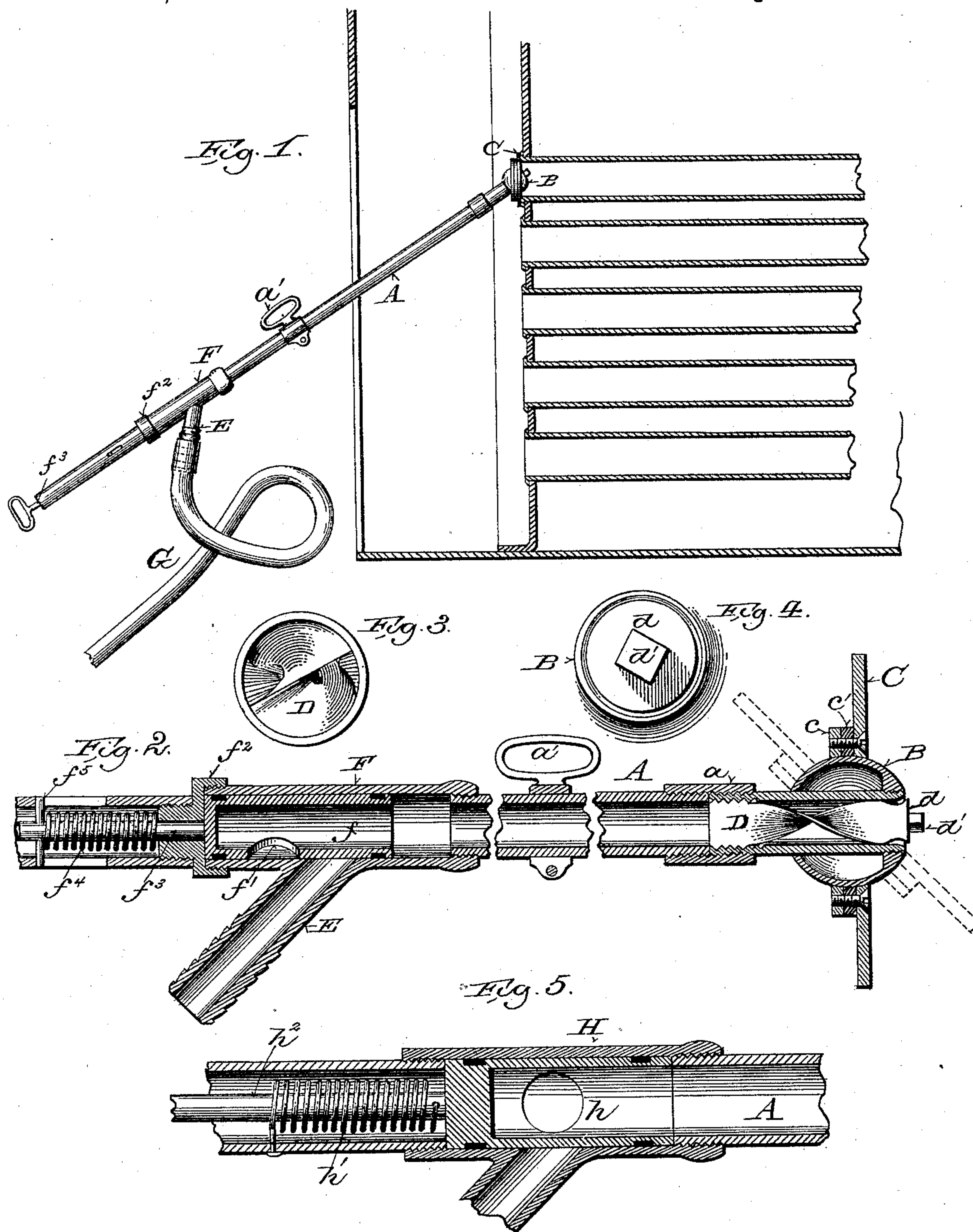


W. F. WHITNEY.
BOILER FLUE CLEANER.

No. 473,987.

Patented May 3, 1892.



Witnesses:
E. C. Amey
Chas. L. Gov.

Inventor:
William F. Whitney,
By Wm. H. Bondersmith & Arthur W. Valo
Attorneys.

