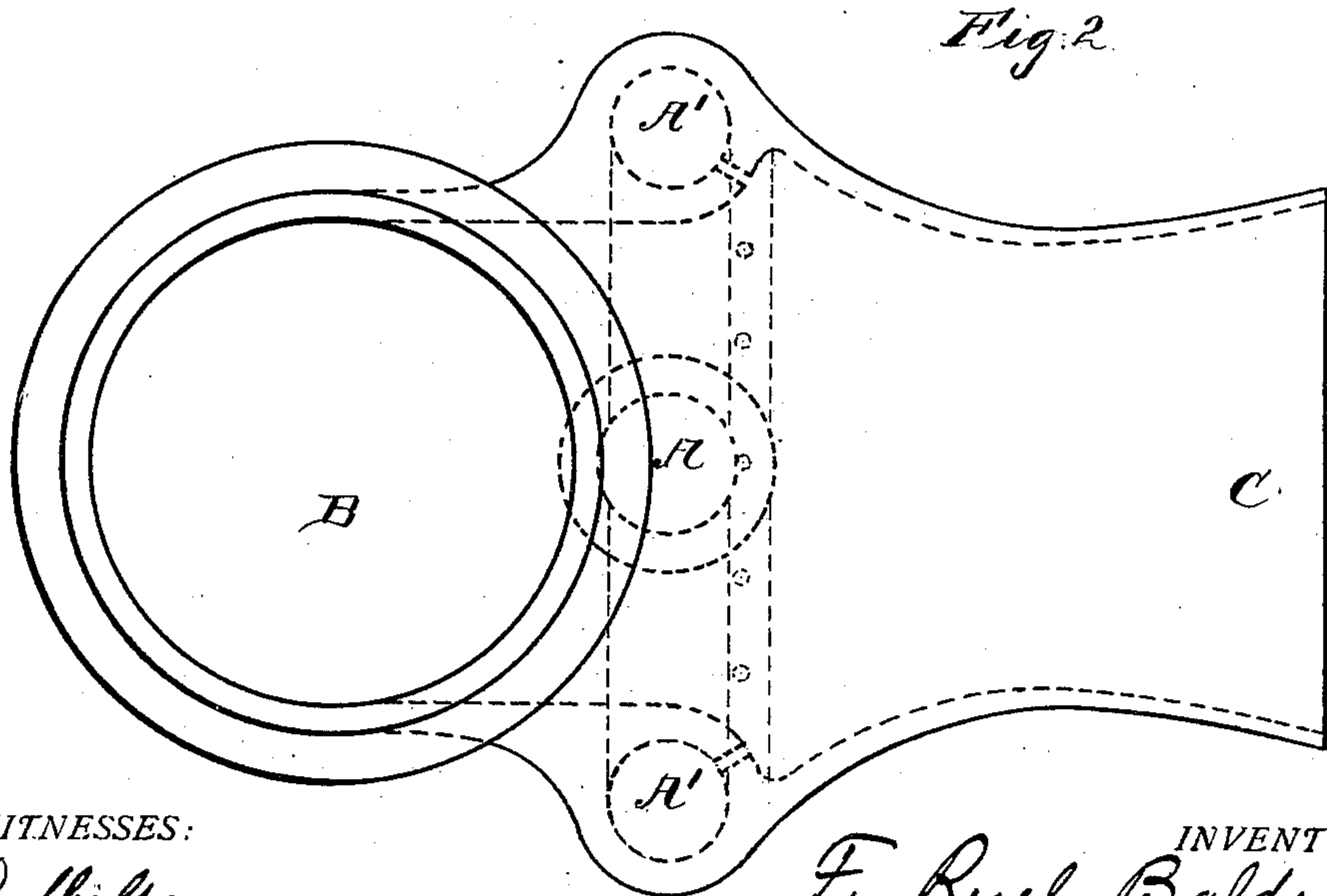
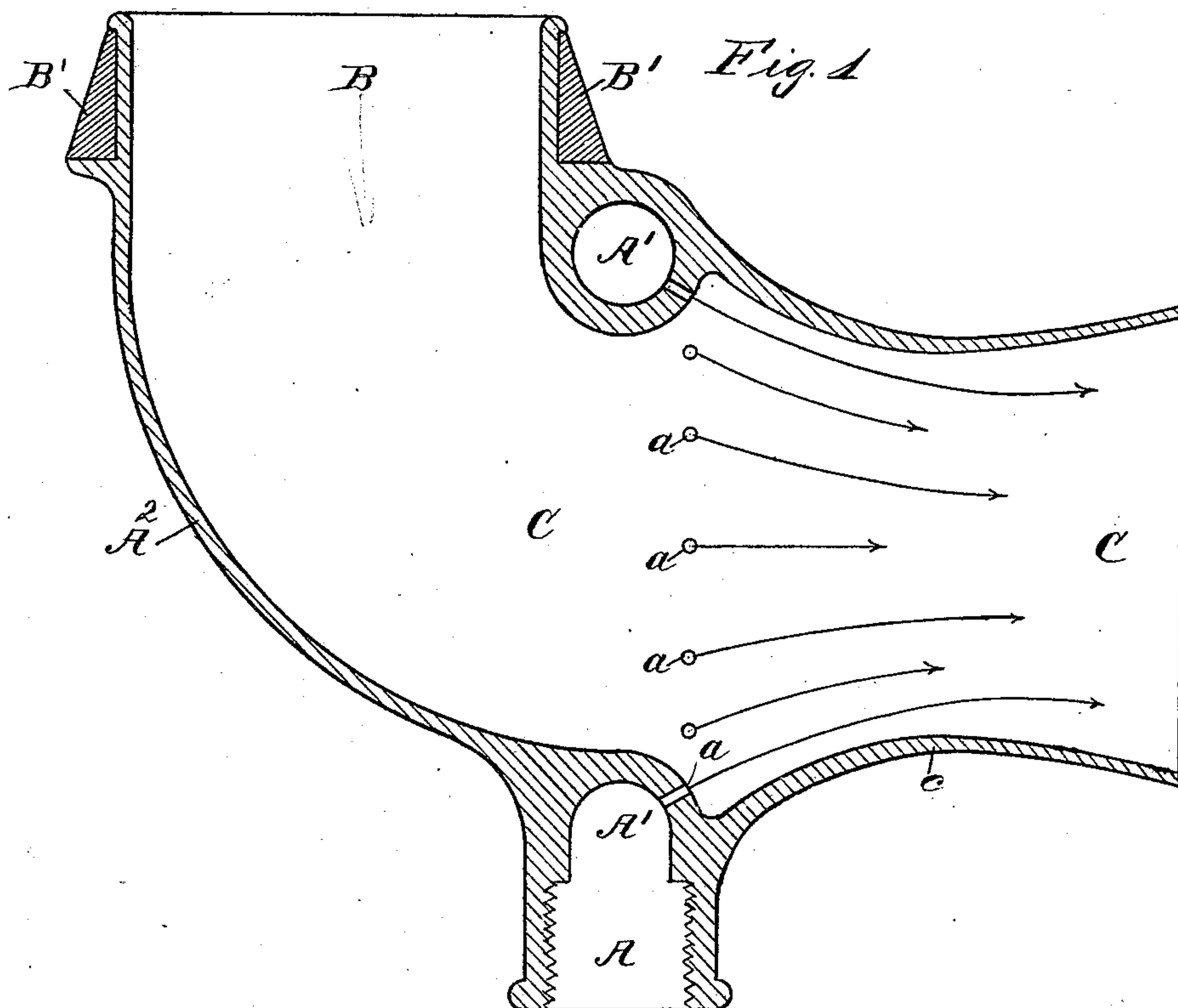


