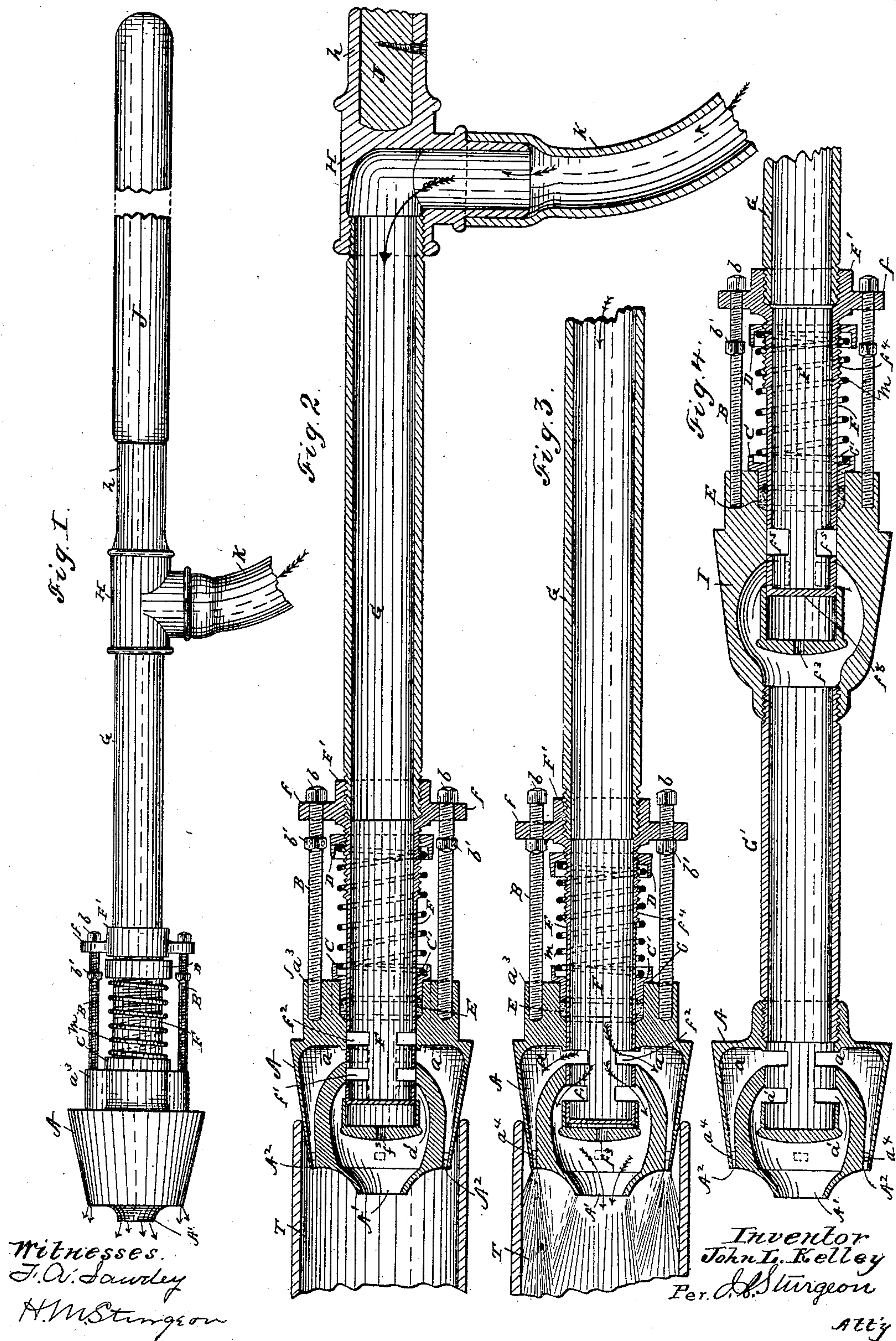


2 Sheets—Sheet 1.

No. 335,820.

Patented Feb. 9, 1886.



