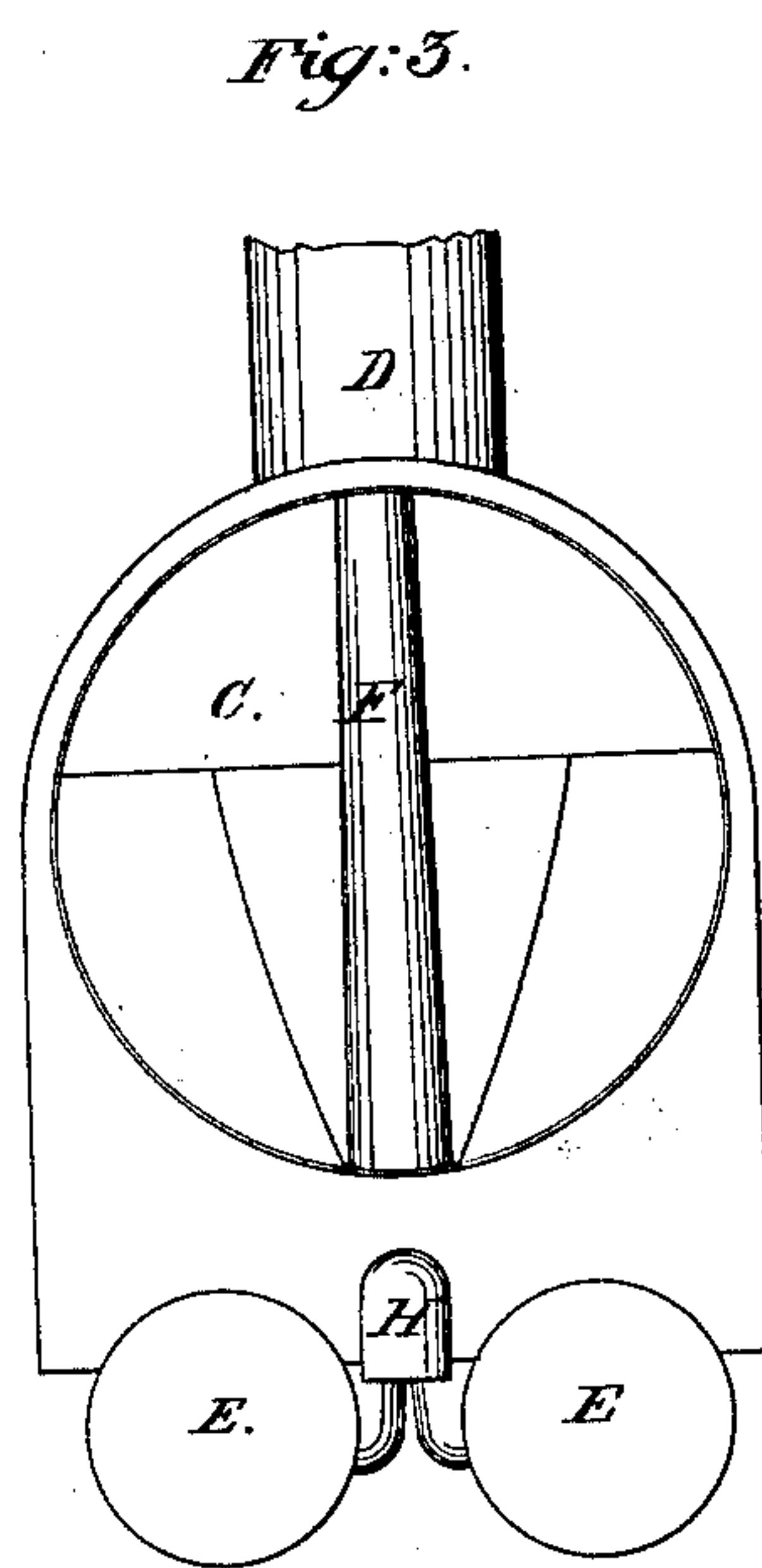
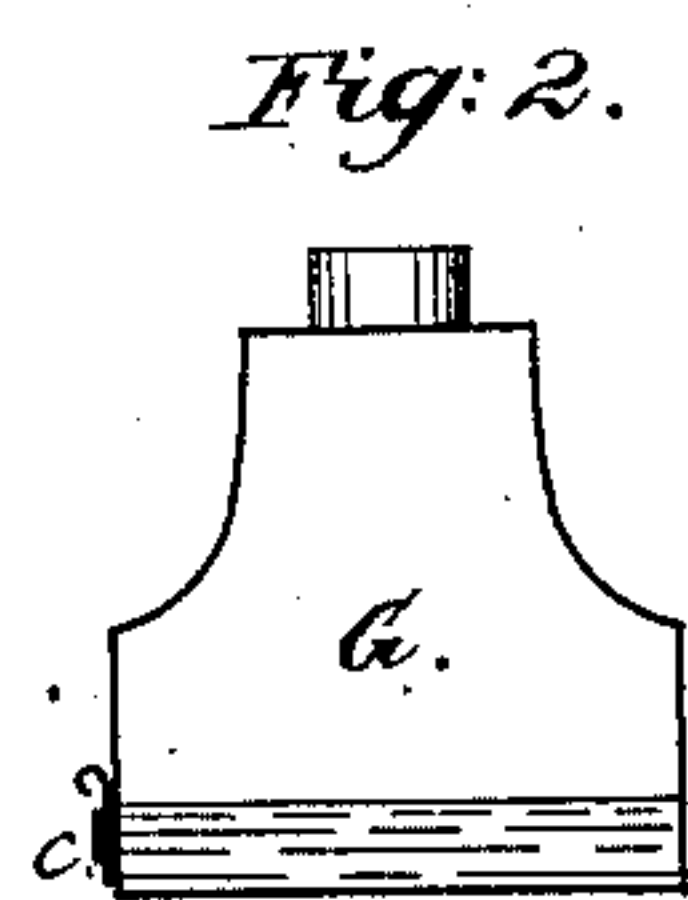
