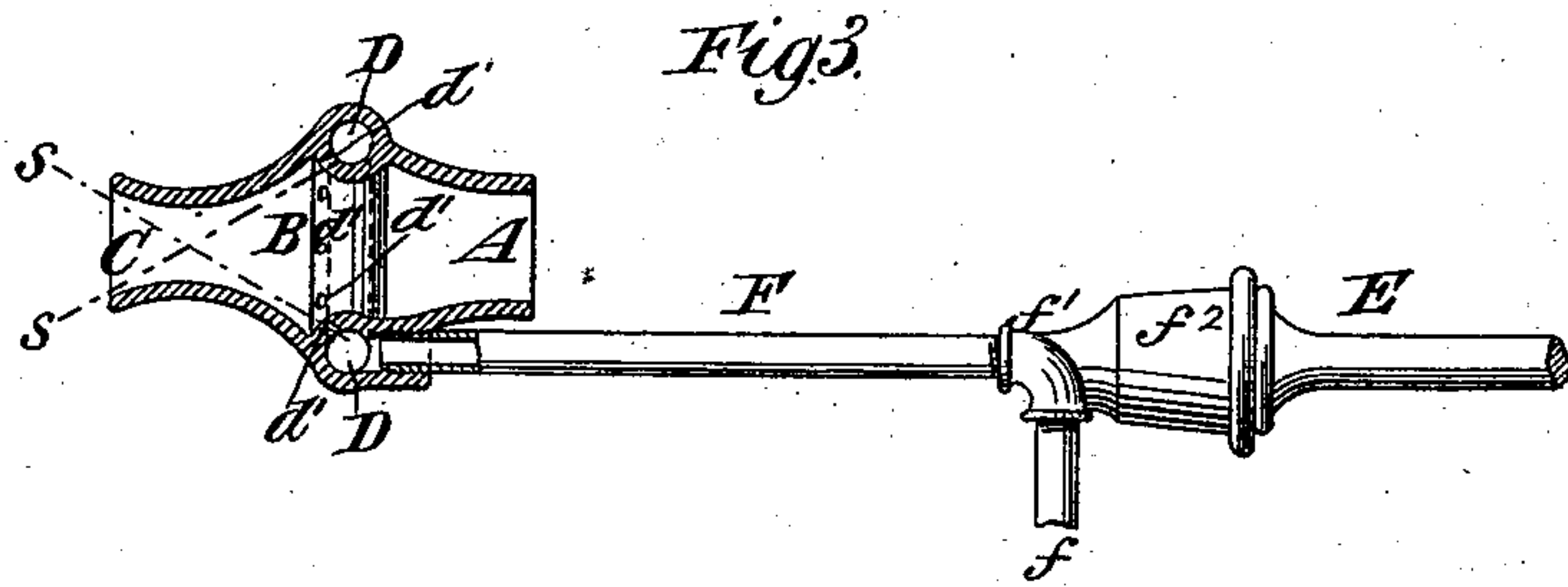
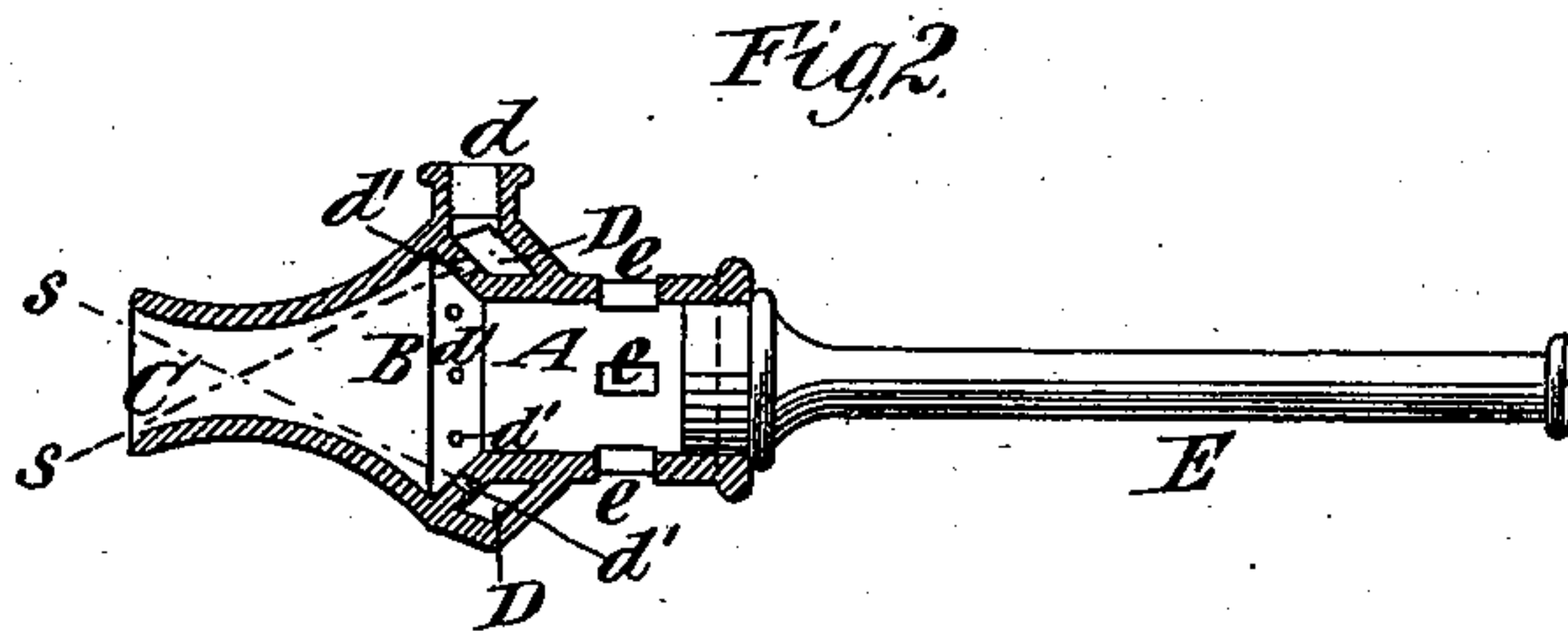
