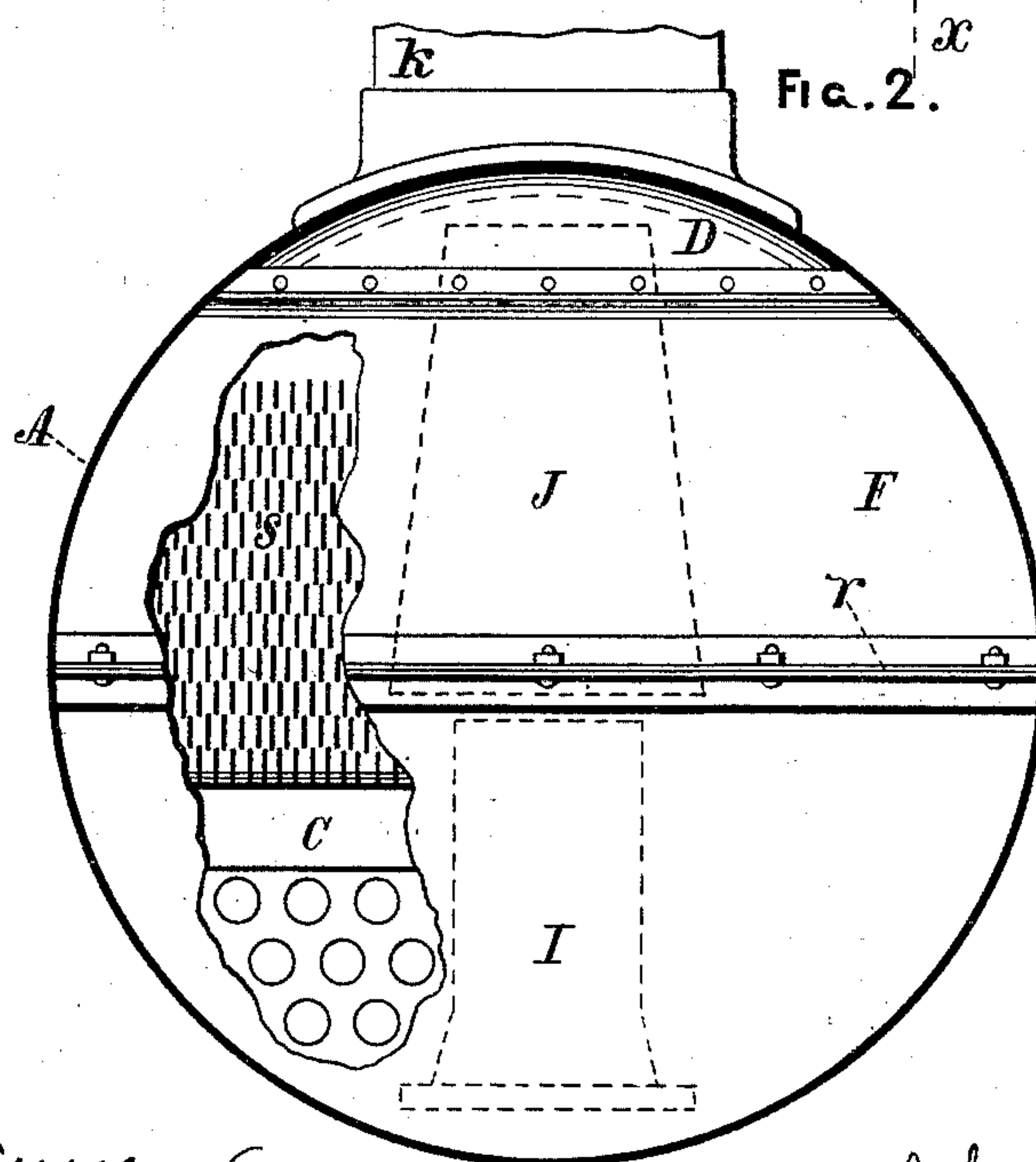
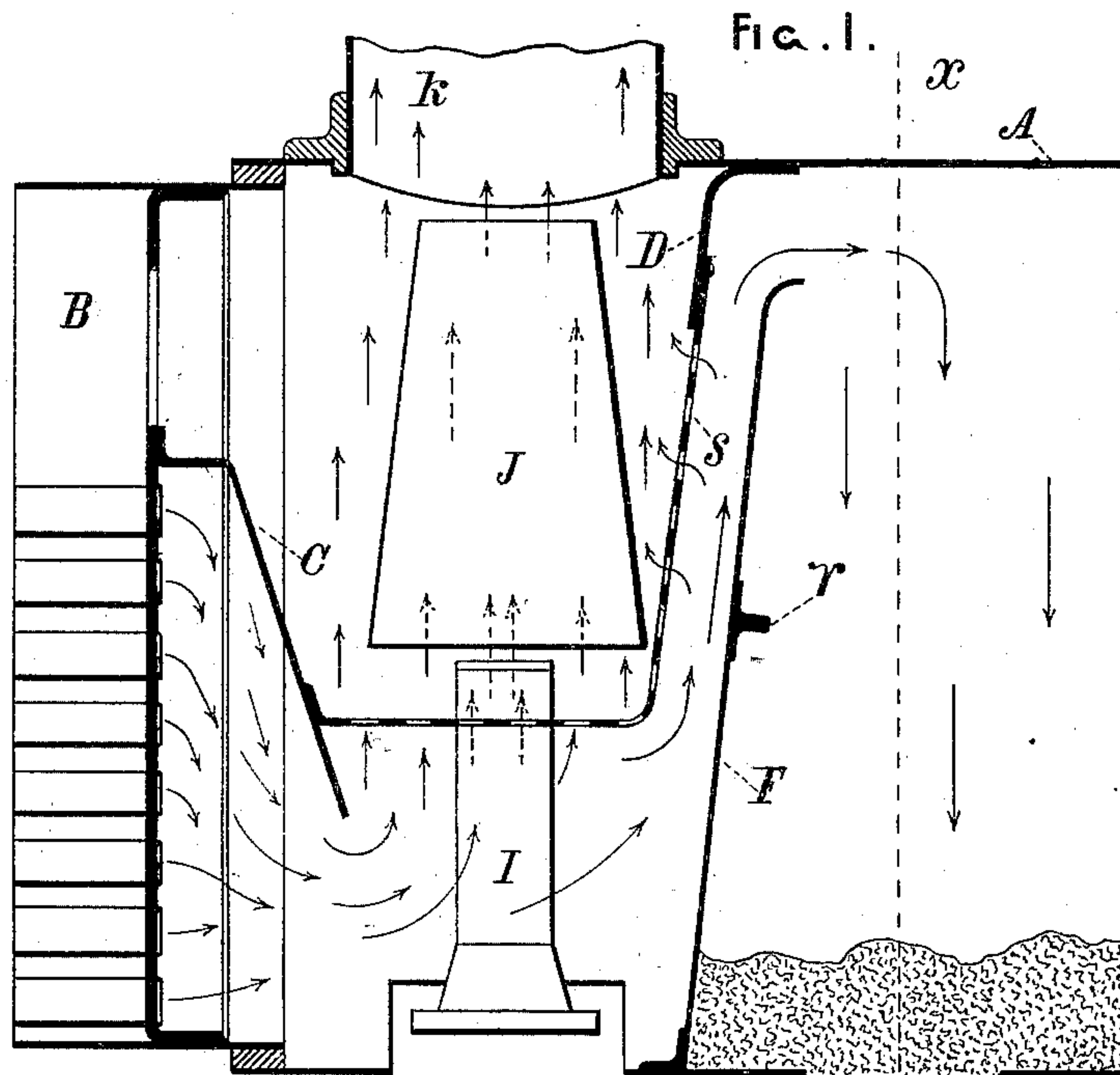