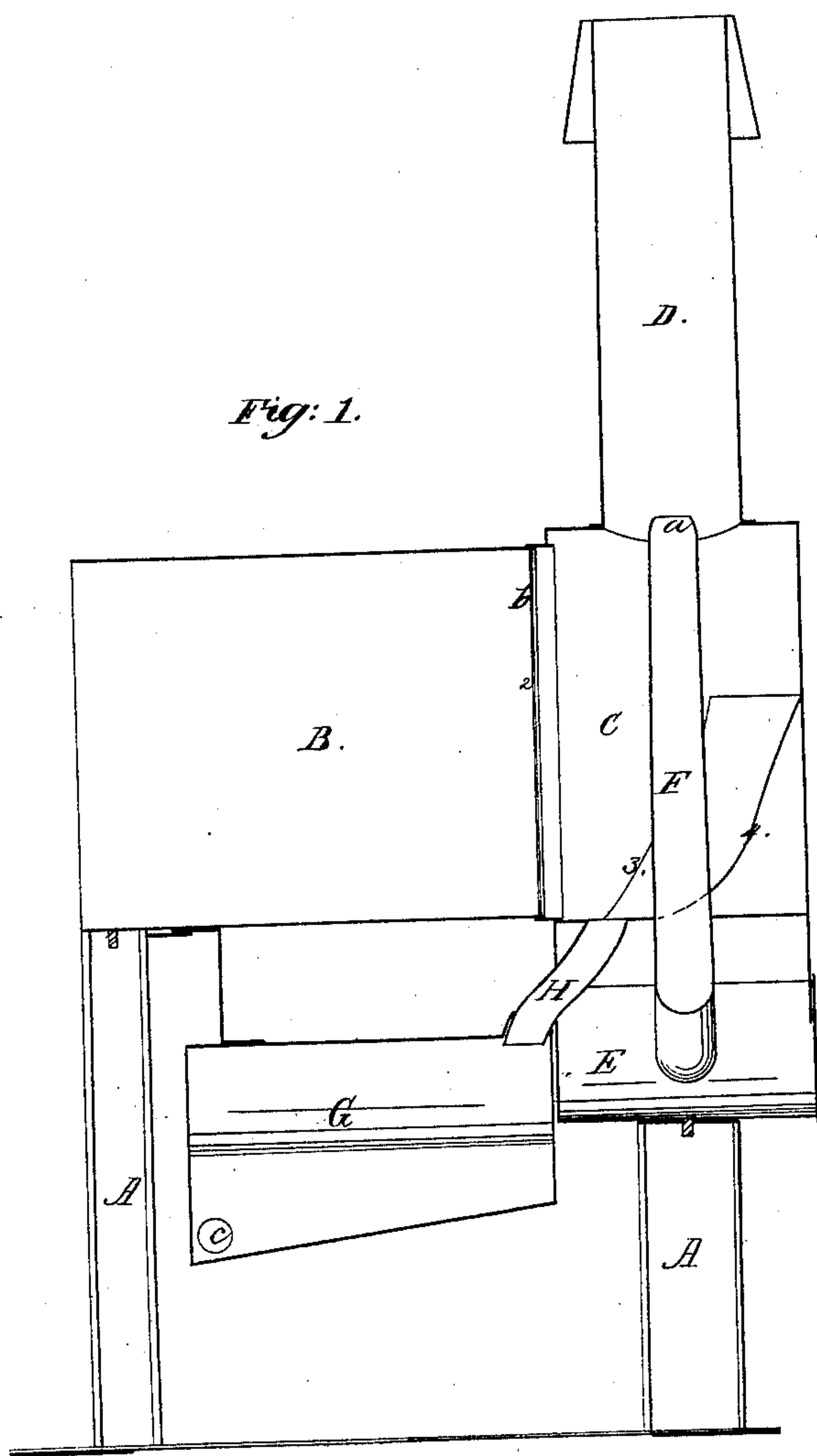