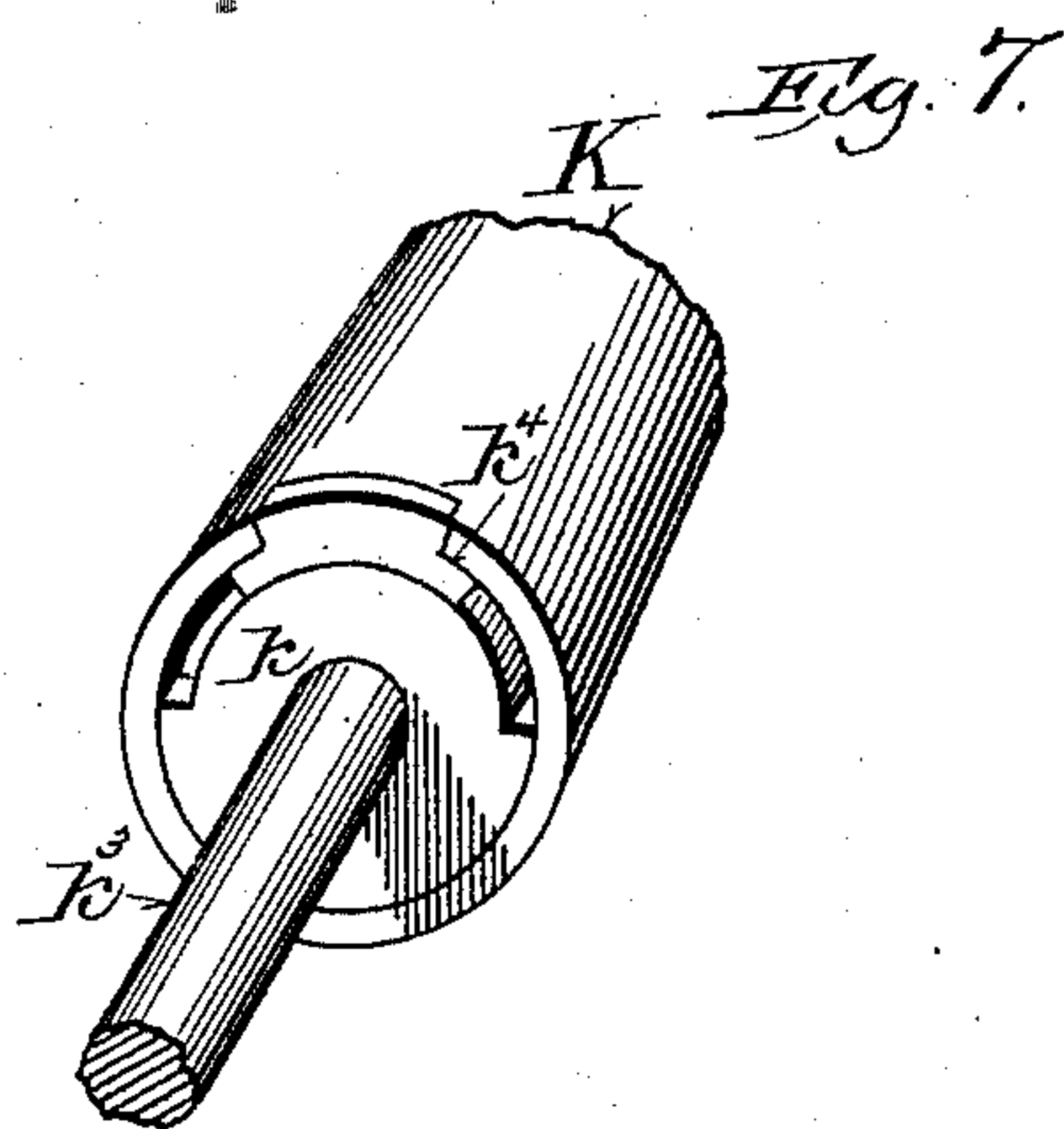
