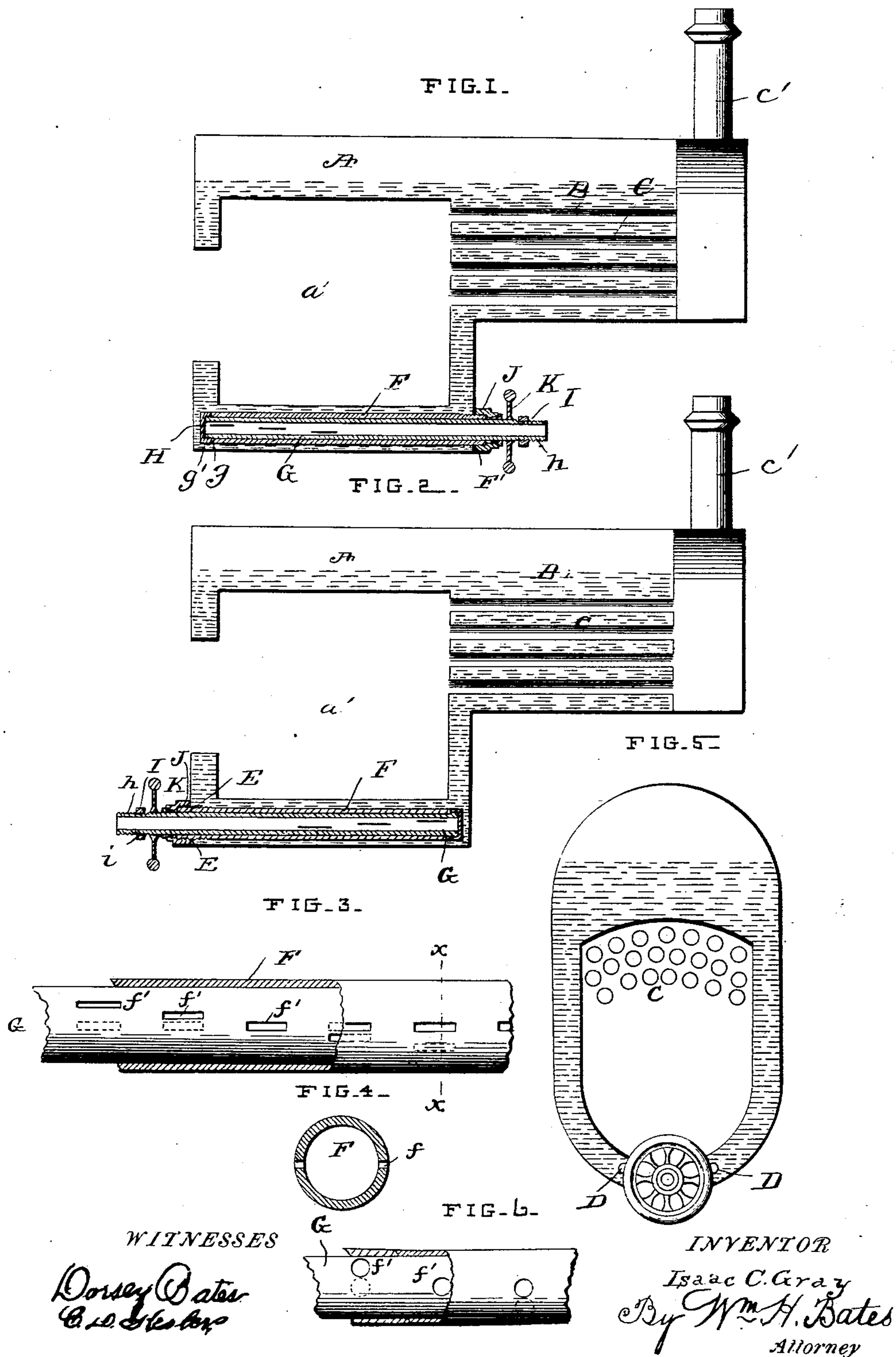


(No Model.)

I. C. GRAY.
BOILER CLEANER.

No. 541,272.

Patented June 18, 1895.



UNITED STATES PATENT OFFICE.

ISAAC C. GRAY, OF ILION, ASSIGNOR OF ONE-HALF TO ELI SHIVELY, OF
ETNA GREEN, INDIANA.

BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 541,272, dated June 18, 1895.

Application filed March 15, 1895. Serial No. 541,914. (No model.)

To all whom it may concern:

Be it known that I, ISAAC C. GRAY, a citizen of the United States, residing at Ilion, in the county of Marshall and State of Indiana, have invented certain new and useful Improvements in Cleaners for Steam-Boiler Furnaces; and I do 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, which form a part of this specification.

My invention relates to improvements in cleaners for steam boiler furnaces; and it has for its object to thoroughly and expeditiously clean out automatically the accumulation of mud and sediment usually deposited in the bottom of the boiler furnace, and which I do through the medium of a stationary outer pipe, having a line or row of perforations at each side thereof, of equal size and distances apart; and a movable inner pipe having a corresponding number of perforations or slots as are contained in one row or line of the former pipe, and which are disposed at the same distances apart, and of the same size as those in the outer pipe to register with the perforations in said outer pipe, but this series of perforations in the movable pipe are out of straight line but upon relatively different planes to each other, and in substantially a spiral course on this movable pipe, and this movable pipe is telescoped within the outer pipe, and so adjusted within the outer pipe that the perforations formed in both pipes will register with each other successively one at a time upon either side of the outer pipe when turned by means of a hand-wheel in a direction transversely to the pipes; the cleaning being effected by the agency of a strong pressure of water and steam passed through these coinciding slots or perforations in each of the pipes, thus thoroughly removing the deposits from the bottom of the boiler furnace upon both sides of the pipes whence they are blown out of said furnace into the pipes through such holes and thence out of the pipes at the discharge end of the inner pipe.

With these ends in view, the invention consists in the novel construction and arrangement of parts, as will be hereinafter more in detail described, and particularly pointed out in the claim.

In the accompanying drawings, to which reference is had and which fully illustrate my invention, Figure 1 is a longitudinal section of a furnace and boiler embodying my improvements. Fig. 2 is a similar view with my invention applied to the rear of the furnace and boiler. Fig. 3 is a detail view, partly shown in section, of the pipes. Fig. 4 is a cross-section through the lines xx of Fig. 3. Fig. 5 is a front elevation of furnace and boiler, partly in section; and Fig. 6 is a similar view of Fig. 3, showing holes instead of slots in pipes.

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

Referring to the drawings, A, designates the boiler furnace, of which the boiler B, forms a part thereof, and a' the fire chamber.

C, designates the boiler tubes, and C' , the smoke stack, for carrying off the products of combustion.

In the lower part and forward end of the boiler furnace are formed openings D, D, provided with wooden plugs, which are removable to clean out the furnace in the ordinary manner. Centrally between these openings D, D, is formed another opening E. At this opening the operator taps in the usual way the boiler furnace, and puts on a cam-globe valve for the purpose of blowing out the mud, &c., but when the boiler furnace is cleaned in such manner it never gets the mud, sediment, and water out entirely, but only that portion that lies right adjoining the cleaning holes. That portion of the deposits lying back on the bottom of the boiler furnace is undisturbed, in this old mode of cleaning, until the two side holes or openings are opened, and the mud scraped out. To overcome this and other objections, is the purpose of my invention.

The above construction of furnace and boiler connection just described, and the manner of removing the deposits therefrom, being of the well known and usual construction form no part of my invention, but are

herein described as one of the many types of boiler furnaces to which my invention is applicable.

F, designates an outer pipe screwed fast or otherwise by any suitable means to, and located longitudinally and centrally within the bottom of the boiler furnace, between the fire and outer furnace sheets, running the full length of the same. Each side of this pipe is provided with a series or line of perforations or slots of equal size, and are at equal distances apart, and diametrically opposite to each other, as clearly shown in Figs. 3, 4, and 6, of the drawings.

G, designates a pipe which is snugly but loosely telescoped within the outer pipe F, so as to be capable of turning therein, and which is somewhat longer than the outer pipe F, and is projected through and beyond both ends of the same, and it is also projected through the central cleaning opening F', in the lower and rear end of the boiler furnace, as shown in Fig. 1, of the drawings.

