

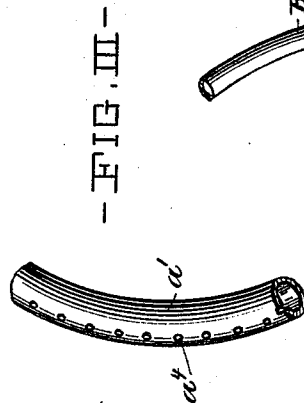
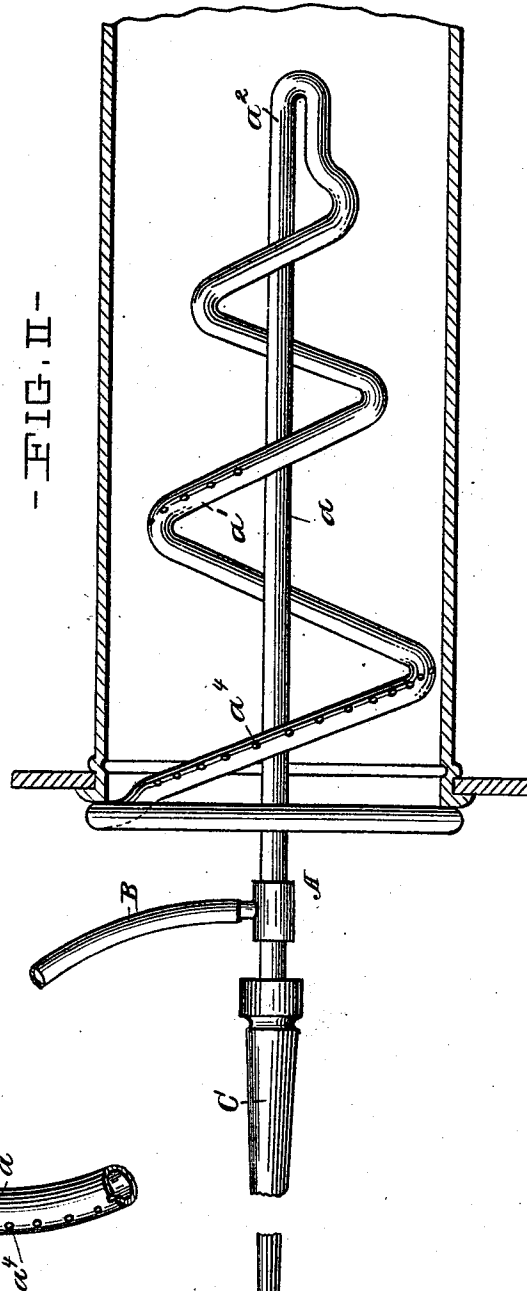
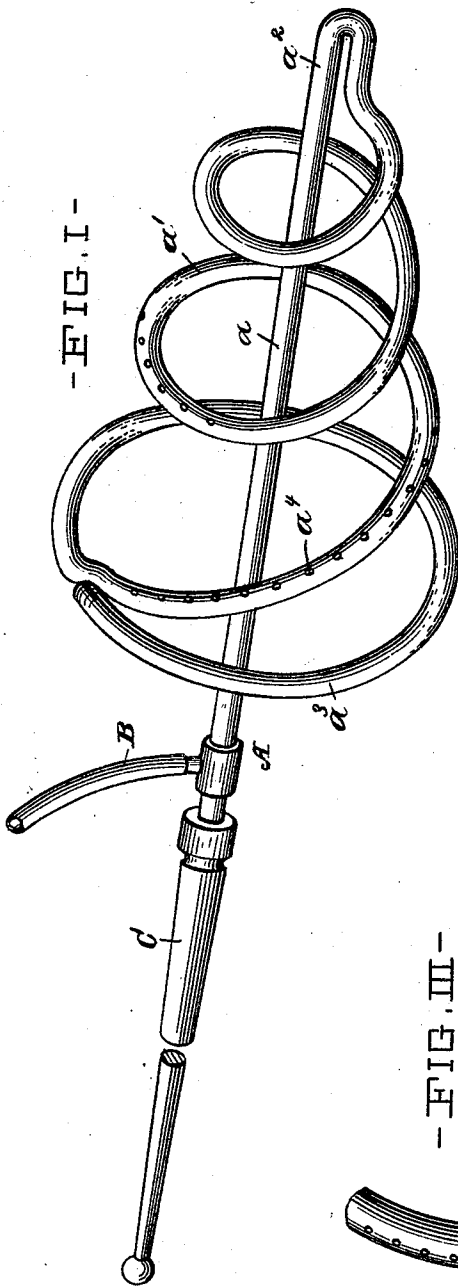
(No Model.)