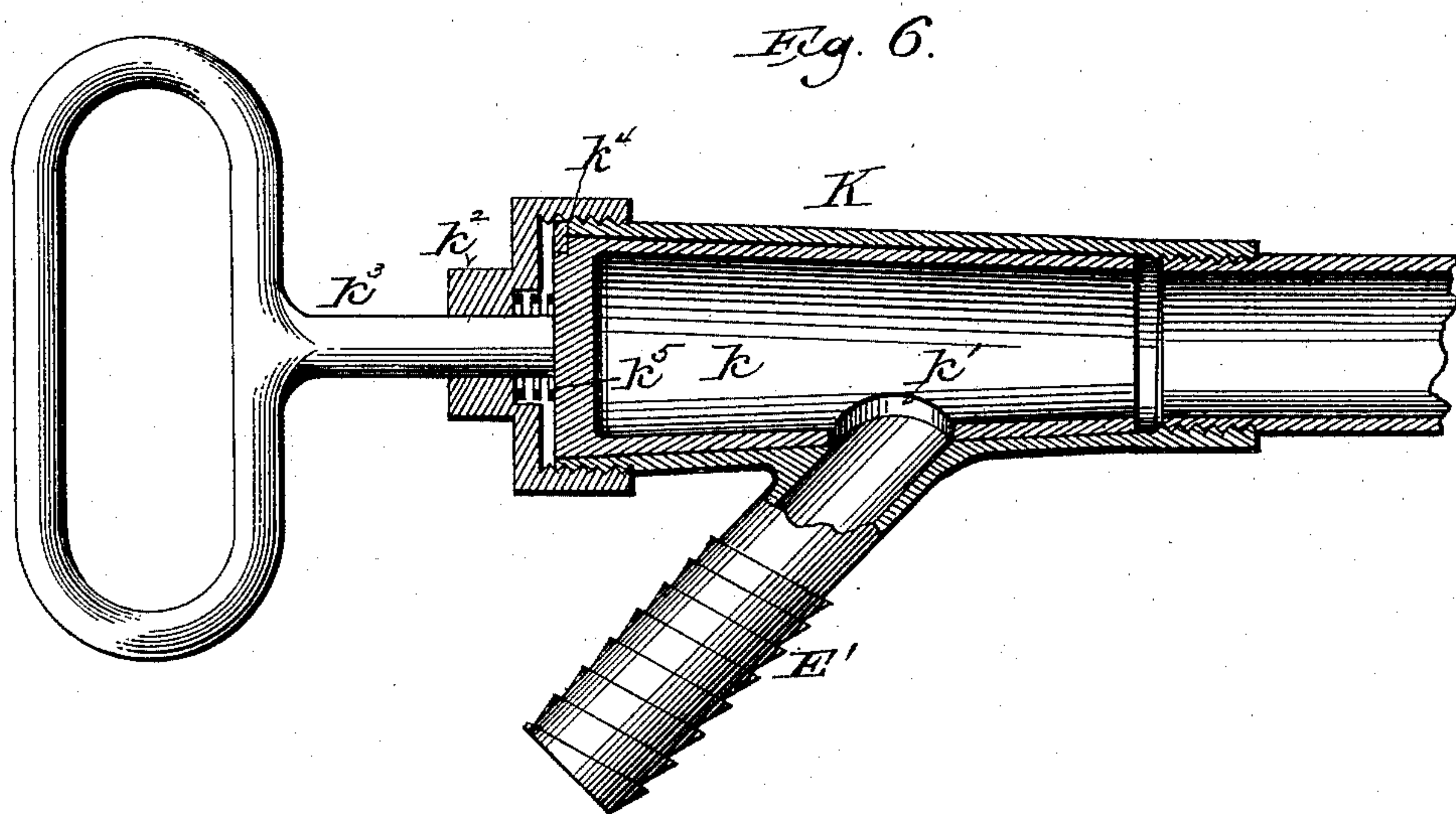
(No Model.)