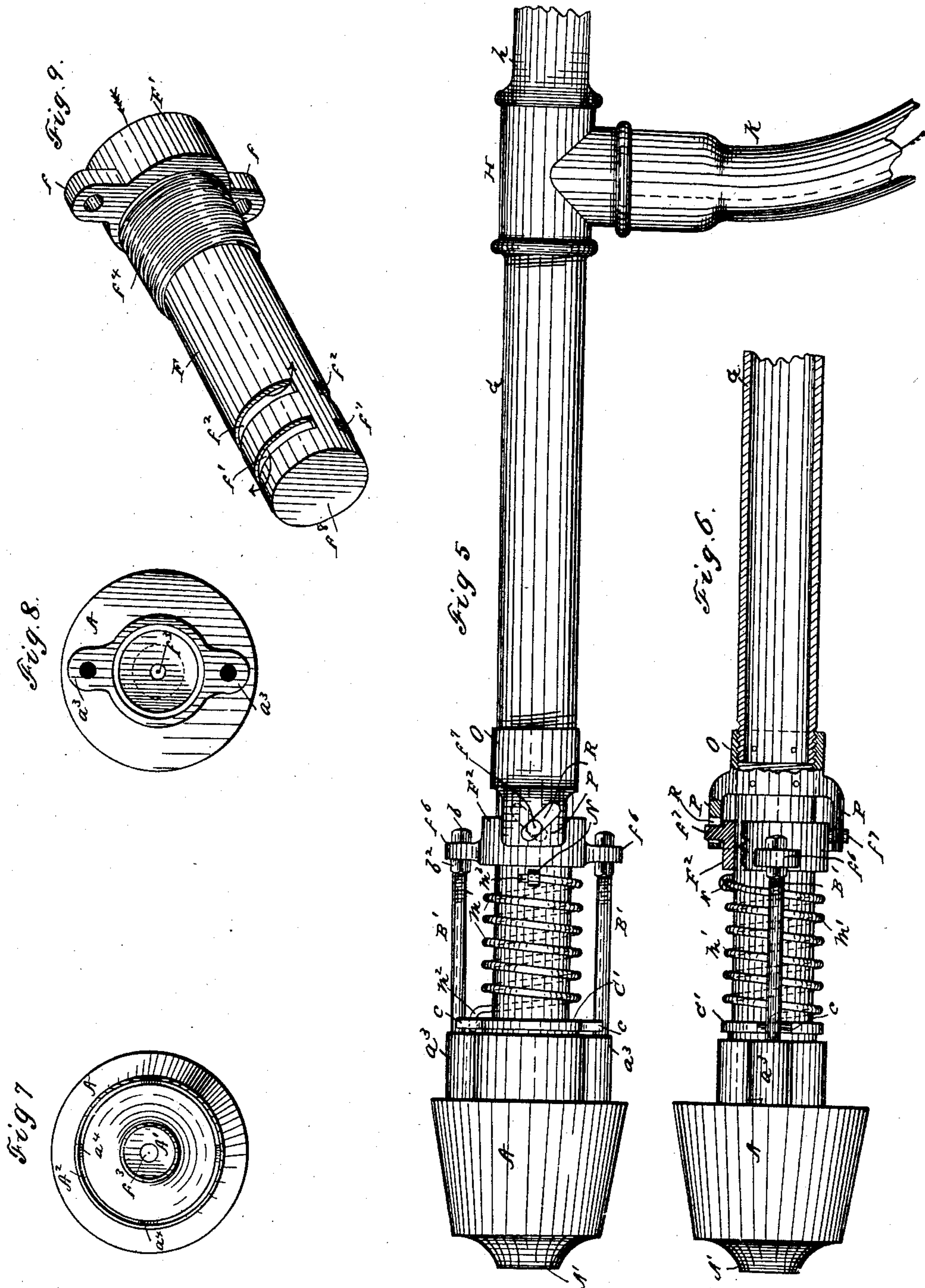
(No Model.)

2 Sheets—Sheet 2.

J. L. KELLEY.
BOILER FLUE CLEANER.

No. 335,820.

Patented Feb. 9, 1886.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN L. KELLEY, OF ERIE, PENNSYLVANIA.

BOILER-FLUE CLEANER.

SPECIFICATION forming part of Letters Patent No. 335,820, dated February 9, 1886.

Application filed March 30, 1885. Serial No. 160,681. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. KELLEY, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Flue Cleaners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention relates to boiler-flue cleaners; and it consists in the improvements herein-after set forth and explained.

