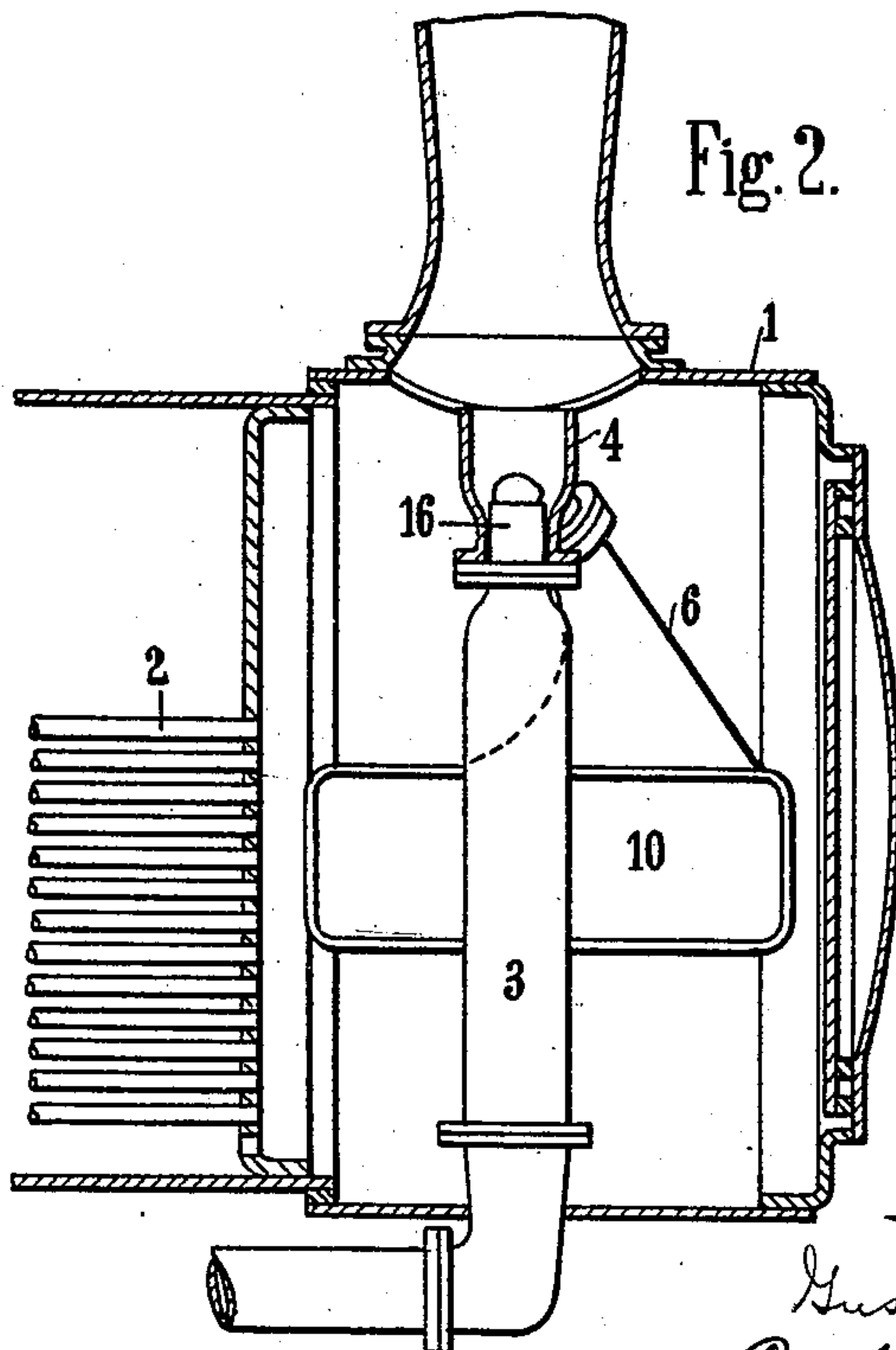