2 Sheets—Sheet 2.

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By Wm. F. Hender Smith, Boston, Mass.
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM F. WHITNEY, OF WAUKESHA, WISCONSIN.

BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 473,987, dated May 3, 1892.

Application filed August 17, 1891. Serial No. 402,839. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. WHITNEY, of Waukesha, in the county of Waukesha and State of Wisconsin, have invented certain new and useful Improvements in Boiler-Flue Cleaners; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of flue-cleaners in which a jet of steam is employed to remove the soot and other impurities from the flues of a boiler.

It consists of certain peculiarities in the construction and arrangement of the parts composing the device, particularly of the device by which the outer end of the flue to be cleaned is closed, and of the device for imparting a spiral movement to the steam, hereinafter described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation of my improved device in connection with a vertical section of a portion of a boiler, illustrating the manner of holding the device in practical operation. Fig. 2 is a longitudinal section, on a greatly-enlarged scale, of the device. Fig. 3 is an end elevation of the helix by which a spiral movement is imparted to the steam. Fig. 4 is an end elevation of the discharge end of the device, showing the spreader. Fig. 5 is an axial section of a modified form of the valve for controlling the supply of steam to the flue-cleaner. Fig. 6 is a longitudinal view of the valve which I prefer to employ in my device; and Fig. 7 is an elevation of the larger end of the valve, the cap being removed to disclose the stop, by which the turning of the valve proper is limited in either direction at the desired point.

A represents a pipe or tube of any suitable dimensions for convenience of manipulation and to afford a conduit for the requisite supply of steam for effectually cleaning the flues of a boiler. It is provided at or near one end with a ball or spherical enlargement B, upon

which the face-plate C is mounted so as to adjust itself to the end of a flue at whatever angle the tube A may be held. This face-plate C may be conveniently secured upon the ball-bearing B by means of a ring or washer c, attached to said plate, with or without an interposed packing-ring c', as shown in Fig. 2. The apertures in the plate C and the ring or washer c are fitted to the spherical surface of the ball B, and constitute therewith a ball and socket or universal joint. The packing ring or gasket c' may be made of rubber, leather, or any other suitable material which will produce a tight joint with the ball B and prevent the egress of any soot or dirt in case back-pressure should occur in the boiler-flue, due to the stoppage or clogging of the flue or any other cause. It will be observed that when the discharge end of the tube A is presented to the open end of a flue, as shown in Fig. 1, and the face-plate C is pressed against the end of the flue it will find a bearing around the entire end of the flue, and thus effectually close the same at whatever angle the tube A may be held.

D is a helix or spiral division-plate inserted in the discharge end of the tube A. It is expanded laterally at its inner end into or provided with a spreader d, by which the steam as it escapes from the tube A is directed outwardly against the inside of the tube, a twisting or spiral movement having been imparted to the steam within the tube A before it reaches the spreader d. The helix or spiral division-plate D is screw-threaded inside of the tube A, so as to be adjusted longitudinally therein for the purpose of varying the area of the pressure or discharge-opening between the spreader d and the end of said tube, and it is provided at its protruding end with a squared head d' or other means by which it may be turned for the purpose of adjustment. To facilitate the insertion and threading of the helix D in tube A, the latter may be made in sections, which are joined by a sleeve or coupling a. At or near its opposite end the tube A is provided with a branch E, constituting the steam connection, and a valve F, by which the supply of steam is controlled. To the branch connection E is attached a hose G, by which the cleaner is connected with the boiler or any convenient steam-generator.

The branch E preferably joins the tube A, or valve-case constituting an extension thereof, at an acute angle, as shown, so as to afford as little impediment as possible to the force of the steam, and the device is constructed throughout with a view to presenting a free uninterrupted passage for the steam without abrupt turns or angles to deflect it in its course and thus diminish its force.

The valve F, as shown in Figs. 1 and 2, comprises a hollow cylinder f , fitted to slide longitudinally a limited distance within a cylindrical valve-case and constituting the valve proper. It is formed in one side with an aperture f' , corresponding and arranged to register with the opening in the branch steam connection E. The outer end of the valve-case is closed by a perforated screw-cap f^2 , through which the stem f^3 of the valve passes, a spring f^4 , placed over the stem f^3 , bearing at the ends against the cap f^2 , and a cross-pin or projection f^5 on the valve-stem moves and holds the valve normally in the position in which it is shown in Fig. 2, so as to cut off the steam from the tube A. The valve-stem is provided at its outer end, as shown in Fig. 1, with a suitable handle, which, with the handle a' on tube A, affords means for manipulating the flue-cleaner. I prefer to cover the valve-stem and spring by a shield, which may be conveniently formed of a tube threaded upon the cap f^2 of the valve-case, as shown in Fig. 2. The end of the tube A which is screwed into the valve-case and the cap f^2 constitute the stops by which the longitudinal movement of the valve f is arrested at the proper points for opening and closing the valve.

In Fig. 5, illustrating a modified form of valve, the cylindrical valve h is turned in its case instead of being moved lengthwise, to admit steam into or shut it out from the tube A. The cap at the outer end of the valve-case is also omitted, the valve h being held in place between the end of the tube A and the end of the tube h' , screwed into the opposite end of the valve-case, constituting a cover or guard for the valve-stem and spring. The spring h^2 in this case, being secured at one end in the valve-stem and at the other in the tube h' , operates by torsion to close the valve and hold the same normally in a closed position, as shown in the drawings.