2 Sheets—Sheet 1.

O. P. CLAY.
FLUE CLEANER.

No. 516,297.

Patented Mar. 13, 1894.



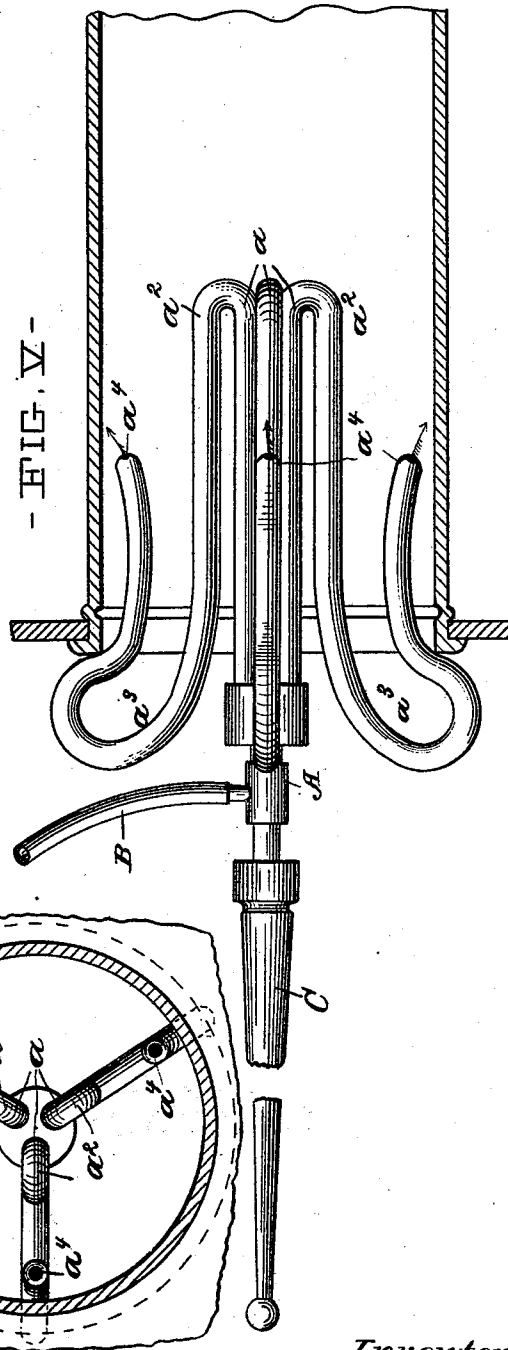
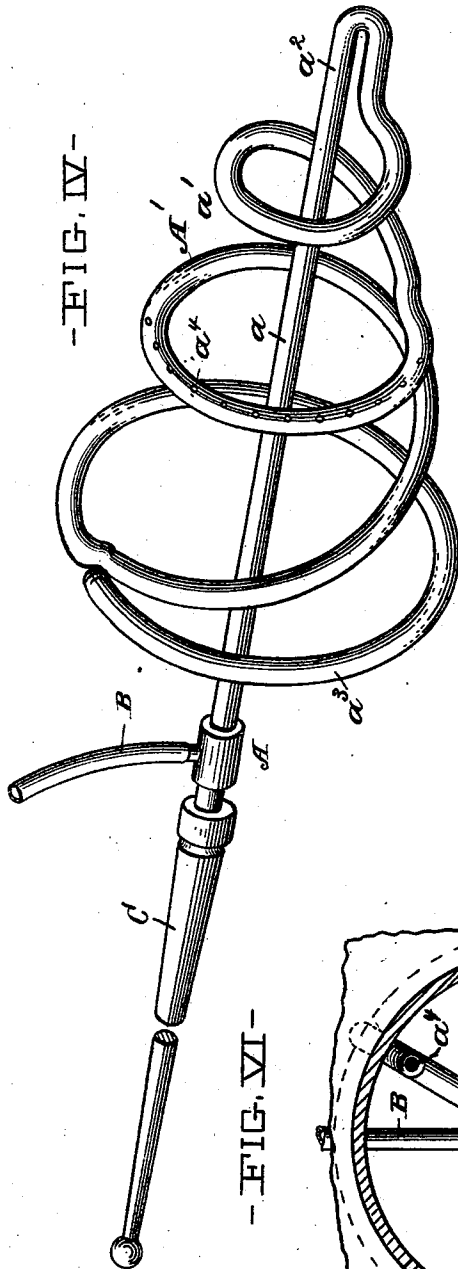
Witnesses,
J. C. Turner
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UNITED STATES PATENT OFFICE.