*W. H. Bullock,*  
*Spark Arrester,*  
*No. 18,953,* *Patented Dec. 29, 1857.*



# UNITED STATES PATENT OFFICE.

WM. H. BULLOCK, OF BOSTON, MASSACHUSETTS.

## ARRANGEMENT OF DEFLECTING-PLATES AND SPARK-RECEIVERS IN LOCOMOTIVES.

Specification of Letters Patent No. 18,953, dated December 29, 1857.

*To all whom it may concern:*

Be it known that I, WM. H. BULLOCK, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Arrangement of Deflecting-Plates and Spark-Receivers for Locomotive-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a longitudinal vertical section through the smoke arch and part of the boiler of a locomotive. Fig. 2, detail to be referred to. Fig. 3, a view of the interior of the smoke arch.

In coal burning locomotive engines as at present constructed, the orifice of the blast pipe does not rise far above the bottom of the smoke arch, or at least not above the middle rows of the boiler tubes where they outlet into the smoke arch; this causes an unequal draft through the boiler tubes wearing out some of them sooner than others, and the larger proportion of the lighter cinders and ashes which are drawn through the tubes is projected by the blast up the chimney at the top of which they are arrested by the bonnet and fall into a casing which surrounds the chimney for this purpose, while the heavier portions fall to the bottom of the smoke arch from which they have to be frequently removed to prevent their clogging the lower rows of the boiler tubes.

To remedy these defects is the object of my present invention which consists in carrying up the orifice of the blast pipe above the outlet of the upper row of boiler tubes by which means the draft through the tubes is equalized and the greater portions of the cinders and ashes which are drawn through the tubes are allowed to fall into the smoke arch from which they are conducted to a reservoir placed in any convenient position (say beneath the boiler) for their reception.

To enable others skilled in the art to understand and use my invention I will proceed to describe the manner in which I have carried out the same.

In the drawings are shown the parts of a locomotive to which my invention refers.

A, is a frame which supports the parts but which has no reference to my invention.

B, is a portion of the boiler; C the smoke arch from which rises the chimney D; E the cylinders from which the exhaust pipes lead

to the central blast pipe F; this pipe passes up through the bottom of the smoke arch and is continued up to such a height that its orifice shall be above the upper row of boiler tubes somewhat in the manner of the English high blast pipe; (in practice I have found it convenient to carry it up to the throat of the chimney at *a*).

*b*, is the tube plate the upper row outletting into the smoke arch at 2.

Beneath the boiler and to the rear of the cylinders is suspended a reservoir G, (a cross section of which is shown at Fig. 2). This is provided with an outlet *c* by which it may be emptied, and communicates with the bottom of the smoke arch by means of the bent pipe H, which enters the arch immediately in front of the tube plate, the front of the smoke arch or that part farthest from the tube plate is banked or built up as indicated by the curved lines 3 and 4, and as shown shaded in Fig. 3. This backing inclines from all sides to the orifice of the pipe H, so that any cinders or ashes that may be drawn through the boiler tubes and fall into the smoke arch will be conducted by the inclined surface into the pipe H, and through it to the reservoir G from which they may be removed at any convenient time, the smoke arch never becoming clogged up so as to interfere with the draft of any of the lower tubes.

I do not confine myself to the exact position or form of the reservoir G, as it is only requisite that it be so placed that whatever falls into the smoke arch may be conducted into it.

As only the lighter particles are carried up the chimney when the blast pipe is arranged as above described, I am enabled to dispense with the cumbersome cone bonnet and casing which are usually attached to and surround the smoke pipe of a locomotive, and thus improve the natural draft; and by equalizing the draft through the boiler tubes, the destruction of some of the tubes before others are much worn, is avoided, and a more regular and uniform heating of the water throughout the boiler is obtained. I am also enabled to use a much larger orifice to the blast pipe than when a short pipe is employed, as the draft being more equal through the tubes does not need to be so rapid, and with a larger orifice I obtain a better exhaust, but I would not be



enabled to use such a height of blast pipe without the arrangement described for freeing the smoke arch.

I have spoken of my improvements as applied to locomotives, but it is evident that they may be applied to any boilers where the exhaust or blast pipe is carried into the smoke arch. Another advantage I may enumerate is that I obtain a much cleaner working engine than with a short blast pipe, as but little dirt is thrown out of the top of the chimney to fall upon the train.

I am aware that a high blast pipe has been used but it is found that it is not practicable

in coal burning engines as now constructed without a means substantially such as above described for freeing the smoke arch. Therefore I do not claim the high or elongated blast pipe, but

What I claim as my invention and desire to secure by Letters Patent is—

The reservoir G, in connection with the elongated blast pipe F, substantially as set forth.

WM. H. BULLOCK.

Witnesses:

THOS. R. ROACH,  
P. E. TESCHEMACHER.