

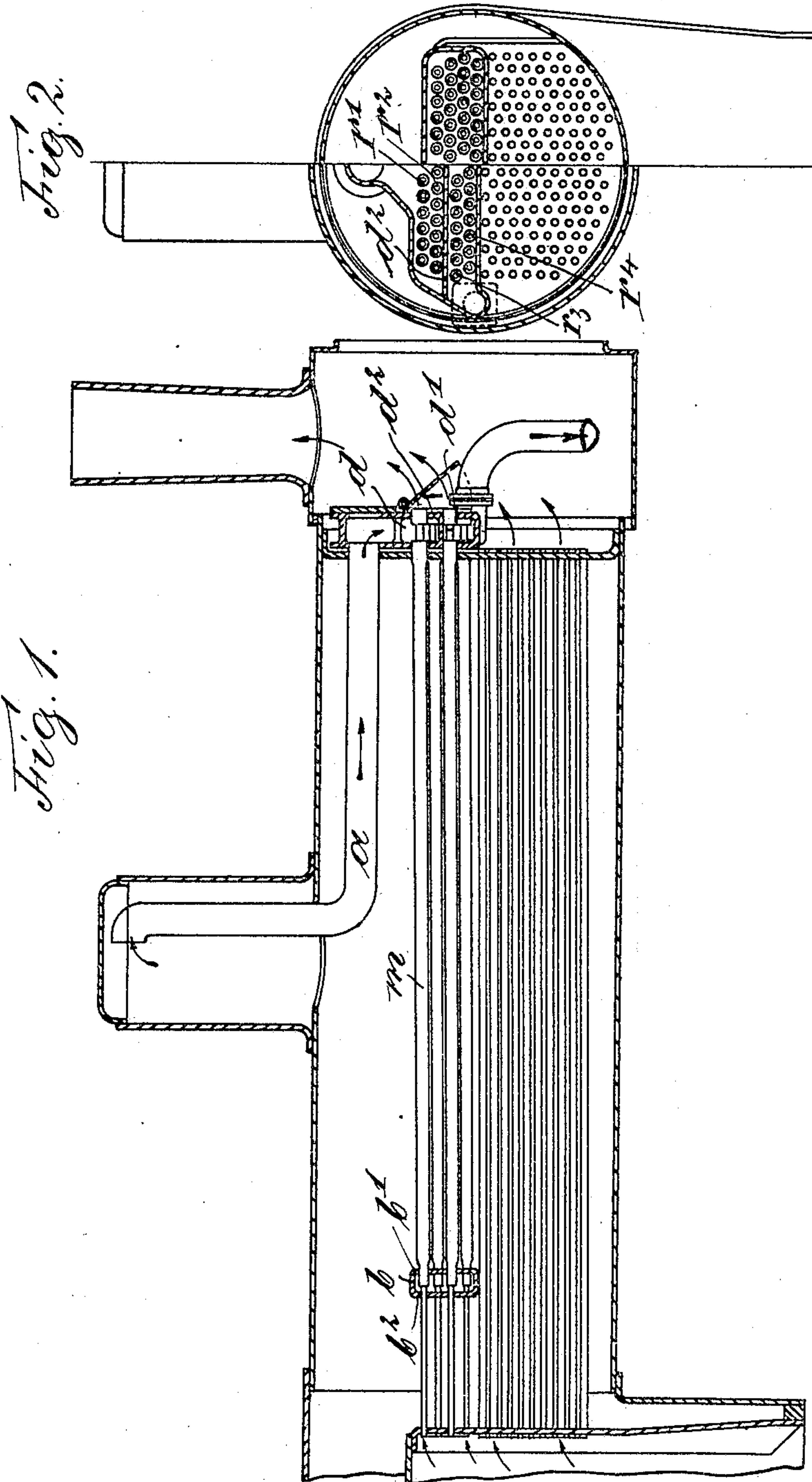
No. 788,170.

PATENTED APR. 25, 1905.

W. SCHMIDT.
SUPERHEATER FOR FLUE BOILERS.

APPLICATION FILED NOV. 21, 1904.

2 SHEETS—SHEET 1.



Witnesses:
Emil Kayser.
Paul Wallenberg.