In the accompanying drawings, Figure 1 is a view in elevation of my improved boiler-flue cleaner. Fig. 2 is a longitudinal section through the center of the same, showing the steam-valve therein closed. Fig. 3 is a longitudinal section of the same, showing the valve therein open and the form of the steam-jets thrown into the boiler-flue. Fig. 4 shows an alternate form of the construction of my improved boiler-flue cleaner. Figs. 5 and 6 show another alternate form of the construction of my improved boiler-flue cleaner. Fig. 7 is a front end view of the conical head of my improved flue-cleaner, showing the annular and central jet-opening therein. Fig. 8 is a back end view of the conical head with the valve-section removed. Fig. 9 is a perspective view of the hollow stem or valve section which operates in the conical head of my improved flue-cleaner.

In the construction of my improved boiler-flue cleaner A is a conical head adapted to fit into the end of a boiler-flue, T, substantially as illustrated in Figs. 2 and 3. I preferably construct this head A with a central opening, A', and an annular opening, A², the central, A', communicating with a central chamber, a', and the annular, A², with an annular chamber, a a, (a front end view of the head showing these openings being illustrated in Fig. 7.) From the back side of the head A a hole is bored into the central chamber, a', of sufficient size to form a seat for the hollow stem or valve F, which fits therein, so as to form a steam-tight joint therewith, this opening for the stem

F cutting the annular chamber a a and the central chamber, a', substantially as shown in Figs. 2 and 3. This hollow stem or valve F is provided near its lower end with openings or ports f' f², and fits into the opening above described in the back of the head A, and moves telescopically therein, so that when it is in the position shown in Fig. 2 the openings or ports f' f² are opposite solid parts of the inside of the conical head A, and thereby closed, so that no steam can escape from the hollow stem F, either into the annular chamber a a or into the central chamber, a'. When, however, it is pushed into the head A until it is in the position shown in Fig. 3, and the openings or ports f' f² are opposite the openings into the annular chamber a a and the central chamber, a', steam will pass freely into the chambers a a and a', and thence into the boiler-flue through the central opening, A', and the annular opening A² in the head A. There is also a vent-hole, f³, bored into the bottom of the seat to relieve the lower end of the valve F from any obstruction which might be occasioned by air or steam being compressed between the lower end of the valve F and the bottom of the valve-seat in the head A. The back end of the conical head A is provided with a collar or projection having lugs a³ a³ thereon, into which are screwed rods B B. The end of this collar is also bored out, so as to receive packing E and the gland C. This gland C is chambered out at C' to receive the lower end of the spiral spring m, as shown in Figs. 2 and 3. The upper end of the hollow stem or valve F is provided with a cross-bar, f f, having holes therein adapted to receive the upper ends of the rods B B, and also with an enlarged end or screw-thimble, F', adapted to receive the end of the pipe G, which serves the purpose hereinafter described. The hollow stem is also further provided with a screw-thread, f⁴, below the cross-bar f f, adapted to receive a screw-collar, D. (See the perspective view of the valve or stem F, Fig. 9.) This collar is chambered out to receive and retain the upper end of the spiral spring m, the object of this screw-thread f⁴ being to enable the collar D to be screwed down, and thereby increase the tension of the spring m when desired. The rods B B are

screw-threaded, and each provided with two nuts, one, b' , below the cross-bar ff , and another, b , above the cross-bar ff . These nuts $b b'$ are adapted to be adjusted up and down on the rods $B B$, thereby regulating the movement of the hollow valve or stem F in the head A , the hollow stem F operating as a valve and the head A as its valve-seat, and when the hollow stem or valve F is moved in the head A into the position shown in Figs. 3 and 4 the valve is fully open and will admit the largest possible volume of steam to the chambers $a a$ and a' , and thence to jet-openings in the head A , which is desirable when the flue-cleaner is used in a long boiler. When, however, it is used in a short boiler, less steam is required, and the valve does not require to be opened to its full capacity, and by screwing up the nuts $b' b'$ on the rods $B B$ the movement of the valve is adjusted so that the stem or valve F will move in the head A but a short distance, and consequently but slightly open the ports $f' f^2$.

Attached to the collar F on the upper end of the stem F is a tube, G , which may be of any convenient length, preferably having about three feet. On the upper end of the pipe G is screwed a section constructed in the form of a T , one end of the T , however, being closed, so that the steam-passage is in the form of an elbow, the other arm of the T being provided with an extension, h , to receive a handle, J .