When constructed in the cylindrical form, (shown in Figs. 2 and 5,) either to slide longitudinally or turn in the valve-case, either valve f or h may be provided at or near its end with annular packing-grooves, in which is inserted any suitable kind of packing to prevent leakage of steam through the outer end of the valve-case or into the tube A when the valve is closed.

Referring to Figs. 6 and 7, illustrating a simple and effective form and construction of valve which I prefer to use in my improved flue-cleaner, K represents a conical or frustum shaped valve-case formed or provided in

the manner hereinbefore specified, with a lateral branch E' for the steam connection. k represents a valve proper, accurately fitted to turn inside of the valve-case K and formed in one side with an aperture k' , arranged to register with the opening in the branch steam connection E'. k^2 is a screw-cap threaded upon the outer larger end of the valve-case, so as to close the same, and formed with a squared wrench-head for screwing it upon or off from the valve-case. The valve k has a stem k^3 , which projects outwardly through an opening in the cap k^2 , and is provided with a suitable handle, by means of which the valve is operated. For the purpose of arresting the movement of the valve k in either direction at the proper point for opening and closing the same I insert in a recess formed for its reception in the end of the valve-case K a segment-shaped block k^4 , which projects into a segmental recess formed in the end of valve k of sufficient length to permit of the necessary movement for opening and closing the valve. A spring k^5 , inserted between the end of valve k and the screw-cap k^2 , takes up any play between the valve and its case, and thus prevents leakage.

Various changes in the details of construction, particularly of the valve, may be made within the intended scope of my invention.

I claim—

1. In a boiler-flue cleaner, the combination of the steam-supply pipe provided with a face-plate at or near one end, having a universal-joint connection therewith, whereby said face-plate is adapted to bear against the end of a boiler-flue at whatever angle said steam-supply pipe may be held, substantially as and for the purposes set forth.

2. In a boiler-flue cleaner, the combination of a steam-supply pipe provided at or near its discharge end with a spherical bearing, and a face-plate provided with a socket adapted to said spherical bearing upon which it is mounted, substantially as and for the purposes set forth.

3. In a boiler-flue cleaner, the combination of a steam-supply pipe having a suitable connection for attachment to a boiler or steam-generator and a thin helical partition-plate inserted in said steam-supply pipe and dividing it diametrically into distinct spiral passages some distance from its discharging end, so as to impart within said pipe a positive spiral or twisting movement of the steam with little obstruction thereto, substantially as and for the purposes set forth.

4. In a boiler-flue cleaner, the combination of a steam-supply pipe, a helical partition-plate screw-threaded in said pipe and dividing the same diametrically into distinct spiral passages for a distance from its discharging end and provided adjacent to the discharge-aperture of said steam-supply pipe with a spreader, by which said aperture is closed, more or less, as desired, substantially as and for the purposes set forth.

5. In a boiler-flue cleaner, the combination of a steam-supply pipe, a helical partition-plate screw-threaded in said pipe and provided at its exposed end with a spreader and means for turning the same, whereby said partition-plate and spreader are screwed in or out to diminish or increase the size of the discharge-aperture, said partition-plate dividing said pipe diametrically into distinct spiral passages some distance from its discharging end, substantially as and for the purposes set forth.

6. In a boiler-flue cleaner, the combination of a steam-supply pipe, a branch steam connection entering the same at an acute angle, a valve controlling the supply of steam to said pipe, and a face-plate having a universal-joint connection with said pipe and adapted to close the end of a flue, against which it is held at whatever angle the supply-pipe may be placed, substantially as and for the purposes set forth.

7. In a boiler-flue cleaner, the combination of a steam-supply pipe serving as a handle for the manipulation of the cleaner, a steam connection joining said pipe at an acute angle, a valve for controlling the supply of steam to the cleaner, a face-plate having a universal-joint connection with said pipe at or near its discharging end, and a helical partition-plate inserted in said pipe and provided adjacent to the discharge-aperture of said pipe with a spreader, said plate and spreader being longitudinally adjustable to vary the size of the aperture through which steam is admitted into the boiler-flue, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM F. WHITNEY.

Witnesses:

CHAS. L. GOSS,
F. C. BUDD.