(No Model.)

J. B. BARNES.
SPARK ARRESTER.

No. 409,344.

Patented Aug. 20, 1889.



WITNESSES:

W. H. Miller
J. H. Cutting

INVENTOR

Joshua B. Barnes
BY *F. S. Davenport*

ATTORNEY

UNITED STATES PATENT OFFICE.

JOSHUA B. BARNES, OF SPRINGFIELD, ILLINOIS.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 409,344, dated August 20, 1889.

Application filed July 8, 1889. Serial No. 316,852. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA B. BARNES, of Springfield, in the county of Sangamon and State of Illinois, have invented a new and Improved Spark-Arrester; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an improvement in spark-arresters for locomotive and other boilers. The object of my invention is to render the draft in the smoke-box stronger in the lower part thereof than in the upper part, and thus arrest more effectively than by the means heretofore employed the solid products of the combustion of soft coal or other fuel requiring special means for the retention of the sparks in the smoke-box or that part of the latter usually termed the "ash-bin."

The improved effectiveness of my device results from a peculiar combination and novel positional relation to each other of the several parts usually employed for arresting the sparks in the smoke-box of a locomotive-boiler. By making the draft stronger in the lower half of the smoke-box I accomplish at once the equivalent of two very desirable features in a locomotive-boiler—namely, a lengthening of the smoke-stack and a reduction in the capacity of that part of the smoke-box which is separated from the ash-bin.