On the arm of the T , extending at right angles to the line of the pipe G and handle J , a hose, K , may be attached communicating with any convenient steam-supply.

To operate this device it is simply necessary to connect the hose K to the steam-supply, the spring m operating to keep the valve-stem F in the position shown in Fig. 2, and the ports $f' f^2$ closed, so that no steam will pass through them. The operator, on inserting the conical head A into the end of a boiler flue or tube, applies sufficient pressure thereto, by means of the handle J , to overcome the resistance of the spring m , by which the stem or valve F is thrust into the head A until the ports $f' f^2$ thereof are opposite the chambers $a a$ and a' in the head A , whereby the steam has free passage from the hollow stem or valve F into the chambers $a a$ and a' , and therefrom into the boiler-flue, by the annular jet A^2 and the central jet, A' , both of which jets being projected, as illustrated in Fig. 3, into the boiler-tube, preferably under boiler-pressure, the flue is thoroughly cleaned thereby. On the removal of the pressure the valve or stem F automatically closes by resuming its normal position, as shown in Fig. 2.

In Fig. 4 I have shown an alternate form of construction, the valve mechanism being removed from the conical head A and placed in an auxiliary chamber, I . In this construction, however, the stem or valve F is provided with but one port, f^3 , opening into the chamber I .

This chamber I is connected to the conical head A by means of a short connecting-pipe, G' , which is screwed into a collar on the back of the head A , and into the front end of the chamber I . This form of my device is constructed in all respects, except as hereinbefore referred to, the same as that shown in Figs. 1, 2, and 3, and is operated in the same manner as hereinbefore described.

Figs. 5 and 6 show another alternate form of construction of my improved flue-cleaner. In these forms of construction, however, the valve F , instead of operating telescopically in the head A , operates by turning diagonally in the head A , and in this manner opening the ports $f' f^2$, which are automatically closed, when not in use, by the spring m' , which operates to automatically turn the valve F back until the ports are closed, this being its normal position when not in use.

These modifications of the construction are shown to illustrate some of the different methods of utilizing my improvement in flue-cleaners.

I am aware that flue-cleaners having hollow stems and conical heads have heretofore been used; but I am not aware of any such flue-cleaner having been constructed to project both annular and central jets of steam into a boiler-tube for cleaning the same. Neither am I aware of any construction of steam-boiler-flue cleaners in which the head of the same is loosely mounted upon the hollow stem, so that the head and stem operate together as a valve for automatically shutting off the steam when the flue-cleaner is not in use.

I am aware of the patent of Crockers, No. 309,377, dated December 16, 1884. In this case, however, there is no central steam-jet, and but one set of ports is shown. In this respect that device differs very materially from the one I have shown and described both in its operation and effect.

I am also aware of several other patents on improvements in flue-cleaners; but in all the cases where the valve is in the head of the flue-cleaner the pressure of the steam is utilized to keep the valve closed, which is a very serious defect in their construction, as the back-pressure of the action of the steam in a boiler-flue, together with the pressure required to open the valve against the steam-pressure, requires the exercise of so much strength that it renders flue-cleaners constructed in this manner so difficult of operation as to be practically useless. These defects I entirely overcome, and at the same time, by using both central and annular jets, I secure the best possible results from the steam used.

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

1. In a boiler-flue cleaner, the combination, with the conical head A , constructed with an annular chamber, a , and a central chamber, a' , substantially as shown, of the hollow valve

F, provided with double ports f' and f^2 in the sides thereof, substantially as and for the purpose set forth.

2. In a boiler-flue cleaner, the combination,
5 with the movable conical head A, provided with the rods B B, of the steam-pipe F, having openings or ports $f' f^2$ therein, and thimble F' and arms $f f$ thereon, and the spiral spring m , substantially as and for the purpose
10 set forth.

3. In a boiler-flue cleaner, the combination, with the movable conical head A, provided with the rods B B and their adjusting-nuts b

b' , of the steam-pipe F, provided with openings or ports $f' f^2$, and screw-thread f^4 , thimble F', and arms $f f$ thereon, the packing E, gland C, spiral spring m , adjusting-collar D, steam-supply pipe G, elbow H, hose K, and handle J, all operating substantially as and for the purpose set forth. 15

In testimony whereof I affix my signature in presence of two witnesses. 20

JOHN L. KELLEY.

Witnesses:

T. J. BASSETT,

H. M. STURGEON.