OLIVER P. CLAY, OF CLEVELAND, OHIO.

FLUE-CLEANER.

SPECIFICATION forming part of Letters Patent No. 516,297, dated March 13, 1894.

Application filed January 20, 1894. Serial No. 497,501. (No model.)

To all whom it may concern:

Be it known that I, OLIVER P. CLAY, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Flue-Cleaners, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail, certain mechanical forms embodying the invention; such detail constructions being illustrative of some of the various forms in which the principle of the invention may be used.

In said annexed drawings—Figure I represents a perspective view of my improved flue cleaner; Fig. II, a section of one end of a boiler flue, illustrating the cleaner in operative position in the same; Fig. III, a detail view of a portion of the perforated coil, illustrating the position of the perforations; Fig. IV, a perspective view of a slightly different form of coil in the cleaner; Fig. V, a section of one end of a boiler flue, illustrating another form embodying the principle of the cleaner, and Fig. VI, a transverse section of a boiler flue, looking toward the boiler head, and illustrating said last form of cleaner in end view.

Flue cleaners of the "blower" type, or constructed to remove the accumulated soot and ashes from the interior of boiler flues by the direct blowing action of the cleaning fluid under pressure, and in which steam is employed as the blowing medium, possess an objectionable property, which renders their employment less desirable than flue cleaners of the "sucker" type, in which the suction created by the cleaner draws the accumulated soot and ash particles out at that end of the flue to which the cleaner is applied. This said objectionable property of the "blower" type of flue cleaner consists in the moistening action of the steam upon the soot and ash particles, which is liable to cause the formation of pasty accumulations in the flues, which will attack the metal of the flues partly by direct chemical action of such soot paste, and partly by the more severe action of the heat and products of combustion upon the

coated places of the flue than upon the clean places of the same.

For the purpose of overcoming the above-mentioned objection, I provide means for superheating the steam within the cleaner, and for causing a current of air to flow through the flue together with the superheated steam,—the superheated steam and air loosening and removing the soot and ash particles and blowing them out at the ends of the flues into the smoke box. The superheating of the steam is accomplished by forming a return loop upon the pipe which conveys the steam, so that the steam may be heated in such loop by the heat within the flue, before escaping at the point or points near the end of the flue, where the steam begins its cleaning action.

The cleaner illustrated in Figs. I, II and III, consists of a pipe, A, bent and curved to form an axial pipe, *a*; a tapering spiral, *a'*, returning around the axial pipe and doubled upon the latter at the end to form a loop, *a''*; and an annular abutting pipe, *a'''*. The open end of the axial pipe has a flexible steam pipe, B, connected to it, either directly to its end, or by means of a suitable coupling. A handle, C, is also secured to the end of the axial pipe, so as to form a convenient means for holding and applying the cleaner. The spiral coil of the return portion of the doubled pipe, increases in diameter from the doubled end of the cleaner to the abutting ring *a'''*, which is formed by the last coil of the spiral pipe. The end of the spiral pipe is suitably closed, and the coil is preferably bent in such manner, at the point where it leaves the abutting ring and commences to form the spiral taper, that the abutting ring may bear perfectly true against the end of the flue, as particularly illustrated in Fig. II of the drawings. One turn of the spiral pipe, from the point of leaving the abutting ring to a point longitudinally opposite said point, is formed with a number of perforations, *a⁴*, which point forward or toward the doubled end of the pipe, with a slight outward inclination, as seen in the detail view, Fig. III. In practice, steam is admitted through the flexible steam pipe, from any suitable portion of the boiler, or from any other source of steam, and passes through the axial pipe to the forward end of the cleaner, where it again returns through