The details and combination of parts upon which the efficiency of my invention depends are fully explained in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a side sectional view of the flue end of the boiler and smoke-box, taken in the line of their axes, but showing the exhaust-pipes and petticoat-pipe in full. Fig. 2 is a front end view of the smoke-box, taken in the line $x x$, showing the interior arrangement of deflectors and screen.

Referring to the drawings, A represents the smoke-box; k , the smoke-stack; B, the flue end of the boiler; C, a baffling-plate of the ordinary form secured to the upper part of the flue-plate, and F an inclined partition which converts the forward part of the smoke-box into an ash-bin. To the lower edge of said

baffling-plate is secured the rear edge of a screen S, reaching horizontally across the smoke-box from side to side thereof, and extending also horizontally forward beyond the exhaust-pipes I to a distance about as shown in Fig. 1, where it is turned up at an angle from the vertical slightly greater than that of the partition F, so as to make the space between the latter and the inclined part of the screen somewhat narrower toward the top.

Through an aperture near the center of the horizontal part of the screen project vertically the exhaust-pipes I, a little above the nozzles of which is the lower opening of a large petticoat or lifting pipe J, said lower opening being sufficiently large to reach nearly from front to rear of the horizontal part of the screen, and the length of the petticoat-pipe is such that it reaches upward nearly to the base of the smoke-stack. (See Fig. 1.)

To the upper edge of the upturned part of the screen is joined an imperforated deflector D, the upper part of which is curved forward and secured to the upper part of the smoke-box.

For the purpose of providing easy access to the screen for cleaning or repairs, the partition F is made in two parts, the lower one secured permanently in position and calked so as to be air-tight all around the curved edge, and the upper one removable at the joint r by the withdrawal of the bolts by which it is secured in position. The upper edge of said removable part is curved forward in order to assist in conducting the sparks into the ash-bin and prevent the possibility of their return.

For the purpose of emptying the ash-bin it is provided in the bottom with an opening closed by a sliding or other convenient form of door.

It will be observed that the lower part of the petticoat-pipe reaches down into the lower half of the smoke-box some distance below the center of the latter. The object of this prolongation of the petticoat-pipe is twofold—namely, to set up the induced draft where it can be employed most effectively (that is, near the lower edge of the baffling-plate C in the lower part of the smoke-box) and to direct the induced draft thus set up

into the smoke-stack in a direction as nearly as possible coincident or parallel with the induced current set up and projected into the smoke-stack outside of the petticoat-pipe, so as to avoid interference of the two annular currents one with the other, and by directing both currents nearly vertically into the stack add the effect of one to that of the other. By the employment of a much longer petticoat-pipe than heretofore used I combine the advantage of a large base area with a near approach to parallelism in the two induced currents, one of which is set up between the exhaust-pipes and the petticoat-pipe and the other between the outside of the petticoat-pipe and the screen and walls by which it is surrounded, causing a strong upward draft between the upturned part of the screen and the partition F; and, further, by confining the cinders and sparks within a broad and shallow space in their ascent in front of the upturned part of the screen they are brought within reach of the draft where it is strongest, and consequently most effective in giving to them that momentum by which they are projected beyond the junction of the screen with the deflector D against the curved part of the latter, and thence into the ash-bin. This is an important feature of my device, and one to which, in view of its well-tested effectiveness, I attach much value, as it enables me to project into the ash-bin the smaller and lighter portion of those solid products of combustion so copiously produced by soft coal and some other kinds of fuel frequently used, and therefore attended with more or less fire-throwing.

The course of the products of combustion as they issue from the flues is indicated in the drawings by arrows—the gaseous products by

short arrows and the solid products by long ones.

I am well aware that the baffling-plate C and likewise the inclined partition F, separately considered, are not new, and therefore I do not claim them as such.

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

In a smoke-box of a locomotive or other boiler provided with one or more blast or exhaust pipes, a baffling-plate C, and a transverse partition F, the combination, with said parts, of a screen S, the rear and lower part thereof encircling the exhaust-pipes and located horizontally in the lower part of the smoke-box near the lower edge of the baffling-plate and secured thereto, the forward part being turned upward a little way rearward of the partition F at an inclination nearly coincident therewith, a curved deflector D, secured to the upper part of the smoke-box and joined to the upper edge of the screen S, and a petticoat-pipe reaching down from a little below the base of the smoke-stack to a plane a little above the exhaust-nozzles, the latter projecting vertically through the central portion of the horizontal part of the screen, all of said parts constructed and positionally located with reference to each other for co-operative effect, substantially in the manner and for the purpose herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of April, 1889.

JOSHUA B. BARNES.

Witnesses:

C. F. LAPE,
S. W. JEFFERY.