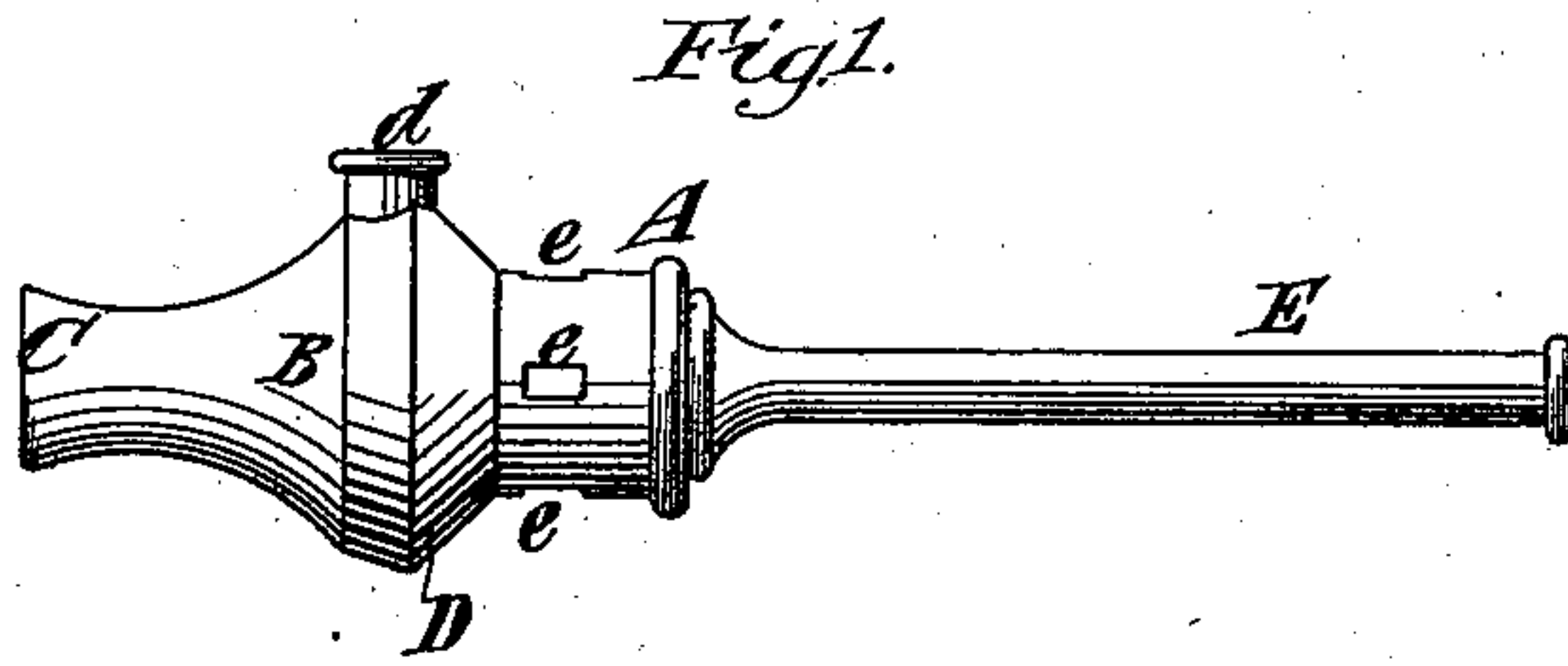