(No Model.)

F. R. BALDWIN.
VACUUM CLEANER.

No. 451,387.

Patented Apr. 28, 1891.



WITNESSES:

V. D. Wilson.

Wm. M. Fowler

INVENTOR

F. Ruel Baldwin

by J. O. Fowler
Atty -

UNITED STATES PATENT OFFICE.

FRANK RUEL BALDWIN, OF NEW YORK, N. Y.

VACUUM CLEANER.

SPECIFICATION forming part of Letters Patent No. 451,387, dated April 28, 1891.

Application filed August 4, 1890. Serial No. 360,903. (No model.)

To all whom it may concern:

Be it known that I, FRANK RUEL BALDWIN, a citizen of the United States, and a resident of New York, county and State of New York, have invented certain new and useful Improvements in Vacuum Boiler-Tube Cleaners, of which the following is a specification.

My invention relates to boiler-tube cleaners in which a current or currents of air or steam or combined steam and air are employed to draw, by means of a powerful blast passed through the same and the vacuum created thereby, a strong current of air through the boiler-tube to which it is applied into the appliance itself in order to remove from the boiler-flues the deposits which accumulate therein, and has for its object the provision of a device simple in construction, cheap in manufacture, and efficient in practical use.

To attain the desired end my invention consists in the construction and arrangement of parts hereinafter described and claimed.

In the drawings which form a part of this specification, Figure 1 represents a central vertical section, and Fig. 2 a front elevation, of an article constructed according to my invention.

Like letters of reference, wherever they occur, indicate corresponding parts in both the figures.