Inventor
Wilhelm Schmidt
by *[Signature]*
Attorneys

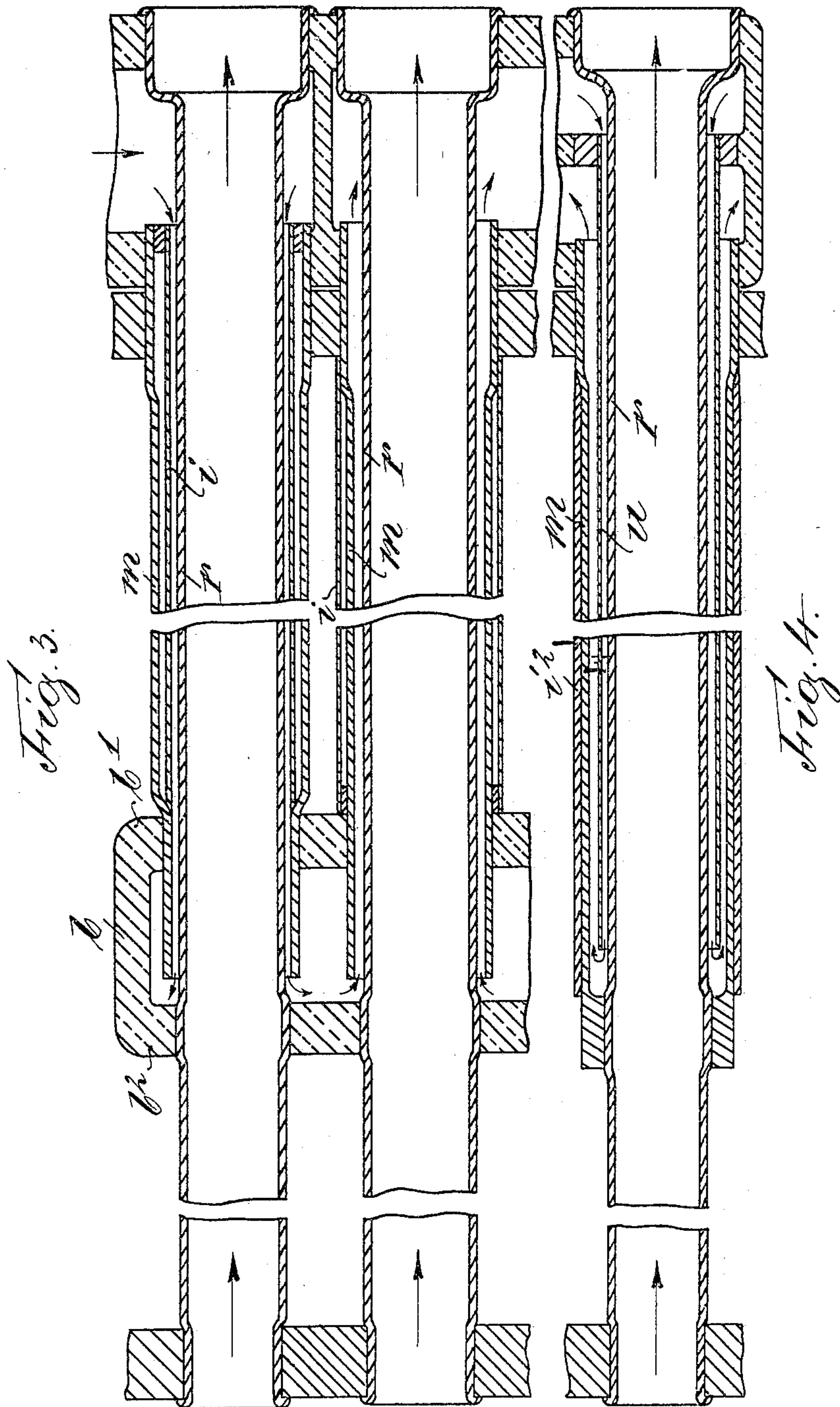
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Wilhelm Schmidt
by: *Robert M. Pfeiffer*
Attorneys.

UNITED STATES PATENT OFFICE.

WILHELM SCHMIDT, OF WILHELMSHÖHE, NEAR CASSEL, GERMANY.

SUPERHEATER FOR FLUE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 788,170, dated April 25, 1905.

Application filed November 21, 1904. Serial No. 233,646.