(No Model.)

P. H. GRIMM.  
STEAM BOILER TUBE CLEANER.

No. 376,820.

Patented Jan. 24, 1888.



Witnesses:

O. Sundgren.  
Emil Herter.

Inventor:

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by his atty  
Brown & Hall.

# UNITED STATES PATENT OFFICE.

PAUL H. GRIMM, OF GLEN COVE, NEW YORK, ASSIGNOR OF ONE-HALF  
TO JOHN DURYEA, OF SAME PLACE.

## STEAM-BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 376,820, dated January 24, 1888.

Application filed April 11, 1887. Serial No. 234,327. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL H. GRIMM, of Glen Cove, in the county of Queens and State of New York, have invented a new and useful Improvement in Steam-Boiler-Tube Cleaners, of which the following is a specification.

My invention relates to that class of boiler-tube cleaners in which a current or currents of steam is or are employed to induce a blast or flow of air through the boiler-tube in order to remove therefrom the deposits; and the object of my invention is to provide a device which may be made and sold at a small price, and which comprises within itself a complete injecting device, so that whatever be the size of the tube into which it is inserted it will operate effectively.

My invention consists in a tube-cleaner comprising novel features, as hereinafter particularly described, and pointed out in the claims, whereby I produce a device which combines the utmost simplicity with a high degree of efficiency.

In the accompanying drawings, Figure 1 is an exterior view of a cleaner embodying my invention. Fig. 2 is an axial section thereof; and Fig. 3 is an axial section of a cleaner of substantially the same construction as Fig. 2, but embodying a slight modification in the arrangement of the steam-pipe and handle.

Similar letters of reference designate corresponding parts in the several figures.

Referring first to Figs. 1 and 2, it will be seen that the device in itself is composed of a single casting, which comprises a suction-tube, A, a combining-chamber, B, and a forcing-tube, C. A steam-belt, D, which is formed by casting, surrounds the device, and may have connected with it a steam-inlet hose at the opening *d*. I have here represented a handle, E, which may be of wood, and which forms an axial extension of the device, inserted in the end of the suction-tube A and projecting rearward therefrom, and if the suction-tube is closed by such a handle it should be provided with side inlets or openings, *e*, for the free admission of air. The steam-belt D communicates with the interior of the device by a circular series of jet openings or apertures, *d'*, as represented in Fig. 2. Any suitable number of these jet-