Referring again to the drawings, A represents the mouth or steam-inlet tube of my device, which connects with the combining and discharge chamber C, preferably by means of the belt or annular space A' and jet openings or apertures *a*, a continuous channel thus being practically formed through the appliance. Communicating with the combining and discharge chamber C is the suction tube B, which is free from any obstructions and of uniform size throughout, which is provided on its exterior surface with a preferably tapering annular flange B', adapted to fit varying sizes of tubes and ordinarily constructed of rubber or equivalent elastic material, in order that when the vacuum is formed within the device by means of a blast being passed through the same a tight joint will be formed between the suction-tube B and the boiler-flue to which it is applied, the action of the vacuum serving to closely draw the parts together.

My elastic flange is constructed of sufficient

width and taper in order to enable it to be held at an angle with or to enter and form a tight joint with different-sized boiler-tubes, thus increasing the efficiency of my device.

The suction-tube B is applied to the boiler-tube to be cleaned, and upon applying steam to the inlet A or forcing a strong current of air through the same a powerful blast passes through the appliance and is discharged at the mouth of the chamber C, which is ordinarily narrowed at *c* in order to create a greater velocity of the current. This current passes with such velocity through the device that a vacuum is established and a suction action is created which induces the air at the other end of the boiler-tube to rush through the tube into the vacuum and to carry all deposits, as soot, ashes, &c., along with it, which are all thereupon discharged through the chamber C, there being no collection of soot formed within the continuous channel of my device on account of the free passage formed thereby, in which there are no obstructions of any kind located, and all liability of clogging up of the same is thus prevented. The flues are thus cleaned throughout their entire length without the admission of steam into the tubes, which exercises such a deleterious action upon the same.

It is obvious that the inlet-tube may open directly into the chamber C, and may consist of a number of perforations *a*, placed so close together that they practically form a continuous narrow annular passage; but for ordinary use I prefer the construction herein shown.

My appliance may be applied to either end of the boiler-tubes, but preferably so as to draw in the direction of the chimney-draft, and is applicable to tubular boilers of all descriptions, whether horizontal or not.

The discharge-chamber C may conduct into the chimney and thence out into the atmosphere, or through a connection into any desired place.

On account of the fact of the annular steam-inlets *a* being of such small diameter, only a comparatively small steam-blast can be admitted thereby, and upon the hot gases being drawn through the flue-cleaner by means of the suction action of the steam the steam-forcing blast-jets being wire-drawn, as it were, are thoroughly dried by the hot gases,

on which account the soot, ashes, &c., being in no wise dampened, cannot stick to or become banked up upon the sides of the channel, and thus choke up the flue-cleaner and
5 destroy its efficiency.

Heretofore the current of steam or combined steam and air has ordinarily been forced from the injector through the boiler-tubes; but this method has proved objectionable on
10 account of the corrosion of the flues by the action of the steam; but I by means of my improved vacuum tube-cleaner force a strong current through the appliance, and on account of the vacuum thus formed the hot
15 gases in the connection at the other end of the boiler are drawn with great velocity through the boiler-tube by reason of the atmospheric pressure rushing into the vacuum, thereby carrying all the deposits through the
20 tube-cleaner and discharging the same, as and in the manner hereinbefore set forth. Besides, by the ordinary practice, the blast being against the chimney-draft, the dirt is blown from the flue being cleaned and be-
25 comes deposited into all the rest of the tubes, whereas by the use of my appliance the deposit of soot, ashes, &c., is drawn in the same direction as the chimney-draft, and consequently the deposits from any one tube can-
30 not return into any of the others.

As it is evident that many slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit and scope of my invention,

I would have it understood that I do not re- 35 strict myself to the particular construction and arrangement of parts shown and described, but that I reserve the right to make such changes, and

What I claim as new, and desire to secure 40 by Letters Patent, is—

A vacuum boiler-tube cleaner provided with an open continuous channel free from obstructions therein placed and consisting at one end of a horizontal suction-tube of practically uni- 45 form size throughout, provided with an annular elastic flange of sufficient width and taper to be held at an angle with and to enter and form a tight joint with different-sized tubes, the remaining portion of the chamber consist- 50 ing of a vertical combining and discharge chamber in connection with steam-jet openings of small diameter communicating therewith, whereby the hot gases and deposits in the flue are drawn through the flue-cleaner, 55 the steam-forcing jets being thereby dried and the whole driven with great velocity from the discharge-chamber, substantially as described.

In testimony of the foregoing specification 60 I do hereby sign the same, in the city of New York, county and State of New York, this 31st day of July, A. D. 1890.

F. RUEL BALDWIN.

Witnesses:

WM. M. V. FOWLER,
J. ODELL FOWLER, Jr.