To all whom it may concern:

Be it known that I, WILHELM SCHMIDT, a subject of the King of Prussia, German Emperor, and a resident of Wilhelmsöhe, near Cassel, in the Province of Hesse-Nassau, German Empire, have invented certain new and useful Improvements in Mantle-Tube Superheaters for Flue-Boilers, of which the following is an exact specification.

My invention relates to flue-boilers in which the superheater is formed by a number of boiler-flues and by surrounding these flues on part of their length by mantle-tubes, thereby creating between the mantle-tubes and their flues annular spaces which are used for superheating the steam.

The main feature of the invention now consists therein that these mantle-tubes are provided with secondary concentrically-placed tubes, so as to insulate the steam in the tubes. The annular space within the heat-insulating double-mantle tube is provided with a stationary layer of steam, air, or water highly suitable as insulating layer. This annular space is perfectly closed, so that any movement in the interior of the insulator is practically avoided.

In order to make my invention more clear, I refer to the accompanying drawings, in which—

Figure 1 shows a locomotive or locomobile boiler fitted out with a superheater according to my present invention. Fig. 2 shows a side view of the superheater and boiler. Figs. 3 and 4 show detail views of superheater-flues.

In Fig. 1, d d' are chambers arranged at the back wall of the flues, the chambers being separated from each other by a partition d^2 . a is the tube leading the steam to be superheated from the steam-dome to the chamber d . m represents heat-insulating mantle-tubes surrounding the four upper rows r' r^2 r^3 r^4 of the boiler-flues. b is a chamber to the wall b' of which the left-hand ends of the mantle-tubes m are tightly secured, whereas the wall b^2 of this chamber is firmly connected to the flues.

In the uppermost superheater mantle-tube of Fig. 3 a secondary tube i is concentrically

placed and firmly connected to m at both ends, so as to form between i and m an annular space which may be filled with steam, air, or water, thereby obtaining a heat-insulating double mantle-tube m i . In the lower arrangement of Fig. 3 the secondary tube i is concentrically placed around mantle-tube m and fastened to the latter at both ends, thereby creating a more or less closed heat-insulating annular space between the outside tube i and the inner tube m .

The operation is as follows: The steam to be superheated enters, through pipe a , chamber d , flows between the heat-insulating double mantle-tube i m and the flue r , Fig. 3, to the left, enters chamber b , passes over, as indicated by arrows, into the annular space between the double mantle-tube i m and flue r , Fig. 3, then moves to the right in the same direction as the heating gases flowing through the flue, and enters, now superheated, the chamber d , from where the steam can be led off to its place of destination. In Fig. 3 the steam first flows in counter-current to the heating gases through the upper tube, thereby being dried, and is then moved in equal current to the heating gases through the lower tube, thereby being superheated, the double tubes i m preventing the boiler-water from cooling the steam to be superheated.

In Fig. 4, i^2 is a heat-insulating layer, and u a concentric tube creating return-channels.

Having thus fully described the nature of my invention, what I desire to secure by Letters Patent of the United States is—

1. In a superheater for flue-boilers, the combination with the boiler-body proper, of a plurality of flues, some of them being concentrically surrounded by two tubes so as to form heat-insulated spaces between the flues and the mantle-tubes, means for leading the steam to be superheated through the annular spaces between the flues and the mantle-tube, for the purpose as set forth.

2. In a superheater for flue-boilers, the combination with the boiler-body proper, of a plurality of flues, some of them being concentrically surrounded by two tubes tightly placed upon each other, one of both consist-

ing of heat-insulating material, and means
for leading steam to be superheated through
the annular space between the flues and the
mantle-tubes, substantially as described and
5 for the purpose set forth.

3. In a superheater for flue-boilers, the
combination with the boiler-body proper, of
a plurality of flues, some of them being con-
centrically surrounded by two tubes tightly
10 placed upon each other, one of both consist-
ing of heat-insulating material, a partition
arranged within the annular spaces between

the flues and the mantle-tubes, so as to cre-
ate return-channels, and means for leading
the steam to be superheated through these 15
return-channels, substantially as described
and for the purpose set forth.

In witness whereof I have hereunto set my
hand in the presence of two witnesses.

WILHELM SCHMIDT.

Witnesses:

GUSTAV HENKE,
JULIUS FRANKE.