openings may be employed, as experience may show to be desirable, and they are arranged equidistant about a circle. I prefer that the axes of the jet-openings *d'* should be in lines which fall within a circle coincident with the internal circumference and diameter of the forcing-tube at its smallest point, or, in other words, that the axes of these jet-openings should be upon the lines *s*, (shown in Fig. 2,) so that they may be formed by a drill introduced through the open forcing-tube C, the device being held at a proper angle meanwhile. Inasmuch as the jet-apertures *d'* are valveless and permanently open, they are substantially cylindric, and may be formed by a simple drill introduced through the end of the forcing-tube C. This arrangement of the jet-openings *d'* enables me to leave the outer wall of the steam-belt D imperforate, and to thus enable the device to be made with less labor. It will be observed that these jet-openings *d'* are unobstructed by any valves and permanently open, and they may be formed of such size and as numerous as experience may show to be desirable, and the passage of steam through them may be controlled solely by an ordinary stop-valve in the hose which supplies steam to the cleaner. The steam-jets *d'* meet in the center of the device, and by their action they induce the flow of air through the inlet-openings *e*, and this air combines with the steam and is delivered in a strong blast through the forcing-tube, which is introduced into the end of the boiler-tube to be cleaned. It will therefore be seen that the device constitutes a complete injector of air independent of the tube into which it is introduced or to which it is applied, and therefore the device will act effectively whatever be the diameter of the boiler-tube to which it is applied.

The cleaner shown in Fig. 3 does not differ materially from that above described, save that the steam-belt D is shown as of circular transverse section and has communicating with it a branch steam-pipe, F, parallel with the axis of the device, and to the branch *f* of this pipe a steam-hose may be applied. As here represented, the elbow *f'*, joining the steam-inlet F with its branch *f*, is of special construction, it having formed with it a



socket,  $f^2$ , which receives a handle, E, of wood. This elbow  $f'$  may be arranged at any suitable distance from the device, a proper length of pipe, F, being employed, and having a horizontal branch,  $f$ , for the adjustment of a steam-hose, it is adapted for cleaning tubes of vertical boilers.

It will be seen from the above description that I provide a cleaner of the simplest possible form and construction, which may be made and sold at a small price, and it will be effective whatever be the diameter of the boiler-tube to which it is applied.

In my Patent No. 282,074, granted July 31, 1883, I have shown a jet-exhauster intended for use in fixed position, and which in some respects resembles my present device. In that exhauster, however, the jet-openings are tapered from the steam-belt toward the combining-chamber, and are fitted with conical valves on stems which work through suitable stuffing-boxes in the outer wall of the belt. Owing to such tapered form of the jet-openings they could be formed only by making openings in the outer wall of the belt for the insertion of a drill, and in these latter openings are fitted plugs or bonnets and stuffing-boxes, through which work the valve-stems. In my present invention the jet apertures or openings  $d'$ , being valveless and permanently open, need not be tapered toward the combining-chamber, but are substantially cylindric, and hence can

be formed by a drill inserted through the open end of the forcing-tube. The jet-apertures being thus formed, the outer wall of the belt D is left imperforate and solid and the construction is greatly simplified.

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

1. The tube-cleaner herein described, consisting of a single casting comprising a suction-tube, A, a combining-chamber, B, and a forcing-tube, C, and having a surrounding steam-belt, D, the outer wall of which is solid and imperforate, and which communicates with the combining-chamber by a circular series of valveless and permanently-open jet-apertures,  $d'$ , of substantially cylindric bore, and having a handle, E, extending rearwardly beyond the suction-tube, substantially as herein described.

2. The tube-cleaner herein described, comprising the suction-tube A, with its side inlets,  $e$ , for air, the combining-chamber B, and the forcing-tube C, and having a steam-belt, D, communicating with its interior by the circular series of steam-jet openings  $d'$ , and a handle, E, inserted in the end of the suction-tube and projecting rearward therefrom, substantially as herein described.

PAUL H. GRIMM.

Witnesses:

FREDK. HAYNES,

HENRY J. McBRIDE.