Although I have shown the pipes projected beyond, and in rear of the furnace wall in Fig. 1, it is evident that this arrangement of pipes may be reversed, and the same may be projected beyond the furnace wall in the forward end of same, as shown in Fig. 2. The forward end of the inner or movable pipe is screw-threaded as at g, to engage with corresponding screw-threads upon the inner side of a cap H. The object of this cap is to close their ends and prevent water from getting in the pipes at this point. This movable pipe has also a series of perforations or slots f', formed therein of the same size and number, and the same distance apart, as those formed in one row of the outer pipe, but they are arranged in slightly different planes, and in a spiral or substantially spiral course as shown in Figs. 3, and 6, of the drawings; so that the movable or inner tube or pipe may be moved upon the outer pipe. In the normal position of the pipes the openings or slots are closed, but preferably those required to be opened are opened coincidently step by step or successively as the pipe is turned. Upon the longest extended end of this movable pipe, are cut screw-threads h, upon which a nut I, is secured, and combined with this nut, is a stuffing-box, J, which prevents leakage between the two pipes at this end. A hand-wheel K, is secured upon this end of the movable pipe for the purpose of turning the same. This wheel is made to run or be pushed on the pipe by the nut I. By this means I am enabled to adjust the stuffing-box J, as desired, and as before stated prevent leakage of the pipes.

Although in Figs. 3, and 6, I have shown but one series of openings or slots arranged in a course spirally or substantially spirally in the inner or movable pipe, it is quite evident if so desired another series of openings or slots similar to those just mentioned can be formed in the inner or movable pipe, at an

angle to the first series of openings, by which means in turning the pipe for one series of openings to register coincidently with one line of openings in the outer pipe, the other series of openings in the movable pipe will coincidently register with the other or opposite line of openings in the outer pipe; so that the operator having turned the wheel to register with the openings in one side of the outer pipe step by step, or successively, he can then at the same time register with the holes in the opposite side of the outer pipe, and when the pipes are so registered it allows the full force of steam and water to drive the mud and sediment through each opening formed coincidently in both pipes and step by step, or successively, and thus clean the bottom of the boiler furnace along one side of the pipes to one end thereof, and then clean the opposite side to the opposite end of the pipes.

From the foregoing description, taken in connection with the accompanying drawings, the operation of my device will be obvious, but may herein be briefly stated as follows: The hand-wheel being turned, it turns the inner pipe, until the first opening near the end of said pipe registers with the first opening in the stationary or outer pipe. Then the water by means of the steam pressure thereon, drives the mud and sediment through these coinciding openings, and forces them out at the outer end or discharge end of the inner pipe. By giving the inner pipe another turn, these openings or holes are quickly closed, and the next holes or openings in the pipes are opened. By other similar turns, each pair of coinciding holes in the pipes are similarly brought into action by the wheel, and so on until the bottom of the boiler furnace is completely cleaned all along one side of the pipe or furnace. Then by turning the inner pipe again as may be requisite, the holes on the opposite side of the outer pipe, may be, one by one, brought into unison or coincidence with those of the inner pipe, and thus as before stated, the cleaning action takes place similarly on the opposite side of the pipes, but commencing with the last holes and ending with the first ones.

With my invention it will be seen that there is not any stopping in order to clean out the boiler; but the cleaning is always done while the fire is in the furnace, and while the steam is on, and it is done automatically after merely turning the tubes to bring two holes at a time into coincidence.

After the cleaning operation a little farther turn of the wheel closes the openings on both sides of the pipes.

Having thus described my invention and explained the operation thereof, what I claim, and desire to secure by Letters Patent, is—

In a steam boiler cleaner, the outer pipe located in the bottom of the boiler furnace having a line or series of openings formed longitudinally and diametrically opposite each other on opposite sides thereof and on a hori-

zontal plane the full length of the same, an
inner rotatable pipe located or telescoped
within the outer pipe and having a series of
openings running spirally or in a substan-
5 tially spirally course upon one side, the open-
ings being of different planes relatively to
each other, in combination with the stuffing
box secured upon one end of the pipes and
hand wheel and nut secured upon the same
10 end of the inner pipe, and a cap detachably

secured upon the inner pipe and inclosing the
opposite end of the pipes substantially as de-
scribed and for the purposes set forth.

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

ISAAC C. GRAY.

Witnesses:

ORANGE RITTER,
WM. D. YAISER.