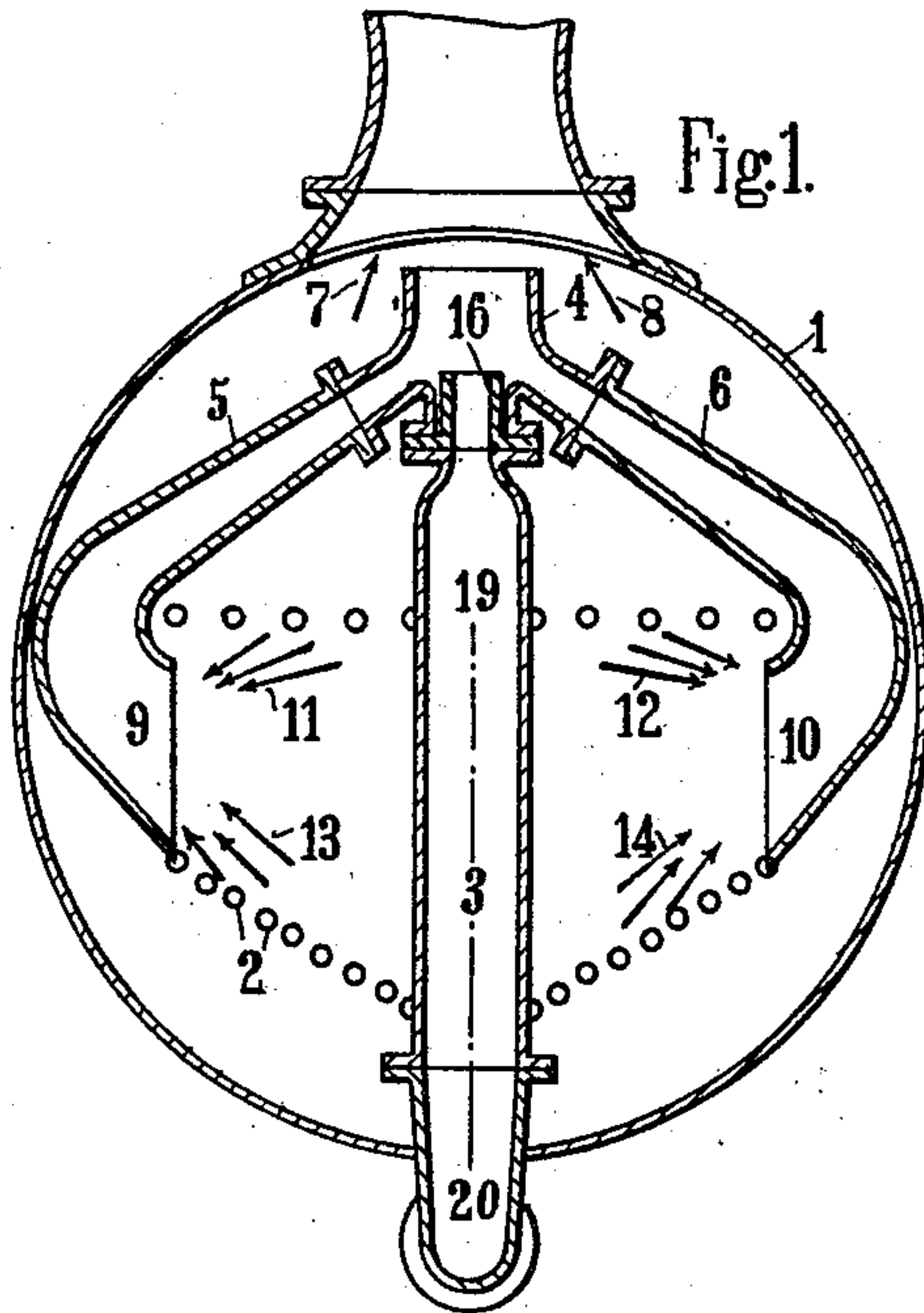