the loop and the forward portion of the spiral coil, until it arrives at the perforated portion of the spiral coil, where it will pass out through the perforations and be projected against the sides of the flue. The jets of steam will issue in a forward direction, as well as against the sides of the flue, so that they will remove the accumulated soot and ash particles from the flue, and blow them out through the opposite end of the flue. The steam will be superheated from the heat within the flue, as it passes through the axial pipe and is again returned through the loop and spiral, so that any moisture which may have passed over with the steam from the boiler, will be sufficiently dried to prevent the steam from forming pasty deposits with the soot. As the flues of a boiler are usually cleaned while the boiler is in operation or, at all events, before it has had time to cool, the interior of the flues will have a higher temperature than the steam generated within the boiler, and for this reason, the steam in the cleaner will be superheated by passing through the doubled loop of the latter, when the cleaner is inserted into a flue in the boiler. Besides the forward, and slightly outward inclination which the steam jets receive by the arrangement of the perforations in the spiral coil, the steam jets will also receive a forwardly whirling direction, on account of their issuing from the spiral coil. As the forward coils of the cleaner are of less diameter than the perforated coil, said forward coils will not in any manner interfere with the free forward passage of the steam jets. The forward rush of the steam within the flue will cause suction at the rear end of the cleaner, so that air will rush in at the end of the flue and, becoming heated within the same, will assist the action of the steam in cleaning out the flue and removing the soot and ash particles. This current of air will assist in making the cleaning action in the flue perfectly dry, as the current will serve to dry any moisture which might have escaped with the steam.

The cleaner illustrated in Fig. IV, is constructed exactly like the cleaner illustrated in the three preceding figures, with the exception that the perforated coil is formed annular instead of spiral, as indicated by A'. In this form the steam will issue in an annular series of jets, and in a forward and slightly outwardly inclined direction. Otherwise the construction and operation of the cleaner is exactly similar to the construction and operation of the previously described form.

In the form illustrated in Figs. V and VI, a number of doubled pipes is substituted for the one axial pipe. Said pipes perform, however, the same function as the axial pipe α , in the preceding forms, and are therefore let-

tered α ,—being arranged around the axis of the cleaner. The forward end of the cleaner forms a number of loops α^2 , instead of one loop, as in the preceding forms, and the pipes are again doubled forward to form abutting portions, α^3 , which may bear against the end of the flue, and forwardly projecting ends having openings α^4 , through which the jets of superheated steam may issue in a forwardly and outwardly inclined direction, exactly similar to the jets in the previously described forms. In this form of cleaner the steam will be superheated in the loops, and the current of steam, issuing from the perforations will create a current of air from the end of the flue in exactly the same manner as in the previously referred to form.

Other modes of applying the principle of my invention may be employed for the modes herein explained. Changes may therefore be made as regards the mechanisms thus disclosed, provided the principles of construction set forth, respectively in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. A flue cleaner having the passage for the actuating medium carried forward and then doubled back upon itself, and having an outlet for said doubled-back portion of the passage, substantially as set forth.

2. A flue cleaner having the passage for the actuating medium carried forward and then doubled back upon itself, and having an outlet at the rear portion of the doubled-back part of the passage, substantially as set forth.

3. A flue cleaner having an axial pipe doubled back at the forward end of the cleaner and formed into a tapering spiral, and having outlet in the rear portion of the spiral, substantially as set forth.

4. A flue cleaner having the passage for the actuating medium carried forward and then doubled back upon itself, having outlet for the doubled-back part of the passage, and having an inlet for air at the rear end of the cleaner, substantially as set forth.

5. A flue cleaner having the pipe for the actuating medium formed into an axial pipe, doubled upon itself to form a forwardly tapering spiral, having outlets in its rear portion for the length of one coil of the spiral, and formed into an annular abutting ring at the rear end of the cleaner, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 18th day of January, A. D. 1894.

OLIVER P. CLAY.

Witnesses:

WM. SECHER,
J. C. TURNER.