No. 886,590.

PATENTED MAY 5, 1908.

G. ELBEL.
BLAST OR EXHAUST APPARATUS.
APPLICATION FILED OCT. 23, 1907.



Witnesses;
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11/14/08

UNITED STATES PATENT OFFICE.

GUSTAV ELBEL, OF ERFURT, GERMANY.

BLAST OR EXHAUST APPARATUS.

No. 886,590.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed October 23, 1907. Serial No. 398,766.

To all whom it may concern:

Be it known that I, GUSTAV ELBEL, a subject of the German Emperor, and residing at Erfurt, in the Kingdom of Prussia and the Empire of Germany, have invented certain new and useful Improvements in Blast or Exhaust Apparatus, of which the following is a specification.

The present invention relates to locomotive and other boilers and has for its object blast or exhaust apparatus for use in connection with the same as means for inducing and maintaining the draft through the combustion-chamber and flues.

An important object is to prevent the escape of sparks from the smoke-stack.

To this end the said invention consists in the novel construction, combination and arrangement of parts hereinafter fully described, and pointed out in the claim.

In the accompanying drawing, Figure 1 is a vertical transverse section through the smoke-box of a locomotive-boiler and Fig. 2 is a longitudinal vertical section through the front end of a locomotive-boiler, showing the exhaust apparatus containing my improvements.

1 is the smoke-box into which the fire-tubes 2 open. The exhaust-steam pipe 3 extends into the smoke-box 1 and is connected to the exhaust-nozzle 16 and to the nozzle 4, said nozzle 4 being of such dimensions that an annular passage is formed between the nozzle 4 and the base of the smoke-stack. From said nozzle 4 suction or exhaust-pipes 5, 6 branch off and open into the smoke-box as far as possible from the axis of the boiler. As shown in Fig. 2 the exhaust-pipes 5, 6 are enlarged at their openings 9, 10 which occupy almost the entire length of the smoke-box. The entire openings 9, 10 of the exhaust-pipes 5, 6 are situated lower than the uppermost series of the fire-tubes 2.

The manner in which the apparatus in accordance with the present invention operates is as follows:—The steam which passes through the exhaust-pipe 3 and the nozzle 16 sucks the sparks and lighter products of combustion, which pass through the tubes 2, into the smoke-box, and at 9, 10 into the exhaust-pipes 5, 6. A part of the sparks and

lighter products of combustion pass from the lower tubes 2 upwards in the direction of the arrows 13, 14 and from the upper tubes downwards in the direction of the arrows 11, 12 to the openings 9, 10. At the same time the steam which passes through the nozzle 4 sucks another part of the sparks and lighter products of combustion, which pass through the upper tubes 2, upwards, so that they are compelled to move in the direction of the arrows 7, 8 into the smoke-stack. Thus one part of the gases which pass through the upper tubes is directed downwards in the direction of the arrows 11, 12 and another part is directed upwards in the direction of the arrows 7, 8. Therefore a flow of gas directed upwards is formed, and one directed downwards, and between these streams in opposite directions there is a horizontal quiet or neutral layer of gas about at the uppermost series or row of tubes. At the same time there are flows of exhaust gases in opposite directions towards the openings 9, 10 and between the latter there is a vertical quiet layer of gas about in the line 19, 20. These two layers of gas calm the gases in the smoke-box and thus prevent the escape of sparks.

I claim:—

In apparatus of the type described, the combination of a smoke-box having fire-tubes opening into the box and having an exhaust-steam pipe extending into the box, a pair of nozzles attached concentrically to the end of said pipe, the outer of said nozzles being of such dimensions that an annular passage is formed between said nozzle and the base of the smoke-stack, and a pair of suction-pipes communicating with the outer nozzle and having mouths directed inwardly and opening into the smoke-box, the entire openings of said suction-pipes being situated lower than the uppermost series of the fire-tubes opening into the smoke-box, for the purpose specified.

The foregoing specification signed at Weimar this seventeenth day of September, 1907.

GUSTAV ELBEL.

In presence of—

JOHANNUS L. ELEMANN,
LEOPOLD AMAND.